PRICING CONTEMPORARY ART

Ralf Peters | Boot (Boat) | 2007

MOTIVATING QUESTION

Is it possible to systematically predict the price of an artwork based on characteristics of the work and its artist?

- Useful for sellers and buyers

Pierre Clerk | Plate II (Green) | 1973

DATA

- ➤Scraped from Artspace.com
- ➤6,400 artists
- ➤22,100 artworks
  - ➤70% created since 2010, 84% since 2000
  - ➤15,800 had price data
  - ➤Lots of other missing data, so final n = 11,227 artworks

Victor Delfín | Baby Condor II | 1979

ARTIST-LEVEL FEATURES

- Year of birth
- Living/dead (thanks, Nora!)
- Academic degrees
- Museum collections
- Galleries
- “Fame”

Jamie Lau | Betting Shop (Red) | 2009

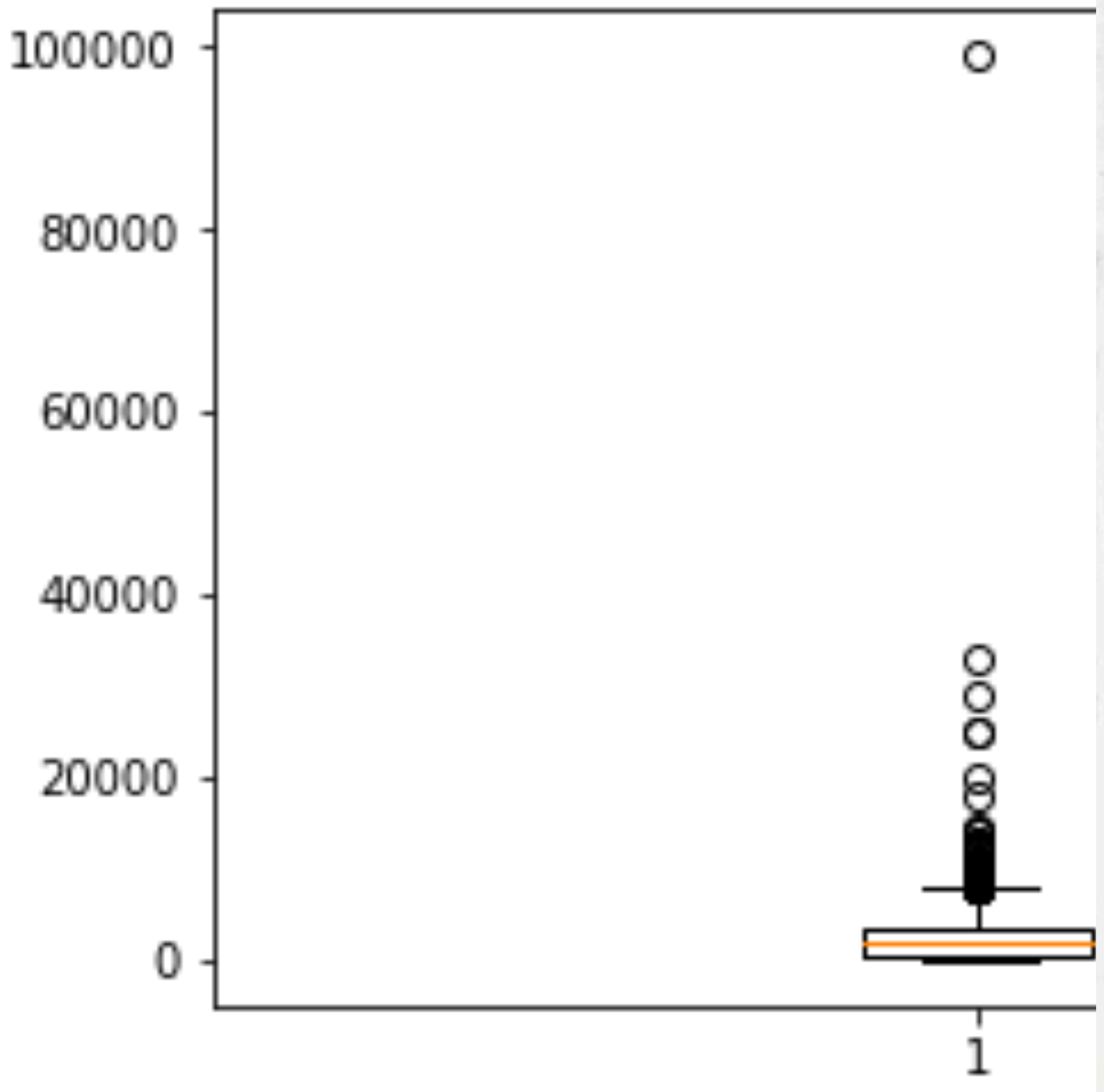
ARTWORK-LEVEL FEATURES

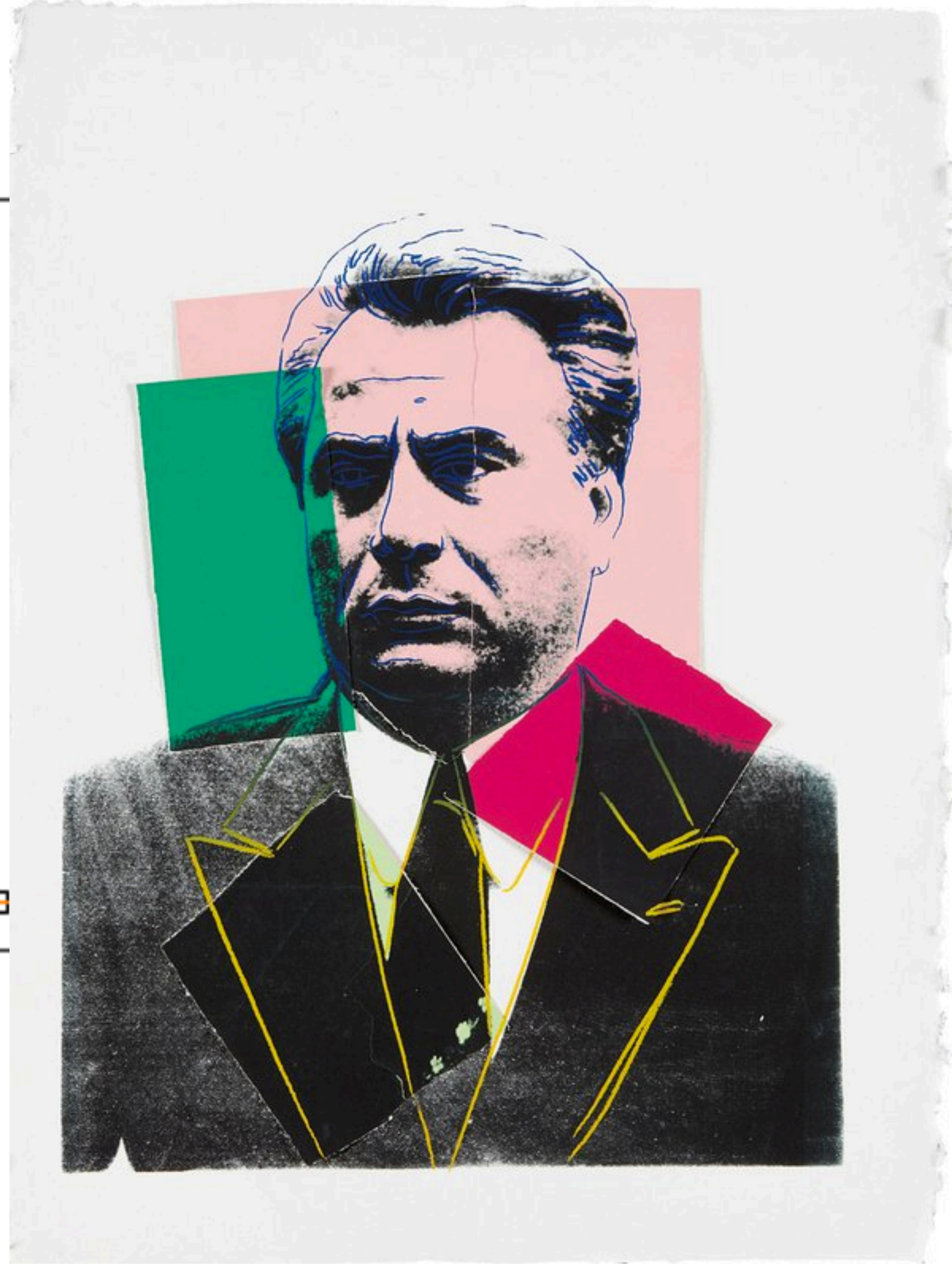
- ➤Decade created
- ➤Medium (painting, print, photograph, sculpture…)
- ➤Physical size (area)
- ➤Edition size (e.g., unique work, or number of copies of a print)
- ➤Signed?

Easton Pribble | *Blue Tree, Green Tree* | *1996*

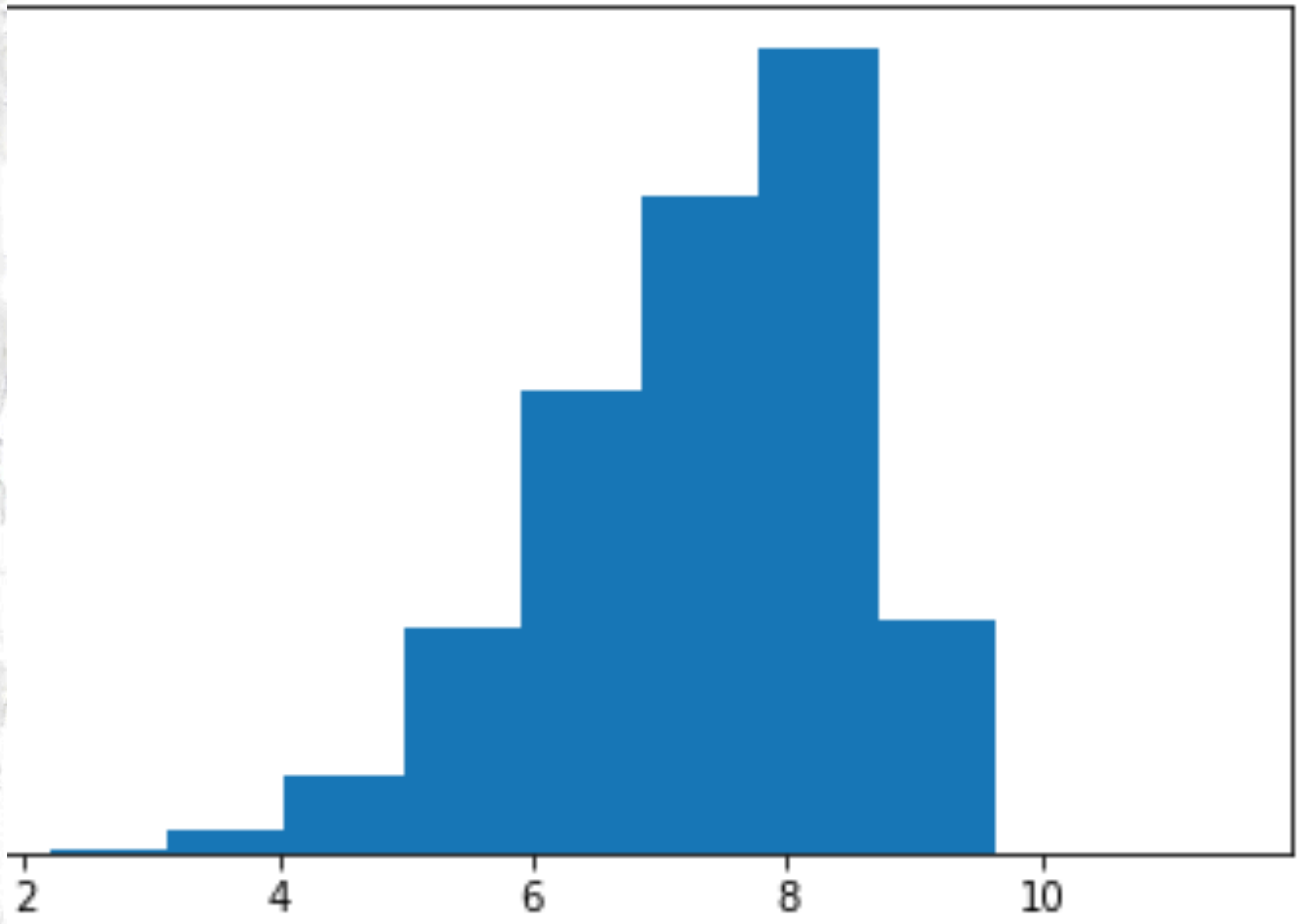
TRANSFORMING PRICE

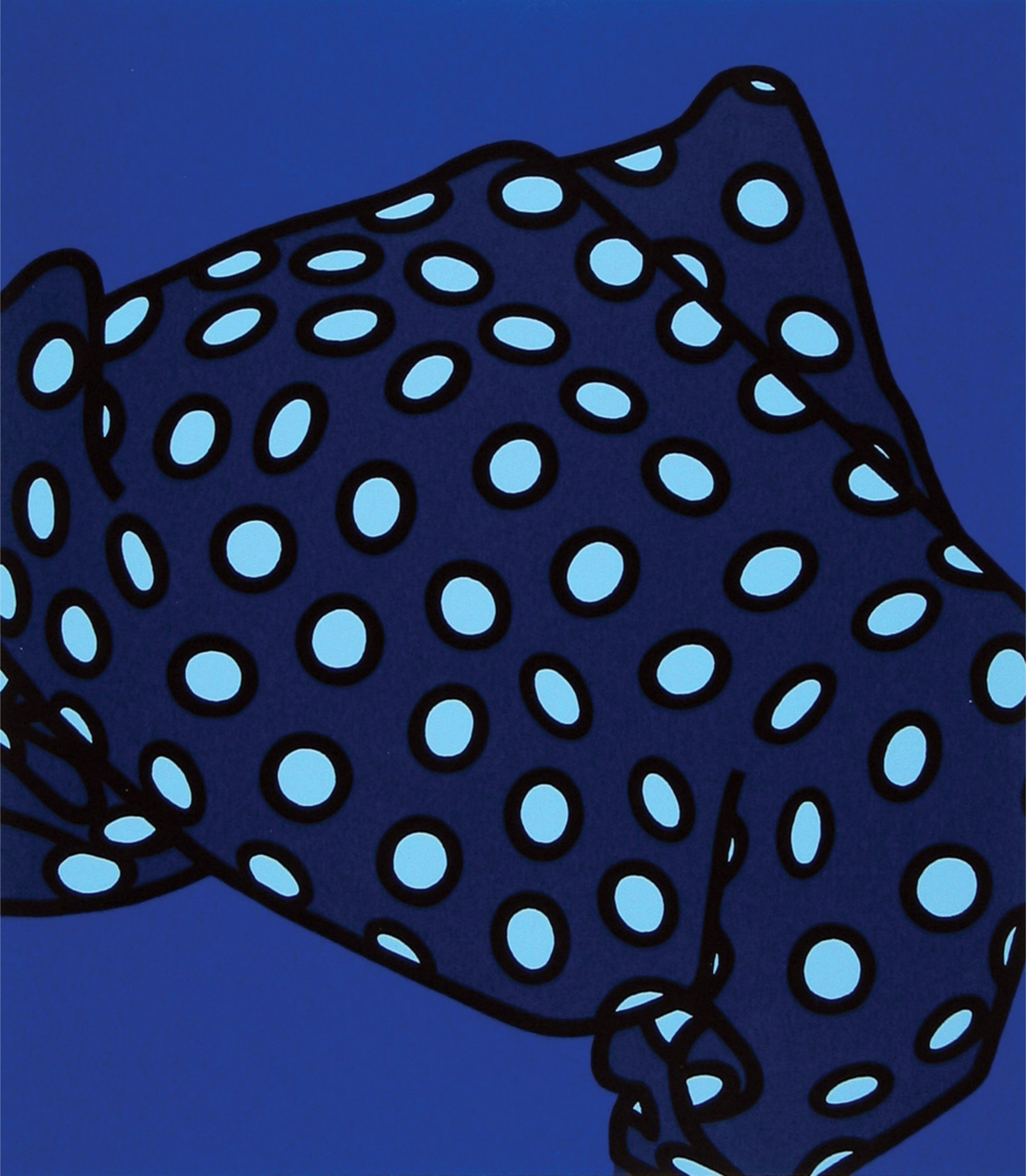
Price





log(Price)





ANALYSIS AND FEATURE ENGINEERING

- Cross-validation: test/train, 80/20 split
- Linear regression
- Add polynomial features
- Add/modify features
- Regularization with LASSO and Ridge

Patrick Caulfield | *She'll Have Forgotten Her Scarf* | *1973*

RESULTS

Model	Train score	Test score
Start with OLS regression	.47	.45
Add polynomial features (best degree = 2)	.63	.57
Recast “fame” as categorical	.62	.55
Add “living” feature	.63	.57
Regularize with LASSO	.62	.56
Regularize with Ridge	.63	.56

Edwin Salmon | Chromatid Mutation II | 2017

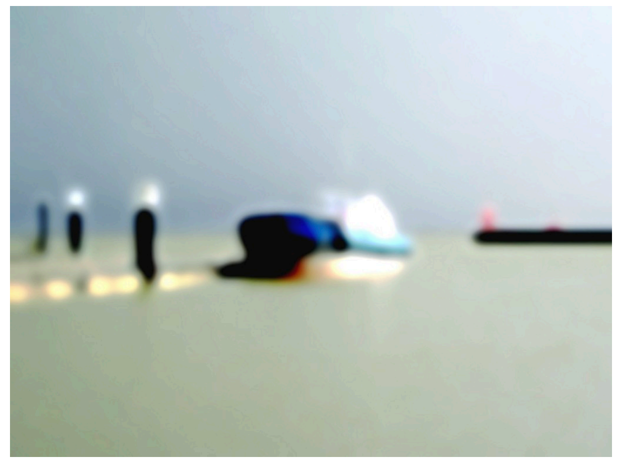
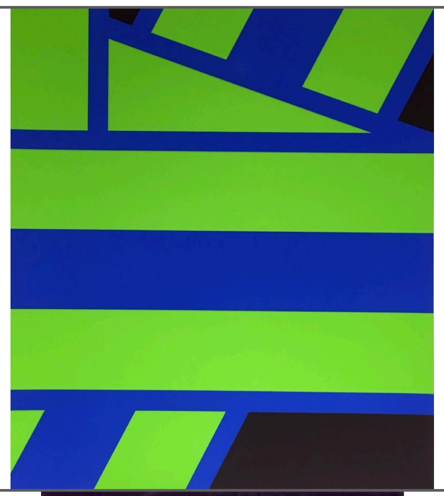
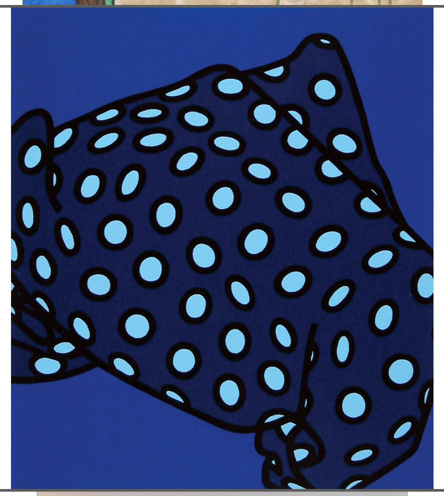
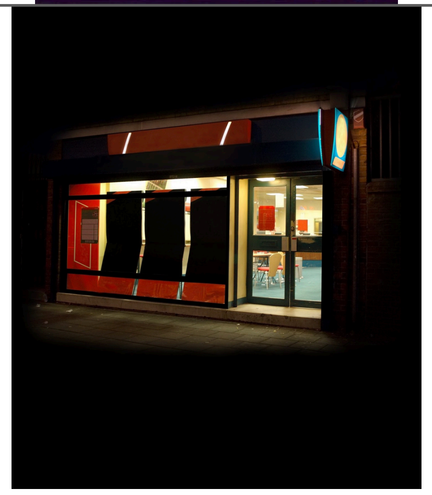
SO, WHAT MAKES AN ARTWORK VALUABLE?

(in descending order of scaled coefs)

- Artwork is larger (.47)
- Not a print (.45) or "decorative arts" (.40)
- Unique work (.43) or smaller edition (.29)
- Artist is "blue-chip" (.25) or "established" (.21)

Charles Hinman | *Before the Letter* | *1973*

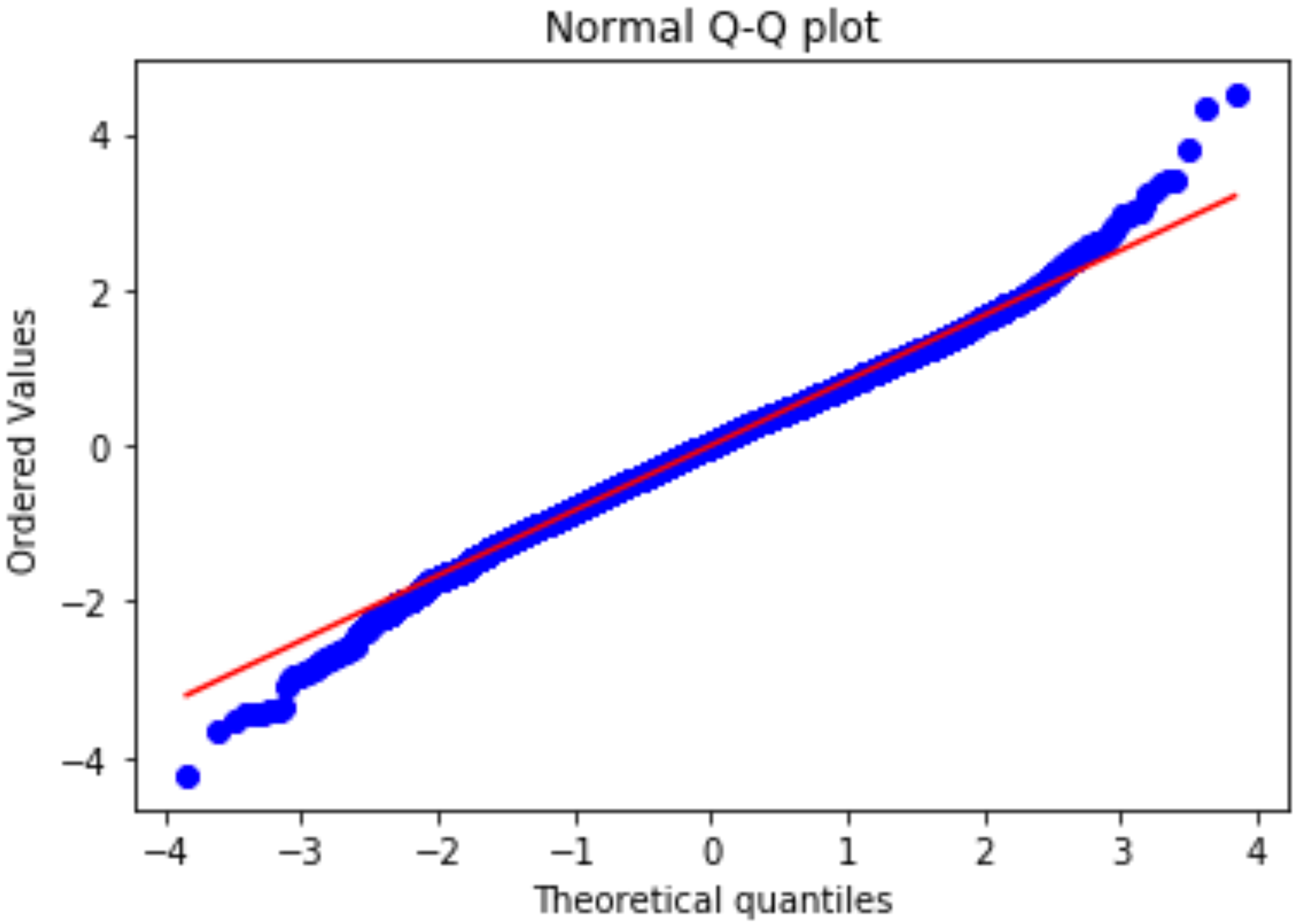
HOW DID THE MODEL PERFORM IN THE REAL WORLD?

Artwork	Predicted	Actual	Ratio	Artwork	Predicted	Actual	Ratio
	$225	$703	3.13		$1432	$2500	1.75
	$1536	$875	0.57		$1448	$524	0.36
	$1237	$417	0.34		$1339	$1400	1.05
	$128	$1377	10.76		$833	$500	0.60

THANK YOU

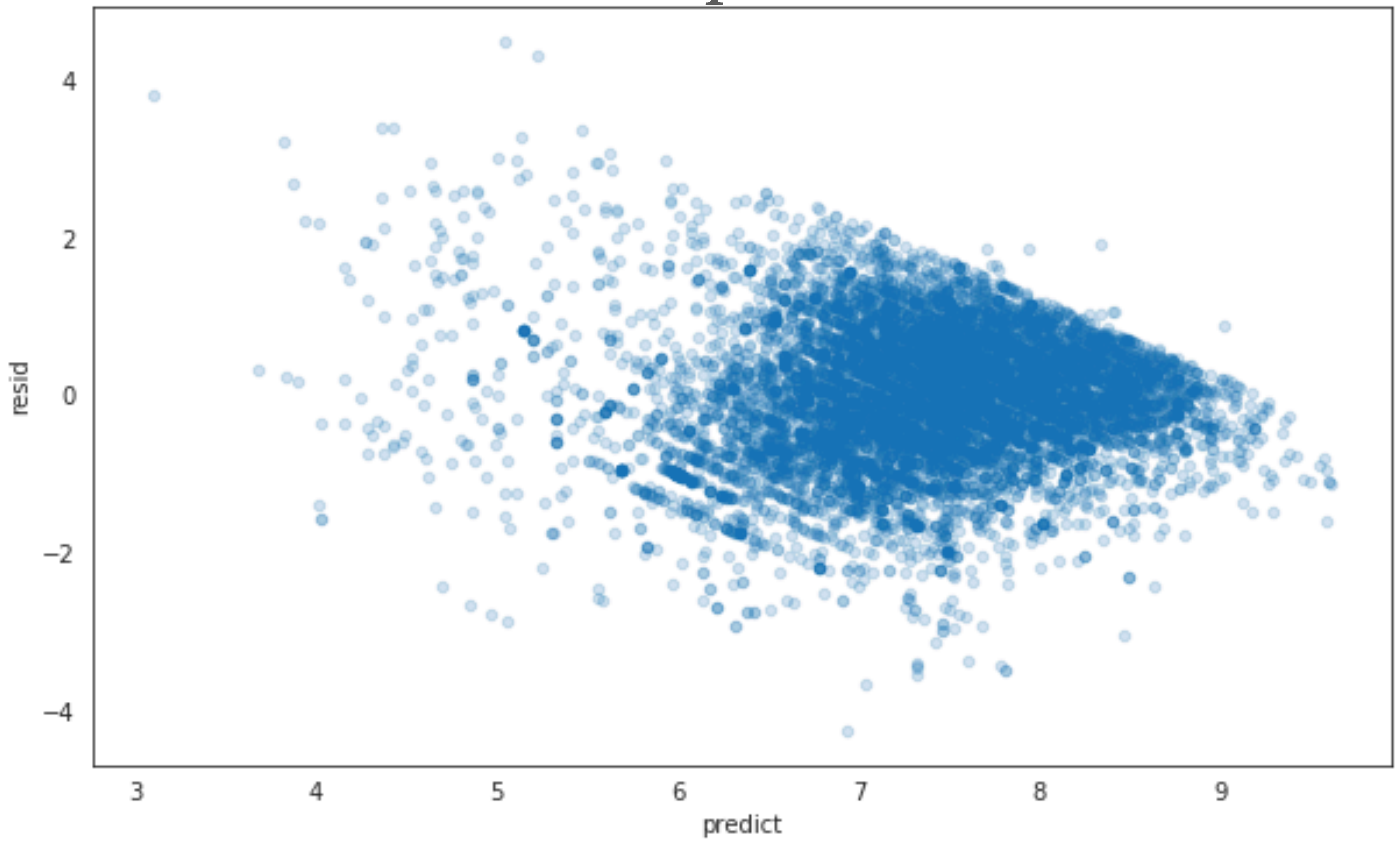
Anne Winston | A Break in the Clouds | 2015

TESTING ASSUMPTION 2: RESIDUALS ARE NORMALLY DISTRIBUTED

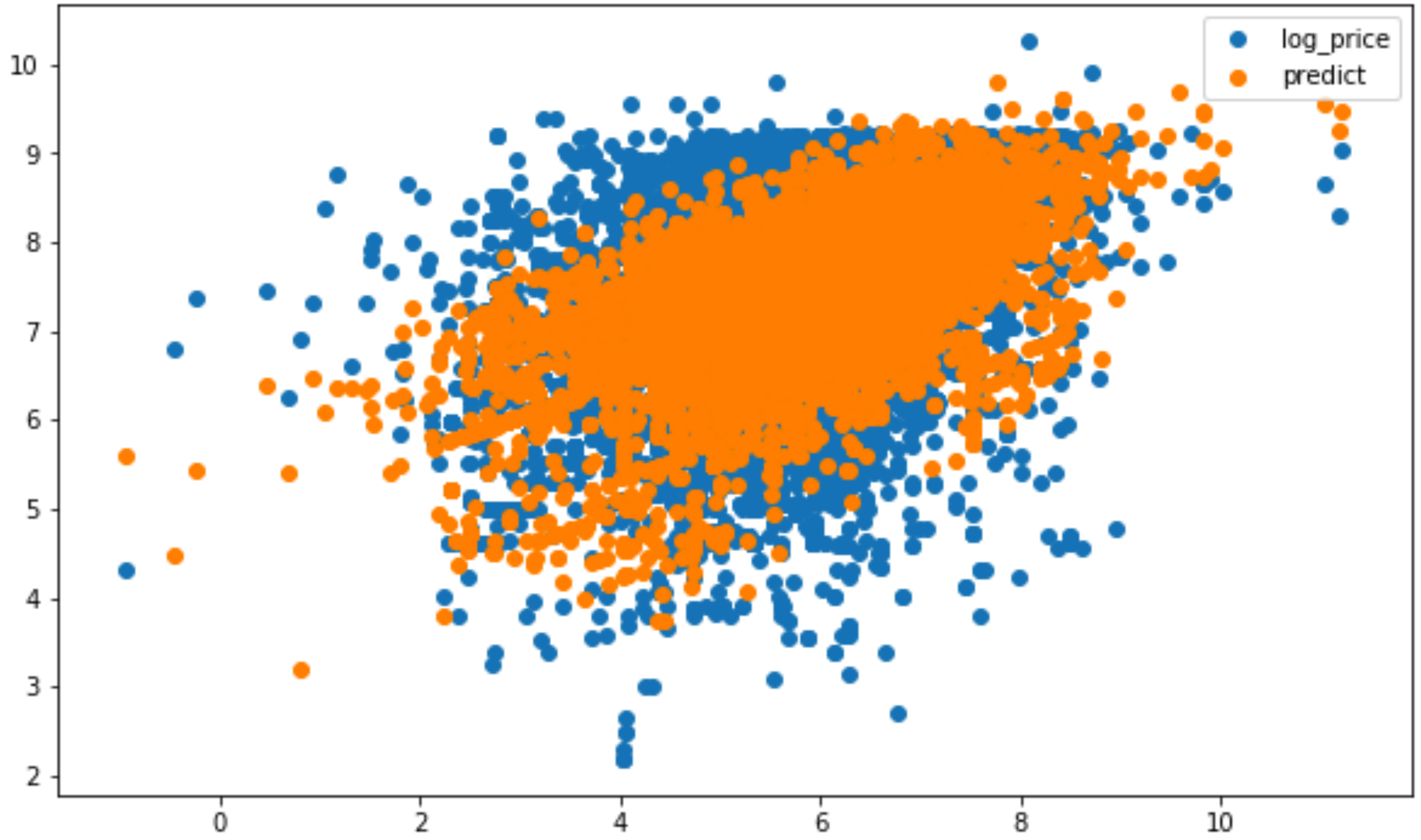


TESTING ASSUMPTION 3: ERROR TERMS HAVE CONSTANT VARIANCE

Residuals vs predicted values

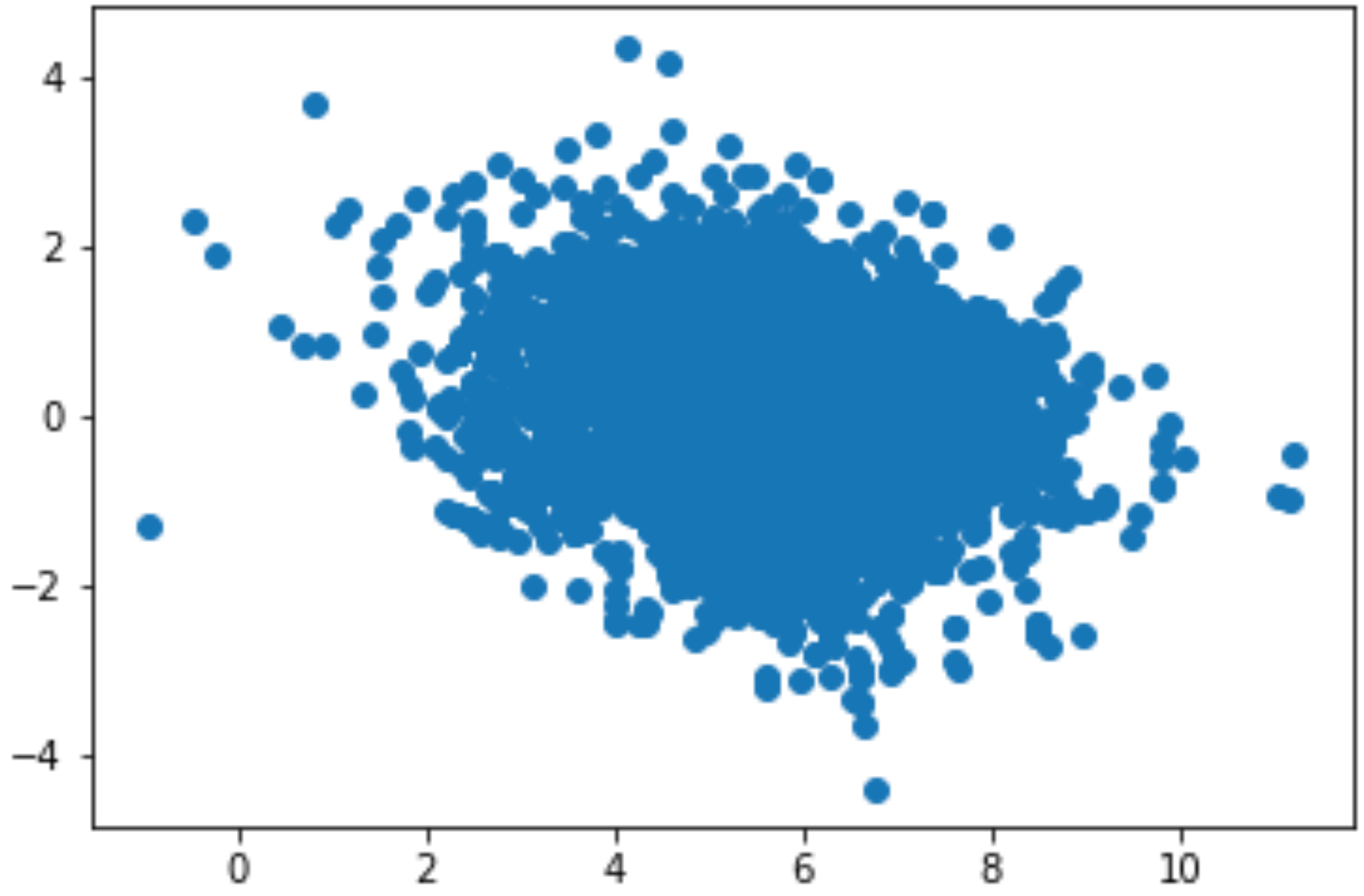


Price vs. area



TESTING ASSUMPTION 4: ERRORS ARE UNCORRELATED ACROSS OBSERVATIONS

Residuals vs. log(area)



Residuals by fame category