Contemporary Art Auction Market Analysis

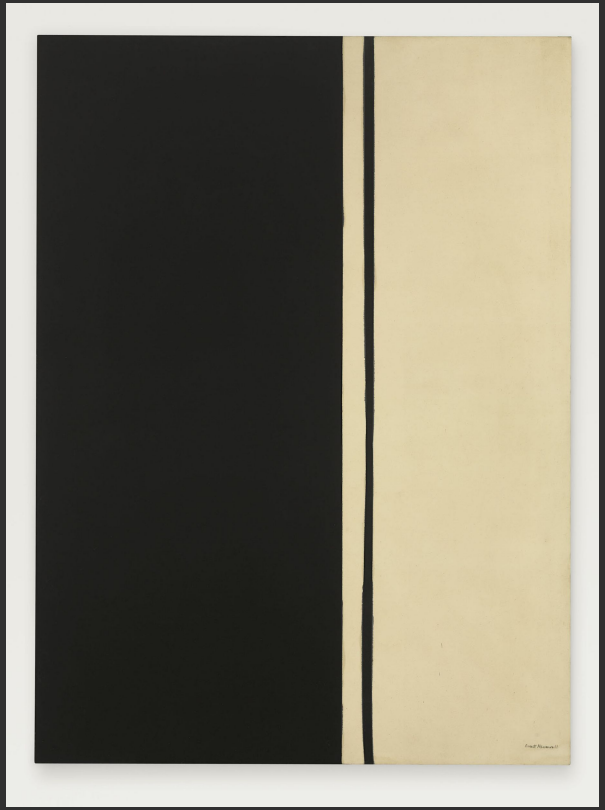
Investigating Youth Premium in the Art Market

Joey Yoo

Table of Contents

Introduction

Black Fire I (Barnett Newman)
$84,165,000
2014, Christie’s



Introduction

Art Auction Market

- Takes up a third of the art sales today
- Christie’s & Sotheby’s - 80% of market share
- Sellers and buyers meet to sell in bidding format
- Each lot has seller’s minimum buyout price, auction house price estimation, buyer’s bidding price

Past Literature

- Focuses in analyzing resale price of single artwork
- “Law of One Price” does not hold: geographical price discrepancy (Mei, Moses)
- Masterpieces tend to underperform in the market (Ashenfelter, Graddy)

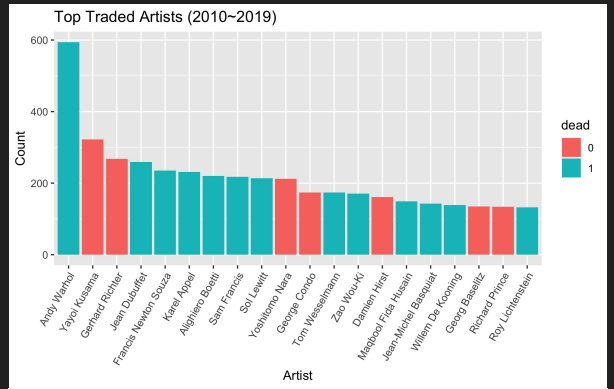
Data Collection

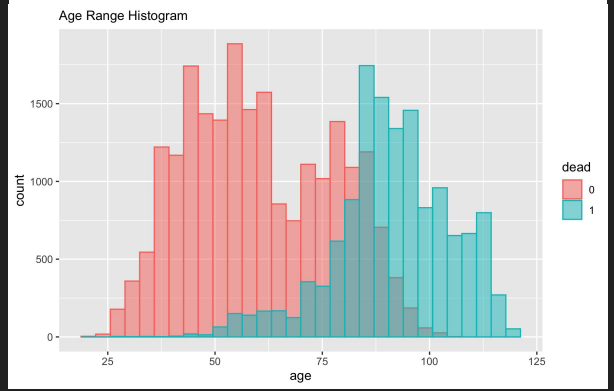
Goal:Analyze the trend in the contemporary auction market ($2 Billion, 2018)

- Python “Scrapy” Web-Framework: Efficient crawling package for extracting structured data
- Selected and crawled auction events related to contemporary art across 10 years (2010-2019)
- Subsampled artists born during 20th century to focus on contemporary market (Total of 35k sales)

Date	Title	Artist	Birth	Death	Price	Low	High	Curr	Loc	Event
2010-02-11	Bucky	Matthew Day Jackson	1974		601,250	30,000	40,000	GBP	London	Post War and Cont
2010-02-11	Red Lounge	Hiroshi Sugito	1970		91,250	80,000	120,000	GBP	London	Post War and Cont
2010-02-11	Marilyn	Joana Vasconcelos	1971		505,250	100,000	150,000	GBP	London	Post War and Cont
2010-02-11	Cherry Blossom no. 9	Gilbert & George	1942		325,250	150,000	200,000	GBP	London	Post War and Cont
2010-02-11	The Head Afloat on Top Levels on the	Gilbert & George	1942		337,250	150,000	200,000	GBP	London	Post War and Cont
2010-02-11	Untitled (from the series Lieber Maler	Martin Kippenberger	1953	1997	847,650	800,000	1,200,000	GBP	London	Post War and Cont
2010-02-11	Concrete Cabin West Side	Peter Doig	1959		2,057,250	2,000,000	3,000,000	GBP	London	Post War and Cont
2010-02-11	Der Rhein	Anselm Kiefer	1945		505,250	200,000	300,000	GBP	London	Post War and Cont
2010-02-11	Dollar Sign	Andy Warhol	1928	1987	2,281,250	1,200,000	1,800,000	GBP	London	Post War and Cont
2010-02-11	Ononimo	Alighiero Boetti	1940	1994	1,049,250	250,000	350,000	GBP	London	Post War and Cont
2010-02-11	Achrome	Piero Manzoni	1933	1963	1,273,250	600,000	800,000	GBP	London	Post War and Cont
2010-02-11	Concetto spaziale, Attese	Lucio Fontana	1899	1968	481,250	300,000	400,000	GBP	London	Post War and Cont
2010-02-11	Anthropométrie (ANT 5)	Yves Klein	1928	1962	4,129,250	1,500,000	2,000,000	GBP	London	Post War and Cont
2010-02-11	Relief éponge or (RE 47 II)	Yves Klein	1928	1962	5,865,250	5,000,000	7,000,000	GBP	London	Post War and Cont
2010-02-11	Towards a Definitive Statement on the	Richard Hamilton	1922		301,250	80,000	120,000	GBP	London	Post War and Cont
2010-02-11	Collage for New York State Mural (Tow	Roy Lichtenstein	1923	1997	421,250	200,000	300,000	GBP	London	Post War and Cont
2010-02-11	I mille fiumi più lunghi del mondo (The	Alighiero Boetti	1940	1994	713,250	250,000	350,000	GBP	London	Post War and Cont

Data Overview





- Strong Presence of dead painters
- Dominance of Andy Warhol’s work in contemporary art market
- Artist career peak at around 50s

Data Overview

- Jean-Michel Basquiat: outlier for (50,60) dead artist group
- Standardized mean painting price for alive artist tend to increase over time from 40 to 80
- Gradual increase of mean of absolute price over time

Research Hypothesis: Existence of Youth Premium, tendency to overvalue younger artists' works for investment

Data Modeling

$$\log(PRICE) = \beta_0 + \nu_{0i} + \beta_{AGE} + \beta_{YEAR} + \beta_{LOCATIONS} + \beta_{RANGE\_MEAN} + \beta_{RANGE} + \epsilon_{ij}$$

$$\epsilon \sim \mathbb{N}(0, \sigma_\epsilon^2)$$

$$\nu_{i0} \sim \mathbb{N}(0, \sigma_\nu^2)$$

	Estimate	Std. Error	t value
(Intercept)	6.6985	2.0920	3.2019
AGE	0.0034	0.0003	12.7734
YEAR	-0.0030	0.0010	-2.9030
LOCDubai	0.0278	0.0225	1.2367
LOCHong Kong	0.1208	0.0171	7.0603
LOCLondon	-0.0521	0.0121	-4.3195
LOCMilan	-0.1156	0.0239	-4.8369
LOCMumbai	0.1696	0.0726	2.3361
LOCNew York	-0.0609	0.0125	-4.8744
LOCParis	0.0143	0.0166	0.8620
LOCShanghai	0.1042	0.0293	3.5594
LOCZurich	-0.3178	0.0755	-4.2070
I(log(HIGH * LOW)/2)	0.9551	0.0020	485.8289
log(HIGH/LOW)	-0.2326	0.0294	-7.9124

Table 1: Fixed Effects Estimates for Model 1

	grp	var1	var2	vcov	sdcor
1	NAME	(Intercept)		0.0864	0.2939
2	Residual			0.2039	0.4516

Table 2: Random Effects Estimate for Model 1

Model I

- Mixed model regression of log(Price)
- Base group: Loc-Amsterdam
- Included geometric range of auction house expectation and log(Price Range) to offset artwork variability
- Location difference and Age is clearly significant

Data Modeling

$$\log(PRICE) = \beta_0 + \nu_{0i} + \beta_{AGE} + \beta_{YEAR} + \beta_{LOCATIONS} + \beta_{RANGE\_MEAN} + \beta_{RANGE} + \epsilon_{ij}$$

$$\epsilon \sim \mathbb{N}(0, \sigma_\epsilon^2)$$

$$\nu_{i0} \sim \mathbb{N}(0, \sigma_\nu^2)$$

	Estimate	Std. Error	t value
(Intercept)	3.2555	2.0439	1.5928
YOUNG1	0.0377	0.0119	3.1733
YOUNG2	0.1963	0.0161	12.2076
YOUNG3	0.1669	0.0142	11.7933
YEAR	-0.0012	0.0010	-1.1618
REG_EU	-0.1585	0.0134	-11.8290
REG_US	-0.1784	0.0132	-13.5121
REG_W. Asia	-0.0837	0.0216	-3.8713
I(log(HIGH * LOW)/2)	0.9546	0.0019	492.4043
log(HIGH/LOW)	-0.2352	0.0293	-8.0261

Table 3: Fixed Effects Estimates for Model 2

	grp	var1	var2	vcov	sdcor
1	NAME	(Intercept)		0.0868	0.2945
2	Residual			0.2039	0.4516

Table 4: Random Effects Estimates for Model 2

Model II

- Converted age into different youth subgroup
- Base Group: Loc-China, Youngest Group (YOUNG0)
- YOUNG3 (dead artists) coefficient less than YOUNG2(the eldest group)
- Geographical price variation does exist

Youth Premium non-existent, then does the event “Death” creates significant price hike?

Data Modeling

$$\log(PRICE_{ij}) = \beta_0 + \nu_{0i} + \nu_{1i}\beta_{DEAD} + \beta_{DEAD} + \beta_{YEAR} + \beta_{LOCATIONS} + \beta_{RANGE\_MEAN} + \beta_{RANGE} + \epsilon_{ij}$$

$$\epsilon \sim \mathbb{N}(0, \sigma_\epsilon)$$

$$\begin{pmatrix} \nu_{i0} \\ \nu_{i1} \end{pmatrix} \sim \mathbb{N}\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix} \begin{bmatrix} \sigma^2_{\nu_0} & \sigma_{\nu_0\nu_1} \\ \sigma_{\nu_0\nu_1} & \sigma_{\nu_1{}^2} \end{bmatrix} \right)$$

	Estimate	Std. Error	t value
(Intercept)	-5.5673	9.4215	-0.5909
DEAD1	0.0083	0.0347	0.2391
I(log(HIGH * LOW)/2)	0.9400	0.0060	157.2368
log(HIGH/LOW)	-0.2453	0.1042	-2.3544
REGIONEU	-0.0760	0.0495	-1.5350
REGIONUS	0.0111	0.0518	0.2149
REGIONWA	0.0759	0.1010	0.7519
YEAR	0.0033	0.0047	0.7121

Table 5: Fixed Effects Estimates for Model 3

	grp	var1	var2	vcov	sdcor
1	NAME	(Intercept)		0.0525	0.2290
2	NAME	DEAD1		0.0281	0.1676
3	NAME	(Intercept)	DEAD1	-0.0231	-0.6019
4	Residual			0.1859	0.4312

Table 6: Random Effects Estimates for Model 3

Model III

- Subsampled artist who passed away during 10 year frame to investigate the effect of death
- Base Group: Same as Model II
- Random effect death variance is smaller than the artist and residual
- DEAD1 non-significant (both for subsample and whole dataset)

Conclusion

Contemporary Auction House does not exhibit *youth premium*

- Mixed regression indicates the eldest artists' works tend to be sold the highest considering locational factors and auction house expectation
- However, the death effect itself does not exhibit significant price rise limited in the given time frame, it might already be reflected in the price of artists who are closer to death
- Locational variation in art pricing, auction house is the price maker

Limitations

- Death Effect: Might take longer time for realization
- Art Market Trend: 10 year frame limitation could be longer
- Sampling Bias: Christie's auction house, arbitrary auction event selections for crawling

Thank you.