

### Predicting Rental Prices

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#### What is Turo?

- Peer to peer car sharing
- "AirBNB for cars"
- Flexibility and options
- Huge variety of vehicles

#### Motivation

- Gain a better understanding of pricing influences
- Owners: Maximize their earnings
- Renters: Recognize value
- Turo: Enhance price suggestion tools

#### Data Sources

- Random Sampling of 2,784 Vehicles
- Turo Data
- Motortrend Vehicle Valuations

# Data Features to Predict Price

Business Class

- # of Trips
- Distance from Airport
- # of Reviews

Free delivery

Vehicle Age

Instant Booking

Purchase Value

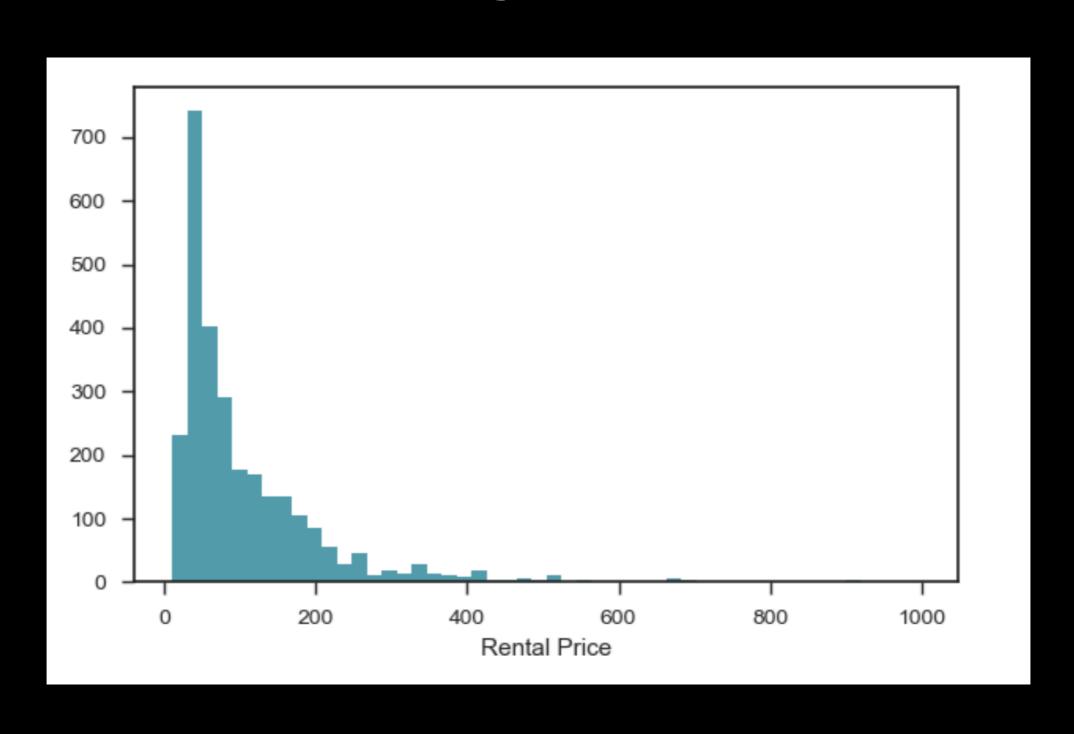
Vehicle Type

Transmission

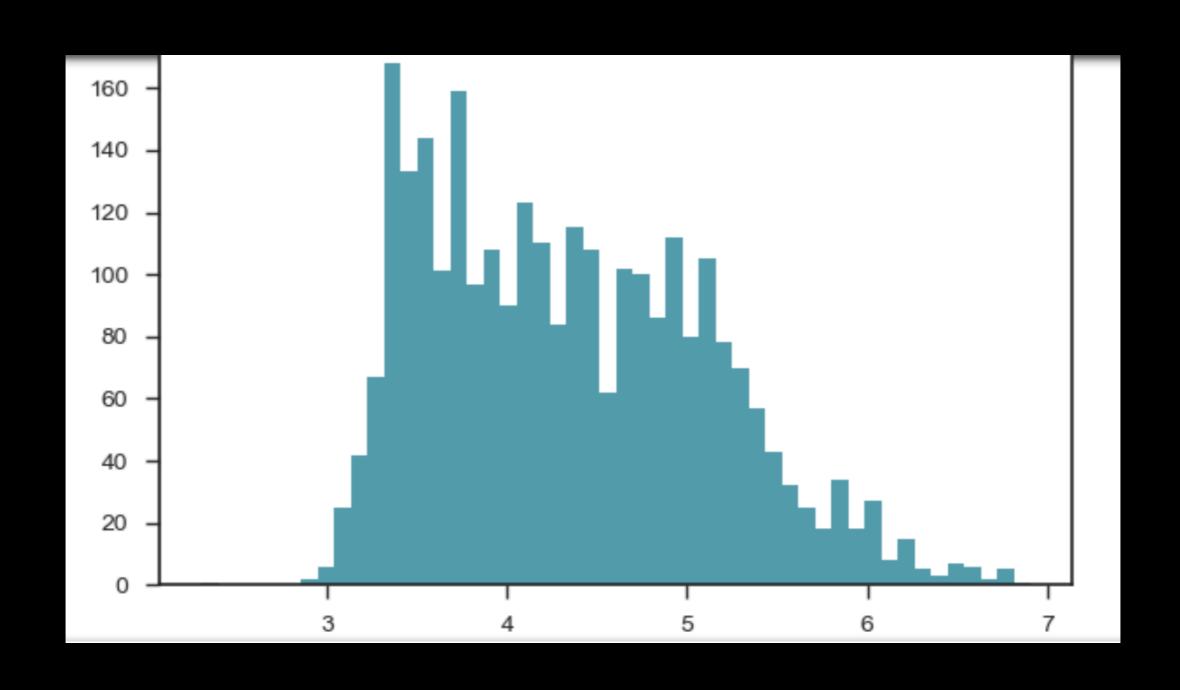
### Model Design

- Linear regression
- Normalized Response Variable
- Cross Validation (10 fold)
- Optimized Complexity

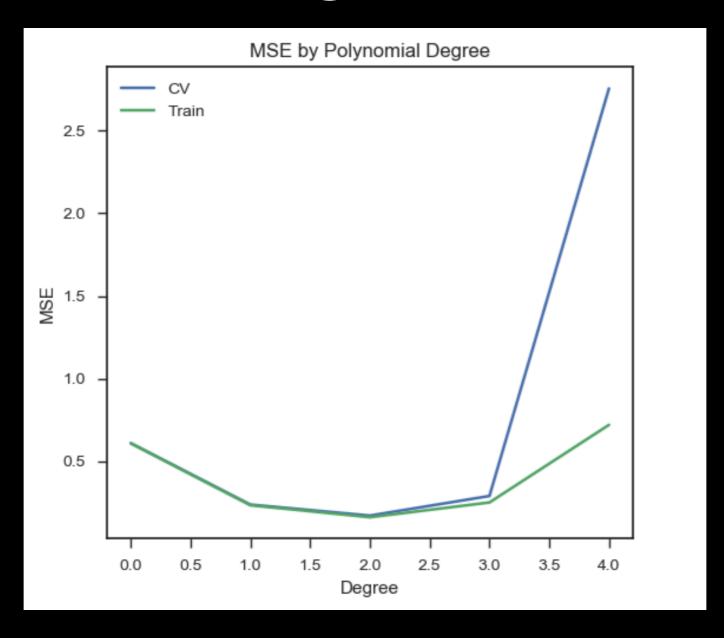
# Rental Prices Not Normally Distributed



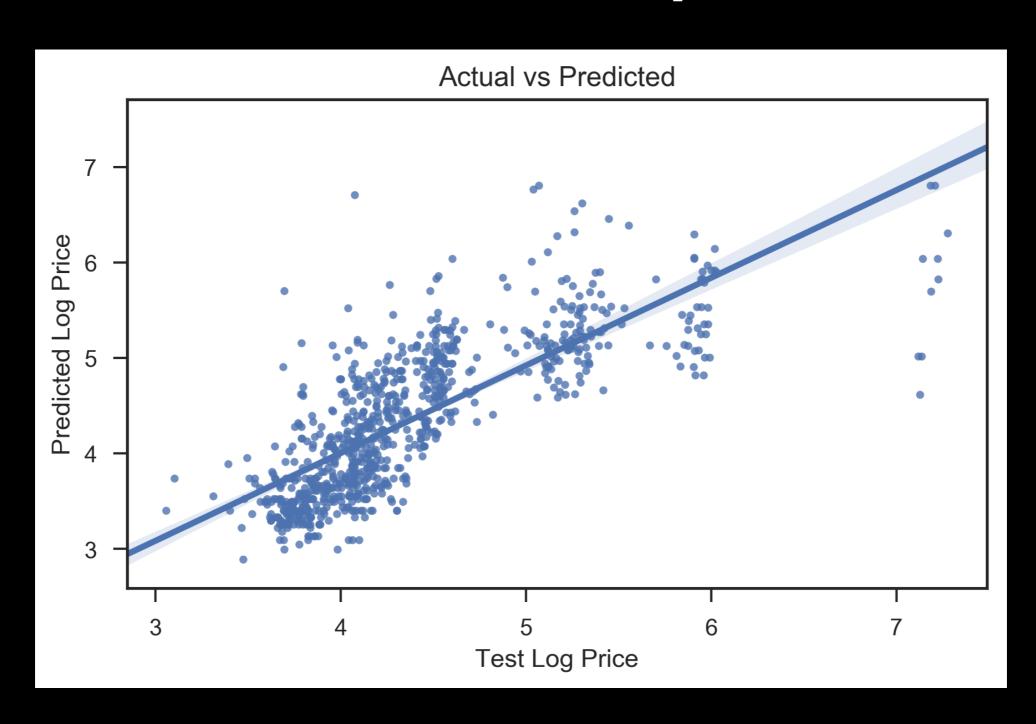
# Transform Response Variable To Log of Price



# Model complexity tested for underfitting / overfitting



#### Actual Response vs Predicted Response



# Model Key Performance Indicators

 $MeanofR^2 = 0.613$ 

Model explains 61% of the variability

Mean of MSE = 0.251

Average variability of model

# Sample Fits of Randomly Selected Vehicles

### 2014 Chevy Silverado



**Actual Price: \$106** 

**Model Fit:** \$88.36

**Comment: Trucks fit the model well** 

### 2016 Dodge Caravan



**Actual Price: \$70.37** 

Model Fit: \$50

Comment: Less exciting vehicles= lower price

#### 2016 Tesla Model X



Actual Price: \$316

**Model Fit:** \$213.41

Comment: Exotic vehicles = poor fit / outlier

### 2016 Ford Fusion



**Actual Price: \$72** 

**Model Fit:** \$62.20

**Comment:** 

Standard vehicles fit well

### Thank You

### Questions?

## Appendix

OLS Regression Results							
Dep. Variable:	log_price	R-squared:	0.595				
Model:	OLS	Adj. R-squared:	0.593				
Method:	Least Squares	F-statistic:	406.6				
Date:	Fri, 12 Oct 2018	Prob (F-statistic):	0.00				
Time:	06:06:40	Log-Likelihood:	-2004.8				
No. Observations:	2784	AIC:	4032.				
Df Residuals:	2773	BIC:	4097.				
Df Model:	10						
Covariance Type:	nonrobust						

Omnibus:	131.902	Durbin-Watson:	1.555
Prob(Omnibus):	0.000	Jarque-Bera (JB):	201.698
Skew:	0.416	Prob(JB):	1.59e-44
Kurtosis:	4.023	Cond. No.	3.27e+05

	coef	std err	t	P> t	[0.025	0.975]
Intercept	3.7949	0.059	64.799	0.000	3.680	3.910
frDvy[T.True]	0.0287	0.022	1.306	0.191	-0.014	0.072
AT[T.True]	-0.1509	0.055	-2.756	0.006	-0.258	-0.044
trips	-0.0084	0.001	-8.796	0.000	-0.010	-0.006
trips_sq	5.111e-05	8.43e-06	6.065	0.000	3.46e-05	6.76e-05
age	-0.0117	0.011	-1.117	0.264	-0.032	0.009
age_sq	0.0021	0.001	1.769	0.077	-0.000	0.004
sold	2.494e-05	4.88e-07	51.093	0.000	2.4e-05	2.59e-05
type_minivan	-0.0818	0.084	-0.974	0.330	-0.247	0.083
type_suv	0.1549	0.023	6.753	0.000	0.110	0.200
type_truck	0.3359	0.070	4.777	0.000	0.198	0.474
		False				