

# Discover Scotch Whisky in the US

## Introduction

We have 3 data sets related to whisky: Scotch Whisky classification scores, USDA food and beverages import data, and Total Wine whisky price list. In this article, I would like to discover the difference among Scotch Whiskies and their availability in the US. Since I am a whisky lover and certified to sell whisky from Scotland, I would like to explore more the whisky market in the US and how to promote Scotch whiskies in the US.

US has a large population that food and beverages consumption is huge that there is a need to import food or beverages. For beverages, Americans consume a lot of liquor import from abroad because there are certain characteristic foreign made liquor could not be found from locally made liquor, possibly due to weather or manufacture methods. With the data of food and beverages import data provided from USDA, we can make a stacked area chart to compare import data by nations across time. If you look at the stacked area chart below, you may find the liquor import volume by nations between 2000 and 2016.

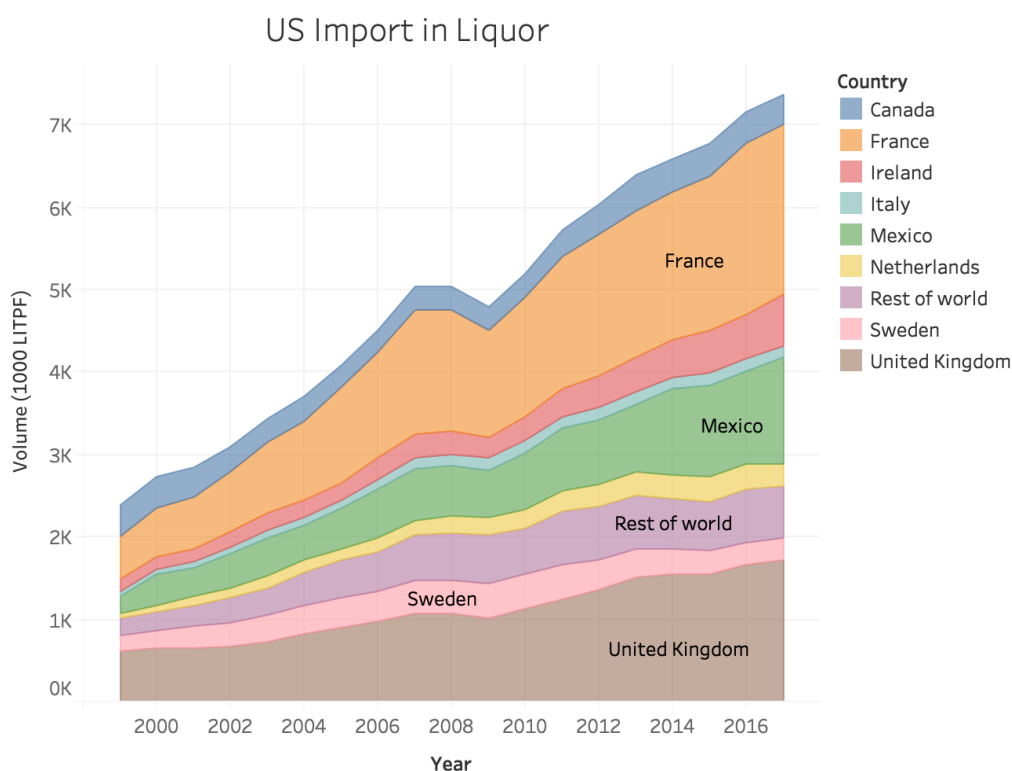


Figure 1: US import in Liquor by nations across year



Figure 2: Top 8 import liquor origin in 2016

In 2016, majority of liquor imported to US is originated from France. The French liquor could be brandy or other liquor distilled from wine. In that year, the top 8 countries of liquor origin are either European countries or North American countries. Beside the demographical reason, it could be also Americans' preference. However, in 2000, the most liquor were imported from United Kingdom that the British liquor could be gin, but more likely to be Scotch whisky.

## Why whisky?

Whisky is a liquor that is distilled from beer and matured in barrels for more than 3 years. Different with gin or vodka, whisky is aged in barrels that make whisky itself has darker colour than gin or vodka, which we called those "light liquor". Because whisky has colour, we called whisky a type of "dark liquor". Like wine, whisky is aged in barrels which add external flavour and characters that could not be found in the raw materials of beer/whisky: Water, yeast, and barley. Since every distillery has their own recipes to make and age whisky that each bottle of whisky is unique and people like to explore the characteristic of whisky.

Scotland is known for producing whisky and have the rich culture of whisky production. Therefore, we will focus on Scotch whiskies.

## Whisky or Whiskey?

Both whisky and whiskey have the same meaning and refer to the same beverage. However, the spelling variation are coming from two different major production countries: Scotland and Ireland. Whisky is the Scottish spelling and Whiskey are Irish. Since we are focusing on Scotch whiskies, from now on, we will spell this as "whisky" without an "e".

## Scotch Whisky Distilleries

Different with wines in France, Scotland did not set up an appellation system for its whisky production. Scottish government do not set quota on Scotch whisky production on each region label or impose complicated regulation. Also, it is less confusing in learning Scotch whisky distilleries because there are only about 120 distilleries in Scotland.<sup>1</sup>

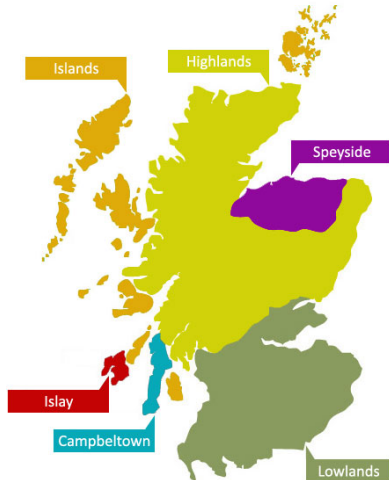


Figure 3: Whisky Production Map<sup>2</sup>

If we treat Campbeltown as one of the Islands region, there are 4 regions in Scotland for Scotch whisky production: Lowland, Highland, Speyside, and Islay & Islands. The French appellation system divided France into more than 4 regions while each region is divided into more sub-regions that drinkers have to spend more time to learn from French wines – Learning Scotch whiskies are easier.



Figure 4: Count of distilleries in Scotland according to the data set

<sup>1</sup> Visit Scotland. <https://www.visitscotland.com/see-do/food-drink/whisky/distilleries/>

<sup>2</sup> Source: Wineware.co.uk <https://www.wineware.co.uk/decanting/spirit-whisky-decanter/scottish-whisky-regions-guide>

On Kaggle, I found a data set that provide a quantitative way to classify the character of whisky, and I used *Whiskies* published by Collins Gem as reference to verify the whisky region classification. This Kaggle data set is great on quantifying subjective matters into objective classification that is the one of the few tabular data sets available for whisky analysis. In our whisky data set, we have data on 86 Scottish distilleries that make single-malt whiskies that most of those are from Highland and Speyside.

Whiskies from different region have their own characteristic different with other regions. For example, Islay whiskies are known for its peaty characteristic which gives drinkers a stronger smoky and charcoal flavour. One of the famous whisky distilleries is Laphroaig. A 10 Year Laphroaig is known for full body and peaty note along with sea salt, seaweed and pears flavour.



Figure 5: The bay next to the Laphroaig Distillery



Figure 6: Laphroaig 10 Year sold in Laphroaig Distillery Visitor Centre

Since there are 4 types of Scotch whiskies. However, single-malt is the foundation of learning Scotch whiskies. Therefore, in this article, we are only focus on Single-malts, no Johnny Walkers!

## Smoky Whiskies

We have seen that Laphroaig is one of the smokiest whisky among Scotch whiskies and is originate from Islay. However, are Islay Whiskies only the only Smoky whiskies? Let's look at the bubble map to find out.

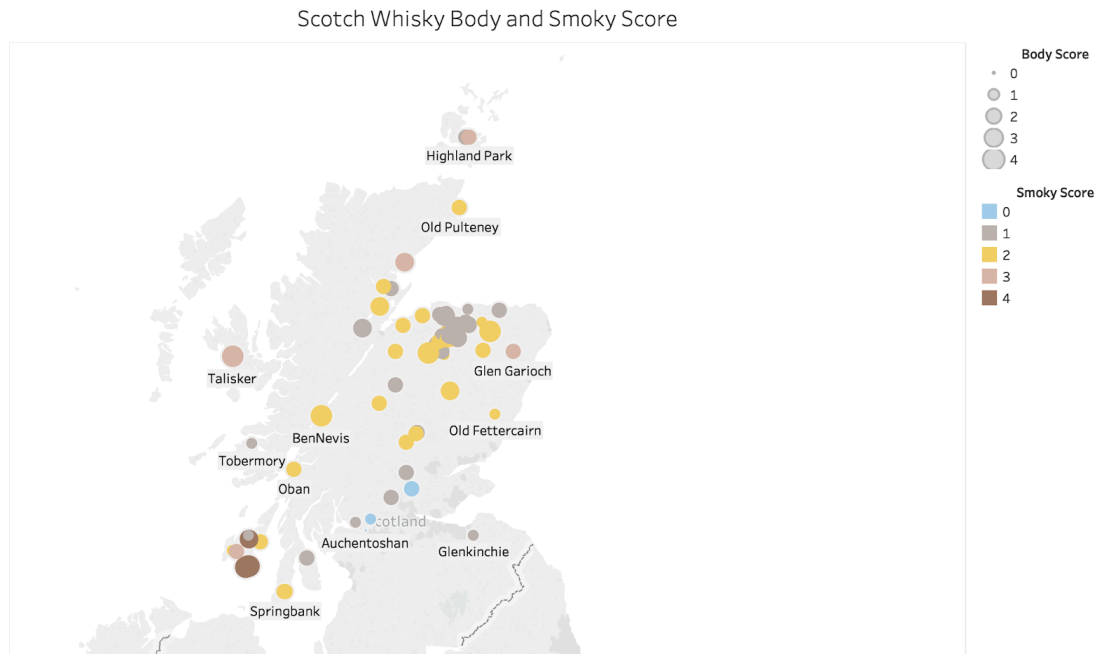


Figure 7: Bubble map on Whisky's body and smokiness

The bubble map has 3 dimension to display the data: Body score is displayed in bubble size, smoky score in colour and the scatter point is plotted on the map according the latitude and longitude on the map. From the bubble map, we can confirm that Islay whiskies are tended to be smoky. Interestingly, most of the smoky whiskies are produced in distilleries close to the coastline of Scotland or Scottish islands.

Most of the whiskies are made from Speyside, those whiskies have the smoky score of 1 to 2. The whiskies made in Lowland and Highland also general score 1 to 3, with 2 exception in Lowland that the whiskies score 0. It indicates that whiskies from Scotland have some smoky character.

You may also have noticed that the scatter point for smoky whiskies are bigger in size, it indicates that Scotch whiskies tend to be more toward to full body if the whisky is smoky.

One may notice winery is one of the character in the data set. Different with American Bourbon, Scotch whiskies never age in virgin barrel (It means a new barrel that never aged with anything) but in used wine, brandy, or sherry barrels. Therefore, wine flavour is one of the common external flavours could be found in Scotch whiskies.

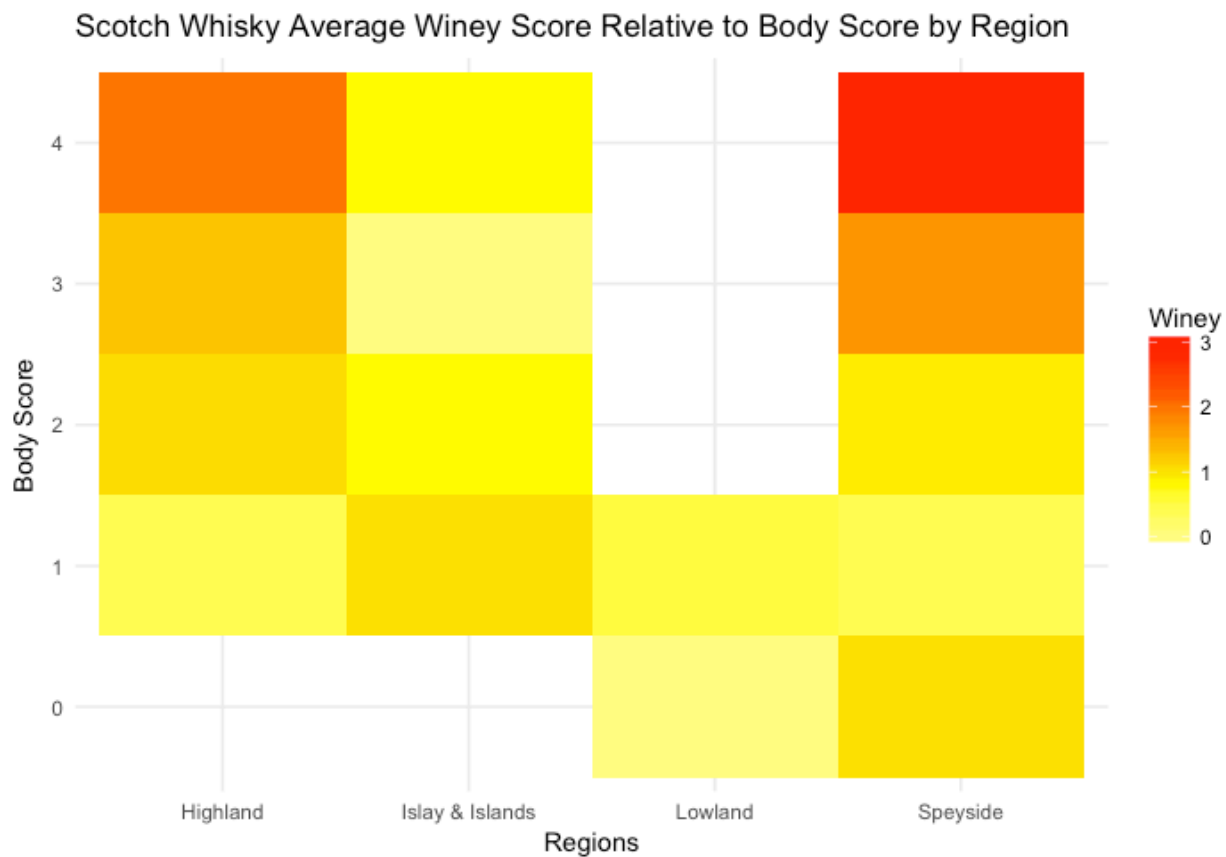


Figure 8: Heat map for Scotch whisky among regions, body score and winey score

Observing from the heat map, we can see that full body Highland and Speyside whiskies tend to have higher winey score that means the external whisky flavour from those regions are very relying on barrels to make the complex characteristic. However, we know that that Islay whiskies are relying on smoky characteristic that wine barrels do not play a huge role in characteristic building in Islay whiskies.

From looking at both heat map and bubble map, we have realized that Lowland whiskies are not too smoky nor winey, so the whiskies do not have complex character. It indicates that Lowland whiskies are tended to be light body and have lighter flavour than the ones in other regions.

## Buying Scotch Whiskies in the US

One of the good liquor store in the US is Total Wines where sells Scotch Whiskies across the US in competitive price. Addition to the fact Toatl Wines is the liquor store that I usually shop, competitive price is another reason that why I choose Total Wines' price list to look at in this article. Each distillery are usually have more than one labels sold in Total wines. Let's have a look of how many labels are available in Total Wine.

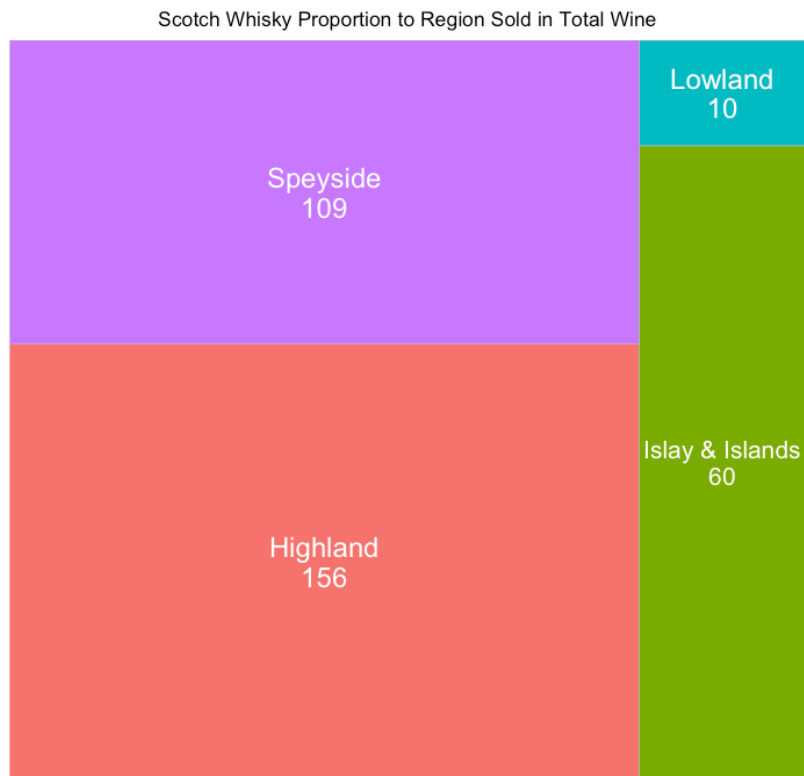


Figure 9: Treemap for Scotch Whisky to Regions sold in Total Wine proportion

We can see that there are a lot of choices of Highland and Speyside whiskies in Total Wine that reflects American tend to buy Scotch whiskies from those regions, not too much on Lowland whiskies. It indicates that Americans prefer medium body and less smoky whiskies.



Figure 10: Histogram of Scotch Whisky price  
Interactive Plot link: [https://jacquessham.github.io/msds622\\_finalproject\\_histogram/](https://jacquessham.github.io/msds622_finalproject_histogram/)

The above histogram show the whisky price sold in Total Wines. You may click the link provide below the plot to interact on the plot to look at the whisky label count sold.

If we focus on whiskies that are sold in \$400 or below, we can find that most of the whiskies are sold between \$20-\$80 in Total Wine. It is natural that there are less whiskies sold beyond \$100 but there are some good proportion of whiskies sold between \$100 and \$200.



Figure 11: Box Plot of Whisky Price by Region  
Interactive Plot link: [https://jacquessham.github.io/msds622\\_finalproject\\_boxplot/](https://jacquessham.github.io/msds622_finalproject_boxplot/)

The above box plot show the whisky price sold in Total Wines by regions. You may click the link provided below the plot to interact on the plot to look at median, 25% and 75% quantile by regions.

The median price of whiskies across regions are around \$100 and most of the price are sold between \$25 and \$125. If the Scotch whiskies are sold above \$300 are consider outliers. In general, even the Scotch whiskies are produced in different regions, the price was not sensitive by its flavour and characteristic. It means American consumers appreciate different kind of Scotch whiskies regardless of lighter or full body whiskies.





Figure 12: Auchentoshan 12 Year, a Lowland whisky, is sold in Total Wines for \$45.99

Auchentoshan 12 Year is one of the Lowland whisky sold in Total Wines. It is different with most of the Scotch whiskies because Auchentoshan is a triple distilled Scotch whisky while Scotch whiskies are commonly double distilled only. You may expect aromas of crème brulee and citrus and a smooth and sweet finish.

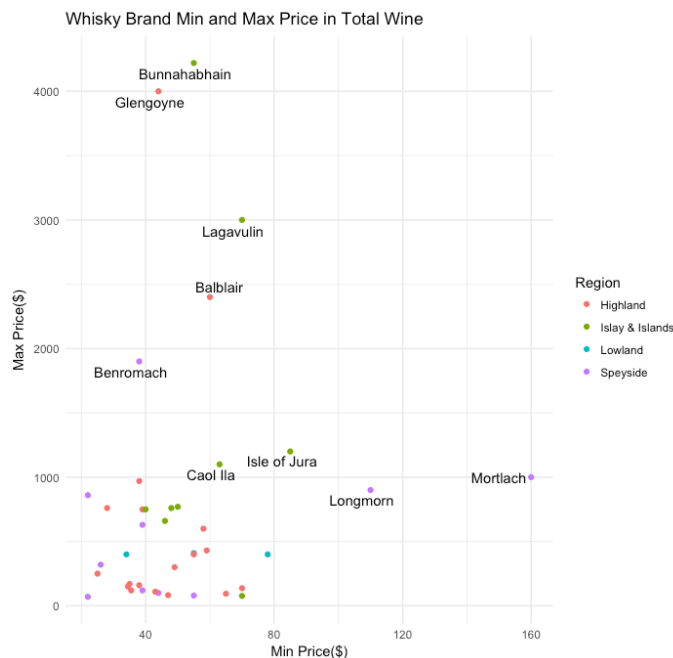


Figure 12: Scatter plot of Maximum and Minimum Price of Labels of each Distilleries

Since each distillery usually have more than one labels of whiskies sold in Total wine, we can look at the price discrepancy between the cheapest and most expensive Scotch whiskies. In the scatter plot, we can see that the wide discrepancy is coming from Islay whiskies and Speyside whiskies. It indicates those distilleries have spent more time to make high price whiskies.

High price whiskies are more likely low-scale production labels and sometimes it is out of stock in Total Wines. For example, Balvenie 15 Year Single Barrel Sherry Cask has limited supply that you may bought those in San Mateo store but not available in Daly City store.

## Whisky Delivery

Unfortunately, California are not allowed to delivery whiskies to residences while wines are allowed. It is a disadvantage of Scotch whiskies or American Bourbons.

2018 Poputlation of State which Allows Alochol Shipments

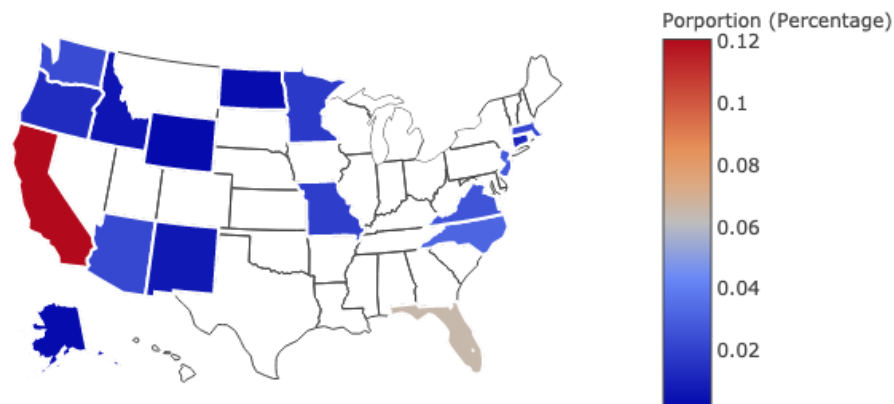


Figure 13: Population of State which allows alcohol shipments

The map above show the states which allows alcohol shipments to residences, that the colour represent the population proportion to the national population.

California is accounted for 12% of the population in the nation. It is unfair for high alcohol content liquor are not allowed for delivery while wine is allowed. Since internet shopping plays a more significant role in the retail market that liquor retail industry should urge Sacramento to relax the law to allow spirit to be sold online and delivery to residence and enjoy the same privilege as wine producer.

## Conclusion

Scotch whiskies are exciting dark liquor that have variety of choice available to Americans. While we are only going over single-malt whiskies from Scotland but there are more whiskies/whiskeys produced around the globe, such as Ireland, Japan and even in the US! The reason of choosing Scotch whiskies because they are well-known and have a good systematic guideline for drinkers to tell the difference, as well as it is the father of Japanese whiskies. This article provided a general views of Scotch whiskies for readers to understand Scotch whiskies and hopeful raise awareness of drinkers to understand more on Scotch whiskies.

## **Github link**

[https://github.com/jacquessham/msds622\\_finalproject](https://github.com/jacquessham/msds622_finalproject)

## **Data Source**

Total Wine: <https://www.totalwine.com>

Whisky Data Set from Kaggle: <https://www.kaggle.com/koki25ando/scotch-whisky-dataset>

USDA Food and Beverages Data Set: <https://www.ers.usda.gov/data-products/us-food-imports.aspx>

## **Reference**

Convert UK postcode to Longitude and Latitude: <https://www.freemaptools.com/convert-uk-postcode-to-lat-lng.htm>

Connection Map on R: <https://www.r-graph-gallery.com/how-to-draw-connecting-routes-on-map-with-r-and-great-circles/>