

# Journal of Cultural Economics

Published in cooperation with the Association of Cultural Economics International

## Editors:

MICHAEL RUSHTON, *School of Public and Environmental Affairs, Indiana University, Bloomington, U.S.A.*

SAM CAMERON, *Department of Economics, University of Bradford, West Yorkshire, U.K.*

## Book Review Editor:

JEANETTE D. SNOWBALL, *Department of Economics, Rhodes University, Grahamstown, South Africa*

## Editorial Board:

Orley Ashenfelter, *Princeton University, U.S.A.*

William J. Baumol, *CV Starr Centre for Applied Economics, New York University, U.S.A.*

Françoise Benhamou, *University of Paris I, France*

Bruno S. Frey, *University of Zurich, Switzerland*

Victor Ginsburgh, *Université Libre de Bruxelles, Belgium*

Christian Hjorth-Andersen, *University of Copenhagen, Denmark*

Michael Hutter, *University of Witten/Herdecke, Germany*

Arjo Klamer, *Erasmus University, Rotterdam, The Netherlands*

William M. Landes, *The University of Chicago, U.S.A.*

Alan Peacock, *David Hume Institute, U.K.*

Rick van der Ploeg, *Robert Schuman Centre, Italy*

Walter Santagata, *University of Torino, Italy*

J. Mark Schuster, *Massachusetts Institute of Technology, U.S.A.*

Bruce Seaman, *Georgia State University, U.S.A.*

David Throsby, *Macquarie University, Sydney, Australia*

Ruth Towse, *Erasmus University, Rotterdam, The Netherlands*

## Association of Cultural Economics International:

Ruth Towse, (President) *Erasmus University Rotterdam, The Netherlands*; Gillian Doyle,

(President-Elect) *University of Glasgow, U.K.*; Charles M. Gray, (Past President) *University of St. Thomas, Minneapolis, MN, USA*; Neil Alper, (Executive Secretary Treasurer) *Northeastern University, USA*

## Executive Board:

Françoise Benhamou, *University of Paris I, France*; Lluís Bonet, *University of Barcelona,*

*Spain*; Arthur Brooks, *Syracuse University, U.S.A.*; Xavier Castañer, *Groupe HEC, France*;

Kazuko Goto, *Saitama University, Japan*; Xavier Greffe, *University of Paris I, France*; Ilde

Rizzo, *University of Catania, Italy*; Steven Tepper, *Vanderbilt University, U.S.A.*

*Journal of Cultural Economics* is published quarterly.

Periodicals Postage paid at Rahway, N.J. USPS No. 017-335.

U.S. Mailing Agent: Mercury Airfreight International Ltd., 365 Blair Road, Avenel, NJ 07001.

Subscriptions should be sent to **Springer Customer Service Journals, Haberstraße 7, 69126 Heidelberg,**

**Germany,** or P.O. Box 2485, Secaucus, NJ 07094-2485, U.S.A., or to any subscription agent. ACEI

members are sent all four issues a year. Annual membership fees are USD 90.00 for 2004, USD 165.00 for

2004-2005, and USD 65.00 for a one-year student membership, payable (by creditcard, Visa or Mastercard,

or by bankdraft from a US bank in US dollars) to the Association for Cultural Economics International,

c/o Professor Neil Alper, Department of Economics, Northeastern University, 301 Lake Hall, Boston,

MA 02115, USA. ACEI membership applications and information can be found on the World Wide Web at

[www.acei.neu.edu](http://www.acei.neu.edu). Changes of mailing address should be notified together with our latest label.

For advertisement rates, prices of back volumes, and other information, please apply to **Springer, P.O. Box**

**17, 3300 AA Dordrecht, The Netherlands.**

Printed in The Netherlands

# Journal of Cultural Economics

Volume 31 No. 4 2007

MICHAEL HUTTER, CHRISTIAN KNEBEL, GUNNAR PIETZNER  
and MAREN SCHÄFER / Two games in town: a comparison of  
dealer and auction prices in contemporary visual arts markets 247–261

JAMES E. PESANDO and PAULINE M. SHUM / The law of one price,  
noise and “irrational exuberance”: the auction market for Picasso  
prints 263–277

JANNETT HIGHFILL and KEVIN O'BRIEN / Bidding and prices for  
online art auctions: sofa art or investment 279–292

DOUGLAS S. NOONAN / Fiscal pressures, institutional context, and  
constituents: a dynamic model of states' arts agency appropriations 293–310

ANDY S. CHOI, FRANCO PAPANDREA and JEFF BENNETT /  
Assessing cultural values: developing an attitudinal scale 311–335

## Book Review

Fiona MacMillan and Kathy Bowery (eds), *New Directions in Copyright  
Law: Volume 3* (MARY RILEY) 337–341

Acknowledgements 343–344



## Two games in town: a comparison of dealer and auction prices in contemporary visual arts markets

Michael Hutter · Christian Knebel · Gunnar Pietzner · Maren Schäfer

Received: 16 November 2006 / Accepted: 1 July 2007 / Published online: 12 October 2007  
© Springer Science+Business Media, LLC 2007

**Abstract** The article tests a couple of hypotheses relating to markets where demand is not taken as a given, but subject to sophisticated and encompassing price-building strategies. The study uses a data set that provides quoted dealer prices for medium-sized works of 100 leading visual artists from 1970 to 2004. These data are compared with auction price results for works by the same artists. The study reports significant discrepancies with respect to the relationship between the age of artists and prices paid for their works in the two markets, and with respect to general price developments in the two markets as measured by indices.

**Keywords** Markets for visual art · Dealer and auction market price indices · Valuation · Pricing process

**JEL Classification** D44 · Z11

### 1 Introduction

This article tests a couple of hypotheses relating to markets where demand is not taken as given, but subject to sophisticated and encompassing price-building strategies. It uses a rare set of time series data on dealer prices for the works of contemporary artists and it establishes significant differences to contemporaneous auction prices for works by the same artists.

The article first outlines the theoretical argument for such “constructed value markets”, points to sociological evidence and formulates two hypotheses: (1) Prices for works of living artists in dealer markets increase steadily over their lifetimes,

---

M. Hutter (✉) · C. Knebel · G. Pietzner · M. Schäfer  
Faculty of Management and Economics, Witten/Herdecke University, Alfred-Herrhausen-Str. 50,  
58448 Witten, Germany  
e-mail: m.hutter@uni-wh.de

while auction prices for works by the same artist are lacking such strict pattern. (2) (a) The aggregate price level in dealer markets is higher than in auction markets for works of a particular artist. (b) The dealer price index follows upward movements but shows resistance toward downward movements of the auction price index. Then it presents data collected by the *Capital Kunstkompass* (CKK) and their correlates generated by auctions over the course of 30 years. The subsequent sections compare dealer price quotes with actual auction outcomes for works by the same artists. The results show that the prices for artists' works increase with age in both markets. The level of dealer prices is generally higher. The yearly price developments show similar upward patterns for both dealer and auction markets, but dealer prices are stickier in their downward movements. These results are consistent with the initial hypotheses.

## 2 A theory of strategic preference construction

There are, in principle, two ways of increasing the market value of any commodity: one of them assumes elastic demand and increases market value by lowering cost and thus increasing the total number of commodities sold. The other assumes severely limited supply and raises market value by increasing demand for the fixed number of commodities available for sale.

The first approach corresponds to classical market theory since Ricardo. Markets for objects like "rare statues and pictures ... and wines of a peculiar quality" (Ricardo 1911, p. 6) are explicitly excluded from consideration. Such exclusion is quite consistent with the basic model, even in its neoclassical formulation: if it is assumed that preferences of consumers are stable, it is inadmissible to assume, at the same time, that demand for certain items increases due to a change in subjective preferences. In the case of markets for rare pictures and wines sellers succeed in making a profit because they are able to change their buyers' preferences.

A recent study on art dealers in Amsterdam and New York provides more detail on the technique with which such value increases are attained (Velthuis 2003, 2005). Apparently, dealers follow a "price script" in their negotiations with prospective buyers. Rule 1 of the script indicates that the rare commodities are to be sold as entry tickets to a club whose members consist of all the artists and the collectors committed to a dealer's particular artistic quality judgment. Rule 2 indicates that the prices quoted for any work are to be increased at regular intervals, irrespective of actual sales. These results support a more general theory, which explains why the market value for certain commodities increases systematically.

To start with, the commodities under consideration must be valued for their communication potential, as in the case of paintings or sculptures. Both types of objects might have material value as well, but the decisive characteristic is their ability to offer opportunities for conversations with others who share knowledge about the same class of commodities. A dealer's first task is to select out of a virtually infinite number of items with communication content those which show the highest potential for gaining the attention of a larger number of users. In the case of artworks, the selection refers to certain styles of visual expression, and, within such styles, to the works of specific creators or artists. The attribution of the material

works to particular authors assures an inevitable limitation of supply. As a second task, dealers have to convince buyers of the sustained artistic value of the works of a particular artist. Although each dealer works independently, there are network effects from a shared consensus among a dealer community as to which artists create works of the highest value. Such networks or "circuits" are asymmetrically ordered, with a few key dealers determining the general guidelines for selection (Becker 1984). To buy from such a dealer is an act that not only confers the property rights on an object, but also grants access to a club distinguished by a specific aesthetic quality.<sup>1</sup> As a third task, the dealers follow a price script which supports the claim that the appreciation of an artist's work grows steadily among an expanding audience. The price script has three major components: (1) Valuation is strictly determined by attribution to the artist and by the medium of execution, like gouache, oil or engraving, and not by subject matter or other criteria related to the communication content. (2) Prices are never decreased. Often, a money-back guarantee is given. (3) Prices for all works by the artist are increased over time, even beyond the artist's lifetime. Irregular price hikes at the time of an artist's death reflect the fact that the number of potentially available works is now fixed.

To summarize, dealers in markets for goods with communication potential not only sell commodities, but also actively create and provide a club good—namely membership in the community which adheres to the dealer's aesthetic style—which they sell jointly with the object. The dealers are not simply traders, they are above all service providers: they select, interpret, educate and signal with the aim of generating the belief that the appreciation of a particular set of new artworks is constantly rising.<sup>2</sup>

However, the artificially constructed dealer markets are not exclusive. If the scheme is successful, derivative auction markets will emerge in which the same commodities are resold. The number of potential buyers may still be small, but auctions are an effective way to achieve transactions in markets where there may be as few as a dozen potential customers worldwide. In the case of the most successful artists, media attention quickly increases the number of potential buyers. Auction prices have ambivalent effects on prices in the "dealer club" market: on one hand, they can confirm that the commitment of an audience to the artistic value of an artist's work has succeeded. The works achieve similar or, in select cases, even higher prices than in the secondary market.<sup>3</sup> On the other hand, the volatility of

<sup>1</sup> One of Velthuis' interview partners remarked with respect to Arnold Glimcher, the founder of Pace Gallery: "Buying from Pace is rather like membership in a club. Glimcher has this group of subscribers who are committed to his aesthetic, and they buy works by each of his stable of artists." (Velthuis 2005, p. 17).

<sup>2</sup> A formal model which is able to capture the peculiarity of this club formation uses graph-theoretic form (Mirowski 1991, pp. 572). It assumes that market relations between buyers and sellers are not of the anonymous and fleeting nature as are transactions in a supermarket. Rather, every single exchange presupposes a social basis, i.e., a well-defined relation between the participants of a connection. All the agents in a market are nodes in a network connected by ongoing relationships between individuals or organizations that know each other well and have invested considerable trust in each other.

<sup>3</sup> In the primary market, living artists sell their works to dealers or collectors. In secondary markets, dealers sell works by living and deceased artists. In tertiary markets, owners sell works through auctions. For a description of the market hierarchy see Throsby (1994, p. 5) who limits the tertiary market to major international auction houses.

auction results—due to the randomness of buyers present at an auction session, and due to the asymmetry of media attention—endangers the stability and sustainability of the dealer's price path for an artist's work. Both feedback loops connect the price developments in the two markets: there are no auction prices without prior price construction activities in the dealer market, and prices in the dealer market are influenced by auction prices.

Quantitative tests of price construction in dealer markets have not been conducted. There are not even studies on the relation of prices paid in dealer markets with prices paid in auction markets for the same works, or at least works by the same artist. Empirical studies of art markets rely almost exclusively on auction price data.<sup>4</sup> Thanks to the growth of data banks, auction data are abundant. Data on dealer prices, however, are difficult to obtain. Therefore, general statements about price formation and movement in visual arts markets implicitly assume that the price vector of an artist's works in the dealer market is simply a linear, scalar transformation of the respective price vector in the auction market.

To test for regularities in the pricing pattern of dealer markets, or for systematic differences between prices in dealer and in auction markets, it would be ideal to have data on actual dealer transactions. However, it is part of the dealer strategy to keep information about actual transactions secret. As a substitute, we have identified a data base that contains at least dealer price statements for the works of specific artists over three decades: The CKK survey provides data on the reputation of 100 leading visual artists and on dealer prices for their works on a yearly basis, from 1970 until today.<sup>5</sup> By calculating "reputation points", the index follows the value signifiers of the art market scene. For the hundred contemporary artists with the highest number of reputation points, dealer prices for average size works are quoted. By combining the data on dealer prices with the contemporaneous auction data for the same sample of artists, we can test for differences in the prices for works in the two markets.

The following study uses the data on dealer prices in the CKK to compare price paths and price levels in the international dealer and auction market for contemporary visual arts from 1970 until 2004.<sup>6</sup> We test two hypotheses:

**Hypothesis 1:** Prices for the works of living artists increase steadily over their lifetime, while auction prices for works by the same artist show no such strict pattern.

We test the steady-price-increase-hypothesis by comparing average dealer and auction prices for works by single artists at different points on their age curve over the course of their artistic career.

<sup>4</sup> For current overviews on this topic, see Burton and Jacobsen (1999) or Ginsburgh et al. (2006).

<sup>5</sup> The index was initiated in 1970 by Willi Bongard, a Cologne-born stock exchange analyst, journalist, publisher, and active participant of the "Fluxus" movement. It is published every year in the November issue of *Capital*, the leading German business monthly. Since 1985, the survey has been continued by his widow, Linde Rohr-Bongard. All the rankings were republished in the 30th edition of the survey. See Rohr-Bongard (2001).

<sup>6</sup> The reputation points of the index are awarded for appearances in international exhibitions and reviews, thus the sample of artists is international. Yet, there is a clear bias toward artists who originate in German-speaking art circuits. However, the bias is inconsequential for the questions under study here.

**Hypothesis 2:** (a) The aggregate price level in dealer markets is higher than in auction markets for works by the same artist. (b) The dealer price index follows upward movements but not downward movements of the auction price index.

The claim of higher prices in dealer transactions contradicts a popular opinion that auctions generate higher prices for artworks. As has been shown in earlier studies, such perceptions are due to a few outlier results that capture media attention and thus provide anecdotal evidence for the impression of high prices.<sup>7</sup> If it is indeed true that dealers of contemporary art provide a joint product that includes club services, then prices for the joint product should be, on average, higher than prices for the bare objects purchased at an auction.<sup>8</sup> Moreover, if it is true that auction prices pull dealer prices upward, but that dealer prices are not constructed for downward mobility, then we should be able to observe corresponding patterns in the time series of the two indices.

Section 3 describes previous uses of CKK. Section 4 specifies our data set. Section 5 reports results on the relationship between the age of artists and prices paid for their works in the two markets. Section 6 reports on the general price development in the two markets. Section 7 evaluates the results.

### 3 Previous uses of the *Capital Kunstkompass*

The main intention of CKK lies in the construction of a "reputation index", not unlike the citation indices used in the sciences. The participation of artists in exhibitions around the world is registered and ranked. Museum exhibits, one-man and group shows are distinguished, and points are awarded according to the quality of the event as determined by experts. Points are also awarded for reviews and articles in the most renowned international journals on contemporary art. The points are added up for a yearly total. They are accumulated over a series of years. The hundred artists with the highest scores are reported on a yearly basis. Over the years, there were few changes in the method of calculating the ranking.<sup>9</sup>

Reputation as measured by the CKK relies, in essence, on the judgments of experts. Experts have been shown to be accurate predictors for art markets (Ashenfelter and Graddy 2006; Caves 2000). Therefore, the accumulation of expert appraisals in a single number is a reasonable representation of the value of an artist's works in their market. In the case of CKK, the resulting index shows a bias toward European artists.

<sup>7</sup> The outlier effect has been demonstrated for prices paid for works by Marc Chagall in various media. See Holub et al. (1993).

<sup>8</sup> On the problem of determining the unknown volume of transactions in the dealer market, see the first paragraph of Sect. 7.

<sup>9</sup> There are no price quotes for the year 1970. In 1982 and 1985, CKK was not published. In 1980, 1984, and 1987, the top 100 focused on young artists under the age of 40. The aggregate prices should show a lower level for these years. In 1988, 1993, and 1999, a so-called "rejuvenation" was undertaken, shortening the time span for the accumulation of points in order to give younger artists a better chance to move to the top. Since this change favored younger artists, a downward shift of the price level must be assumed in these years.

The reputation rank of CKK is then confronted with a price quote for a medium size work. The price quote is generated by a survey of dealers representing the ranked artists. Analogous to the price/earnings ratio in the stock market, the ratio of reputation rank and price quote is shown to illustrate expected price performance in the future.

The way in which CKK selects and weighs the reputation points and the way in which the data from the secondary market are gathered has been criticized in trade articles and in scholarly works, e.g. Bonus and Ronte (1997). Despite its shortcomings, the CKK has provided a rare consistent measure for over three decades.

Economic researchers have been interested primarily in the reputation index. Schneider and Pommerehne (1983) were the first to use CKK reputation points as a proxy for the aesthetic valuation of artworks. With regressions for the years 1971–1978 they found that aesthetic value has a significant influence on the price of artworks. Grampp (1989) found that an increase in CKK reputations points of 10 percent accounts for a price increase of 8 percent. This result supports the thesis that expert appraisal is a good predictor for the prices of artworks in art markets. Singer (1990) extended the ideas of Schneider and Pommerehne with a study of the time an artist needs to move from the dealer market to the auction market. In this context, he used CKK reputation points to calculate the “artist capital stock” for every artist.

Recently, Beckert and Rössel (2004) used auction price and gallery price data combined with CKK reputation points to show that the value of an artist and his or her work is driven by a process of acquiring reputation through experts and institutions in both the auction and the dealer market. They used the CKK points as a measurement for value which is not based on the physical traits of the artwork but on artistic estimation. Using data from careers of artists in both the auction and the dealer market, they demonstrated the significant influence of reputation on the resulting price.<sup>10</sup>

With the partial exception of Beckert and Rössel, all the studies quoted use auction prices for determining the market value of works of artists. Auction prices are provided by auction houses and by special art auction data banks. The data can be verified because auctions are public. In consequence, these studies forgo the opportunity provided by the second time series in the data set, namely the dealer price quotes. This study, in contrast, will use the CKK reputation points only to distinguish the artists in our sample from all the others. It will primarily use the series of dealer price quotes to investigate discrepancies with the related auction price data.

Our first test will distinguish prices for works of artists at different ages and compare the results for the two markets. The subject is not entirely new. Studies for the influence of the age of an artist on the price of his works in auction markets have been done by Galenson and Weinberg (2000) and by Landes (2000). The results

<sup>10</sup> Just before this article went into print, Schönfeld and Reinstaller (2007) published a model which suggests reasons for price restraint on the part of galleries with higher reputation, using the data on gallery prices in Beckert and Rössel as evidence. Given the fact that these data represent price lists from galleries in two cities only, and that the estimated coefficient is not significant, such interpretation is doubtful.

show significant positive effects of age on prices and thus support Singer’s “artist capital stock” hypothesis.

The second test compares price levels in dealer and auction markets between 1970 and 2004. Until now, no such studies exist. Candela and Scorcu (2001) have constructed a dealer price index for Italian prints and drawings between 1977 and 1999, but did not relate it to an auction price index.

#### 4 Description of the data set

Our data set registers the CKK reputation points of the visual artists with the 100 highest scores in all issues of the *Kunstkompass* as CKK\_POINTS. The set extends from 1971 and 2004, with a total of 3,192 observations on 442 artists. For the same 442 artists, the “average sized work” prices quoted in CKK are registered as CKK\_PRICE.

For each of the years in which one of the 442 artists is included in CKK, auction prices for the artists were accumulated. In total, the data set contains 17,216 auction transactions, carried out between 1971 and 2004. The average market values for each year and artist result in AUC\_PRICE. Currencies were converted to US dollars and prices were deflated with the American consumer price index using 2000 as base year.

Thus, our total data set includes the following variables (Table 1).

#### 5 Age of artist and price development (H 1)

The relationship between the age of an artist at sale and the price at which his or her work sells in the two markets is the subject of our first investigation. For the test, we

**Table 1** Variables in data set

Variable	Description	Mean	SD	Min	Max
ARTIST	Full name of artist				
AGE	Age of artist in the observed year	52.17	10.99	24	93
YEAR	Year of observation	1991.44	8.87	1971	2004
CKK_PRICE	Price of “an average sized” work of artist in the observed year indicated by CKK	120336.64	206785.34	489	3563384
CKK_POINTS	Quality points indicated by CKK in the observed year	13638.29	7431.15	1100	63160
AUC_PRICE	Average price of auctioned works for artist in the observed year	64911.79	229788.46	585	5372945
AUC_PRICE_QCM	Average price per cm <sup>2</sup> of auctioned works by artist in the observed year	11.18	53.03	0.03	1378

only used age values where prices for at least two artists are part of our sample. This leads to an age span from 29 to 85 years.

It can be observed that there is a distinct difference between dealer and auction price at all ages. Starting at the youngest age, dealer prices are at least twice as high as auction prices for works of the same artist. Between the age of 36 and 42, prices at galleries are on average 2.29 times higher. The gap widens gradually: between the ages of 50 and 57, the average price difference is 2.52, between 70 and 80 it is 3.85 times higher until the difference stabilizes beginning with age 81 at a level which is 3.99 times as high as the auction price.

A first result is the graphic representation of the two data sets in Fig. 1 where average prices per age of both markets are displayed.

The outliers in the data, notably around age 75 in dealer price and around age 60 in auction price, can be explained by small samples, by hidden effects of the art boom in the years 1989 and 1990 and by anomalies of the CKK (see footnote 9).

The difference between the two price series is evident in graphic as well as in statistical comparisons. The data set has to be modified accordingly: a dummy variable AUCTION is introduced to distinguish between data from the auction market (1) and those from the dealer market (0), thus pooling all price data into a dependent variable called PRICE. Furthermore we built an interaction term between both age variables (AGE and AGE<sup>2</sup>) and AUCTION to control for the different influence of age in both markets (INTER1 and INTER2). In addition, we use the reputation index called CKK\_POINTS. This indicator is available in the CKK, and indicates the quality of the artist as mentioned. Assuming different influences of this variable in both markets we also used an interaction term, composed of CKK\_POINTS and AUCTION (INTER3). To interpret the effects more easily, all variables have been centered. In running the estimation, we used the pooled data

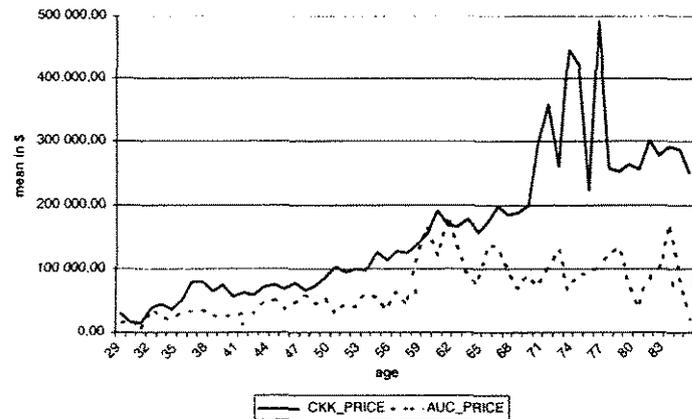


Fig. 1 Price development at different ages in dealer and auction markets (yearly mean price)

for simple linear regression (POOLED), random effects regression (RANDOM), and fixed effects regression (FIXED) controlling for artist-specific heterogeneity. We have chosen the following econometric specification:

$$LN\_PRICE = \alpha_0 + \alpha_1(AGE\_Z) + \alpha_2(AGE\_Z^2) + \alpha_3(AUCTION) + \alpha_4(AGE\_Z * AUCTION) + \alpha_5(AGE\_Z^2 * AUCTION) + \alpha_6(CKK\_POINTS\_Z) + \alpha_7(CKK\_POINTS\_Z * AUCTION) \quad (1)$$

Regression results are shown in Table 2.

According to the Hausman-Test, unobserved heterogeneity is expected and the fixed effect model (FIXED) has to be chosen as the most appropriate. Altogether the regression shows highly significant influences of nearly all included variables.

The influence of AGE\_Z on auction and dealer prices results in a positive effect of 0.9535 percent per year of age. The quadratic term AGE\_Z<sup>2</sup> suggests a lower effect of age on price at higher ages. The negative effect of AUCTION suggests a generally lower price level in the auction market, confirming the observation of systematic differences in the two price series. The interaction terms of AUCTION and AGE\_Z and AGE\_Z<sup>2</sup>, respectively, INTER1 and INTER2, measure the differences in change of price for the auction market when the artist gets older. With a negative influence of -0.0203 for INTER1, it is shown that in auction markets the age of an artist has less influence on the resulting price. Because of the very low influence of AGE\_Z<sup>2</sup> in general, the term INTER2 does not reach significant levels and is not relevant for our further considerations.

In order to control for the influence of the “artistic capital stock” we also tested for the influence of CKK\_POINTS, as Singer (1990) had done. The assumed

Table 2 Regression results for LN\_PRICE corresponding to H 1

	POOLED	RANDOM	FIXED
AGE_Z	0.03253 (3.06)***	0.07493 (7.21)***	0.09535 (8.44)***
AGE_Z <sup>2</sup>	0.00012 (0.72)	-0.00043 (2.61)***	-0.00069 (3.94)***
AUCTION	-0.55463 (2.50)**	-0.55463 (3.40)***	-0.55463 (3.42)***
INTER1 (AGE_Z * AUCTION)	-0.02503 (1.66)*	-0.02503 (2.26)**	-0.02503 (2.27)**
INTER2 (AGE_Z <sup>2</sup> * AUCTION)	0.00020 (0.86)	0.00020 (1.17)	0.00020 (1.18)
CKK_POINTS_Z * 10 <sup>-3</sup>	0.04710 (9.94)***	0.01709 (3.59)***	0.01409 (2.80)***
INTER3 * 10 <sup>-3</sup> (CKK_POINTS_Z * AUCTION)	0.02247 (3.35)***	0.02247 (4.56)***	0.02247 (4.58)***
Constant	10.09768 (64.43)***	9.22185 (59.26)***	9.07289 (53.85)***
Observations	3204	3204	3204
R <sup>2</sup>	0.33		0.39

Absolute value of t statistics in parentheses

\*Significant at 10%; \*\*significant at 5%; \*\*\*significant at 1%

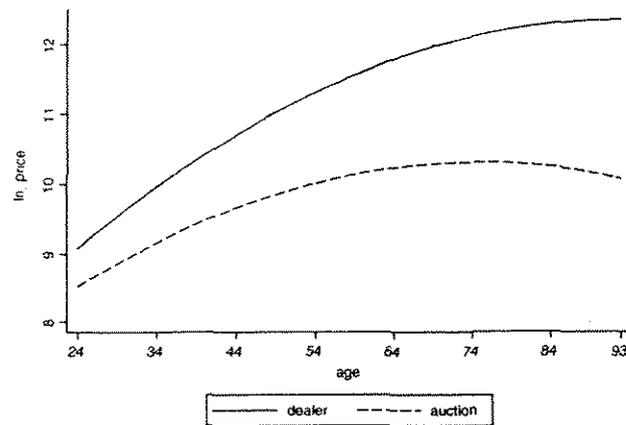


Fig. 2 Regression lines for the influence of artist's age on dealer and auction prices

positive effect should show that reputation increases prices on both markets. The hypothesis is confirmed with highest significance levels with a factor of 0.01409, which means that an increase of 1,000 CKK points results in a price increase of 1.409 percent. A third interaction term (INTER3) measures the differences of this effect between both markets. A positive sign for this term would show that reputation is more important for the resulting price in the auction market than it is in the dealer market. This conjecture is confirmed with an influence level of 0.02247, which means that an increase of 1,000 points in the CKK results in a total price increase of 3.656 percent in the auction market.

To summarize the results: Prices increase generally with age in a nonlinear pattern, auction prices remain lower than dealer prices and the price increases due to age are lower in auction markets. The results are displayed by the regression plots of price on age for both markets in Fig. 2.

## 6 Differences of price level time series (H 2)

For our second test, we constructed simple indices by calculating the arithmetic mean value of the average dealer prices quoted in the CKK (CKK\_PRICE) and the mean of the average auction prices (AUC\_PRICE) of an artist's works by year.<sup>11</sup> The result is displayed in Fig. 3.<sup>12</sup>

<sup>11</sup> We left out the years 1970 and 1980 due to small sample sizes of only five and two observations, respectively.

<sup>12</sup> The anomalies in the price development of the dealer market result from the peculiarities of the CKK mentioned in footnote 9.

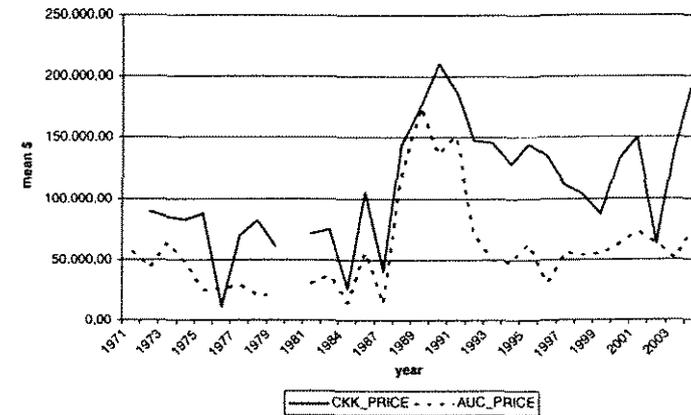


Fig. 3 Price development from 1971 to 2004 in dealer and auction markets (yearly mean price)

In the years 1971–1975, dealer prices were about 2.17 times higher than auction prices. Between 1977 and 1987, they were 2.54 times higher. During the art market boom, the difference was reduced to a factor of 1.25 on average. After the boom, the gap widened gradually. By 1996, dealer prices were 4.53 times higher than auction prices. From 1997 until 2004, the difference stabilizes at a level of 2.14 times above the auction price level, with the exception of a slump in 2002. Thus, prices in the dealer market declined much less after the boom years than they did in the auction market.

To check for comparability, we also calculated the average prices per cm<sup>2</sup> (AUC\_PRICE\_QCM) for each year. In order to compare the auction market price (AUC\_PRICE) to the standardized auction market price per cm<sup>2</sup> (AUC\_PRICE\_QCM), we divided the yearly value by the mean value of all prices in the respective series to create a price index. The result, shown in Fig. 4, confirms the close similarity of the two auction price patterns and therefore the validity of our results.

In order to present statistical results regarding the different developments in the two markets, we used yearly regression variables to construct a hedonic price index. We included the dummy variable AUCTION to find general differences in the price level of both markets. We also included CKK\_POINTS to account for reputation as an influence on the resulting price. INTER4 represents the assumed difference of the influence of CKK\_POINTS in the auction market. Finally, we used yearly dummy variables for both markets (YEAR\_D1971 until YEAR\_D2004) and combined them with AUCTION to account for general differences between the developments of both markets (YEAR\_D1971\_INTER until YEAR\_D2004\_INTER). 2003 is the base year for this index.

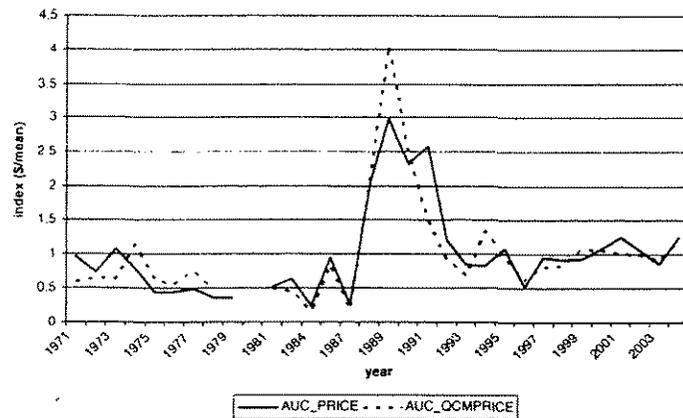


Fig. 4 Price indices from 1971 to 2004 in auction markets (yearly mean prices divided by overall mean price)

The regression is constructed as follows:

$$\begin{aligned} \text{LN\_PRICE} = & x_0 + x_1(\text{AUCTION}) + x_2(\text{CKK\_POINTS\_Z}) \\ & + x_3(\text{AUCTION} * \text{CKK\_POINTS\_Z}) \\ & + x_4(\Sigma \text{YEAR}) + x_5(\text{AUCTION} * \Sigma \text{YEAR}) \end{aligned} \quad (2)$$

The regression results are displayed in Table 3. Again, the Hausman-Test advises to use the fixed regression results (FIXED).

This regression also confirms at highest significance level that the price level is generally lower in the auction market, with an influence of  $-0.93449$ . The influence of  $\text{CKK\_POINTS}$  (0.02038) and  $\text{INTER4}$  (0.02023) confirms the result that the reputation points of  $\text{CKK}$  have a positive influence on dealer and auction prices.

To graphically exploit the results of the regression and the resulting hedonic price index, we printed the yearly dummies (price index for both markets) and the interacted yearly dummies (price index for the auction market) in Fig. 5.

With the exception of the years 1971 and 1976 (omitted in Fig. 5), the resulting price index shows a quite detailed picture of price development in the art market of the last 30 years. As described before, the auction prices are generally lower than the dealer prices. Around the art market boom 1989/90, the prices come closer together, after the “crash”, the gap widens beyond its former extent.

## 7 Interpreting the results

In interpreting the results of both tests, one must first take into consideration the quality of the data. Auction data reflect actual sales, even if there is a margin of manipulated transactions. The dealer data, on the other side, are figures released by

Table 3 Regression results for LN\_PRICE corresponding to H 2

	POOLED	RANDOM	FIXED
AUCTION	-0.93449 (5.58)***	-0.93449 (8.76)***	-0.93449 (8.83)***
CKK_POINTS_Z	0.05291 (11.59)***	0.02330 (5.70)***	0.02038 (4.79)***
INTER4	0.02023 (3.13)***	0.02023 (4.92)***	0.02023 (4.96)***
(CKK_POINTS_Z * AUCTION)			
YEAR_D1971–YEAR_D2004			
YEAR_D1971_INTER–YEAR_D2004_INTER			
Constant	11.18519 (94.41)***	11.09628 (117.72)***	11.45471 (146.29)***
Observations	3,204	3,204	3,204
R <sup>2</sup>	0.38		0.58

Absolute value of *t*-statistics in parentheses

\*Significant at 10%; \*\*significant at 5%; \*\*\* significant at 1%

<sup>a</sup> Detailed regression results are omitted here as they are plotted in Fig. 5. Please contact the authors for more detailed information

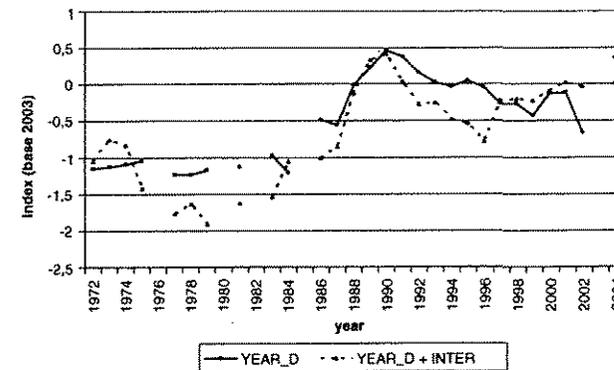


Fig. 5 Hedonic price indices from 1972 to 2004 bases on the regression presented in Sect. 6

an interested party, namely the potential seller. Dealers have an interest in overstating their prices because prices are interpreted as indicators of demand. They quote their starting points in a bargaining game where the final price includes discounts and long-term arrangements, like deferred payments. In addition, we do not know the factual volume of dealer sales. We can only simulate the volume of artist-specific dealer transactions by using the number of corresponding auction sales as a proxy. A further problem could be sample selection bias: when registering the works of a particular artist sold in a given year, the auctioned paintings tend to be “older” than the ones sold through dealers. There is mixed evidence in research

about the connection between the time of execution and prices paid for works at a later point in time (Galenson and Weinberg 2000; Edwards 2004; Galenson 2005). Such considerations must be kept in mind, but they do not invalidate the significance of the differences between the two markets as registered in our two tests.

The age-price profile reported in Sect. 5 supports Hypothesis 1: systematic price increase scripts are pursued in the dealer market. While auction prices show a moderate increase in prices for works of artists past the age of 60, dealer prices climb steadily starting in earlier ages around thirty on an aggregate level (Fig. 1). The trend continues past the age of 80, even if the price data show a less clear picture in the bracket of age 70–80.

The price level time series reported in Sects. 5 and 6 contain several insights with respect to Hypothesis 2a: Price levels in the dealer market were, on average, about twice as high in dollar value as corresponding auction market price levels.

Hypothesis 2b is supported by comparing the two price levels since 1971: Prices in the dealer as well as in the auction market were pushed up in the late 1980s. The reasons for the push were mostly external: liquidity among potential traditional buyers was unusually high and new groups of buyers entered, especially in the auction market (Hiraki et al. 2003; Wieand et al. 1998). Within 2 years, the mean dealer price increased by a factor of over 4, while the mean auction price increased by a factor of about 3 at its peak. Dealer prices were then only about 1.25 times higher than auction prices. When liquidity dried up and media attention ceased, auction prices adjusted quickly downwards to a level 1.6 times higher than before 1988. Dealer prices, however, took a decade to come back to a level 1.5 times higher than in the late 1980s. This supports the claim that price scripts without tolerance for declining prices were successfully at work and held up the market price during that decade.<sup>13</sup>

We therefore conclude that the behavior registered in dealer art markets provides evidence for an alternative strategy of raising market value by changing the preferences of consumers with respect to a fixed supply of particular goods with communication potential. Thus, standard price theory is expanded: Neoclassical price theory predicts that markets generate, in equilibrium, one price for any specific good. There may be adjustments for distance, lack of information, quality of services, economies of size for wholesale operations, etc., but once these factors are taken into account, one equilibrium price remains. When the commodities on the market have immaterial communication properties, and yet are limited in supply, they can be used as the basis for a club good that forms a joint product with the ownership of the object. As a result of the club activity, preferences for the works of selected artists are changed in such a stable way that the media and their audiences accept these valuations and thus trigger correspondingly high prices in auction markets. The buyer acquires the object in a potentially anonymous transaction, and with the object comes the artistic valuation generated in the preceding dealer market. The conjecture of such generated or constructed valuations explains a significant part of endogenous preference change, in art markets as well as in other markets for consumption goods.

<sup>13</sup> We ignore the indications in the data that point to a new art boom starting around 2004.

**Acknowledgements** The authors would like to thank Ariane Berthoin Antal, Bernd Frick, Felix Oberholzer-Gee, and two anonymous referees for their comments and remarks.

## References

- Ashenfelter, O., & Graddy, K. (2006). Art auctions. In V. Ginsburgh & D. Throsby (Eds.), *Handbook of the economics of art and culture* (pp. 909–945). Amsterdam: North-Holland.
- Becker, H. (1984). *Art worlds*. Berkeley: University of California Press.
- Beckert, J., & Rössel, J. (2004). Kunst und Preise. Reputation als Mechanismus der Reduktion von Ungewissheit am Kunstmarkt. *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 56(1), 32–50.
- Bonus, H., & Ronte, D. (1997). Credibility and economic value in the visual arts. *Journal of Cultural Economics*, 21, 103–118.
- Burton, B. J., & Jacobsen, J. P. (1999). Measuring returns on investments in collectibles. *Journal of Economic Perspectives*, 13(4), 193–212.
- Candela, G., & Scoreu, A. E. (2001). In search of stylized facts on art market prices: Evidence from the secondary market for prints and drawings in Italy. *Journal of Cultural Economics*, 25, 219–231.
- Caves, R. E. (2000). *Creative industries. Contracts between art and commerce*. Cambridge: Harvard University Press.
- Edwards, S. (2004). The economics of Latin American art: Creativity patterns and rates of return. *Economía*, 4, 1–35.
- Galenson, D. W., & Weinberg, B. A. (2000). Age and the quality of work: The case of modern American Painters. *Journal of Political Economy*, 108(4), 761–777.
- Galenson, D. W. (2005). *Artistic capital*. London: Routledge.
- Ginsburgh, V., Mei, J., & Moses, M. (2006). The computation of price indices. In V. Ginsburgh & D. Throsby (Eds.), *Handbook of the economics of art and culture* (pp. 947–979). Amsterdam: North-Holland.
- Gramp, W. D. (1989). *Pricing the priceless: art, artists and economics*. New York: Basic Books.
- Hiraki, T., Ito, A., Spieth, D. A., & Takezawa, N. (2003). How did Japanese investments influence international art prices? Yale ICF Working Paper No. 03–09.
- Holub, H.-W., Hutter, M., & Tappeiner, G. (1993). Light and shadow in art price computation. *Journal of Cultural Economics*, 17(1), 49–68.
- Landes, W. M. (2000). Winning the art lottery: The economic returns to the Ganz collection. John M. Olin Law & Economics Working Paper No. 76. Retrieved May 7, 2005 from <http://www.law.uchicago.edu/Publications/Working/index.html>
- Mirowski, P. (1991). Postmodernism and the social theory of value. *Journal of Post-Keynesian Economics*, 13(4), 565–582.
- Ricardo, D. (1911). *The principles of political economy and taxation*. London: Everyman's Library.
- Rohr-Bongard, L. (2001). *Kunst=Kapital. Der Capital-Kunstkompass von 1970 bis heute*. Köln: Salon Verlag.
- Schneider, F., & Pommerehne, W. W. (1983). Analyzing the market of works of contemporary fine arts: an exploratory study. *Journal of Cultural Economics*, 7(2), 41–67.
- Schönfeld, S., & Reinstaller, A. (2007). The effects of gallery and artist reputation on prices in the primary market for art: a note. *Journal of Cultural Economics*, 31, 143–153.
- Singer, L. P. (1990). The utility of art versus fair bets in the investment market. *Journal of Cultural Economics*, 14(2), 1–14.
- Throsby, D. (1994). The production and consumption of the arts: A view of cultural economics. *Journal of Economic Literature*, 32, 1–29.
- Velthuis, O. (2003). Symbolic meanings of prices: Constructing the value of contemporary art in Amsterdam and New York galleries. *Theory and Society*, 32(2), 181–215.
- Velthuis, O. (2005). *Talking prices. Symbolic meanings of prices on the market for contemporary art*. Princeton: Princeton University Press.
- Wieand, K., Donaldson, J., & Quintero, S. (1998). Are real assets prices internationally? Evidence from the art market. *Multinational Finance Journal*, 2, 167–187.