

# Fundamental\_Analysis

September 29, 2021

## 1 Fundamental Analysis in Python

```
[29]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import yfinance as yf
```

```
[3]: symbol = 'MSFT'
stock = yf.Ticker(symbol)
```

```
[4]: stock.info
```

```
[4]: {'ask': 136.47,
      'askSize': 13,
      'averageDailyVolume10Day': 20983360,
      'averageDailyVolume3Month': 24646032,
      'bid': 136.47,
      'bidSize': 8,
      'bookValue': 13.389,
      'currency': 'USD',
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      'earningsTimestamp': 1563494400,
      'earningsTimestampEnd': 1572278400,
      'earningsTimestampStart': 1571756340,
      'epsForward': 5.93,
      'epsTrailingTwelveMonths': 5.06,
      'esgPopulated': False,
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      'exchangeDataDelayedBy': 0,
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      'exchangeTimezoneShortName': 'EDT',
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      'fiftyDayAverageChangePercent': -0.0048019923,
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      'fiftyTwoWeekHighChange': -5.1049957,
      'fiftyTwoWeekHighChangePercent': -0.036031876,
```

```

'fiftyTwoWeekLow': 93.96,
'fiftyTwoWeekLowChange': 42.614998,
'fiftyTwoWeekLowChangePercent': 0.45354405,
'fiftyTwoWeekRange': '93.96 - 141.68',
'financialCurrency': 'USD',
'forwardPE': 23.031197,
'fullExchangeName': 'NasdaqGS',
'gmtOffsetMilliseconds': -14400000,
'language': 'en-US',
'longName': 'Microsoft Corporation',
'market': 'us_market',
'marketCap': 1025407844352,
'marketState': 'REGULAR',
'messageBoardId': 'finmb_21835',
'priceHint': 2,
'priceToBook': 10.200538,
'quoteSourceName': 'Nasdaq Real Time Price',
'quoteType': 'EQUITY',
'region': 'US',
'regularMarketChange': -1.2850037,
'regularMarketChangePercent': -0.9321077,
'regularMarketDayHigh': 137.2,
'regularMarketDayLow': 135.85,
'regularMarketDayRange': '135.85 - 137.2',
'regularMarketOpen': 136.61,
'regularMarketPreviousClose': 137.86,
'regularMarketPrice': 136.575,
'regularMarketTime': 1567526388,
'regularMarketVolume': 8010208,
'sharesOutstanding': 7662819840,
'shortName': 'Microsoft Corporation',
'sourceInterval': 15,
'symbol': 'MSFT',
'tradeable': True,
'trailingAnnualDividendRate': 1.84,
'trailingAnnualDividendYield': 0.013346874,
'trailingPE': 26.991106,
'triggerable': True,
'twoHundredDayAverage': 127.34752,
'twoHundredDayAverageChange': 9.227478,
'twoHundredDayAverageChangePercent': 0.072459035}

```

```
[5]: stock.history(period='1mo')
```

```

[5]:
      Open   High   Low  Close  Volume  Dividends  Stock Splits
Date
2019-08-05 132.86 133.49 130.35 131.77 42749600      0.00          0

```

2019-08-06	133.36	135.23	132.77	134.24	32696700	0.00	0
2019-08-07	133.35	135.20	131.39	134.83	33414500	0.00	0
2019-08-08	136.15	138.53	135.48	138.43	27496500	0.00	0
2019-08-09	138.15	138.92	136.01	137.25	23466700	0.00	0
2019-08-12	136.62	137.40	134.79	135.34	20476600	0.00	0
2019-08-13	135.60	138.34	134.55	138.14	25154600	0.00	0
2019-08-14	136.36	136.92	133.67	133.98	32527300	0.46	0
2019-08-15	134.39	134.58	132.25	133.68	28074400	0.00	0
2019-08-16	134.88	136.46	134.72	136.13	24449100	0.00	0
2019-08-19	137.85	138.55	136.89	138.41	24355700	0.00	0
2019-08-20	138.21	138.71	137.24	137.26	21170800	0.00	0
2019-08-21	138.55	139.49	138.00	138.79	14970300	0.00	0
2019-08-22	138.66	139.20	136.29	137.78	18697000	0.00	0
2019-08-23	137.19	138.35	132.80	133.39	38508600	0.00	0
2019-08-26	134.99	135.56	133.90	135.45	20312600	0.00	0
2019-08-27	136.39	136.72	134.66	135.74	23102100	0.00	0
2019-08-28	134.88	135.76	133.55	135.56	17393300	0.00	0
2019-08-29	137.25	138.44	136.91	138.12	20168700	0.00	0
2019-08-30	139.15	139.18	136.27	137.86	23940100	0.00	0
2019-09-03	136.61	137.20	135.85	136.55	8026492	0.00	0

```
[10]: stock.history(period="max")
```

```
[10]:
```

Date	Open	High	Low	Close	Volume	Dividends	\
1986-03-13	0.06	0.07	0.06	0.06	1031788800	0.00	
1986-03-14	0.06	0.07	0.06	0.07	308160000	0.00	
1986-03-17	0.07	0.07	0.07	0.07	133171200	0.00	
1986-03-18	0.07	0.07	0.06	0.06	67766400	0.00	
1986-03-19	0.06	0.07	0.06	0.06	47894400	0.00	
1986-03-20	0.06	0.06	0.06	0.06	58435200	0.00	
1986-03-21	0.06	0.06	0.06	0.06	59990400	0.00	
1986-03-24	0.06	0.06	0.06	0.06	65289600	0.00	
1986-03-25	0.06	0.06	0.06	0.06	32083200	0.00	
1986-03-26	0.06	0.06	0.06	0.06	22752000	0.00	
1986-03-27	0.06	0.06	0.06	0.06	16848000	0.00	
1986-03-31	0.06	0.06	0.06	0.06	12873600	0.00	
1986-04-01	0.06	0.06	0.06	0.06	11088000	0.00	
1986-04-02	0.06	0.06	0.06	0.06	27014400	0.00	
1986-04-03	0.06	0.06	0.06	0.06	23040000	0.00	
1986-04-04	0.06	0.06	0.06	0.06	26582400	0.00	
1986-04-07	0.06	0.06	0.06	0.06	16560000	0.00	
1986-04-08	0.06	0.06	0.06	0.06	10252800	0.00	
1986-04-09	0.06	0.06	0.06	0.06	12153600	0.00	
1986-04-10	0.06	0.06	0.06	0.06	13881600	0.00	
1986-04-11	0.06	0.07	0.06	0.06	17222400	0.00	
1986-04-14	0.06	0.07	0.06	0.07	12153600	0.00	

1986-04-15	0.07	0.07	0.06	0.07	9302400	0.00
1986-04-16	0.07	0.07	0.06	0.07	31910400	0.00
1986-04-17	0.07	0.07	0.07	0.07	22003200	0.00
1986-04-18	0.07	0.07	0.07	0.07	21628800	0.00
1986-04-21	0.07	0.07	0.06	0.07	22924800	0.00
1986-04-22	0.07	0.07	0.06	0.06	15552000	0.00
1986-04-23	0.06	0.07	0.06	0.06	15609600	0.00
1986-04-24	0.06	0.07	0.06	0.07	62352000	0.00
...	...	...	...	...	...	
2019-07-23	139.30	139.53	137.57	138.83	18034600	0.00
2019-07-24	138.44	140.27	138.39	140.25	20738300	0.00
2019-07-25	139.96	140.14	138.86	139.72	18356900	0.00
2019-07-26	139.90	141.21	139.83	140.87	19037600	0.00
2019-07-29	141.03	141.04	138.91	140.56	16605900	0.00
2019-07-30	139.67	140.75	139.34	139.88	16846500	0.00
2019-07-31	139.86	140.02	134.63	135.82	38598800	0.00
2019-08-01	136.55	140.47	136.48	137.60	40557500	0.00
2019-08-02	137.63	137.86	134.81	136.45	30791600	0.00
2019-08-05	132.86	133.49	130.35	131.77	42749600	0.00
2019-08-06	133.36	135.23	132.77	134.24	32696700	0.00
2019-08-07	133.35	135.20	131.39	134.83	33414500	0.00
2019-08-08	136.15	138.53	135.48	138.43	27496500	0.00
2019-08-09	138.15	138.92	136.01	137.25	23466700	0.00
2019-08-12	136.62	137.40	134.79	135.34	20476600	0.00
2019-08-13	135.60	138.34	134.55	138.14	25154600	0.00
2019-08-14	136.36	136.92	133.67	133.98	32527300	0.46
2019-08-15	134.39	134.58	132.25	133.68	28074400	0.00
2019-08-16	134.88	136.46	134.72	136.13	24449100	0.00
2019-08-19	137.85	138.55	136.89	138.41	24355700	0.00
2019-08-20	138.21	138.71	137.24	137.26	21170800	0.00
2019-08-21	138.55	139.49	138.00	138.79	14970300	0.00
2019-08-22	138.66	139.20	136.29	137.78	18697000	0.00
2019-08-23	137.19	138.35	132.80	133.39	38508600	0.00
2019-08-26	134.99	135.56	133.90	135.45	20312600	0.00
2019-08-27	136.39	136.72	134.66	135.74	23102100	0.00
2019-08-28	134.88	135.76	133.55	135.56	17393300	0.00
2019-08-29	137.25	138.44	136.91	138.12	20168700	0.00
2019-08-30	139.15	139.18	136.27	137.86	23940100	0.00
2019-09-03	136.61	137.20	135.85	136.57	8099529	0.00

#### Stock Splits

Date	
1986-03-13	0.0
1986-03-14	0.0
1986-03-17	0.0
1986-03-18	0.0
1986-03-19	0.0

1986-03-20	0.0
1986-03-21	0.0
1986-03-24	0.0
1986-03-25	0.0
1986-03-26	0.0
1986-03-27	0.0
1986-03-31	0.0
1986-04-01	0.0
1986-04-02	0.0
1986-04-03	0.0
1986-04-04	0.0
1986-04-07	0.0
1986-04-08	0.0
1986-04-09	0.0
1986-04-10	0.0
1986-04-11	0.0
1986-04-14	0.0
1986-04-15	0.0
1986-04-16	0.0
1986-04-17	0.0
1986-04-18	0.0
1986-04-21	0.0
1986-04-22	0.0
1986-04-23	0.0
1986-04-24	0.0
...	...
2019-07-23	0.0
2019-07-24	0.0
2019-07-25	0.0
2019-07-26	0.0
2019-07-29	0.0
2019-07-30	0.0
2019-07-31	0.0
2019-08-01	0.0
2019-08-02	0.0
2019-08-05	0.0
2019-08-06	0.0
2019-08-07	0.0
2019-08-08	0.0
2019-08-09	0.0
2019-08-12	0.0
2019-08-13	0.0
2019-08-14	0.0
2019-08-15	0.0
2019-08-16	0.0
2019-08-19	0.0
2019-08-20	0.0

```

2019-08-21      0.0
2019-08-22      0.0
2019-08-23      0.0
2019-08-26      0.0
2019-08-27      0.0
2019-08-28      0.0
2019-08-29      0.0
2019-08-30      0.0
2019-09-03      0.0

```

[8438 rows x 7 columns]

```
[11]: df = stock.history(period="max")
```

```
[12]: df.head()
```

```
[12]:
```

	Open	High	Low	Close	Volume	Dividends	Stock Splits
Date							
1986-03-13	0.06	0.07	0.06	0.06	1031788800	0.0	0.0
1986-03-14	0.06	0.07	0.06	0.07	308160000	0.0	0.0
1986-03-17	0.07	0.07	0.07	0.07	133171200	0.0	0.0
1986-03-18	0.07	0.07	0.06	0.06	67766400	0.0	0.0
1986-03-19	0.06	0.07	0.06	0.06	47894400	0.0	0.0

```
[13]: df.tail()
```

```
[13]:
```

	Open	High	Low	Close	Volume	Dividends	Stock Splits
Date							
2019-08-27	136.39	136.72	134.66	135.74	23102100	0.0	0.0
2019-08-28	134.88	135.76	133.55	135.56	17393300	0.0	0.0
2019-08-29	137.25	138.44	136.91	138.12	20168700	0.0	0.0
2019-08-30	139.15	139.18	136.27	137.86	23940100	0.0	0.0
2019-09-03	136.61	137.20	135.85	136.58	8100861	0.0	0.0

```
[6]: stock.financials
```

```
[6]:
```

	6/30/2019	6/30/2018	6/30/2017	\
Total Revenue	125843000	110360000	96571000	
Cost of Revenue	42910000	38353000	34261000	
Gross Profit	82933000	72007000	62310000	
Operating Expenses	-	-	-	
Research Development	16876000	14726000	13037000	
Selling General and Administrative	23098000	22223000	19942000	
Non Recurring	NaN	NaN	NaN	
Others	NaN	NaN	NaN	
Total Operating Expenses	82884000	75302000	67240000	

Operating Income or Loss	42959000	35058000	29331000
Income from Continuing Operations	-	-	-
Total Other Income/Expenses Net	729000	1416000	570000
Earnings Before Interest and Taxes	42959000	35058000	29331000
Interest Expense	-2686000	-2733000	-2222000
Income Before Tax	43688000	36474000	29901000
Income Tax Expense	4448000	19903000	4412000
Minority Interest	NaN	NaN	NaN
Net Income From Continuing Ops	39240000	16571000	25489000
Non-recurring Events	-	-	-
Discontinued Operations	NaN	NaN	NaN
Extraordinary Items	NaN	NaN	NaN
Effect Of Accounting Changes	NaN	NaN	NaN
Other Items	NaN	NaN	NaN
Net Income	-	-	-
Net Income	-	-	-
Preferred Stock And Other Adjustments	NaN	NaN	NaN
Net Income Applicable To Common Shares	39240000	16571000	25489000

6/30/2016

Total Revenue	91154000
Cost of Revenue	32780000
Gross Profit	58374000
Operating Expenses	-
Research Development	11988000
Selling General and Administrative	19198000
Non Recurring	NaN
Others	NaN
Total Operating Expenses	63966000
Operating Income or Loss	27188000
Income from Continuing Operations	-
Total Other Income/Expenses Net	-1549000
Earnings Before Interest and Taxes	27188000
Interest Expense	-1243000
Income Before Tax	25639000
Income Tax Expense	5100000
Minority Interest	NaN
Net Income From Continuing Ops	20539000
Non-recurring Events	-
Discontinued Operations	NaN
Extraordinary Items	NaN
Effect Of Accounting Changes	NaN
Other Items	NaN
Net Income	-
Net Income	-
Preferred Stock And Other Adjustments	NaN

Net Income Applicable To Common Shares 20539000

```
[17]: IC = stock.financials[stock.financials.columns[:: -1]] # Reverse Column
```

```
[18]: IC
```

```
[18]:
```

	6/30/2016	6/30/2017	6/30/2018	\
Total Revenue	91154000	96571000	110360000	
Cost of Revenue	32780000	34261000	38353000	
Gross Profit	58374000	62310000	72007000	
Operating Expenses	-	-	-	
Research Development	11988000	13037000	14726000	
Selling General and Administrative	19198000	19942000	22223000	
Non Recurring	NaN	NaN	NaN	
Others	NaN	NaN	NaN	
Total Operating Expenses	63966000	67240000	75302000	
Operating Income or Loss	27188000	29331000	35058000	
Income from Continuing Operations	-	-	-	
Total Other Income/Expenses Net	-1549000	570000	1416000	
Earnings Before Interest and Taxes	27188000	29331000	35058000	
Interest Expense	-1243000	-2222000	-2733000	
Income Before Tax	25639000	29901000	36474000	
Income Tax Expense	5100000	4412000	19903000	
Minority Interest	NaN	NaN	NaN	
Net Income From Continuing Ops	20539000	25489000	16571000	
Non-recurring Events	-	-	-	
Discontinued Operations	NaN	NaN	NaN	
Extraordinary Items	NaN	NaN	NaN	
Effect Of Accounting Changes	NaN	NaN	NaN	
Other Items	NaN	NaN	NaN	
Net Income	-	-	-	
Net Income	-	-	-	
Preferred Stock And Other Adjustments	NaN	NaN	NaN	
Net Income Applicable To Common Shares	20539000	25489000	16571000	

	6/30/2019
Total Revenue	125843000
Cost of Revenue	42910000
Gross Profit	82933000
Operating Expenses	-
Research Development	16876000
Selling General and Administrative	23098000
Non Recurring	NaN
Others	NaN
Total Operating Expenses	82884000



Operating Income or Loss	42959000
Income from Continuing Operations	-
Total Other Income/Expenses Net	729000
Earnings Before Interest and Taxes	42959000
Interest Expense	-2686000
Income Before Tax	43688000
Income Tax Expense	4448000
Minority Interest	NaN
Net Income From Continuing Ops	39240000
Non-recurring Events	-
Discontinued Operations	NaN
Extraordinary Items	NaN
Effect Of Accounting Changes	NaN
Other Items	NaN
Net Income	-
Net Income	-
Preferred Stock And Other Adjustments	NaN
Net Income Applicable To Common Shares	39240000

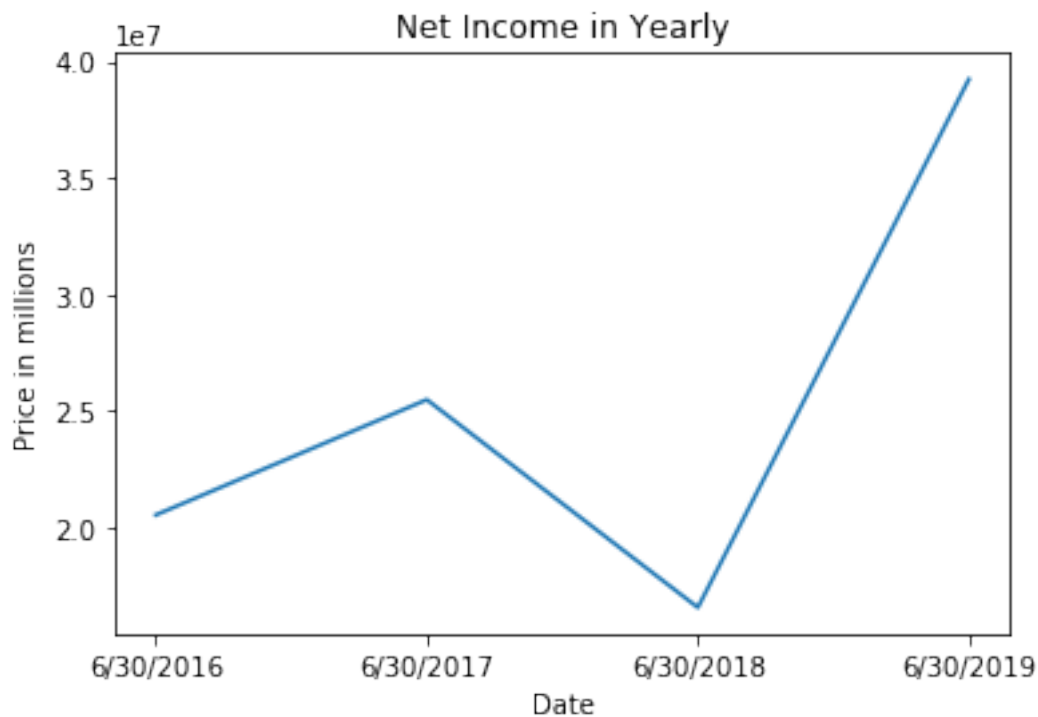
```
[28]: IC.loc['Net Income Applicable To Common Shares']
```

```
[28]: 6/30/2016    20539000
      6/30/2017    25489000
      6/30/2018    16571000
      6/30/2019    39240000
      Name: Net Income Applicable To Common Shares, dtype: object
```

```
[39]: # Change Data object to float
      NI = IC.loc['Net Income Applicable To Common Shares'].astype(float)
```

```
[41]: plt.plot(NI)
      plt.xlabel('Date')
      plt.ylabel('Price in millions')
      plt.title('Net Income in Yearly')
```

```
[41]: Text(0.5,1,'Net Income in Yearly')
```



```
[7]: stock.balancesheet
```

```
[7]:
```

	6/30/2019	6/30/2018	6/30/2017	\
Current Assets	-	-	-	
Cash And Cash Equivalents	11356000	11946000	7663000	
Short Term Investments	122476000	121718000	125238000	
Net Receivables	29524000	26481000	22431000	
Inventory	2063000	2662000	2181000	
Other Current Assets	10133000	6855000	5183000	
Total Current Assets	175552000	169662000	162696000	
Long Term Investments	2649000	1862000	6023000	
Property, plant and equipment	43856000	36146000	30289000	
Goodwill	42026000	35683000	35122000	
Intangible Assets	7750000	8053000	10106000	
Accumulated Amortization	NaN	NaN	NaN	
Other Assets	14723000	7442000	6076000	
Deferred Long Term Asset Charges	7536000	1369000	248000	
Total Assets	286556000	258848000	250312000	
Current Liabilities	-	-	-	
Accounts Payable	9382000	8617000	7390000	
Short/Current Long Term Debt	5516000	3998000	1049000	
Other Current Liabilities	45860000	38195000	30879000	

Total Current Liabilities	69420000	58488000	55745000
Long Term Debt	66662000	72242000	76073000
Other Liabilities	35699000	35707000	22986000
Deferred Long Term Liability Charges	NaN	NaN	NaN
Minority Interest	NaN	NaN	NaN
Negative Goodwill	NaN	NaN	NaN
Total Liabilities	184226000	176130000	162601000
Stockholders' Equity	-	-	-
Misc. Stocks Options Warrants	NaN	NaN	NaN
Redeemable Preferred Stock	NaN	NaN	NaN
Preferred Stock	NaN	NaN	NaN
Common Stock	78520000	71223000	69315000
Retained Earnings	24150000	13682000	17769000
Treasury Stock	-340000	-2187000	627000
Capital Surplus	NaN	NaN	NaN
Other Stockholder Equity	-340000	-2187000	627000
Total stockholders' equity	102330000	82718000	87711000
Net Tangible Assets	52554000	38982000	42483000

6/30/2016

Current Assets	-
Cash And Cash Equivalents	6510000
Short Term Investments	106531000
Net Receivables	18277000
Inventory	2251000
Other Current Assets	6091000
Total Current Assets	139660000
Long Term Investments	10438000
Property, plant and equipment	18356000
Goodwill	17872000
Intangible Assets	3733000
Accumulated Amortization	NaN
Other Assets	3409000
Deferred Long Term Asset Charges	219000
Total Assets	193468000
Current Liabilities	-
Accounts Payable	6898000
Short/Current Long Term Debt	NaN
Other Current Liabilities	33972000
Total Current Liabilities	59357000
Long Term Debt	40557000
Other Liabilities	20796000
Deferred Long Term Liability Charges	NaN
Minority Interest	NaN
Negative Goodwill	NaN
Total Liabilities	121471000

Stockholders' Equity	-
Misc. Stocks Options Warrants	NaN
Redeemable Preferred Stock	NaN
Preferred Stock	NaN
Common Stock	68178000
Retained Earnings	2282000
Treasury Stock	1537000
Capital Surplus	NaN
Other Stockholder Equity	1537000
Total stockholders' equity	71997000
Net Tangible Assets	50392000

```
[47]: BS = stock.balancesheet.iloc[:,::-1] # Reverse Column
```

```
[59]: BS
```

```
[59]:
```

	6/30/2016	6/30/2017	6/30/2018	\
Current Assets	-	-	-	
Cash And Cash Equivalents	6510000	7663000	11946000	
Short Term Investments	106531000	125238000	121718000	
Net Receivables	18277000	22431000	26481000	
Inventory	2251000	2181000	2662000	
Other Current Assets	6091000	5183000	6855000	
Total Current Assets	139660000	162696000	169662000	
Long Term Investments	10438000	6023000	1862000	
Property, plant and equipment	18356000	30289000	36146000	
Goodwill	17872000	35122000	35683000	
Intangible Assets	3733000	10106000	8053000	
Accumulated Amortization	NaN	NaN	NaN	
Other Assets	3409000	6076000	7442000	
Deferred Long Term Asset Charges	219000	248000	1369000	
Total Assets	193468000	250312000	258848000	
Current Liabilities	-	-	-	
Accounts Payable	6898000	7390000	8617000	
Short/Current Long Term Debt	NaN	1049000	3998000	
Other Current Liabilities	33972000	30879000	38195000	
Total Current Liabilities	59357000	55745000	58488000	
Long Term Debt	40557000	76073000	72242000	
Other Liabilities	20796000	22986000	35707000	
Deferred Long Term Liability Charges	NaN	NaN	NaN	
Minority Interest	NaN	NaN	NaN	
Negative Goodwill	NaN	NaN	NaN	
Total Liabilities	121471000	162601000	176130000	
Stockholders' Equity	-	-	-	
Misc. Stocks Options Warrants	NaN	NaN	NaN	
Redeemable Preferred Stock	NaN	NaN	NaN	

Preferred Stock	NaN	NaN	NaN
Common Stock	68178000	69315000	71223000
Retained Earnings	2282000	17769000	13682000
Treasury Stock	1537000	627000	-2187000
Capital Surplus	NaN	NaN	NaN
Other Stockholder Equity	1537000	627000	-2187000
Total stockholders' equity	71997000	87711000	82718000
Net Tangible Assets	50392000	42483000	38982000

6/30/2019

Current Assets	-
Cash And Cash Equivalents	11356000
Short Term Investments	122476000
Net Receivables	29524000
Inventory	2063000
Other Current Assets	10133000
Total Current Assets	175552000
Long Term Investments	2649000
Property, plant and equipment	43856000
Goodwill	42026000
Intangible Assets	7750000
Accumulated Amortization	NaN
Other Assets	14723000
Deferred Long Term Asset Charges	7536000
Total Assets	286556000
Current Liabilities	-
Accounts Payable	9382000
Short/Current Long Term Debt	5516000
Other Current Liabilities	45860000
Total Current Liabilities	69420000
Long Term Debt	66662000
Other Liabilities	35699000
Deferred Long Term Liability Charges	NaN
Minority Interest	NaN
Negative Goodwill	NaN
Total Liabilities	184226000
Stockholders' Equity	-
Misc. Stocks Options Warrants	NaN
Redeemable Preferred Stock	NaN
Preferred Stock	NaN
Common Stock	78520000
Retained Earnings	24150000
Treasury Stock	-340000
Capital Surplus	NaN
Other Stockholder Equity	-340000
Total stockholders' equity	102330000

Net Tangible Assets 52554000

```
[60]: BS.loc['Retained Earnings']
```

```
[60]: 6/30/2016    2282000
      6/30/2017    17769000
      6/30/2018    13682000
      6/30/2019    24150000
      Name: Retained Earnings, dtype: object
```

```
[61]: CR = BS.loc['Total Current Assets'].astype(int) / BS.loc['Total Current_
      ↳Liabilities'].astype(int)
      CR
```

```
[61]: 6/30/2016    2.352882
      6/30/2017    2.918576
      6/30/2018    2.900800
      6/30/2019    2.528839
      dtype: float64
```

```
[8]: stock.cashflow
```

```
[8]:
```

	6/30/2019	6/30/2018	\
Net Income	39240000	16571000	
Operating Activities, Cash Flows Provided By or...	-	-	
Depreciation	11600000	9900000	
Adjustments To Net Income	-2521000	-3054000	
Changes In Accounts Receivables	-2812000	-3862000	
Changes In Liabilities	4694000	7070000	
Changes In Inventories	597000	-465000	
Changes In Other Operating Activities	-1542000	-459000	
Total Cash Flow From Operating Activities	52185000	43884000	
Investing Activities, Cash Flows Provided By or...	-	-	
Capital Expenditure	-13925000	-11632000	
Investments	540000	6557000	
Other Cash flows from Investing Activities	NaN	-98000	
Total Cash Flows From Investing Activities	-15773000	-6061000	
Financing Activities, Cash Flows Provided By or...	-	-	
Dividends Paid	-13811000	-12699000	
Sale Purchase of Stock	NaN	NaN	
Net Borrowings	-4000000	-10201000	
Other Cash Flows from Financing Activities	-675000	-971000	
Total Cash Flows From Financing Activities	-36887000	-33590000	
Effect Of Exchange Rate Changes	-115000	50000	
Change In Cash and Cash Equivalents	-590000	4283000	

	6/30/2017	6/30/2016
Net Income	25489000	20539000
Operating Activities, Cash Flows Provided By or...	-	-
Depreciation	7800000	5878000
Adjustments To Net Income	1342000	6229000
Changes In Accounts Receivables	-1216000	562000
Changes In Liabilities	3901000	2653000
Changes In Inventories	50000	600000
Changes In Other Operating Activities	349000	-2907000
Total Cash Flow From Operating Activities	39507000	33325000
Investing Activities, Cash Flows Provided By or...	-	-
Capital Expenditure	-8129000	-8343000
Investments	-12511000	-14417000
Other Cash flows from Investing Activities	-197000	203000
Total Cash Flows From Investing Activities	-46781000	-23950000
Financing Activities, Cash Flows Provided By or...	-	-
Dividends Paid	-11845000	-11006000
Sale Purchase of Stock	NaN	NaN
Net Borrowings	31459000	18283000
Other Cash Flows from Financing Activities	-190000	-369000
Total Cash Flows From Financing Activities	8408000	-8393000
Effect Of Exchange Rate Changes	19000	-67000
Change In Cash and Cash Equivalents	1153000	915000

```
[22]: CF = stock.cashflow.loc[:,::-1] # Reverse Column
```

```
[23]: CF
```

	6/30/2016	6/30/2017	\
Net Income	20539000	25489000	
Operating Activities, Cash Flows Provided By or...	-	-	
Depreciation	5878000	7800000	
Adjustments To Net Income	6229000	1342000	
Changes In Accounts Receivables	562000	-1216000	
Changes In Liabilities	2653000	3901000	
Changes In Inventories	600000	50000	
Changes In Other Operating Activities	-2907000	349000	
Total Cash Flow From Operating Activities	33325000	39507000	
Investing Activities, Cash Flows Provided By or...	-	-	
Capital Expenditure	-8343000	-8129000	
Investments	-14417000	-12511000	
Other Cash flows from Investing Activities	203000	-197000	
Total Cash Flows From Investing Activities	-23950000	-46781000	
Financing Activities, Cash Flows Provided By or...	-	-	
Dividends Paid	-11006000	-11845000	

Sale Purchase of Stock	NaN	NaN
Net Borrowings	18283000	31459000
Other Cash Flows from Financing Activities	-369000	-190000
Total Cash Flows From Financing Activities	-8393000	8408000
Effect Of Exchange Rate Changes	-67000	19000
Change In Cash and Cash Equivalents	915000	1153000
	6/30/2018	6/30/2019
Net Income	16571000	39240000
Operating Activities, Cash Flows Provided By or...	-	-
Depreciation	9900000	11600000
Adjustments To Net Income	-3054000	-2521000
Changes In Accounts Receivables	-3862000	-2812000
Changes In Liabilities	7070000	4694000
Changes In Inventories	-465000	597000
Changes In Other Operating Activities	-459000	-1542000
Total Cash Flow From Operating Activities	43884000	52185000
Investing Activities, Cash Flows Provided By or...	-	-
Capital Expenditure	-11632000	-13925000
Investments	6557000	540000
Other Cash flows from Investing Activities	-98000	NaN
Total Cash Flows From Investing Activities	-6061000	-15773000
Financing Activities, Cash Flows Provided By or...	-	-
Dividends Paid	-12699000	-13811000
Sale Purchase of Stock	NaN	NaN
Net Borrowings	-10201000	-4000000
Other Cash Flows from Financing Activities	-971000	-675000
Total Cash Flows From Financing Activities	-33590000	-36887000
Effect Of Exchange Rate Changes	50000	-115000
Change In Cash and Cash Equivalents	4283000	-590000

## 1.1 Ratio Analysis

### 1.1.1 Short term solvency ratios

```
[76]: print('Short term solvency ratios')
print('-'*40)
print('Current Ratio')
CR = BS.loc['Total Current Assets'].astype(int) / BS.loc['Total Current_Liabilities'].astype(int) # Total Current Assets/Total Current Liabilities
print(CR, "\n")
print('Quick Ratio')
QR = (BS.loc['Total Current Assets'].astype(int) - BS.loc['Inventory'].astype(int)) / BS.loc['Total Current Liabilities'].astype(int) # (Total Current Assets-Inventory)/Total Current Liabilities
print(QR, "\n")
```



```

print('Cash Ratio')
CashR = (BS.loc['Cash And Cash Equivalents'].astype(int) - BS.loc['Short Term_
↳Investments'].astype(int)) / BS.loc['Total Current Liabilities'].astype(int)
↳# (Cash And Cash Equivalents + Short Term Investments + Intangible Assets)/
↳Total Current Liabilities)
print(CashR, "\n")
print('Networking Capital to Current Liabilities')
NCCL = (BS.loc['Total Current Assets'].astype(int) - BS.loc['Total Current_
↳Liabilities'].astype(int)) / BS.loc['Total Current Liabilities'].astype(int)
↳# (Total Current Assets - Total Current Liabilities)/Total Current_
↳Liabilities)
print(NCCL, "\n")

```

#### Short term solvency ratios

##### Current Ratio

6/30/2016	2.352882
6/30/2017	2.918576
6/30/2018	2.900800
6/30/2019	2.528839

dtype: float64

##### Quick Ratio

6/30/2016	2.314959
6/30/2017	2.879451
6/30/2018	2.855287
6/30/2019	2.499121

dtype: float64

##### Cash Ratio

6/30/2016	-1.685075
6/30/2017	-2.109158
6/30/2018	-1.876829
6/30/2019	-1.600691

dtype: float64

##### Networking Capital to Current Liabilities

6/30/2016	1.352882
6/30/2017	1.918576
6/30/2018	1.900800
6/30/2019	1.528839

dtype: float64

### 1.1.2 Asset Utilization or Turnover ratios

```
[75]: print('Asset Utilization or Turnover ratios')
print('-'*40)
print('Average Collection Period')
ACP = BS.loc['Net Receivables'].astype(int) / (IC.loc['Total Revenue'].
    ↳astype(int)/360) # Net Receivables/(Total Revenue/360)
print(ACP, "\n")
print('Inventory Turnover Ratios')
ITR = IC.loc['Total Revenue'].astype(int) / BS.loc['Inventory'].astype(int)#
    ↳Total Revenue / Inventory
print(ITR, "\n")
print('Receivable Turnover')
RT = IC.loc['Total Revenue'].astype(int)/BS.loc['Net Receivables'].astype(int)#
    ↳# Total Revenue / Net Receivables
print(RT, "\n")
print('Fixed Asset Turnover')
FAT = IC.loc['Total Revenue'].astype(int)/BS.loc['Net Receivables'].astype(int)#
    ↳# Total Revenue / Property, plant and equipment
print(FAT, "\n")
print('Total Asset Turnover')
TAT = IC.loc['Total Revenue'].astype(int)/BS.loc['Total Assets'].astype(int)#
    ↳Total Revenue / Total Assets
print(TAT, "\n")
```

#### Asset Utilization or Turnover ratios

##### Average Collection Period

6/30/2016	72.182460
6/30/2017	83.618892
6/30/2018	86.382385
6/30/2019	84.459525

dtype: float64

##### Inventory Turnover Ratios

6/30/2016	40.494891
6/30/2017	44.278313
6/30/2018	41.457551
6/30/2019	61.000000

dtype: float64

##### Receivable Turnover

6/30/2016	4.987361
6/30/2017	4.305247
6/30/2018	4.167516
6/30/2019	4.262397

dtype: float64

Fixed Asset Turnover

6/30/2016	4.987361
6/30/2017	4.305247
6/30/2018	4.167516
6/30/2019	4.262397

dtype: float64

Total Asset Turnover

6/30/2016	0.471158
6/30/2017	0.385803
6/30/2018	0.426351
6/30/2019	0.439157

dtype: float64

### 1.1.3 Financial Leverage ratios

```
[86]: print('Financial Leverage ratios')
print('-'*40)
print('Total Debt Ratio')
TDR = BS.loc['Total Liabilities'].astype(int) / BS.loc['Total Assets'].
      ↳astype(int) # Total Liabilities / Total Assets
print(TDR, "\n")
print('Debt/Equity')
DE = BS.loc['Total Liabilities'].astype(int) / BS.loc["Total stockholders' equity"]
      ↳astype(int) # Total Liabilities / Total stockholders' equity
print(DE, "\n")
print('Equity Ratio')
ER = BS.loc["Total stockholders' equity"].astype(int) / BS.loc['Total Assets'].
      ↳astype(int) # Total stockholders' equity / Total Assets
print(ER, "\n")
print('Long-term Debt Ratio')
LTDR = BS.loc['Long Term Debt'].astype(int) / BS.loc['Total Assets'].
      ↳astype(int) # Long Term Debt / Total Assets
print(LTDR, "\n")
print('Times Interest Earned Ratio')
TIER = IC.loc['Earnings Before Interest and Taxes'].astype(int) / IC.
      ↳loc['Interest Expense'].astype(int) # Earnings Before Interest and Taxes / Interest Expense
print(TIER, "\n")
```

Financial Leverage ratios

-----

Total Debt Ratio

6/30/2016	0.627861
6/30/2017	0.649593
6/30/2018	0.680438

```
6/30/2019    0.642897
dtype: float64
```

```
Debt/Equity
6/30/2016    1.687168
6/30/2017    1.853827
6/30/2018    2.129283
6/30/2019    1.800313
dtype: float64
```

```
Equity Ratio
6/30/2016    0.372139
6/30/2017    0.350407
6/30/2018    0.319562
6/30/2019    0.357103
dtype: float64
```

```
Long-term Debt Ratio
6/30/2016    0.209632
6/30/2017    0.303913
6/30/2018    0.279090
6/30/2019    0.232632
dtype: float64
```

```
Times Interest Earned Ratio
6/30/2016    -21.872888
6/30/2017    -13.200270
6/30/2018    -12.827662
6/30/2019    -15.993671
dtype: float64
```

#### 1.1.4 Profitability ratios

```
[92]: print('Profitability ratios')
      print('-'*40)
      print('Gross Profit Margin')
      GPM = IC.loc['Gross Profit'].astype(int) / IC.loc['Total Revenue'].astype(int)
      ↪ # Gross Profit / Total Revenue
      print(GPM, "\n")
      print('Net Profit Margin')
      NPM = IC.loc['Net Income Applicable To Common Shares'].astype(int) / IC.
      ↪ loc['Total Revenue'].astype(int) # Net Income / Total Revenue
      print(NPM, "\n")
      print('Return on Assets (ROA)')
      ROA = IC.loc['Net Income Applicable To Common Shares'].astype(int) / BS.
      ↪ loc['Total Assets'].astype(int) # Net Income / Total Assets
```

```

print(ROA, "\n")
print('Return on Equity (ROE)')
ROE = IC.loc['Net Income Applicable To Common Shares'].astype(int) / BS.
    ↳loc['Total stockholders\' equity'].astype(int) # Net Income / Total Equity
print(ROE, "\n")
print('Earning Per Share (EPS)')
EPS = IC.loc['Net Income Applicable To Common Shares'].astype(int) / (BS.
    ↳loc['Common Stock'].astype(int) - BS.loc['Treasury Stock'].astype(int)) #
    ↳Net Income / (Common Stock - Treasury Stock)
print(EPS, "\n")

```

## Profitability ratios

### Gross Profit Margin

```

6/30/2016    0.640389
6/30/2017    0.645225
6/30/2018    0.652474
6/30/2019    0.659020
dtype: float64

```

### Net Profit Margin

```

6/30/2016    0.225322
6/30/2017    0.263941
6/30/2018    0.150154
6/30/2019    0.311817
dtype: float64

```

### Return on Assets (ROA)

```

6/30/2016    0.106162
6/30/2017    0.101829
6/30/2018    0.064018
6/30/2019    0.136937
dtype: float64

```

### Return on Equity (ROE)

```

6/30/2016    0.285276
6/30/2017    0.290602
6/30/2018    0.200331
6/30/2019    0.383465
dtype: float64

```

### Earning Per Share (EPS)

```

6/30/2016    0.308204
6/30/2017    0.371084
6/30/2018    0.225732
6/30/2019    0.497591
dtype: float64

```

