Thomas Plapinger

July 14, 2017

Project 2-Scenario 1

Executive Summary

This analysis was commissioned by the Iowa State tax board for the Iowa State legislature in order to consider changes to liquor taxes for the next fiscal year. Currently, the state of Iowa taxes its liquor at a 50% mark up price when selling to vendors. This report provides a projection of how liquor sales will progress in 2016 based on the first quarter of 2016 and the entirety of 2015 in order to help the Tax Board decide on a resolution in regards to the current tax code.

The methods used for completing this task were the use of the Ordinary Least Squares of the Singular Linear regression model analysis to build a model taking the recorded 16 months of sales in Iowa to predict not just the next 8 months, but what the entire sales total would be for 2016 by minimizing the sum of squares of the difference between the recorded data and our projections. It is important to note that the initial data modeling and analysis was done using 10 percent of the data in order to provide a test sample for our analysis so that the larger set was left unaffected. We performed cross-validation tests to ensure the minimization of error, increased accuracy, and validity of our model. Those tests were a testing/training split test, a k-folds test with the standard 10 folds, and a ridge regression.

All code and mathematic calculations can be located in the attached Jupyter Notebook document.

The results of our analysis are that liquor sales, and thus the states profits, will continue to increase into 2016. Based on the increase of 2016 Q1 compared to 2016 Q1 the total amount of new money set to arrive should be in the area of $11.4 million dollars. The sales particularly seem to increase in counties associated with the University of Iowa and Iowa State University with the primary liquors of choice being 80 Proof Vodka, Canadian Whiskies, and Straight Bourbon Whiskies.

It is the conclusion of this report that the prospect of liquor sales increasing in the State of Iowa are very likely if the current trends continues as it has done since 2004 (when the state began recording alcohol consumption by gallons) there should be no reason to believe consumption will decrease and the Tax Board should consider taking advantage of that trend.

It is my recommendation that the state Tax Board increases the tax on liquor in balance with the percentage rise in consumption and sales. If that policy remained in place for a extended period of time it could provide millions of dollars for the current benefactors of the liquor tax. Particularly, the Iowa General Fund which receives around 80% of the sales and that accounts for ~40% of its funding with the second biggest recipient being the Iowa Department of Public health which receives around 16%. These are particularly important as medical and insurance costs continue will likely continue to rise and the state will need more funds to provide the citizens of Iowa necessary healthcare.

While this report was conducted in the hopes of providing the best information to the Iowa State Tax board in order for it to makes its decision the data provided also had its limitations and if more time and manpower was able to be applied to this analysis I would suggest incorporating the following factors into our understanding of liquor sales between January 2015 and April 2016. These limitations include, a lack of previous data on liquor sales so that we know the time period under analysis is not anomaly. Data on dates of major snowstorms as it is well known that people tend to bulk up on liquor before storms, which could have provided us with the ability to account for large spikes in sales. Data on the economic status and trends of individual counties in order to understand how socio-economic status affected consumption of liquor and a person selection of type of alcohol. Specifically to this dataset, which happened to overlap with the Iowa Caucasus of the 2016 election cycle , it would have been good to have data on fluctuating population growth, which would likely change consumption rates, as press, campaign staff, and candidates of both parties crisscrossed the states. Perhaps, the greatest limitation of this dataset was that we were unable to compare the liquor sales to that of Wine and Beer sales in order to see if more revenue can be generated raising taxes either in addition to or separately on them as well.