

## What?

Investors care about financial ratios. However, implications and importance of financial ratios may be dependent on several factors. Therefore, market's perception of each financial ratio changes through time.

We would expect that the companies that have a healthy balance between debt and assets would be favorable to investors at all times. However, our job is to figure out the current investor appetite for the debt to asset ratio.

## Method

We will create two portfolios based on the debt to asset ratio. *Portfolio<sub>HIGH</sub>* will include companies with the highest debt to asset ratio in the market. *Portfolio<sub>LOW</sub>* will include companies with the lowest debt to assets ratio in the market. Then, we will compare these portfolios for the current month. We will statistically evaluate if there is any meaningful differences between these two portfolios.

## Portfolios

The Stata code to download the most recent annual balance sheets for all S&P-500 companies:

```
net install http://researchdata.com/stata/048/fetch_statements.pkg, force
net install http://researchdata.com/stata/010/fetchcomponents.pkg, force
fetchcomponents, symbol(^GSPC)
levelsof Symbol, local(symbols) clean
foreach aa in `symbols' {
    di "`aa'"
    clear
    capture: fetch_statements `aa', freq(a) st(BS)
    if (_rc==0) {
        if (_N>5) {
            qui: ds
            local temp = word("`r(varlist)'",2)
            rename `temp' most_recent
            keep item most_recent
            gen symbol="`aa'"
            capture: append using SP500_BS.dta
            save SP500_BS.dta, replace
        }
    }
}
```

The Stata code to calculate the debt to asset ratio (DA):

```
use SP500_BS.dta, clear
gen temp_tl = most_recent if (item == "Total Liabilities")
gen temp_ta = most_recent if (item == "Total Assets")
collapse (firstnm) TL=temp_tl (firstnm) TA=temp_ta, by(symbol)
gen DA = TL / TA
sort DA
```

Let's filter our companies that have no debt to assets ratio.

```
drop if DA==.
drop if DA==0
```

The Stata code to get the symbols for companies with the lowest and the highest debt to asset ratio. Note that we have 450 companies with usable debt to asset ratios.

```
levelsof symbol if _n<=50, local(low_da) clean
levelsof symbol if _n>(450-50), local(high_da) clean
```

The Stata code to download the daily prices for the companies with the lowest and the highest debt to asset ratios:

```
net install http://researchdata.com/stata/203/fetchyahooquotes.pkg, force
fetchyahooquotes `GSPC' `low_da' `high_da', freq(d) chg(ln) start(01jan2018)
```

The Stata code to create the low debt to asset ratio and the high debt to asset ratio portfolios:

```
gen P_low_da = 0
foreach aa in `low_da' {
    replace P_low_da = P_low_da + ln`aa' if (ln`aa'!=.)
}
replace P_low_da = P_low_da / 50

gen P_high_da = 0
foreach aa in `high_da' {
    replace P_high_da = P_high_da + ln`aa' if (ln`aa'!=.)
}
replace P_high_da = P_high_da / 50
```

Let's compare total risk and return for the recent days (i.e. October and November):

```
tabstat P_low_da P_high_da if (month(date)>8), stat(sd sum) columns(variables)
```

stats	P_low_da	P_high_da
sd	.0151835	.0124391
sum	-.2173474	-.1488352

In this table *sd* refers to standard deviation of daily returns for the two months we are testing. *sum* refers to the total return for the two months. **Low debt to asset ratio companies had slightly higher risk and had slightly more losses.**

Let's statistically compare daily returns for the recent days (i.e. October and November):

```
ttest P_low_da == P_high_da if (month(date)>8)
```

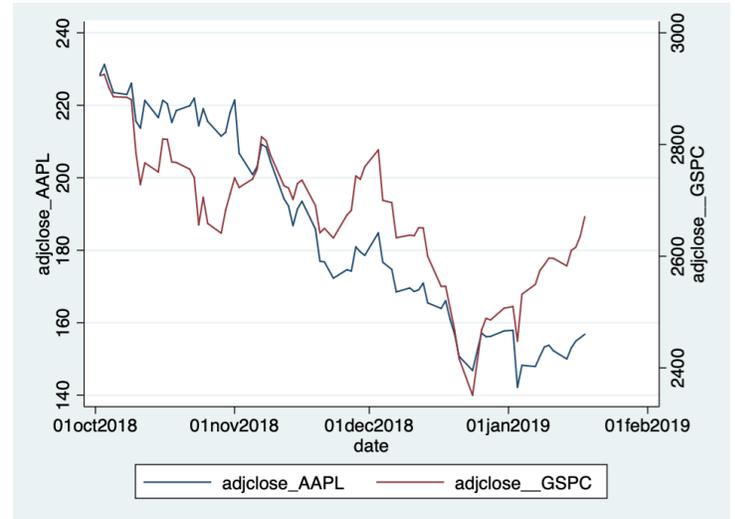
Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
P_low_da	82	-.0026506	.0016767	.0151835	-.0059868	.0006856
P_high_da	82	-.0018151	.0013737	.0124391	-.0045482	.0009181
diff	82	-.0008355	.000649	.0058774	-.0021269	.0004559
mean(diff) = mean(P_low_da - P_high_da)					t = -1.2873	
Ho: mean(diff) = 0					degrees of freedom = 81	
Ha: mean(diff) < 0		Ha: mean(diff) != 0		Ha: mean(diff) > 0		
Pr(T < t) = 0.1008		Pr( T  >  t ) = 0.2017		Pr(T > t) = 0.8992		

Note that this test is based on average daily returns. While both portfolios, high debt to asset ratio and

low debt to asset ratio, had negative average returns, low debt to asset ratio companies had lower returns. The highlighted *t-test* shows that average daily returns for low debt to asset ratio portfolio are lower compare to the average daily returns for the high debt to asset ratio portfolio.

Let's compare AAPL price chart to S&P-500 index for October and November.

```
fetchyahoquotes `GSPC AAPL, freq(d) chg(ln) start(01oct2018)
tway (line adjclose_AAPL date, yaxis(1)) (line adjclose_GSPC date, yaxis(2))
```



**Where does AAPL stand?**

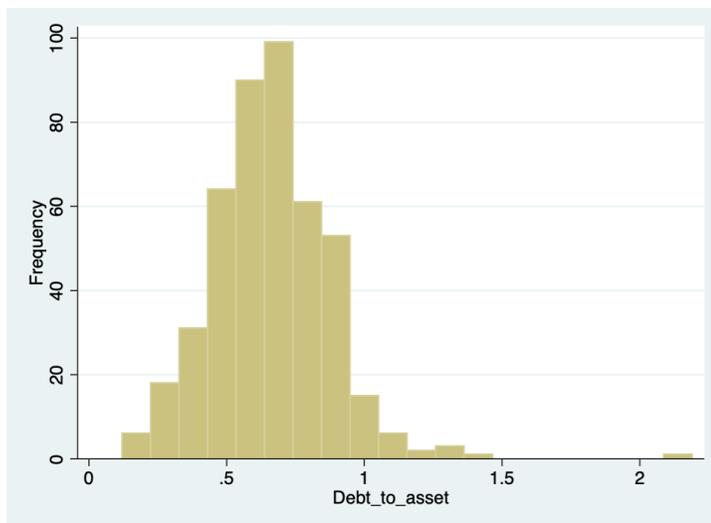
Let's look at the current distribution of debt to asset ratios for the S&P-500 companies:

```
use SP500_BS.dta, clear
gen temp_tl = most_recent if (item == "Total Liabilities")
gen temp_ta = most_recent if (item == "Total Assets")
collapse (firstnm) TL=temp_tl (firstnm) TA=temp_ta, by(symbol)
gen DA = TL / TA
drop if DA==.
drop if DA==0
sort DA
generate groupDA=recode(DA,.10,.20,.30,.40,.50,.60,.70,.80,.90)
tabulate groupDA, plot
```

groupDA	Freq.
.2	6 ***
.3	12 *****
.4	22 *****
.5	56 *****
.6	75 *****
.7	96 *****
.8	75 *****
.9	108 *****
Total	450

Let's chart the debt to asset ratio distribution.

```
rename DA Debt_to_asset
hist Debt_to_asset, freq bin(20)
```



Note that the debt to asset ratio for AAPL is 70.70%. Current market perception seems to favor companies with high debt to asset ratios. Thus, based on our results, AAPL is at an advantage.

