WILLIAM MARSH RICE UNIVERSITY

Market Financial Data Distributions

Spring 2023

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Table of Contents

i. Introduction 1
ii. Figure 1 2
iii. Figure 2 3
iv. Figure 3 4
v. Figure 4 5
vi. Figure 5 6
vii. Appendix A..... 7

Introduction

The purpose of this mini-project was to determine the distribution of certain financial data factors and their coverage for certain indices and the companies within. The primary factors under consideration were Market Capitalization ($M), Dividend Yield (%), and EBITDA/Enterprise Value. To do this, we determined the coverage of these factors or percentage of companies for which this data was present since 1926 while also accounting for incomplete data entries. We then compiled and graphed the distribution of these factors' coverage.

We determined that for our given timeframe (1926-2022), the percent of all stocks with a dividend yield was 14.9%, the percent of all stocks with a (calculable) market value was 83.16%, and the percent of all stocks with an EBITDA/EV ratio was 13.36%

Note that EV must be calculated using DLC, DLTT, PSTK, CHE, CSHO, and PRCC_F (according to the equations given by [1]), and the ratio makes use of all those values *and* EBITDA. Thus, the percentage of EV (and the ratio itself) is dictated by whatever component used in the calculation is minimized in frequency. This would be PSTK, with a frequency of 13.36% - even though EBITDA has a frequency of 78.04%.

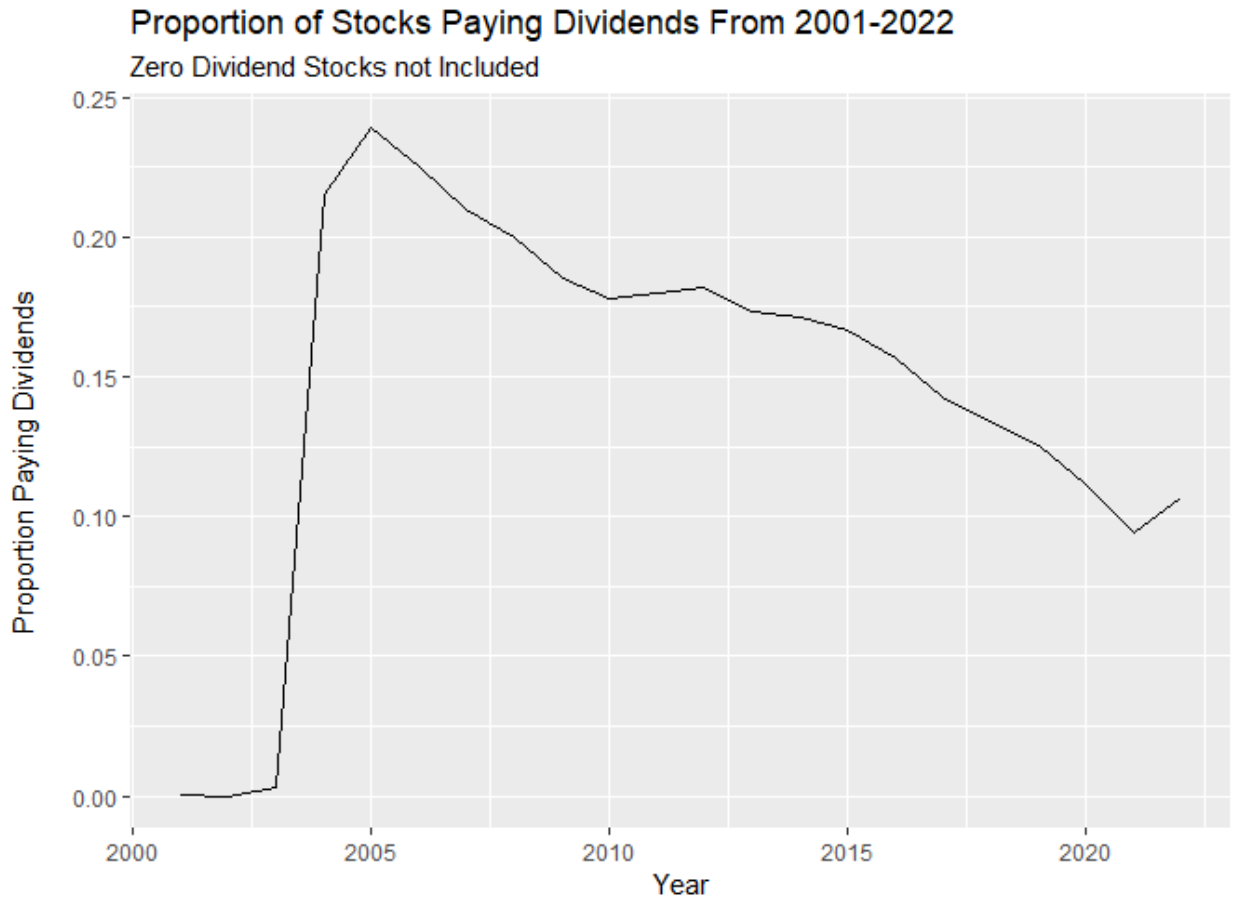

Figure 1- Proportion of Stock Paying Dividends (2001-2022)

All the following figures only begin charting at 2001 as there exists either no dividend yields prior to 2001. It appears that the percentage of stock paying dividends has decreased over time, reaching a maximum in 2005 and a minimum in 2021.

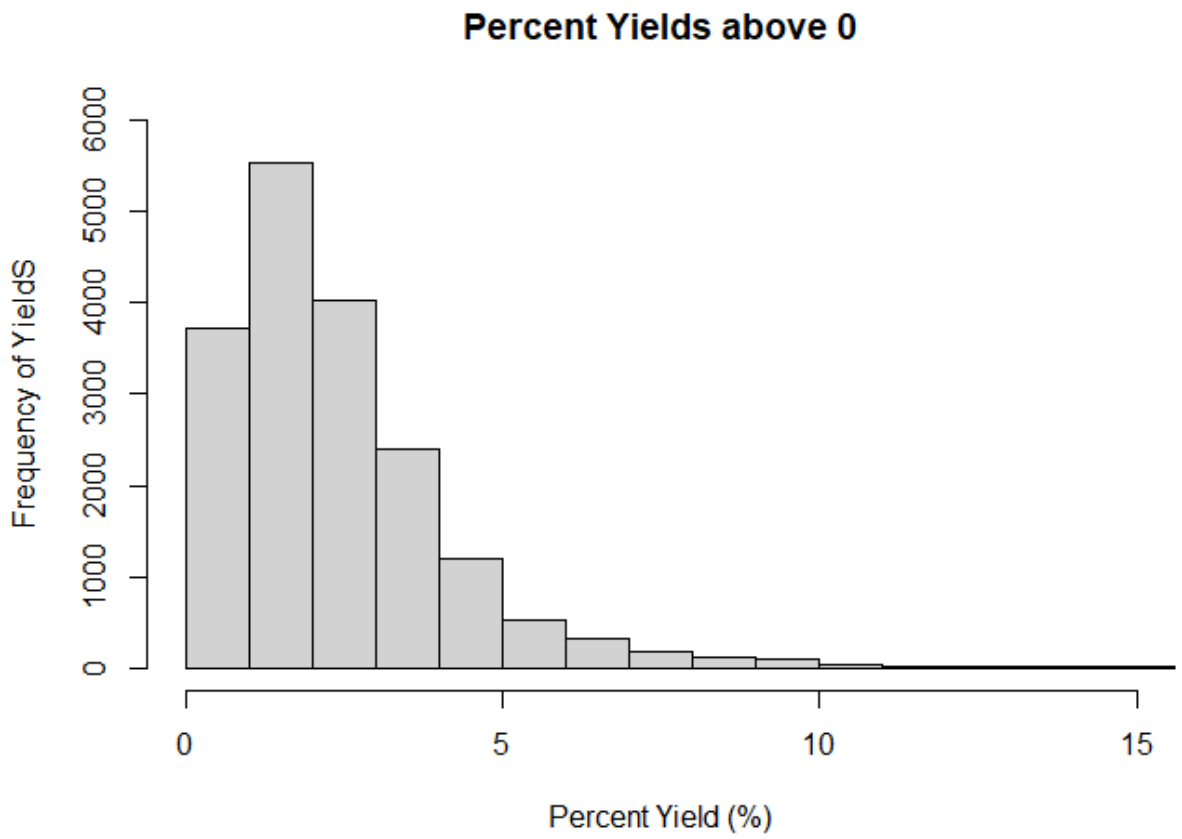

Figure 2- Percent Yields above 0 during period 2001-2022

From Figure 2, we can see a unimodal distribution centered around 2% skewed to the right with 1 standard deviation being approximately 1.5% percent yield. In practicality this means the majority of dividend yields analyzed were between 1 and 3% which is healthy for a company. While some sectors including energy are known for high dividend payouts, for most companies the higher the dividend yield, the more in distress a company may be due to a decrease in stock price or mismanagement in dividend payouts.

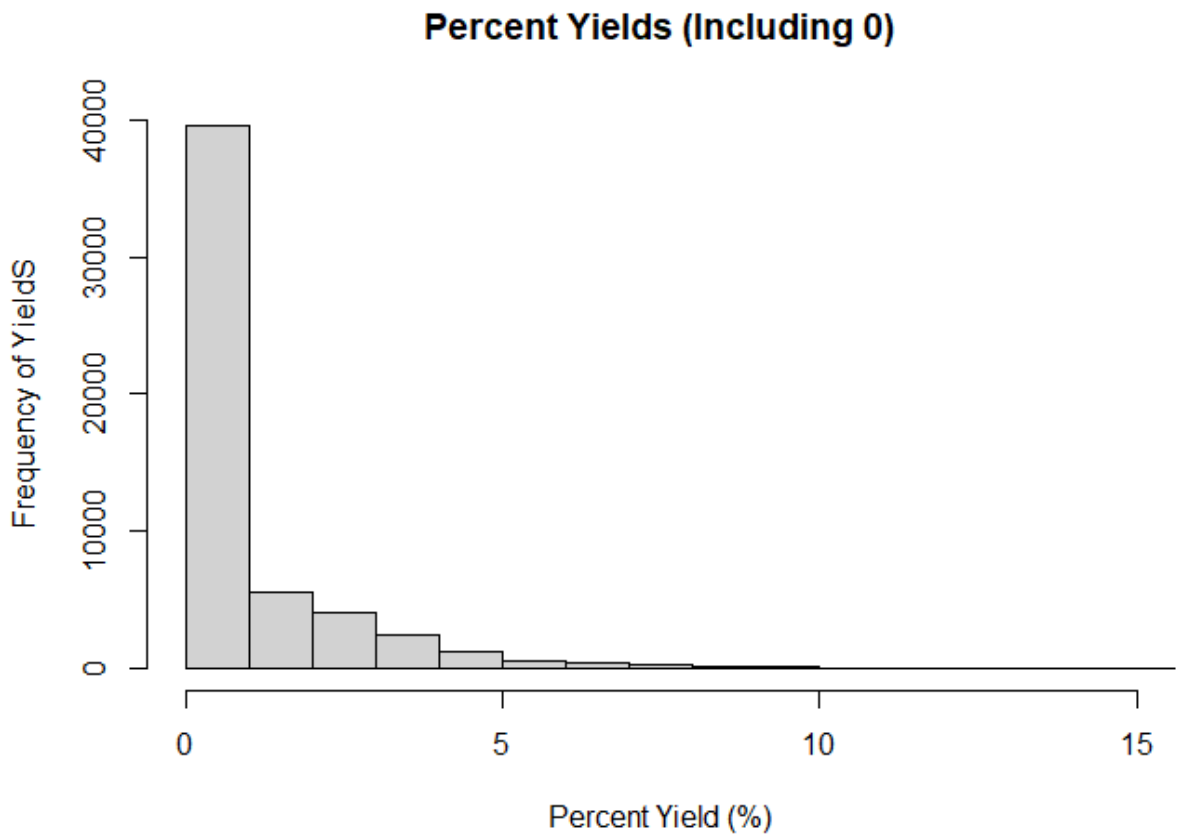

Figure 3- Percent Yields above and including 0 during period 2001-2022

From Figure 3, it is clearly apparent that the large majority of stocks during our analyzed period did not pay out any dividend whatsoever with few having yields upwards of 5%. Including stocks with a 0% yield skews the graph further to the right than ever before - it also shows us how dividend yields are more often 0 than not.

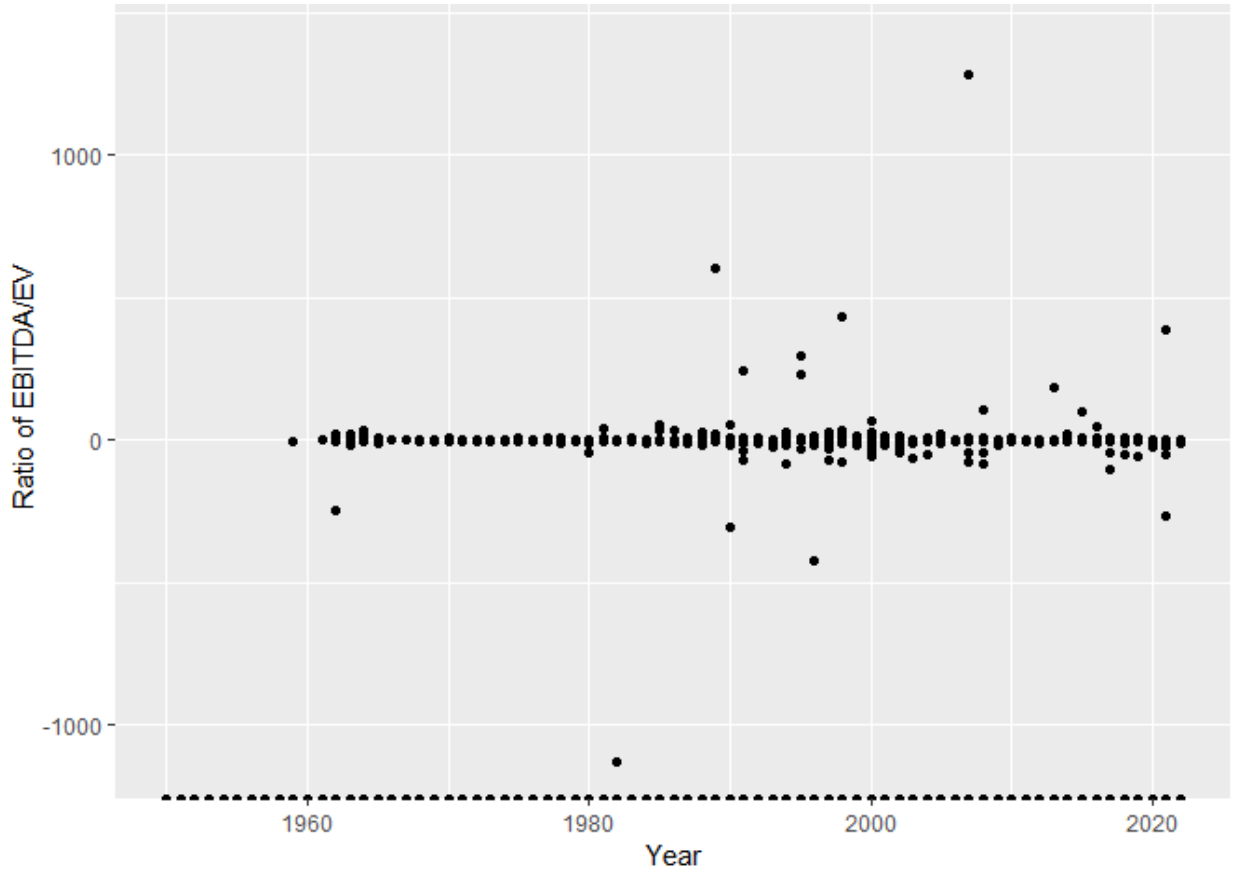

Figure 4 - The Ratio of EBITDA/EV during period 1950-2022

Figure 4 shows us the relative stability of the ratio of EBITDA/EV over the past 72 years. There were occasional outliers, specifically during the Dot.Com Bubble and the Global Financial Crisis of 2008. From this graph, we can extrapolate the idea that this ratio is indicative of the state of the U.S. Stock market - however consistently close it is to 0 during any given period represents the stability of the market at that time.

Take note of the points at the bottom of the graph: these are markers for each and every year plotted, not values of the ratio itself.

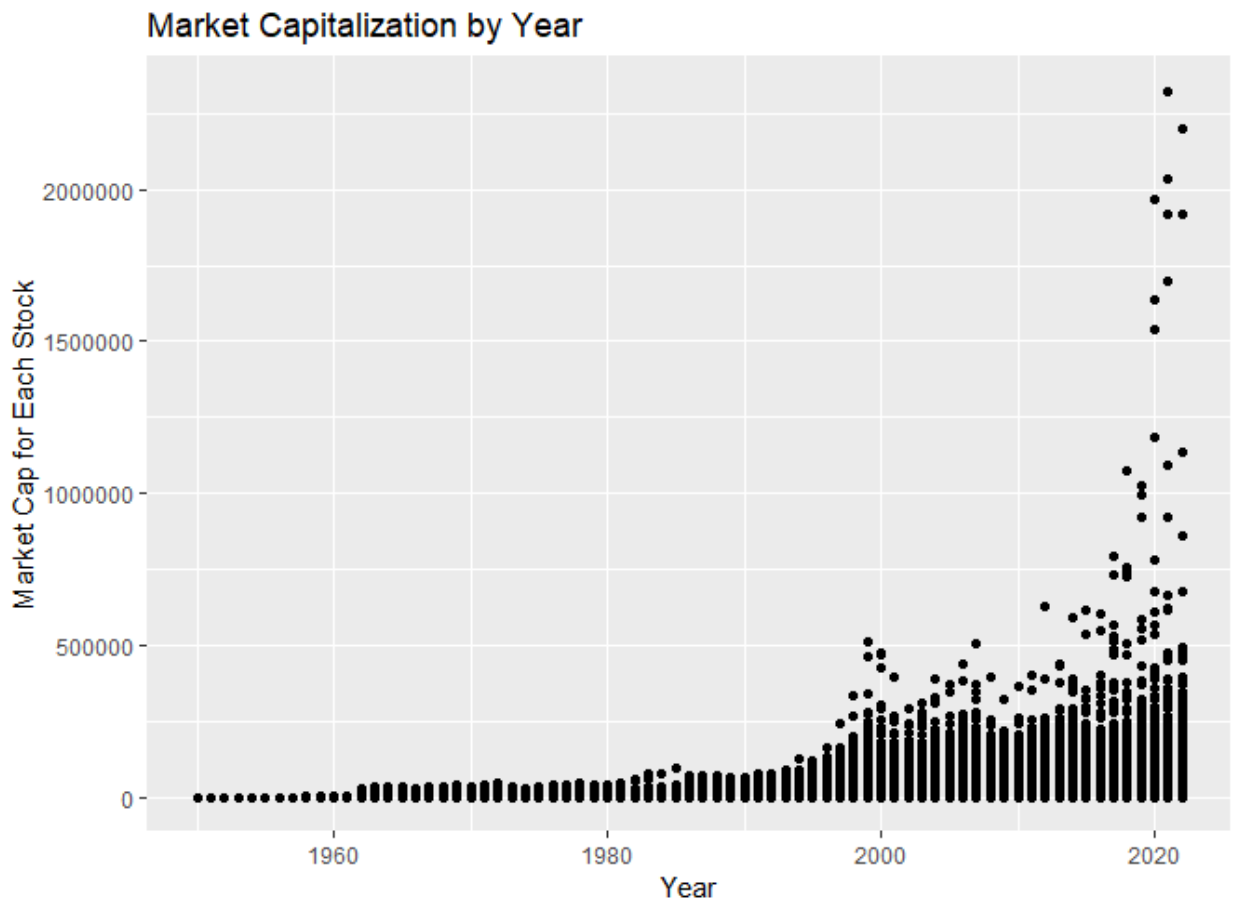

Figure 5 - Market Capitalization of Every Stock by Year (1950-2022)

Although it may seem trivial, Figure 5 shows us how the market capitalization of stocks has generally increased over time - of course, more capital in the U.S. would lead to higher market capitalization for each stock. However, the majority of all stocks, over the past 72 years, have lived in the realm of market capital less than $250,000: hence the congested points in that area.

The Market Capital prior to 1950 (from 1926-1949) is not plotted, but can be found in the following tables:

Market Financial Data Distribution

Appendix A: R Code Used for Plotting

```
with_0 <- read_excel("Market Financial Data Distribution.xlsx", sheet="%_with_0")
without_0 <- read_excel("Market Financial Data Distribution.xlsx", sheet="%_without_0")
proportion <- read_excel("Market Financial Data Distribution.xlsx", sheet="div_prop")
data <- read_excel("Market Financial Data Distribution.xlsx", sheet="market_time")

hist(without_0$optdr, breaks = 100, xlim=c(0, 15), ylim=c(0, 6000),
    main="Percent Yields above 0", xlab="Percent Yield (%)",
    ylab="Frequency of YieldS")

hist(with_0$optdr, breaks = 100, xlim=c(0, 15), ylim=c(0, 40000),
    main="Percent Yields (Including 0)", xlab="Percent Yield (%)",
    ylab="Frequency of YieldS")

ggplot(without_0, aes(x=`FISCAL YEAR`, y=optdr)) + geom_point() + coord_flip()

prop_plot <- ggplot(proportion, aes(x=year, y=divprop)) + geom_line()
prop_plot + labs(title="Proportion of Stocks Paying Dividends From 2001-2022",
      subtitle="Zero Dividend Stocks not Included", x="Year",
      y="Proportion Paying Dividends
      ")

cap_1930 <- read_excel("Market Financial Data Distribution.xlsx",
                  sheet="1926-1975")
cap_1976 <- read_excel("Market Financial Data Distribution.xlsx",
                  sheet="1976-2000")
cap_2001 <- read_excel("Market Financial Data Distribution.xlsx",
                  sheet="2001-2022")

ratio_plot <- ggplot(data, aes(x=`FISCAL YEAR`, y=ebitda/ev)) + geom_point() +
  ylim(-1130, 1500)
ratio_plot + labs(x="Year", y="Ratio of EBITDA/EV")

plot(data$`FISCAL YEAR`, data$mv)

mc_plot <- ggplot(data, aes(x=`FISCAL YEAR`, y=mv)) + geom_point()
mc_plot + labs(title="Market Capitalization by Year", x="Year",
            y="Market Cap for Each Stock")

percent_ebitda <- 283443/363168
```

```
percent_ev <- 48526/363168

if (percent_ev < percent_ebitda){
  percent_ratio <- percent_ev
} else{
  percent_ratio <- percent_ebitda
}

percent_mv <- 302038/363168

percent_div_yield <- 54128/363168
```

Work Cited

[1] University of Muenster, *WRDS Cheat Sheet*, https://www.wiwi.uni-muenster.de/uf/sites/uf/files/2017_10_12_wrds_data_items.pdf