

Historic art exhibitions and modern day auction results

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May 27, 2015

Abstract

This paper uses historic art exhibitions in order to investigate the impact of the contemporary success of artistic careers on today's auction prices of modern paintings. That is, if an artist's work was displayed in a historic art exhibition in a given year, paintings dated from this year fetch higher prices at auction today. This can be attributed to two effects: artists who participated in such shows were already acknowledged as superstars contemporaneously and participants in art exhibitions benefited from a longer-lasting career boost as reflected by positive mark-ups on paintings made in the years following a show. For both channels participation in historic art exhibitions is a strong quality signal for today's art buyers. This study is based on a global sample of 273 'superstars' of modern art born between 1800 and 1945, 34,141 auction results of paintings and participation in important historic art exhibitions.

Keywords: art auctions, hedonic regressions, modern artists, careers

JEL Classification: G14, J4, N3, Z11

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1 Introduction

With demand for art constantly increasing and art enthusiasts and investors alike seeking to pin down what makes a great piece of art in the midst of a rather opaque market (Baumol, 1986), investors often rely on expert opinion, such as pre-sale estimates (Bruno and Nocera, 2012, and Czujack and Martins, 2004) or a work's provenance. A common solution for the highest end of the market is to look for prominence of the painter and attributes of the painting. Next to these factors, art history is often referenced to determine the historicity of the painting. One such factor is the inclusion of an artist's paintings in one of the historic exhibitions that have shaped modern art, such as the Salon de Refuses 1863 in Paris or the first Blaue Reiter Exhibition 1911 in Munich, which indicates the contemporary prominence of a painter. For artists to have participated in such a show was not only a great honour and a reflection of large approval by contemporary art experts and peers, but it also was a strong signal that the artist was cutting-edge.

This paper uses a historic, high-frequency dataset on the value of modern art products and data on historic art exhibitions. In a hedonic framework this paper assesses whether paintings made by artists whose work was showcased in a historic exhibition in a given year are more valuable than paintings of non-participants. Thus, this paper analyses whether the contemporary importance of an artist translates into higher prices at auction today. Such a quality signal is important for investors and it can be informative as to the longevity of expert opinion. As such, this paper contributes to the literature on art auctions by extending the set of quality indicators by a novel, historic measure of artistic quality, namely historic art exhibitions.

Although art investors and art historians are well aware of the importance of such historic data, thus far it has been difficult to obtain information on the most important art shows. Altshuler (2008) is the first author to compile a comprehensive data source from a vast array of original sources. In this exercise he sources original documentation of art exhibitions in order to determine participating artists, the size of a show, and the audience it attracted. This unique data source has been digitalised in order to analyse the importance of art shows from an economic point of view.

Interestingly the general idea to organise major group exhibitions of art coincides with a most innovative era in the arts at the end of the 19th century. Not only did artists start organising their own shows in order to attract dealers and patrons for their works, but also the state and European cities started to sponsor major art shows in order to promote their cultural profiles (Altshuler, 2008). With this culture of large-scale public shows in which artists would showcase their works also came a culture of market access and expert

appraisal for art. This is why participation in historic art exhibitions is such an important indicator for an artist's historic reputation. If an artist was considered avantgarde and innovative in Paris in the late 19th century, his/her work would be displayed in one of the yearly Salons or later in one of the artist-organised competitor shows. Thus, these historic data can be indicative of the first critical appraisal of an artist's work and allow for conclusions on the value of works today.

The estimations presented in this paper are based on a hedonic estimation which is suitable as it implicitly prices observable value-adding characteristics of an artwork.¹ However, when applying the hedonic framework to auction results of modern art, incorporating unobservables might be important: In addition to the observable features of a painting, like size and medium used, less tangible characteristics may impact its price. For example, Picasso's work may sell for more because of his unique, cubist style and international reputation. Traditionally, hedonic models would only use an artist fixed effect to account for these artist level unobservables due to the difficulty of obtaining data on artists' lives and working methods. Recently, efforts have been undertaken in the literature to include more artist-specific information in hedonic estimations. For example, Renneboog and Spaenjers (2012) use proxies for artistic reputation in order to explain prices at auction. In addition, Hellmanzik (2010) estimates 'location effects' for New Yorker and Parisian artists and the impact of artists' residences on modern day auction prices while Hellmanzik (2012) shows that traveling serves as inspiration to artists and thereby increases art works' values. Moreover, there is a strand of literature on artistic careers such as Galenson and Weinberg (2000, 2001) who use birth cohorts - which they interpret as cohort-specific innovation methods - to explain price variations over artistic careers.

In this paper, I build on this literature by including historic art exhibitions as a measure of an artist's contemporary reputation in such a regression. Exhibitions have been used as control variables in the past, but generally in a coarser way than in this paper. Most noticeably, Campos and Barbosa (2009) include a contemporary exhibition indicator for a Latin American sample of painters and find that it has a significant and positive impact. Collins et al. (2009) use the information on number of exhibitions provided in auction catalogues as a control in a hedonic model, but they do not further comment on their findings on this variable. However, this might be due to the fact that it is hard to discern which exhibitions are covered and whether or not they were important. Renneboog and

¹Moreover, it allows all observations to be included in the estimation as discussed by Ashenfelter and Graddy (2006) as opposed to a re-sale estimation where only repeat sales can be considered.

Spaenjers (2012) include information on Documenta participation of artists in order to capture a reputation effect.

The analysis in this paper is based on an extensive dataset encompassing auction results of a broad sample of superstars of modern visual art who were active between 1820 and 2007. Artists are sampled based on a prominence indicator and each artist's prevalence in historic art exhibitions between 1863 and 1959 is assessed (see Section 2 for details). The resulting superstar sample of modern art is matched with prices of artists' paintings yielded in modern art auctions between 1988 to 2007. These auction data are used as a measure for the value of paintings executed during the sample period.

The key finding of this paper is that artists who had works displayed in a historic art exhibition and thus were critically acclaimed by their contemporaries also fetch higher prices at auction today. I attribute this effect to a strong quality signal which translates into higher prices. Interestingly, the effect also pertains to paintings made in the year after the exhibition, indicating that exhibitions are indeed strong, time-spanning quality signals.

The paper is organised as follows. Section two briefly describes the dataset and presents some first insights from summary statistics. In Section three, the empirical evidence is discussed: first, a show effect on auction results is estimated and then decomposed over time to allow for variations in show importance. Next, specific show fixed effects are estimated and the contribution of show characteristics are analysed. Subsequently, I present results on more persistent effects for an artist's career of participating in an art show. The last section concludes.

2 Data and sample characteristics

In order to analyse the impact of historic art exhibitions on auction results of important modern artists, I compile an extensive historic dataset which expands considerably on other papers on artistic production in terms of the time period and sample width covered.² The dataset used in this paper combines three dimensions: the artist, the painting, and artists' exhibition history. It encompasses a sample of the 273 most important visual artists worldwide who were born between 1800 and 1945, and roughly 35,000 paintings by these artists auctioned between 1988 and 2007. Modern day auction results are used to measure the value of paintings made by the superstar sample in the respective countries and years covered in this study. This is matched with participation in historic art exhi-

²Such as Hellmanzik (2010), Hodgson (2007), or Galenson and Weinberg (2000, 2001).

bitions for each artist in the sample for each year of their careers. Artists in the sample were active in 31 countries between 1820 and 2007 with a marked concentration of artistic activity in Paris as reflected by the fact that 42.4% of all paintings in the sample were produced by Parisian artists.³ Summary statistics for the overall sample and the different sub-periods are provided in Table 1. These were chosen according to the major historic incidents which shaped the 20th century and which might have evoked changes in the artistic landscape. The different data dimensions will be introduced in turn.

2.1 Superstar sample

The sampling of superstars in the profession under consideration is standard in the literature on human capital externalities. See for example, Azoulay et al. (2010), Kim et al. (2009), or Waldinger (2009). In general, there are two main reasons for superstar sampling: firstly, superstars are the drivers of innovation in their field and thus it is arguably more interesting to study their careers than those of lesser-known creative minds. From a more practical point of view it is also easier to obtain accurate data for the sample of superstars than for less eminent artists.

The sampling technique for artists is based on a historiometric measure as discussed in Kelly and O'Hagan (2005). The space dedicated to each artist in terms of columns and inches in the *Oxford Dictionary of Art: New Edition* (1997) is used to rank artists by importance and the sample-entry cut-off point is a minimum of 0.2 column-inches. A potential bias toward English artists is handled by cross comparison with *Reclam's Kuenstlerlexikon* (2002), so only those artists from the British Isles and the USA are included that had an entry in both dictionaries. In this fashion, the superstars of modern art can be ranked according to their importance: Vincent van Gogh for example has 2.2 column-inches, Andy Warhol 1.45, and Pablo Picasso 3.0, the highest number in the sample.⁴

For the sample at hand, the most expensive paintings are from the period prior to and during the First World War. This is also reflected by the high share of artists active around that time. Another interesting fact is that artists' average age of production is continuously increasing over time.

³New York is, of course, the other big centre of modern arts as shown in Hellmanzik (2010).

⁴Vincent van Gogh's 2.2 column-inches, for example, indicate that 2 full columns and 2 inches of page space are devoted to his career.

2.2 Auction data on paintings

To measure the productivity of artists I use prices yielded at modern day art auctions for paintings by the sample of artists. Auction results on paintings sold between 1988 and 2007 by this sample of artists were collected from *artvalue.com* (2010);⁵ all prices are in real US dollars and are hammer prices adjusted using the US CPI retrieved from the IMF's *International Financial Statistics*. In addition, several control variables were obtained: the size, support, and medium of the painting, the year in which the painting was made, whether or not the painting was signed by the artist, and if the painting was auctioned at either Christie's or Sotheby's. In the final dataset, each painting can be uniquely identified in terms of the artist who made it, his or her age at the time of production, location and year in which it was painted, and its value at auction today. Moreover, it is important to note that any vintage effects or market fads do not affect the results presented in this paper as all estimations include sale year fixed effects.⁶

2.3 Historic art exhibitions

In order to estimate contemporary importance of artists and their innovativeness I use participation in historic art exhibitions as an indicator. Altshuler (2008) has put together a comprehensive guide on historic art shows which is to my knowledge the only source of such data.⁷ In his book, Altshuler compiles art historic documents for group exhibitions 'that made art history'. In total there are 23 such shows between 1863 and 1959 which covers the beginnings of modern art with Impressionism up to and including American Expressionism. Summary statistics for those art exhibitions are presented in Table 2. In terms of this paper's sample, 120 artists' works were displayed in one or more of the art exhibitions identified by Altshuler (43.9% of the sample) with an average of 4.5 artists participating per show. Especially in light of the fact that this paper is based on a superstar sample, it is striking that almost half of these artists received critical acclaim in the form of an art exhibition by their contemporaries. Although art history strongly emphasises the importance of these early market places for modern art, this is the first

⁵Only artists with a minimum of 10 auctioned paintings were considered.

⁶The dataset was collected in two waves. All auction data of the sample of artists born between 1850 and 1945 cover sale years up to and including the year 2007. The second wave of artists (born between 1800 and 1849) was collected in 2010 and thus sale data encompass the year 2010. It was thoroughly tested whether excluding paintings sold after 2007 (amounting to 684 paintings), which might create a potential imbalance in sales data, changes the findings of this paper. However, the findings remain valid when the analysis is based on paintings which were sold between 1988 and 2007 only.

⁷Altshuler's book was included in The Economist's books of year 2008 (The Economist, 2008).

quantification of how sizable the population of artists for whom these major art shows actually mattered is.

The average number of paintings displayed at a show is 520. As it is not possible to determine exactly which of the artists' paintings were actually displayed in the exhibition I link the yearly output of each artist to the year of the show as it is highly likely that paintings which were showcased were made close to the date of the exhibition. Thus, participation in a historic art exhibition can be interpreted as a strong sign of quality. However, it might be that we underestimate the importance of exhibitions if an artist's best paintings are not traded in today's market. Paintings that are off the market tend to be particularly significant and therefore of high value.

In addition, I retrieved the show location, the show itinerary and the audience from Altshuler (2008). As can be seen in Table 2, most shows took place in New York with a share of 60.5% followed by Paris with 23.3 % of all shows. The average exhibition traveled to one more location than the one it was opened in (*show itinerary*) and attracted about 320,000 viewers.⁸

Exhibitions were a way for artists to display their works to a broader public and thereby establish a reputation, and to attract money and attention for their works from patrons, dealers, and collectors. As all exhibitions covered in this paper were curated by expert juries, each submission had to pass a quality hurdle in order to enter. That is why participation in historic art exhibitions essentially is a proxy for contemporary stardom of artists in the sample.⁹ The main advantages of this measure are that it is historic and independent of market prices and thus captures artistic quality on a somewhat wider trajectory - given that experts base their verdict on more than prices fetched.¹⁰

Moreover, most of the art exhibitions sampled in Altshuler (2008) made history because of their distinct departure from the contemporary state of the arts. Thus show participation is also a proxy for artistic innovativeness.

⁸The audience of each show is patchy in Altshuler and thus reduced the number of observations considerably; nevertheless, a high number of visitors can be a sign of quality of a show and thus the variable is included in the analysis.

⁹This is different from the column-inch measure used as sampling criterion as these are established ex-post.

¹⁰This question is discussed by Ginsburgh (2003) and Galenson (2002), for example.

3 Empirical analysis

3.1 Estimation strategy

Using these data on modern artists' art shows and auction results, a hedonic regression is estimated. Firstly, a pure show effect is estimated in order to assess whether historic exhibitions matter for auction results. The effect is then decomposed over time to allow for variations in show importance. Next, show characteristics are analysed so a better understanding of what makes these shows important can be achieved. Lastly, I present results on a more permanent effect that participating in an art show had for an artist's career and thus his/her oeuvre.

In line with the recent literature, I employ a broad set of traditional hedonic variables and complement these by exhibition-specific variables. The inclusion of these exhibition variables in the hedonic estimation yields consistent coefficients on the traditional hedonic estimators while at the same time provides new insights on the valuation of art works. Formally, the baseline specification is given by

$$\begin{aligned} \ln(\text{price})_{ij} = & \delta(\text{exhibition}_{ij}) + \gamma_1 \text{canvas}_{ij} + \gamma_2 \ln(\text{size})_{ij} + \gamma_3 \text{oil}_{ij} + \gamma_4 \text{signed}_{ij} \\ & + \gamma_5 \text{deceased}_{ij} + \gamma_6 \text{auction house}_{ij} + [\beta_1 \text{age}_{ij} + \beta_2 \text{age}_{ij}^2 + \beta_3 \text{age}_{ij}^3 + \beta_4 \text{age}_{ij}^4] \\ & + \sum_{y=1988}^{2007} \theta_y(\text{sale year}_{ij} = y) + \alpha_i + e_{ij} \end{aligned} \quad (1)$$

Index i indicates the artist and j the painting. *Exhibition* is an indicator variable for each artist which takes on the value 1 if the artist's work was displayed in the respective art exhibition in a given year and 0 otherwise.

Age_{ij} reflects an artist's career age at the time the painting was executed and enters as a fourth-order polynomial. It captures fluctuations in quality over the course of a career.¹¹ Moreover, there are several control variables for the hedonic characteristics of the painting: a dummy variable to indicate if the support used for the painting is canvas or some other material, the size of the painting in square centimeters, a dummy variable to indicate an oil painting, an indicator for signed artworks, for works by artists deceased at time of auction, and for works sold by the two main auction houses - Christie's and Sotheby's. Moreover, I include an indicator for the sale year of the painting j to adjust

¹¹This has been shown in the literature to be the most appropriate reflection of career paths of artists. See for example Galenson and Weinberg (2000, 2001), Hellmanzik (2009, 2010), and Hodgson (2010). This polynomial is used for comparability with these studies.

for potential fads in the art market. All of these variables are expected to impact auction results.

In addition to the i and j specific variables, period and artist fixed effects are used to control for other influences on the quality of creative output. Artist fixed effects are used to account for any individual specific characteristics which might explain prices at auction. Period fixed effects, divided by historic events (see Table 1), are also used, with the period from 1820 to 1870 as the base. In addition, heteroskedasticity-robust standard errors are employed in all specifications.¹²

3.2 Regression results

3.2.1 General exhibition effect and decomposed over time

The results of the baseline regression and one which decomposes the show effect over historic periods are presented in Table 3. Column 1 shows the results of a ‘traditional’ hedonic regression in order to confirm that standard coefficients are significant and carry the same signs as in comparable studies. The second column displays the results of the estimation with the show effect included as a binary indicator. If an artist’s work was displayed in any art exhibition in the given year, paintings from that year fetch higher prices in auction markets today by about 12.8%. This effect is even somewhat larger when we change the indicator to a numerical variable of the total of shows in which an artist participated in the given year (Column 3) despite the fact that this variable has a small range between 0 and 2. Although we use a large sample and historic rather than contemporary exhibitions, this finding is in line with Campos and Barbosa (2009) who also find a positive coefficient on their exhibition indicator.

These two results reflect that artists’ participation in historic art exhibitions, and thus their acknowledgment as ‘stars’ by contemporary art experts, is an important reputational determinant of prices modern paintings fetch at auction today. As such this finding is comparable to Ginsburgh’s (2003) finding for prize-winning books, movies, and musicians with prize-winners also having more economic success. That is, if prizes and show entries are a comparable reward, paintings which were deemed to be good by experts also perform well on the market the same way Pulitzer price winners become bestsellers or oscar-winning movies box-office hits. Moreover, this is indicative of the fact that contemporary reputation and contribution to the historic art scene plays a role in price formation in the market. Another interesting fact is that out of the superstar sample, those artists who

¹²The findings of this paper remain valid when the standard errors are clustered at the artist level.

were already successful during their life-times remain especially so today, as the exhibition mark-up shows. This is evidence that they have passed the ‘test of time’ (Landes, 2002, and Coetzee, 2002) - that is their value and inherent merit has translated across time and trends.

It is reasonable to assume that the impact on prices of such shows varies over time periods and with artistic developments. Results of such a regression are presented in Table 3, Column 4 where the period prior to 1870 serves as the base group.¹³ The premium of shows is biggest between 1919 and 1938 (*Interwar*) with a mark-up of 36.2%. The most notable shows taking place during this period are the *Exposition Internationale du Surrealism* and *Erste Internationale Dada Messe*, which truly reflected the innovations in the arts taking place at the time. The major retrospective of Cubism and Abstract Art in New York in 1936 and degenerate Art in Munich (1938) also took place during this time. In addition, this period is characterised by a vast density of artistic movements, such as Expressionism, Surrealism, and Futurism. The next strongest period is 1946-1974 with a mark-up of 12.5%, which largely reflects the rise of American paintings and the arrival of Abstract Expressionism - one of the first artistic inventions to originate from the United States. Interestingly, the years between 1870 and 1913 only have the third highest mark-up of 11.1% despite the fact that many early artistic innovations stem from this period.¹⁴

Altogether, the evidence for our sample of modern artists suggests that there is a significant, positive mark-up on paintings stemming from the same year in which an artist has participated in a major art show. This effect is biggest when innovation in the arts was relatively pronounced.

3.2.2 Show fixed effects

In order to assess the importance of the individual art exhibitions covered in Altshuler (2008), I run the previous baseline regression including a fixed effect for each individual show. The results of this exercise are presented in Table 4. Overall it is striking that the coefficients on the show fixed effects are large relative to the other estimated coefficients, underlining the importance of such an early signal of quality in an artist’s career. Another pattern that emerges from this exercise is that exhibitions which are a clear departure

¹³Note that the period of World War One is also excluded as no shows took place during these years. The same is true for the years after 1975 (*Postwar II*), the reason being that these exhibitions are not covered in Altshuler (2008).

¹⁴As a robustness check, exhibitions in which less than two of the artists in this paper’s sample participated have been excluded. The results remain valid.

from the contemporary artistic trends have the highest mark-up on prices at auction. This gives further evidence of the importance of artistic innovation as a quality characteristic in a modern art work. This is in line with Galenson and Weinberg (2000, 2001) who also use innovativeness as a determinant of career peak for modern artists. Assuming that entry into art shows was easier for truly innovative artists, participation in historic art exhibitions is a good proxy for how experts have viewed artist's innovativeness historically.

The highly innovative character of these shows is also underlined in Altshuler's (2008) selection criteria. The Futurists, for example, explicitly declared that no more nudes shall be painted for ten years while the Salon de la Section d'Or was the first prestigious show to exhibit Cubist paintings and subsequently there was a string of artists who joined *Les Cubistes* in their studios in order to participate in this new movement (Altshuler, 2008). Lastly, the *Ninth Street Show* was the first major outlet for the novel circle of American Expressionists.

3.2.3 Show characteristics

In addition to show participation and the individual show effects, I also estimate the baseline regression including more detailed information on the art exhibition in order to control for the importance and impact of the shows in more depth. These data are also based on Altshuler (2008). The results of this exercise are presented in Table 5. Firstly, there is no general time trend in the show variable. That is, paintings which were relevant for earlier shows are just as valuable as paintings for later shows. Next, it can be seen that the size of the show is an important determinant of the show's impact on art prices. We can see that both the number of artists and the number of paintings included in the exhibition has a significant and positive impact on prices at auction today (Columns 1 and 2). This indicates that shows which are of a larger scale and thus tailored for a bigger market also tend to include better works and thus are a stronger signal for quality. This makes sense as exhibition space was scarce and expensive and thus only the best works could be shown. This led to high refusal rates, particularly at the early Salons despite the fact that paintings were hung unusually densely by today's standards (Altshuler, 2008).¹⁵

Another important quality indicator is the exhibition's itinerary. Not all shows traveled, such as the Parisian Salons, but if shows were successful and gallerists and dealers wanted a broader exposure to the market, they often planned multi-stop exhibitions with the average show touring 1.25 cities. Nevertheless, itinerary is not significantly different from zero and thus does not have an impact on prices. The same is true for the size of

¹⁵Note that the two size proxies are not included in the same regression due to their high collinearity.

the audience, which captures the historic public reception of these art exhibitions and the works displayed in them. Due to the difficulty of assessing these historic documents the data are not available for all shows covered in this study. Nevertheless, for those where the information is available there is no significant effect, which indicates that shows which did not receive a warm public reception are no different in terms of quality from top-selling shows. This could be indicative of the fact that it is mostly expert opinion on show participation which matters for prices rather than historic public opinion. This gives further evidence that historic acknowledgment by experts was greatly important in forming an artist's career.

3.2.4 Persistence of show effect

Pertaining to the career effect, Column 3 in Table 5 displays results on a regression containing the impact of a show over the six years following an exhibition.¹⁶ With this, the persistence of the show effect on an artist's career can be captured and thus the long-term impact on his or her career. As we can see, the painter who had his or her work exhibited in one of Altshuler's exhibitions not only experiences a contemporary boost in the quality of his paintings as assessed in the previous section, but this boost in quality persists for the four years following the exhibition. However, the effect wanes in the third and fourth years (5.0%) with only a third of the impact of the first and second years after the exhibition (15.6%). Bearing in mind that the contemporary impact on prices is 15.5% in this specification, this is a sizable effect which is reflective of the fact that recognition in a show indicates a particularly strong phase in an artist's career. One can only speculate that such a strong market signal of appreciation of their works gave artists a boost to their creativity or encouraged them to pursue their stylistic choices even further and to deepen them. This finding is consistent with the literature on individual creative production and extrinsic rewards, such as Eisenberg and Shanock (2011), for example, who review research in the area which postulates that rewards for novel performance increase intrinsic motivation and creativity.

¹⁶The periods are chosen in order to maximise the number of observations in each time interval. The results persist when each year after the exhibition is considered separately or wider intervals of three years are used.

4 Conclusion

The art market is a greatly complex market and information on art as an investment vehicle can be difficult to obtain. Thus investors often rely on expert opinion, such as pre-sale estimates or a work's provenance. This paper analyses the informative quality of historic expert opinion for today's auction results. This has the advantage that those quality indicators are independent and untainted by current market trends.

I find that paintings of artists whose work was displayed in a historic art exhibition fetch significantly higher prices at auction today. The mark-up amounts to 12.8% which is a sizable quality mark-up for works in the high end of the market. This effect channels the contemporary acknowledgment by art experts and gives evidence to the fact that artists who were already considered superstars by their peers fare even better in terms of market prices today than those who were only discovered after the fact, such as the famous van Gogh, whose works never made it in the market during his lifetime.

Interestingly, shows that made the biggest departure from the contemporary state of the arts fetch the greatest premia in the market. This is particularly important in light of the fact that it is hard to assess innovativeness along any other trajectory. However, show participation implies that contemporary experts deem the artist's work to be of a particular style and this label might explain his or her rise to fame in the first place and thus why these historic art exhibitions are an important piece of information for today's market participants. Regarding the different show characteristics, I find that larger shows (both in terms of paintings displayed and artists participating) are more important price determinants while the show's audience and its itinerary are not significant. This emphasises the strong role of expert selection as the main channel of the quality signal.

I also find evidence of a longer lasting impact of show participation on artistic careers. That is, the positive impact does not only pertain to paintings from the same year of the exhibition, but also to works made in the four years following an exhibition. This is indicative of the importance of acknowledgment by peers for creative careers as it is likely that many artists were affirmed in their chosen styles by their market success. This finding is consistent with the literature on individual creative production.

The literature on hedonic models of art auctions is continuously expanding by including new variables which can be informative of price formation. Particularly historic data have recently grown in importance. The role of experts and contemporary fame has not been assessed thus far and it would be desirable to have more research on the topic in order to shed more light on art prices and creative careers.

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Table 1: Summary statistics

	All	1820-1870	1871-1913	1914-1918	1919-1938	1939-1945	1946-1975	1976-2007
Year of birth	1885 (30.7)	1821.6 (11.0)	1851.8 (20.4)	1872 (14.0)	1880 (12.2)	1887 (12.9)	1906 (15.8)	1920 (11.9)
Year of execution	1936 (33.6)	1859 (9.3)	1895 (12.6)	1916 (1.4)	1928 (5.7)	1942 (2.1)	1961 (8.0)	1984 (6.6)
Age at execution	50.8 (15.3)	37.4 (10.6)	43.7 (14.9)	44.4 (14.0)	48.1 (12.5)	54.7 (12.8)	54.7 (14.9)	63 (12.2)
Year of sale	1999 (5.6)	2000 (6.1)	1999 (5.8)	1999 (5.5)	1998 (5.3)	1998 (5.3)	1999 (5.6)	2000 (5.4)
Price	511,847 (2,278,277)	220,456 (661503)	879,759 (33181472)	921,078 (2,961874)	442,808 (2038241)	438,533 (2,521,888)	384,463.50 (1,718,427)	222,709 (889,875)
Area	6,726 (41,659)	3,290 (5215)	3,699 (15204)	4,038 (4405)	4,024 (4554)	3,957 (8445)	9,511 (66958)	11,670 (15,618)
Canvas	0.68 (0.47)	0.69 (0.46)	0.74 (0.44)	0.7 (0.46)	0.72 (0.45)	0.62 (0.48)	0.65 (0.48)	0.56 (0.49)
Column-Inches	0.57 (.55)	0.6 (.74)	0.62 (.63)	0.59 (.49)	0.56 (.51)	0.64 (.64)	0.52 (.49)	0.62 (.46)
Observations	34,877	1,087	8,069	1,370	5,995	1,860	12,738	3,650
Number of artists	273	50	157	106	163	134	157	66
Paintings per artist	127.7	21.7	51.4	12.9	36.8	13.9	81.1	55.3

Notes: Data presented are the respective period's averages and standard deviations. The nominal prices were adjusted using the US CPI retrieved from the IMF's International Financial Statistics. *Sources:* Information on artists were obtained from Grove Dictionary of Art: Online (2008). Data on paintings were obtained from artvalue.com (2007).

Table 2: Summary statistics

	Observations	Mean	s.d.	Median
Year of show	1664	1926.00	52.05	1937
No. of artists in show	1664	4.49	0.90	4.26
No. of paintings in show	1664	520.36	553.09	175
Show itinerary	1664	1.25	2.93	0
Show audience	414	319,447	679,962	25,000
Show locations (% of total shows):				
New York	60.46			
Paris	23.32			
London	7.69			
Others: Munich, Berlin, Dresden, Stuttgart				

Notes: Data on shows were

obtained from Historic Art Shows (2011).

Table 3: Baseline hedonic regression and show premium

	(1)	(2)	(3)	(4)
Log (Price)	Baseline	Any shows participated in	Total shows participated in	Show-period indicators
Age	0.373 [0.031]***	0.370 [0.031]***	0.369 [0.031]***	0.371 [0.031]***
Age ²	-0.011 [0.001]***	-0.011 [0.001]***	-0.011 [0.001]***	-0.011 [0.001]***
Age ³	0.000 [0.000]***	0.000 [0.000]***	0.000 [0.000]***	0.000 [0.000]***
Age ⁴	0.000 [0.000]***	0.000 [0.000]***	0.000 [0.000]***	0.000 [0.000]***
Log (size)	0.595 [0.006]***	0.596 [0.006]***	0.596 [0.006]***	0.596 [0.006]***
Canvas	0.293 [0.015]***	0.294 [0.015]***	0.294 [0.015]***	0.293 [0.015]***
Oil	0.340 [0.021]***	0.340 [0.021]***	0.340 [0.021]***	0.339 [0.021]***
Signature	0.180 [0.030]***	0.181 [0.030]***	0.182 [0.030]***	0.182 [0.030]***
Artist deceased	0.158 [0.029]***	0.159 [0.029]***	0.159 [0.029]***	0.160 [0.029]***
Christie's	0.401 [0.014]***	0.400 [0.014]***	0.400 [0.014]***	0.400 [0.014]***
Sotheby's	0.383 [0.014]***	0.383 [0.014]***	0.383 [0.014]***	0.383 [0.014]***
Prewar2 (1870-1913)	0.575 [0.049]***	0.579 [0.049]***	0.579 [0.049]***	0.580 [0.049]***
World War I (1914-1918)	0.569 [0.063]***	0.591 [0.063]***	0.594 [0.063]***	0.592 [0.064]***
Interwar (1919-1938)	0.581 [0.064]***	0.604 [0.065]***	0.607 [0.065]***	0.601 [0.065]***
World War II (1939-1945)	0.683 [0.074]***	0.682 [0.074]***	0.679 [0.074]***	0.708 [0.076]***
Postwar I (1946-1974)	0.630 [0.080]***	0.654 [0.080]***	0.658 [0.080]***	0.663 [0.081]***
Postwar II (1975-2007)	0.393 [0.092]***	0.418 [0.092]***	0.422 [0.092]***	0.431 [0.093]***
Any shows		0.128 [0.030]***		
Total (shows)			0.142 [0.029]***	
Show*Prewar2				0.111 [0.050]**
Show*Interwar				0.362 [0.075]***
Show*WW2				0.049 [0.056]
Show*Postwar1				0.125 [0.057]**
Artists fixed effects	yes	yes	yes	yes
Year of sale dummy	yes	yes	yes	yes
Observations	34,868	34,868	34,868	34,868
R-squared	0.7	0.7	0.71	0.71

Notes: Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Show fixed effects

Show title	Show year	Number of artists	Coefficient	P-value
Les Peintres Futuristes Italiens	1912	2	3.287	0.000
Exposition Internationale du Surrealism	1938	14	2.414	0.000
Erste Russische Kunstausstellung	1922	2	2.165	0.000
Salon de la Section d'Or	1912	7	2.006	0.000
Ninth Street Show	1951	9	1.788	0.000
The New American Painting	1959	9	1.778	0.000
Cubism and Abstract Art	1936	34	1.736	0.000
The Armory Show	1913	41	1.734	0.000
Salon d'Automne	1905	22	1.715	0.000
The First German Autumn Salon	1913	17	1.590	0.000
Art of This Century	1945	27	1.553	0.000
The First Impressionist Exhibition	1874	8	1.545	0.000
The First Blaue Reiter Exhibition	1911	3	1.522	0.004
Entartete Kunst	1937	21	1.484	0.000
Salon des Refuses	1863	7	1.403	0.000
Manet and the Post-Impressionists	1910	11	1.278	0.000
The First Bruecke Exhibition	1906	5	1.256	0.000
Erste Internationale Dada-Messe	1920	5	1.042	0.000
First Papers of Surrealism	1942	1	0.945	0.000
The First Salon des Independants	1884	2	0.689	0.010

Notes: The results are based on specification (1) in Table 3 extended by show fixed effects.

Table 5: Show characteristics and persistence of show effect

	(5)	(6)	(7)
Log (Price)	Show characteristics I	Show characteristics II	Persistence of show effect
Log (size)	0.594 [0.007]***	0.594 [0.007]***	0.596 [0.006]***
Canvas	0.292 [0.015]***	0.292 [0.015]***	0.293 [0.015]***
Oil	0.329 [0.021]***	0.329 [0.021]***	0.341 [0.021]***
Signature	0.192 [0.030]***	0.192 [0.030]***	0.183 [0.030]***
Artist deceased	0.171 [0.029]***	0.171 [0.029]***	0.157 [0.029]***
Christie's	0.387 [0.014]***	0.387 [0.014]***	0.400 [0.014]***
Sotheby's	0.372 [0.014]***	0.372 [0.014]***	0.382 [0.014]***
Any shows			0.155 [0.030]***
Year of show	0.000 [0.000]	0.000 [0.000]	
No. of artists in show	0.114 [0.057]**		
No. of paintings in show		0.239 [0.083]***	
Show itinerary	0.016 [0.031]	0.043 [0.034]	
Show audience	-0.046 [0.082]	-0.131 [0.091]	
1st & 2nd year after show			0.156 [0.029]***
3rd & 4th year after show			0.050 [0.027]*
5th & 6th year after show			-0.039 [0.026]
Age polynomial	yes	yes	yes
Artists fixed effects	yes	yes	yes
Period made dummy	yes	yes	yes
Year of sale dummy	yes	yes	yes
Observations	33,678	33,678	34,868
R-squared	0.71	0.71	0.71

Notes: Robust standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%