Relative valuation – McDonald's
Ticker MCD

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Date of valuation: 16/06/24 dd/mm/yy
Data source: yahoo-finance

opening

- Relative valuation isn't much like intrinsic valuation, in intrinsic valuation we compute the fair value of a firm by our story of her future performance.

- the intrinsic valuation is in some way internal and introverted, because it is based on your own story and thoughts.

- On the other hand, relative valuation (or pricing) is the opposite, in relative valuation you try to assess by what means does the market price stocks, and by that logic find mispriced stocks.

- In relative valuation we breakdown the most common used multipliers that help the market price stocks, and try to conclude if relatively to the market, the stock is over or underpriced.

PE ratio

- **The price to earnings ratio measures a company's share price relative to its earning per share.**

- **This ratio is probably the most important ratio in relative valuation because it is the most widely used ratio in the market**

$$PE = \frac{p_0}{EPS}$$

Where:

P = price

EPS = earnings per share

PE ratio

- To understand the multiple and to be able to analyze it, lets break it further into it's peace's;

By the dividend discount model:

$$p_0 = \frac{DPS_1}{r - g_n}$$

Where:

DPS = dividends per share

r = required rate of return

g = growth rate in dividends

$$\frac{P_0}{EPS} = PE = \frac{DPS}{(r - g_n)} \frac{1}{EPS} = \frac{(payout\ ratio)(1 + g_n)}{r - g_n}$$

PE ratio

- We can conclude that the pe ratio is a function of the payout ratio, the growth and the risk.

$$\frac{P_0}{EPS} = PE = \frac{DPS}{(r - g_n)}\frac{1}{EPS} = \frac{(payout\ ratio\ )(1 + g_n)}{r - g_n}$$

- There are 2 main problems with this formula;

- 1 – the dividend discount model is a model for stable companies, and not for young growth companies

- 2 – the dividend discount model is based on the (wrong) theory that firms pay all their leftover income as dividends

PE ratio

- **To fix problem number 2, we can change the dividends to free cash flow to equity formula;**

- $$p_0 = \frac{FCFE_1}{r - g_n}$$

$$\frac{P_0}{EPS} = PE = \frac{FCFE}{(r - g_n)}\frac{1}{EPS} = \frac{(FCFE/earnings)(1 + g_n)}{r - g_n}$$

PE ratio

- To fix problem number one, we can use a two part dividend discount model, first part for the growth period and second part for the stable period;

$$pe\ ratio = \frac{EPS * Payout\ Ratio * (1 + g) * (1 - \frac{(1 + g)^n}{(1 + r)^n})}{r - g} + \frac{EPS * Payout\ Ratio * (1 + gn) * (1 + g)^n}{(r - gn) * (1 + g)^n}$$

Its a messy formula, but the bottom line is that the PE ratio is a function of:

- Payout Ratio

- Risk (cost of equity)

- Growth rate

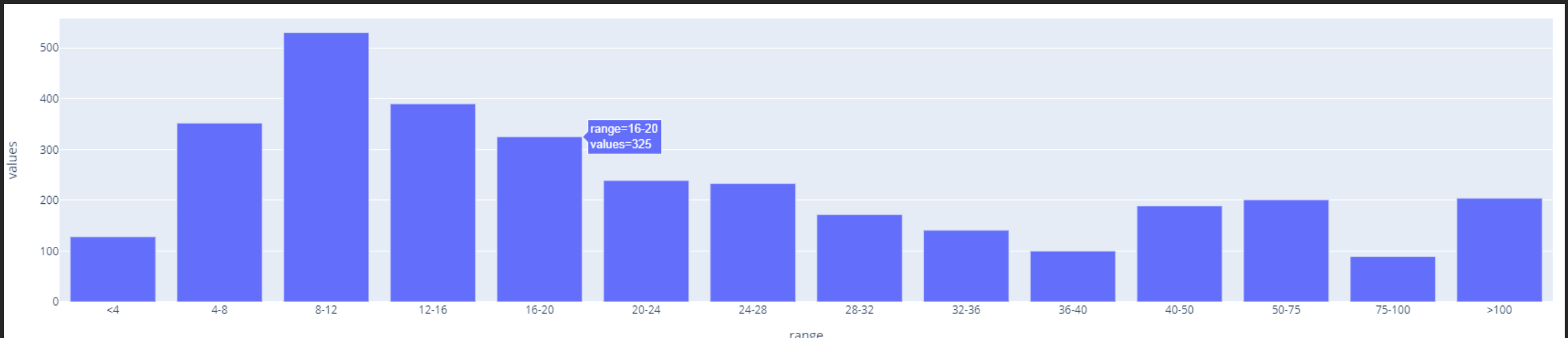Thus, when we search for an underpriced stock, we search for low PE, high Payout Ratio, low Risk, high Growth Rate.
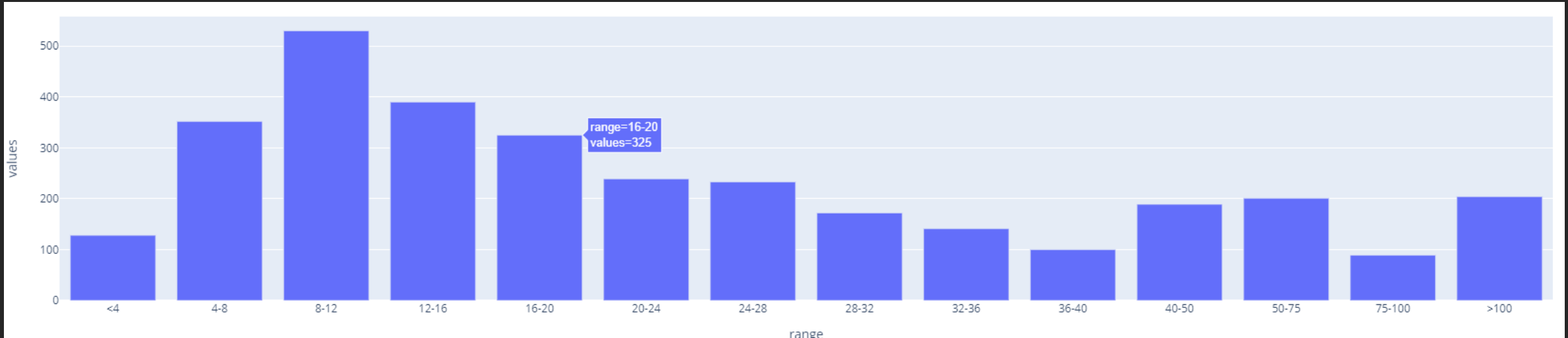
PE ratio

- **At 11/06/24 dd/mm/yy, mcd's trailing pe is 21 .56**

To get some objective ground to whether it is over or undervalued, we can check the trailing pe spread across the US.

By writing a simple program in python, I managed to do so:

PE ratio

Average = 44

Median = 19

The huge difference between the average and the median comes from the existing of extreme values, so the median is much more reliable than the average.

Note that unprofitable firms doesn't have pe ratios, thus there is a bias in the sample towards more successful firms.

Mcd's pe ratio is 21.5, slightly higher than the median, so on surface it looks **slightly overpriced**

PE ratio

If we take a different angle by looking at the mean/median of the industry average, to look how the market price on average other firms from the same industry

By writing a short code in python, I am able to do so;

Industry: restaurants

Sample:

```
industry_list = ['MCD','SBUX','CMG','YUM','QSR','DRI','DPZ','YUMC','TXRH','WING','CAVA','ARMK','SHAK','WEN','EAT','ARCO','CAKE','BLMN','PZZA','HDL'
,'FWRG','CNNE','KRUS','CBRL','JACK','BJRI','PTLO','BH','DIN','CHUY','RICK','DENN','GENK','LOCO','NATH','PBPB','THCH','PNST','FATBB','FAT'
,'ARKR','BDL','RAVE','GTIM','SDOT','BFI','REBN','BTBD','YOSH']
```

Bias: unsuccessful, young firms or growth firms, who lose money, don't have pe ratio's, thus the program works only for successful, profitable firms.

Finding:

Average = 45.45

Median = 20.144

Lowest = 6.5

Highest = 428.095

Standard deviation = 95.3949

Conclusion:

First of all, the spread of that data is very wide, the standard deviation is quite huge, and the highest pe is 428!
Thus, again, the median will be much more precise measure then the average.
The median is 20.144
Mcd's pe ratio is 21.5
Slightly higher but really is the same

PE ratio – relative risk

- By writing a short code in python we can plot the pe ratio against a relative risk measure, the beta;

First of all, the correlation between the two isn't strong at all, the linear regression has an R^2

Of 2.758%.

With that being said, we expect that naturally riskier companies will have lower pe ratio's, and safer companies will have higher pe's.

 but mcd's has about median pe ratio, but is outstandingly safe, which on first sight make her somewhat underpriced

PE ratio – growth

- **When testing the strength between growth and pe ratio's, we get a stronger correlation with R^2 of about 21%;**

- **As firms experience more rapid growth, they most likely are riskier than other firms, thus, they have lower pe's.**

- **Mcd's years growth is somewhat average, and it's pe ratio is also average, so by growth its** fair priced

PE ratio – payout ratio

- **When testing the strength between the payout ratio and pe ratio's, we get a R^2 of about 15%;**

- **As we can see in the formula of the pe ratio, as the payout ratio grow bigger, thus the pe ratio.**

- **Mcd's pe ratio is 63%, slightly higher them the median of 45%, but her pe ratio is also slightly higher then the**

- **Median, so she is just about fair priced**

conclusion

Mcdonald's is a mature company with mature characteristics, while the market doesn't fully price fairly her non riskiness, it does price fairly just about any other matric there is in the pe, for that reason I conclude the mcdonald's, ticker MCD is;

Fair Valued