Andy Wong

Major: Masters in Information Management
School: University of Washington
Targeted Graduation: June 2024
Division: Cox Automotive
Hiring Manager: Chris Stutsman
Email: wongand18@gmail.com
LinkedIn: Linkedin.com/in/andy-wong-data

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Forecasting Vehicle Retail Depreciation:

Dataset Preparation

The retail depreciation model will help **dealerships** feel more **confident in their pricing** choices for **used vehicles** by providing a projected average list price **x** days in the future

Aggregation on a PER DAY basis on a YEAR MAKE MODEL level

Vehicle Properties:

MODEL YEAR	MAKE	MODEL	SERIES
VEHICLE SEGMENT	DRIVETRAIN TYPE	BODY TYPE	BODY CABSTYLE
AVERAGE LIST PRICE	MEDIAN LIST PRICE	AVERAGE ODOMETER READING	MEDIAN ODOMETER READING

Market Data:

ACTIVE LISTINGS COUNT	RECENT LISTINGS COUNT	SOLD LISTINGS COUNT	MARKET DAY SUPPLY

Manheim Market Report Data

MMR INDEX	MSRP	MMR INDEX % OF MSRP

Self-Defined:

15 DAYS OUT LIST PRICE DIFFERENCE	SHIFTED WHOLESALE LAGGED DIFFERENCE	MONTHLY WHOLESALE SLOPE	SHIFTED SOLD COUNTS DIFFERENCE
CREST INDICATOR	WHOLESALE SIZE DIFFERENCE		

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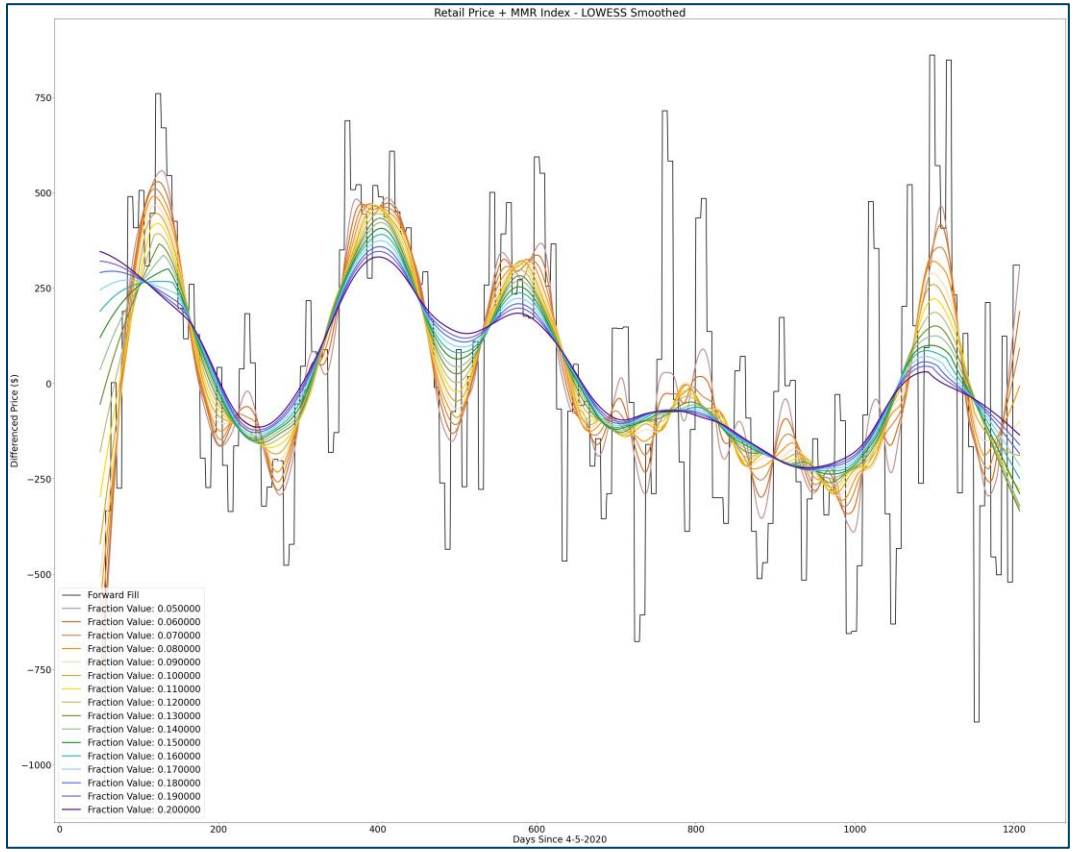
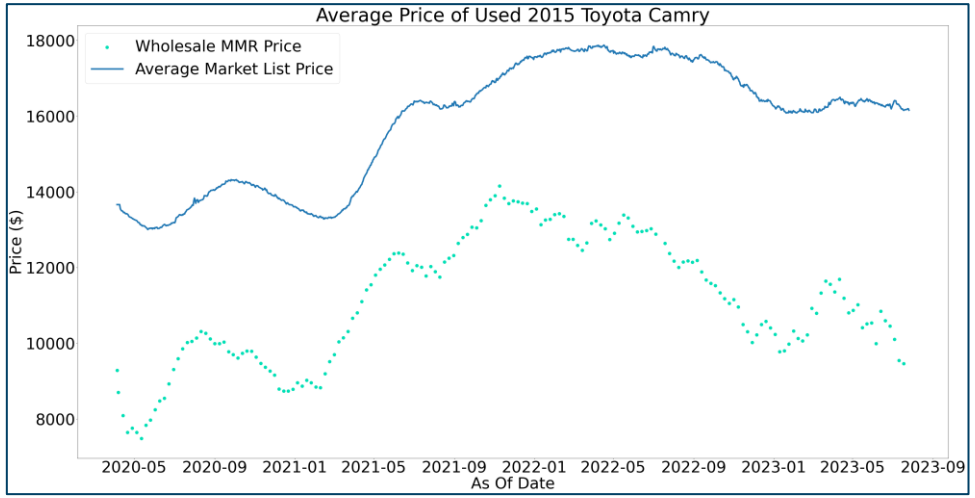
Forecasting Vehicle Retail Depreciation:

Dataset Visualization and Analysis





- Univariate/Bivariate Visualizations Against Target
- LOWESS Smoothing
- Shift Differencing

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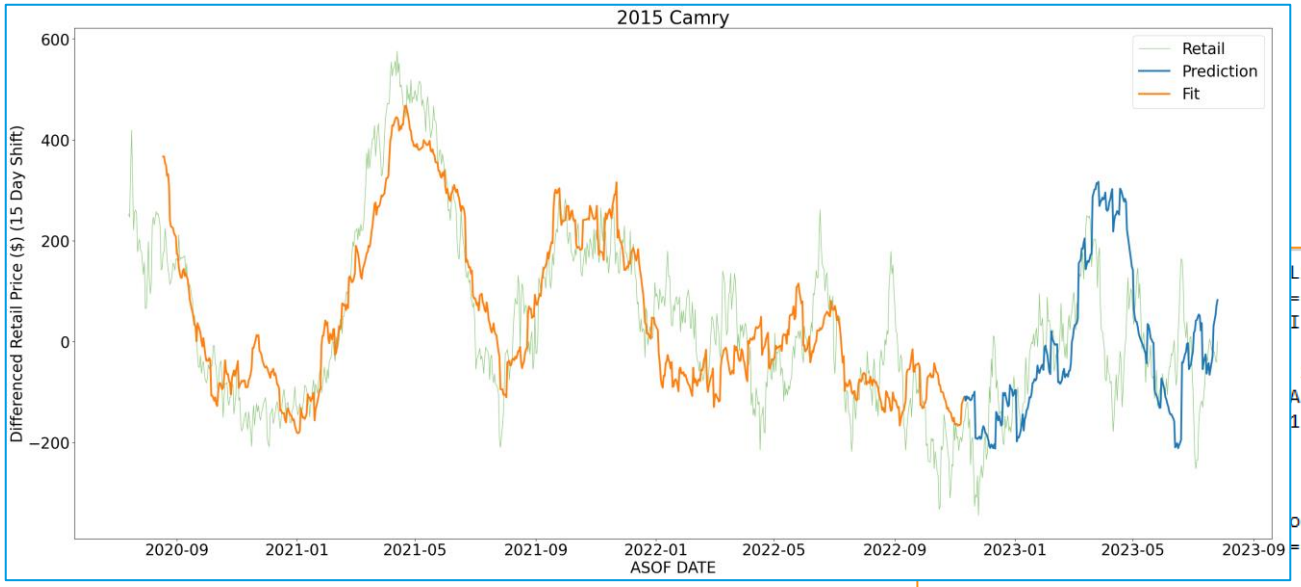
Forecasting Vehicle Retail Depreciation:

Model Building



Granularity: Model Year, Make, Model (i.e. *2015 Toyota Camry*)

Timepoint Scale: Daily Average of all Market Data

Target: 15 Day Differenced Market Average List Price ($)

LS Regression Results

IFT_DIFF	R-squared:		0.758
OLS	Adj. R-squared:		0.756
Squares	F-statistic:		422.4
Aug 2023	Prob (F-statistic):		3.59e-245
15:43:59	Log-Likelihood:		-4823.3
815	AIC:		9661.
808	BIC:		9693.
6			
onrobust			

	coef	std err	t	P>|t|	[0.025	0.975]
const	124.8559	25.939	4.813	0.000	73.941	175.771
MDS	-1.6869	0.551	-3.063	0.002	-2.768	-0.606
MMR_7WK_SHIFT_SMOOTH_05	0.4983	0.017	29.666	0.000	0.465	0.531
CREST	-55.3095	7.779	-7.110	0.000	-70.579	-40.040
OVERALL_MONTH_SLOPE_MMR	-0.1254	0.009	-14.138	0.000	-0.143	-0.108
SOLD_2WK_1WK_SHIFT	0.3859	0.055	7.065	0.000	0.279	0.493
WHOLESALE_SIZE_DIFF	0.2761	0.189	1.457	0.146	-0.096	0.648

Omnibus:	8.604	Durbin-Watson:	0.176
Prob(Omnibus):	0.014	Jarque-Bera (JB):	8.508
Skew:	0.224	Prob(JB):	0.0142
Kurtosis:	2.778	Cond. No.	3.57e+03

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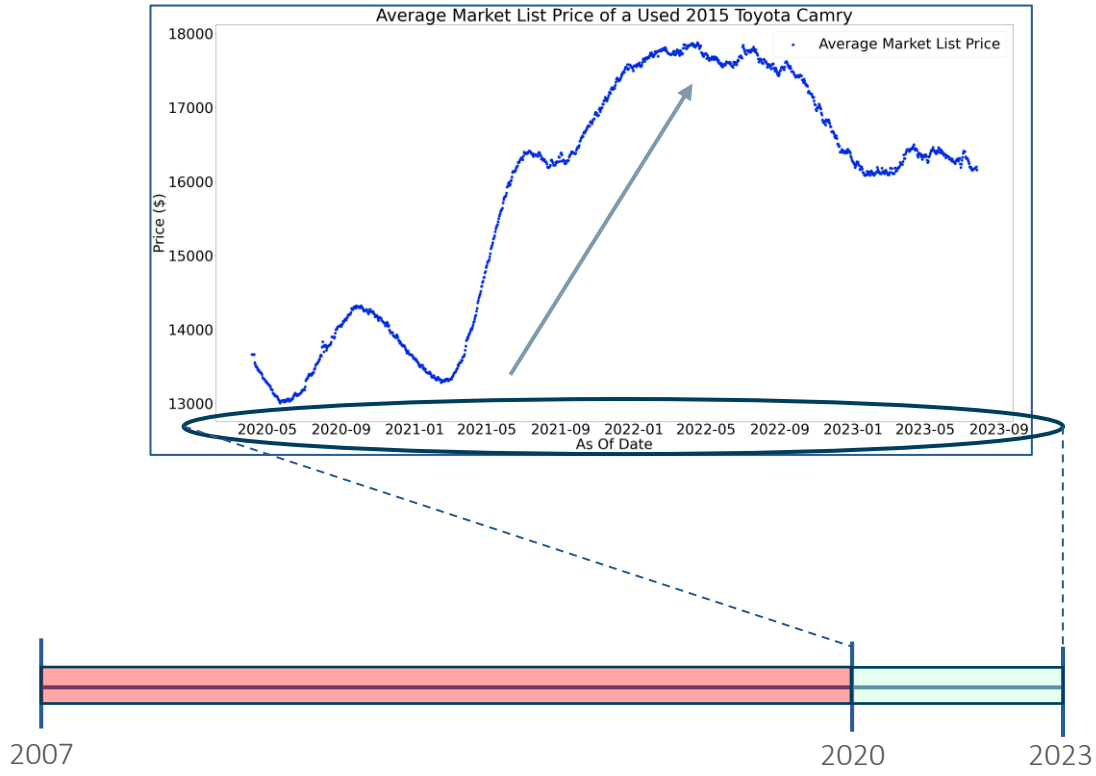
Forecasting Vehicle Retail Depreciation:

Ongoing Questions



How do we factor in special circumstance (COVID) years?

How do we transition the model to handle more historical data?

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Personal/Professional Growth:

- **Interpersonal Communication Abilities**
- **Familiarity with an Agile Iterative Development Cycle**
- **Effective Presentation Capabilities**
- **SQL Query Writing**
- **Time Series Data Analysis**
- **Efficient Data Science Practices**