temporary title

MTKG776: Applied Probability Models in Marketing

2017-04-05

Contents

Dish Network Subscriber Acquisition
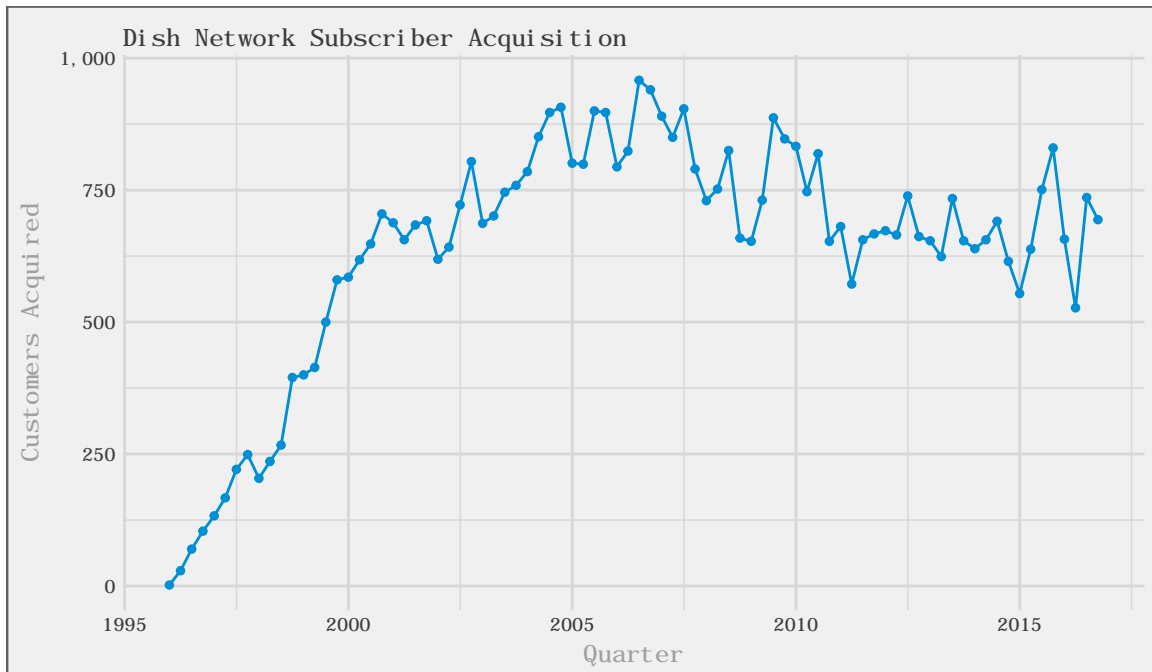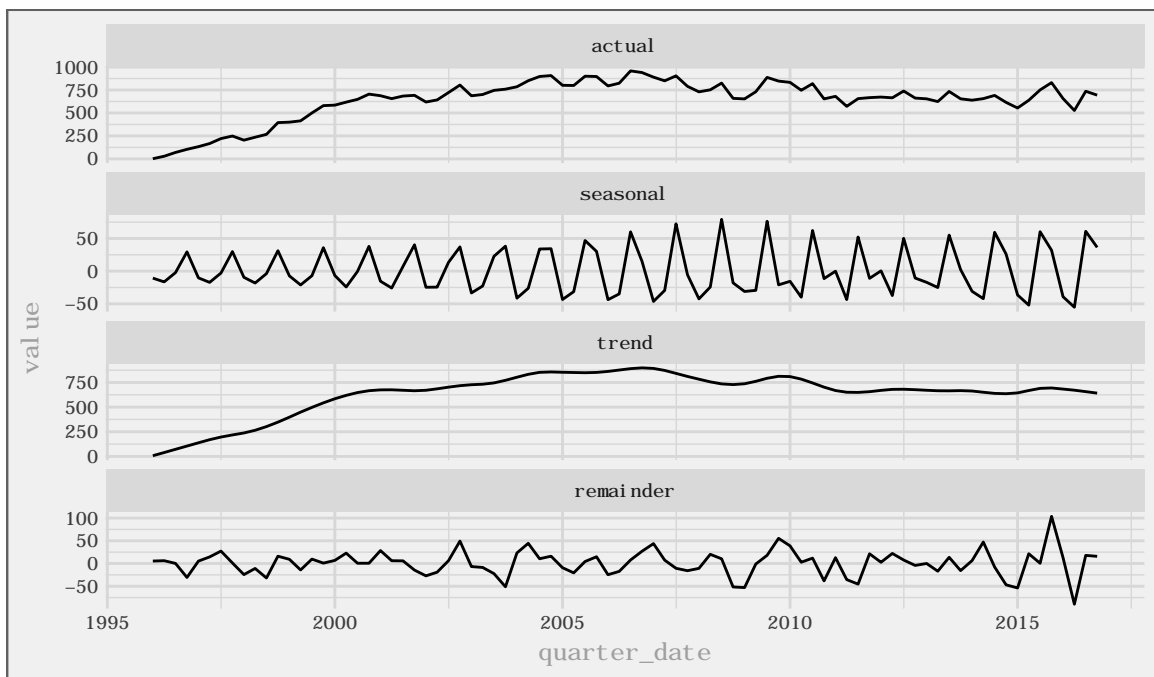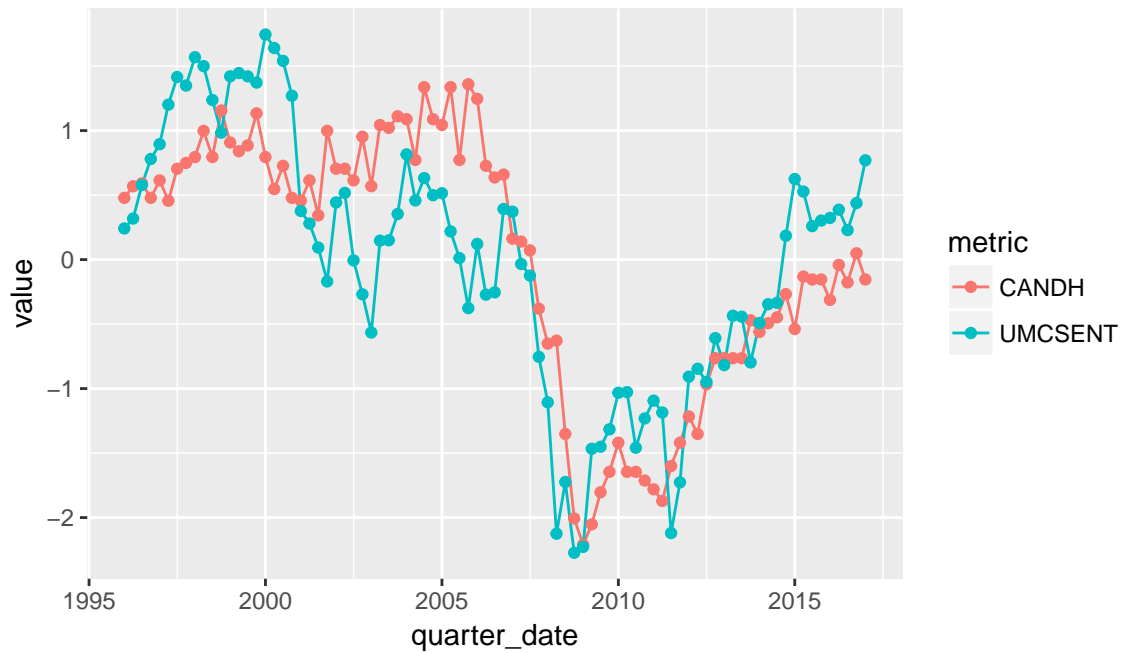
Word Count: 132

1 Executive Summary

Forceast Plot

2 Analysis

2.1 Candidate Models

Baseline Model ✗ Exponential (E) ✓ Weibull (W)

Heterogeneity ✓ Gamma (G) ✗ Finite-Mixture ✗ Hard-core Never-acquirers (HCNA)

✓ 1. WG ✗ 1. 2-Segment W ✗ 1. W with HCNA
✗ 2. WG with HCNA ✗ 2. 3-Segment W
  ✗ 3. 2-Segment WG

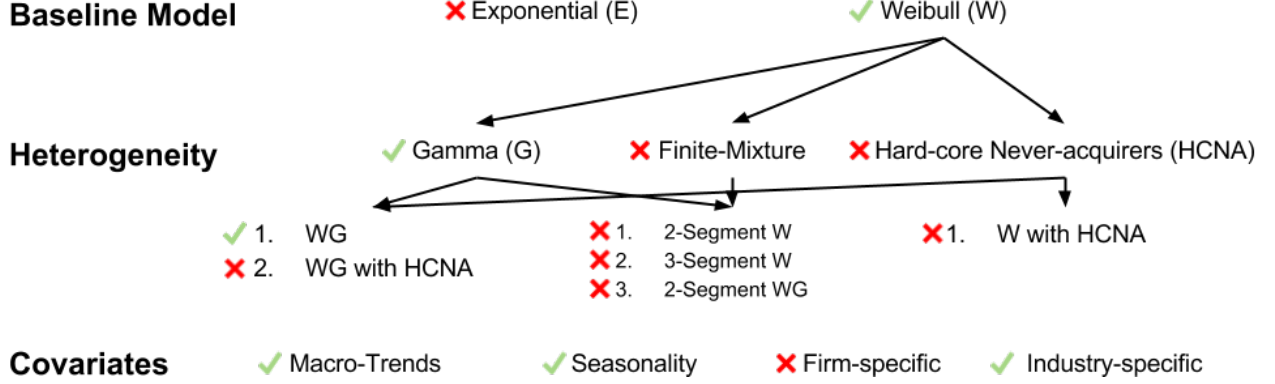**Covariates** ✓ Macro-Trends ✓ Seasonality ✗ Firm-specific ✓ Industry-specific

Figure 1: Candidate Models

$$P(T \leq t) = \int_0^\infty \left(1 - e^{\lambda B(t)}\right) \frac{\alpha^r \lambda^{r-1} e^{-\alpha\lambda}}{\Gamma(r)} d\lambda \tag{1}$$

$$= 1 - \left(\frac{\alpha}{\alpha + B(t)}\right)^r \tag{2}$$

where

$$B(t) = \sum_{i=1}^t \left(i^c - (i-1)^c\right) e^{\boldsymbol{x}(i)\boldsymbol{\beta}} \tag{3}$$

2.2 Covariates

– Explain scaling

2.2.1 Macro-Trends

### 2.2.2 Seasonality

2.2.3 Firm-specific

2.2.4 Industry-specific

2.3 WG + Covariates

Table 1: Top 10 Weibull-Gamma with Covariate Model by BIC

Covariates	# Params	LL	Median APE	BIC
CANDH & UMCSENT & seasonality & netflix_stock	7	-254,171	0.0489	508,373
CANDH & UMCSENT & seasonality & slingbox_effect & netflix_stock	8	-254,171	0.0503	508,377
UMCSENT & seasonality & netflix_stock	6	-254,175	0.0483	508,377
UMCSENT & seasonality & slingbox_effect & netflix_stock	7	-254,175	0.0478	508,382
CANDH & seasonality & netflix_stock	6	-254,196	0.0569	508,418
CANDH & seasonality & slingbox_effect & netflix_stock	7	-254,196	0.0569	508,423
CANDH & UMCSENT & netflix_stock	6	-254,262	0.0693	508,550
seasonality & netflix_stock	5	-254,271	0.0604	508,564
CANDH & netflix_stock	5	-254,271	0.0723	508,565
CANDH & slingbox_effect & netflix_stock	6	-254,271	0.0755	508,568

Cumulative Customer Acquisitions
Top 2 Models
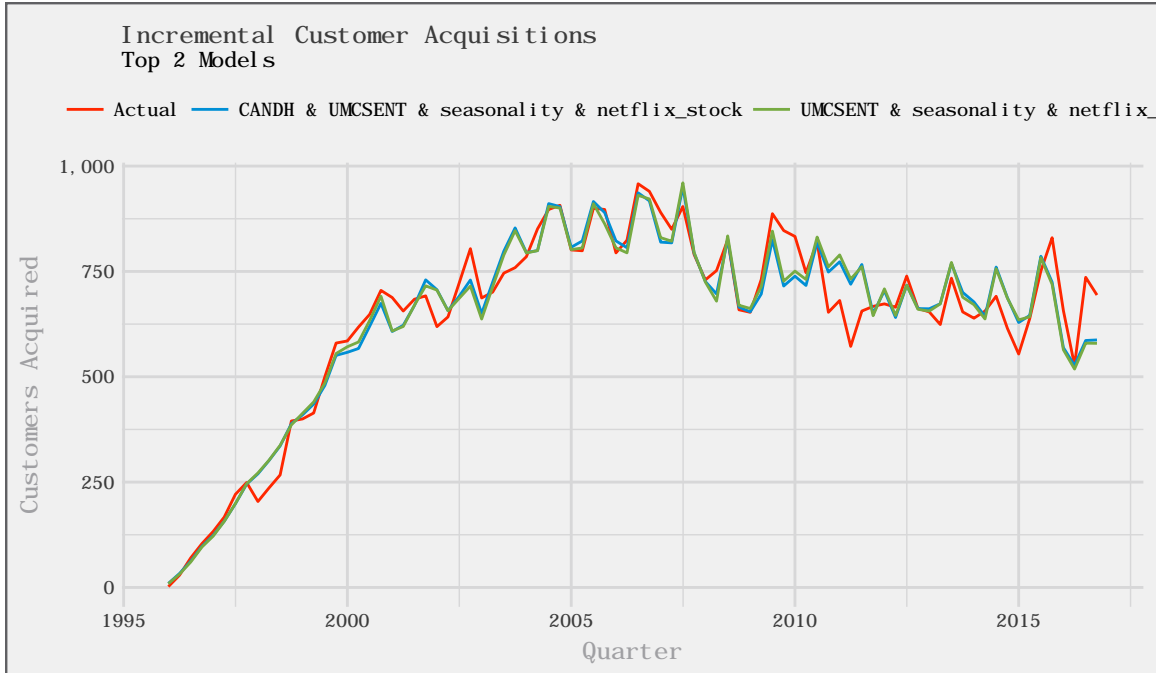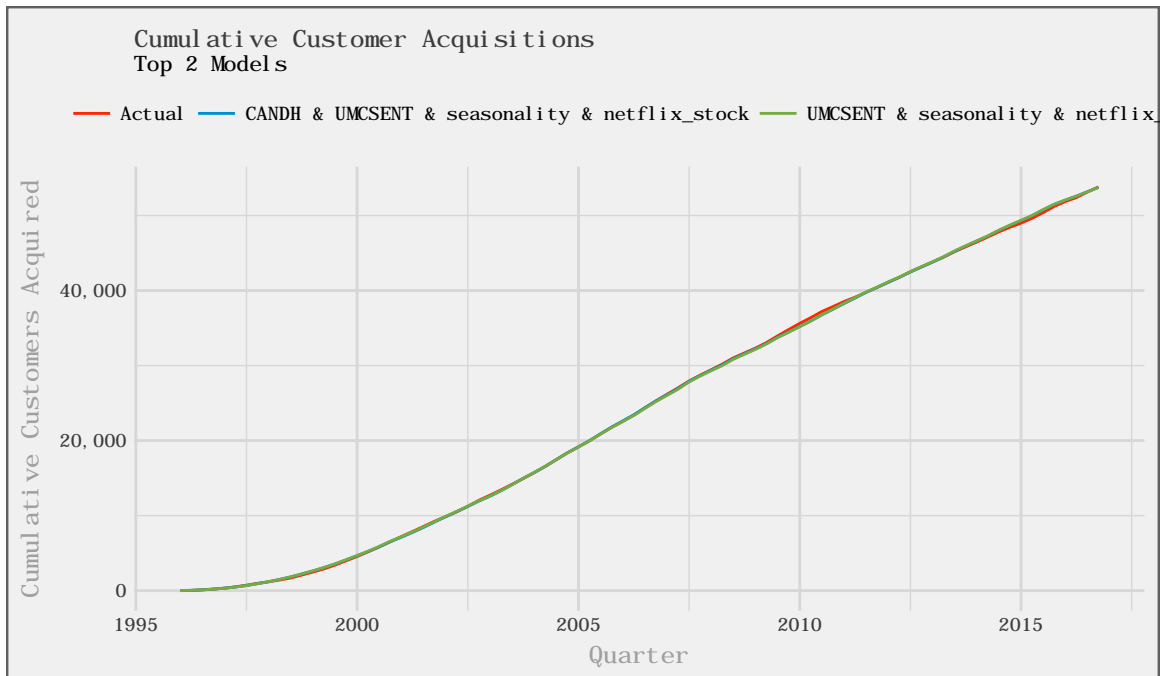
3 Results

3.1 Final Model

3.1.1 Forecast 2017

4 Limitations

5 Appendix