PREDICTING MEDICAL AND PHARMACY SPEND ON SPECIALTY DRUGS BY EMPLOYER GROUP SIZE IN THE US

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Introduction

- Prescription drug expenditure in the US for 2020 is approx. $535.3 Billion of which specialty spend accounts for 52%[1,2]
- Specialty spend is estimated to reach approx. $310 Billion across the pharmacy and medical benefit by 2030 in the US[3]
- It is estimated that out of total specialty drug spend, 40% is covered under medical and 60% under pharmacy[4].
- Due to high specialty drug expenditure, it is important for employers to understand, measure, manage and anticipate future specialty drug spend across both side of benefits.
- For this study, we chose time series forecasting techniques to predict specialty drug spend for different employer groups

Objectives

- Primary objective of the study was to forecast medical and pharmacy specialty drug spend for 3-year horizon across employer groups (aggregated)
- The analysis also focused on comparing results of time series forecasting of different cohorts of employers (based on the membership size)

Methods

- Specialty spend (both medical and pharmacy) data of members enrolled under commercial plans was analyzed from 2005 to 2019
- Only employers providing 15 years of continuous medical and pharmacy coverage were included
- Average Cost per member per year (PMPY) across employers was used as a measure to forecast future spend of employers from 2020 till 2022
- From statistical modelling standpoint, Univariate time series models (UTM) were used to predict future spend PMPY.
- UTMs were fitted using 2005 to 2016 data as training dataset and data from 2017 to 2019 as validation dataset
- Accuracy and MAPE measures were used to evaluate the forecasting models
- Cost PMPY values from 2005 to 2019 were inflation adjusted using Construct index of cyclically sensitive inflation (CSI) values taken from US Bureau of Labor Statistics.
- For the later part of the analysis, employers were divided into three groups based on employee

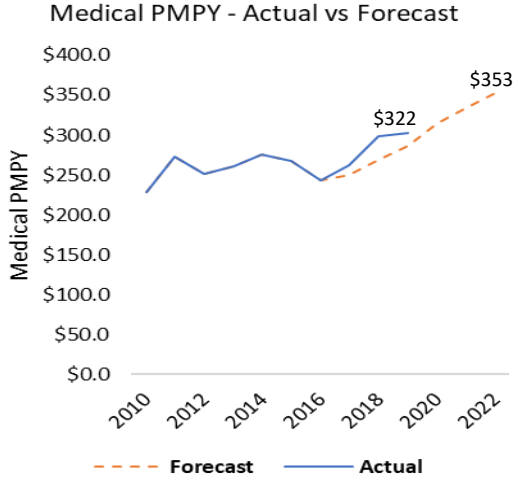
# of Employers	0-499	500-9,999	10,000+
Medical	55%	35%	10%
Pharmacy	72%	25%	3%

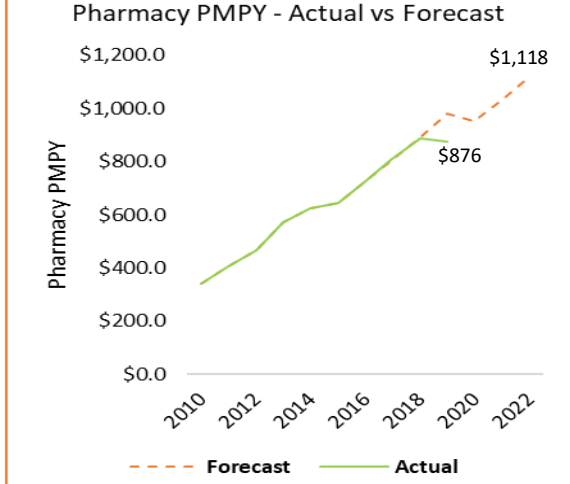
Results

- Out of all the models tested, Autoregressive Integrated Moving Average (ARIMA) model performed the best on the time series considered (refer appendix)
- ARIMA Model forecast accuracy were 94% (MAPE* = 6%) and 96% (MAPE* = 4%) for Medical and Pharmacy cost PMPY series (for all employer groups), respectively
- The forecasted medical PMPY for year 2022 is **$353** and forecasted pharmacy PMPY for year 2022 is **$1,118**, aggregated for all employer groups. The latest available actual PMPY is **$302** for medical and **$876** for pharmacy in year 2019.
- The model performance was best for employers with 10k+ employee size

Conclusion

- The average yearly growth rate was calculated to be **8.5%** in case of medical spend and **11.7%** in case of pharmacy spend aggregated across all employer groups
- Forecasting model for employers with 10,000+ employees enrolled under commercial plan performed better than employers with fewer employees based on accuracy and MAPE
- Due to high churn rate of employees under smaller employer groups, high volatility was observed, hence the model didn't perform as well for employers with less than 10,000 employees





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*MAPE = Mean Average Percentage Error