# BAC & CITI Financial Valuation

**FINC525 Financial Modeling**

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# 1 Purpose of valuation:

The purpose of this valuation is to know the values of two companies selected by investors in order to determine the economic value of the company as it is an informed estimate of the total worth of a company and helps us to know which company has better performance.

# 2 Benefits of Business Valuation:

The valuation helps us to know the wealth of a company. Knowing what an asset is worth and what determines that value is a pre-requisite for intelligent decision making and in choosing investments for a portfolio in deciding on the appropriate price to pay or receive in a takeover and in making investment, financing, and dividend choices when running a business. This valuation provides broad access to investors. They not only get an idea of company's current value but a comprehensive value projection. By getting this information, investors get an idea of where the money is going or about cash flows and how it will provide with a smart return. Higher the valuation, that means more money per share sold to investors. Analysts do a valuation to determine whether a company or asset is overvalued or undervalued by the market.

# 3 Valuation Methods Categories:

**Absolute valuation models** :

It helps to find the true value of an investment based only on fundamentals, which includes dividends, cash flow, and growth rate for a single company only. Some methods under this category are:

- DCF( Discounted Cash Flow method)
- Asset-based model
- Dividend discount Model

**Relative valuation models**:

This model operates by comparing the company in question to other similar companies. These methods involve calculating multiples and ratios such as price to earnings multiple and comparing them to multiples of similar companies. A multiple is simply a ratio that is calculated by dividing the market or estimated value of an asset by a specific item on the financial Statements The multiples approach is a comparable analysis method that seeks to value similar companies using the same financial metrics. the idea behind multiples analysis is that when firms are comparable, the multiples approach can be used to determine the value of one firm based on the value of another. These are market methods. Some common ratios used in multiple approach are:

- P/E (price to earning) ratio used for stock valuation
- E V/sales (enterprise value to sales ratio)
- Price to book ratio

## 3.1 Methods Used (Absolute Valuation Models):

- Discounted Cash Flow (DCF): (Enterprise value approach)
- Weighted Average Cost of Capital (WACC)

# 4 Requirements:

- We require 2 companies' financial statement to analyze financial condition
- We will use both companies 2019 financial statement.
- Both companies will be again re-analyzed using their 2020 financial statement to see the changes in company financial condition after covid.
- Our investment plan on basis of above results.

**Information Sources for Financial Statement:**

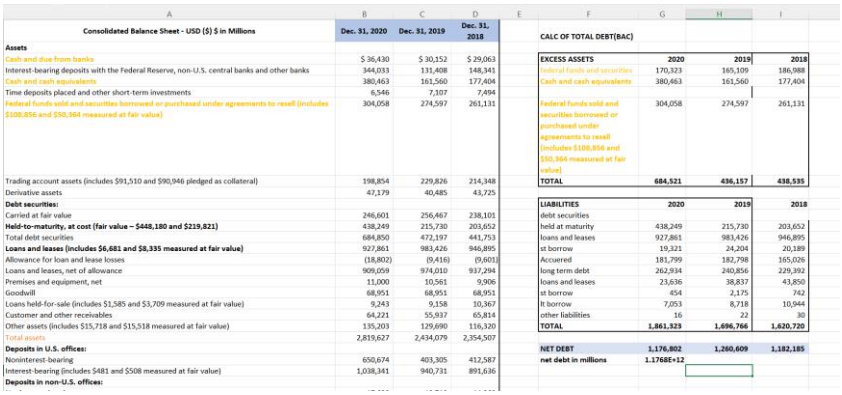
| **Material** | **Source** |
|---|---|
| BAC Financial Statement | https://www.sec.gov/cgi-bin/viewer?action=view&cik=70858&accession_number=0000070858-21-000023&xbrl_type=v# |
| CITI Financial Statement | https://www.sec.gov/cgi-bin/viewer?action=view&cik=831001&accession_number=0000831001-21-000042&xbrl_type=v# |
| BAC historical Price | https://finance.yahoo.com/quote/BAC/history?p=BAC |
| CITI historical Price | https://finance.yahoo.com/quote/C/history?p=C |
| SPY | https://finance.yahoo.com/quote/SPY/history?p=SPY |

# 5 Financial Statement Reconstruction and Forecasts:

Accurate estimation of business value depends upon the subject financial performance. To determine the business value accurately, the company's historic financial statements , such as income statement, balance sheet, cash flow statement , generally require certain adjustments. These adjustments will help to reveal true economic potential and earning power of the subject business.

## Screenshot of Financial Statement Reconstruction:

### BAC Balance Sheet and Calculation of net debt



| Consolidated Balance Sheet - USD ($) $ in Millions | Dec. 31, 2020 | Dec. 31, 2019 | Dec. 31, 2018 |
|---|---|---|---|
| **Assets** | | | |
| Cash and due from banks | $ 36,430 | $ 30,152 | $ 29,063 |
| Interest-bearing deposits with the Federal Reserve, non-U.S. central banks and other banks | 344,033 | 131,408 | 148,341 |
| Cash and cash equivalents | 380,463 | 161,560 | 177,404 |
| Time deposits placed and other short-term investments | 6,546 | 7,107 | 7,494 |
| Federal funds sold and securities borrowed or purchased under agreements to resell (includes $108,856 and $50,364 measured at fair value) | 304,058 | 274,597 | 261,131 |
| Trading account assets (includes $91,510 and $90,946 pledged as collateral) | 198,854 | 229,826 | 214,348 |
| Derivative assets | 47,179 | 40,485 | 43,725 |
| **Debt securities:** | | | |
| Carried at fair value | 246,601 | 256,467 | 238,101 |
| **Held-to-maturity, at cost (fair value – $448,180 and $219,821)** | 438,249 | 215,730 | 203,652 |
| Total debt securities | 684,850 | 472,197 | 441,753 |
| **Loans and leases (includes $6,681 and $8,335 measured at fair value)** | 927,861 | 983,426 | 946,895 |
| Allowance for loan and lease losses | (18,802) | (9,416) | (9,601) |
| Loans and leases, net of allowance | 909,059 | 974,010 | 937,294 |
| Premises and equipment, net | 11,000 | 10,561 | 9,906 |
| Goodwill | 68,951 | 68,951 | 68,951 |
| Loans held-for-sale (includes $1,585 and $3,709 measured at fair value) | 9,243 | 9,158 | 10,367 |
| Customer and other receivables | 64,221 | 55,937 | 65,814 |
| Other assets (includes $15,718 and $15,518 measured at fair value) | 135,203 | 129,690 | 116,320 |
| Total assets | 2,819,627 | 2,434,079 | 2,354,507 |
| **Deposits in U.S. offices:** | | | |
| Noninterest-bearing | 650,674 | 403,305 | 412,587 |
| Interest-bearing (includes $481 and $508 measured at fair value) | 1,038,341 | 940,731 | 891,636 |
| **Deposits in non-U.S. offices:** | | | |

| CALC OF TOTAL DEBT(BAC) | | | |
|---|---|---|---|
| **EXCESS ASSETS** | **2020** | **2019** | **2018** |
| Federal funds and securities | 170,323 | 165,109 | 186,988 |
| Cash and cash equivalents | 380,463 | 161,560 | 177,404 |
| Federal funds sold and securities borrowed or purchased under agreements to resell (includes $108,856 and $50,364 measured at fair value) | 304,058 | 274,597 | 261,131 |
| **TOTAL** | **684,521** | **436,157** | **438,535** |

| **LIABILITIES** | **2020** | **2019** | **2018** |
|---|---|---|---|
| debt securities | | | |
| held at maturity | 438,249 | 215,730 | 203,652 |
| loans and leases | 927,861 | 983,426 | 946,895 |
| st borrow | 19,321 | 24,204 | 20,189 |
| Accuered | 181,799 | 182,798 | 165,026 |
| long term debt | 262,934 | 240,856 | 229,392 |
| loans and leases | 23,636 | 38,837 | 43,850 |
| st borrow | 454 | 2,175 | 742 |
| lt borrow | 7,053 | 8,718 | 10,944 |
| other liabilities | 16 | 22 | 30 |
| **TOTAL** | **1,861,323** | **1,696,766** | **1,620,720** |
| **NET DEBT** | **1,176,802** | **1,260,609** | **1,182,185** |
| **net debt in millions** | **1.1768E+12** | | |

### CITI : Net Debt Calculation using balance Sheet

| Calculation of total debt | | | |
|---|---|---|---|
| **EXCESS ASSET** | **2020** | **2019** | **2018** |
| Cash and due from banks (including segregated cash and other | $ 26,349 | $ 23,967 | $ 23,645 |
| Held-to-maturity debt securities (including $547 and $1,923 pledged to creditors as of December 31, 2020 and 2019, respectively), net of allowance | 104,943 | 80,775 | 63,357 |
| Cash and due from banks (including segregated cash and other deposits) | 281 | 108 | 270 |
| Total | ######## | 806,389 | 810,454 |
| **LIABILITIES(8NVESTEMNT(ST, LT)** | | | |
| Trading account assets (including $168,967 and $120,236 pledged to creditors at December 31, 2020 and 2019, respectively) | 8,104 | 6,719 | 0 |
| **TOTAL LIABILITY** | **399,433** | **395,037** | **388,002** |
| **NET DEBT** | (645,202) | (411,352) | (422,452) |
| **ASSUMPTION : Since the net debt is negative, so we will just consider equity re not cost of debt.** | | | |

# 6 Methods for evaluation used (Detail):

## 6.1 Discounted Cash flow statement (DCF):

This method falls under Enterprise value (EV) method for valuing the company's productive activities. Enterprise value (EV) of the firm is the value of the firm's core business activities and forms the basis of most corporate valuation method. DCF approach values the EV as the present value of the firms future anticipated cash-free flow (FCF), discounted at weighted average cost of capital. The present value (PV) of all future cash flows is considered as firms EV. FCF are the cash flow produced by firm operating assets – working capital. Fixed assets, good will and more. Main idea is that in order to make an investment decision on company and want to make sure it keeps on generate profit or cash flows. It is based on idea of present value.

**Assumption:**

1. We consider that the fundamental value of the company is equal to its ability to generate future cash flows and it Keeps generating it. If we discount it to the present value, then that will be proxy to the fundamental value of the company.

2. Model assume a limited number of predictive models

3. Assume that cash flows occur evenly throughout the year (in mid-year), where we receive our cash flow

4. The future FCF estimation is projected using current FCF and adding some growth rate(g) whose value is defined by us. It assumes that the firm keep generating cash flow with *some certain growth rate*

## Formula for DCF model:

(1) *DCF Formula*

$$\text{Value} = \frac{CF_1}{(1+i)^1} + \frac{CF_2}{(1+i)^2} + \cdots + \frac{CF_\infty}{(1+i)^\infty} = \sum_{n=i}^{\infty} \frac{CF_n}{(1+i)^n}$$

where

$CF$ = cash flow
$i$ = discount rate
$n$ = time periods from one to infinity

(2) *Fair Market Value Estimate*

$$\text{Value} = \sum_{n=1}^{t} \frac{CF_n}{(1+i)^n} + \frac{TV_t}{(1+i)^t}$$

where

$CF$ = cash flow
$i$ = discount rate
$n$ = time periods, time = 1 to $t$
$TV$ = terminal value.

$$EV = \sum_{t=1}^{\infty} \frac{FCF_t}{(1+WACC)^t}$$

### Where

- FCF is the free cash flows (FCF) , which are cash generated by firms operating activities.
- WACC is the weighted average cost, which is the risk_adjusted discount rate appropriate to risk of the FCF. **Its value has been calculated which is as:**

## Values for WACC used

**VALUES OF WACC FOR BOTH YEARS AND COMPANY**

| | WACC (BAC) | |
|---|---|---|
| YEAR | 2019 | 2020 |
| | 13.40% | 7.21% |

| | WACC | |
|---|---|---|
| YEAR | 2019 | 2020 |
| | 73.14% | 41.63% |

# 7 Changes made to cash flow Statement (CSCF TO FCF Statement):

The method requires free cash flow (FCF) in the future and to obtain it we can use historical value from cash flow statement *after excluding cash flow from financial activities.*

*Table showing changes made to CSCF statement to convert to FCF statement*

| CSCF | FCF |
|---|---|
| **Operating Activities** | All operating activities are kept, and net cash provided by operating activities are used in calculation of FCF. |
| **Investing Activities** | 1. In general, we don't keep any investing activities e.g. short term investment or debt removed.<br>2. In general, under investment activities includes purchase of property and other related operational activities so we will just keep that part of it and remove others since it is relevant to operating activities<br>3. My CF statement contains "purchase "under Investing Activities and since it's not explicitly mentioned that it's a purchase of plants or for any operational activities, we will not include here in FCF. |
| **Financing Activities** | We do not include any financial activities in our FCF statement and so will remove it during calculation. |
| **Add Income tax rate** | Calculated as ratio of income tax paid net to sum of income tax paid and net income for each year |

## Screenshot for showing Changes made to CSCF and calculation of FCF: FIG: 2 :BAC

| (BAC)FREE CASH FLOW STATEMENT - USD ($) $ in Millions | 12 Months Ended | | |
|---|---|---|---|
| | Dec. 31, 2020 | Dec. 31, 2019 | Dec. 31, 2018 |
| **Operating activities** | | | |
| **Net income** | **$ 17,894** | **$ 27,430** | **$ 28,147** |
| **Adjustments to reconcile net income to net cash provided by operating activities:** | | | |
| Provision for credit losses | 11,320 | 3,590 | 3,282 |
| Gains on sales of debt securities | (411) | (217) | (154) |
| Depreciation and amortization | 1,843 | 1,729 | 2,063 |
| Net amortization of premium/discount on debt securities | 4,101 | 2,066 | 1,824 |
| Deferred income taxes | (1,737) | 2,435 | 3,041 |
| Stock-based compensation | 2,031 | 1,974 | 1,729 |
| Impairment of equity method investment | 0 | 2,072 | 0 |
| **Loans held-for-sale:** | | | |
| Originations and purchases | (19,657) | (28,874) | (28,071) |
| Proceeds from sales and paydowns of loans originally classified as held for sale and instruments from related securitization activities | 19,049 | 30,191 | 28,972 |
| **Net change in:** | | | |
| Trading and derivative assets/liabilities | 16,942 | 7,920 | (23,673) |
| Other assets | (12,883) | (11,113) | 11,920 |
| Accrued expenses and other liabilities | (4,385) | 16,363 | 13,010 |
| Other operating activities, net | 3,886 | 6,211 | (2,570) |
| **Net cash provided by operating activities** | **37,993** | **61,777** | **39,520** |
| **Investing activities** | **0** | **0** | **0** |
| **Financing activities** | **0** | **0** | **0** |

| | | | |
|---|---|---|---|
| **free cash flow before interest** | 37,993 | 61,777 | 39,520 |
| **After interest** | 7456.120262 | 19152.42002 | 17547.17278 |
| **FCF** | **45,449** | **80,929** | **57,067** |

**Screenshot for showing Changes made to CSCF and calculation of FCF: FIG3: CITI**

| | | | | |
|---|---|---|---|---|
| **Capital expenditures on premises and equipment and capitalized software** | | **(3,446)** | **(5,336)** | **(3,774)** |
| **Proceeds from sales of premises and equipment, subsidiaries and affiliates and repossessed assets** | | **50** | **259** | **212** |
| **TOTAL** | | (3,396) | (5,077) | (3,562) |
| sum | | (3,396) | (5,077) | (3,562) |
| FCF tax after tax | (24,017) | (17,914) | 33,390 | |
| FCF tax before | 9271.838298 | 22909.94 | 18533.29 | |
| **FCF** | **(14,745)** | **4,996** | **51,923** | |

**Formula for FCF calculation:**

Company pay some interest when it issues for example bond to bond holder, so we adjust interest and then calculate FCF. So

**Formula for FCF given as:**

| **FCF = FCF before interest adjustment + FCF after tax net interest** |
|---|

# 8 Valuation statement generated for Valuation Purpose:

**Assumptions:**

1 We assume that the FCF cash flows calculated for each year represents Cash flow generated from companies operating activities and will be used as current cash flow for the year and will be further used to project future cash flow.

2. We are considering projection of future cash flow for next 5 years **.**

3. Every cash flow are generated from previous year cash flow with some growth rate

4. Growth rate is decided on basis of how we think company future cf be:

| **Growth rate (optimistic)** | **Growth rate** |
|---|---|
| **Gst = 8%** | **Glt = 5%** |
| | |

## Screenshot of BAC Valuation report :

**BAC CORP VALUATION BASED ON CF**

| | | | | | | |
|---|---|---|---|---|---|---|
| **FCF(2019)** | **80,929** | | | | | |
| **Short term investment growth rate gst** | **8%** | | | | | |
| **long term investemet growth rate glt** | **5%** | | | | | |
| **)wacc(dic rate)** | **13.40%** | | | | | |
| **year** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** |
| | **80,929** | **87404** | **94396.08** | **101948** | **110103.582** | **118912** |
| discounting period | | 0.5 | 1.5 | 2.5 | 3.5 | 4.5 |
| df(discounting factor) | | 0.9391 | 0.828119 | 0.7303 | 0.64399662 | 0.5679 |
| discounted fcf | | 82078 | 78171.22 | 74450 | 70906.3344 | 67531 |
| **terminak value** | | | | | | **1E+06** |
| **total** | | **87404** | **94396.08** | **101948** | **110103.582** | **2E+06** |
| **EV** | **1217496** | | | | | |
| Add back initial cash and marketable securities(excess asset added) | | | | | | |
| Subtract 2019 financial liabilities | | | | | | |
| Equity value | | | | | | |
| Per share (1 million shares outstanding) | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| FCF(2020) | 45,449 | | | | | |
| Short term investment growth rate gst | 8% | | | | | |
| long term investemet growth rate glt | 5% | | | | | |
| )wacc(dic rate) | 7.21% | | | | | |
| **year** | **2020** | **2021** | **2022** | **2023** | **2024** | **2025** |
| | 45,449 | 49085.04988 | 53012 | 57253 | 61833.03 | 66779.67 |
| discounting period | | 0.5 | 1.5 | 2.5 | 3.5 | 4.5 |
| df(discounting factor) | | 0.939069326 | 0.8281 | 0.73 | 0.643997 | 0.567909 |
| discounted fcf | | 46094.26472 | 43900 | 41810 | 39820.26 | 37924.79 |
| terminak vslue | | | | | | 317244 |
| total | | 49085.04988 | 53012 | 57253 | **61833.03** | **323922** |
| **EV** | **2559703.572** | | | | | |
| Add back initial cash and marketable securities(excess asset added) | 684,521 | | | | | |
| Subtract 2019 financial liabilities | 1,861,323 | | | | | |
| Equity value | 5105547.572 | | | | | |
| Per share (1 million shares outstanding) | 5.105547572 | | | | | |

**Table for BAC EV for 2019 and 2020**

| EV (2019) | EV (2020) |
|---|---|
| **1217496** | **2559703.572** |

## 8.1 Conclusion:

**For 2019:**

1. All projected Cash flows are positive in case of BAC
2. The value of EV is positive for 2019.

**For 2020:**

1. As we see from valuation statement that all projected future cash flows are positive which indicates that more money moving into it than out of it. It indicates that company liquid assets are increasing enabling it to cover obligations, reinvest in its business, return money to shareholders, pay expense, and provide a buffer against future financial challenges and generating more than enough cash to cover expenses.

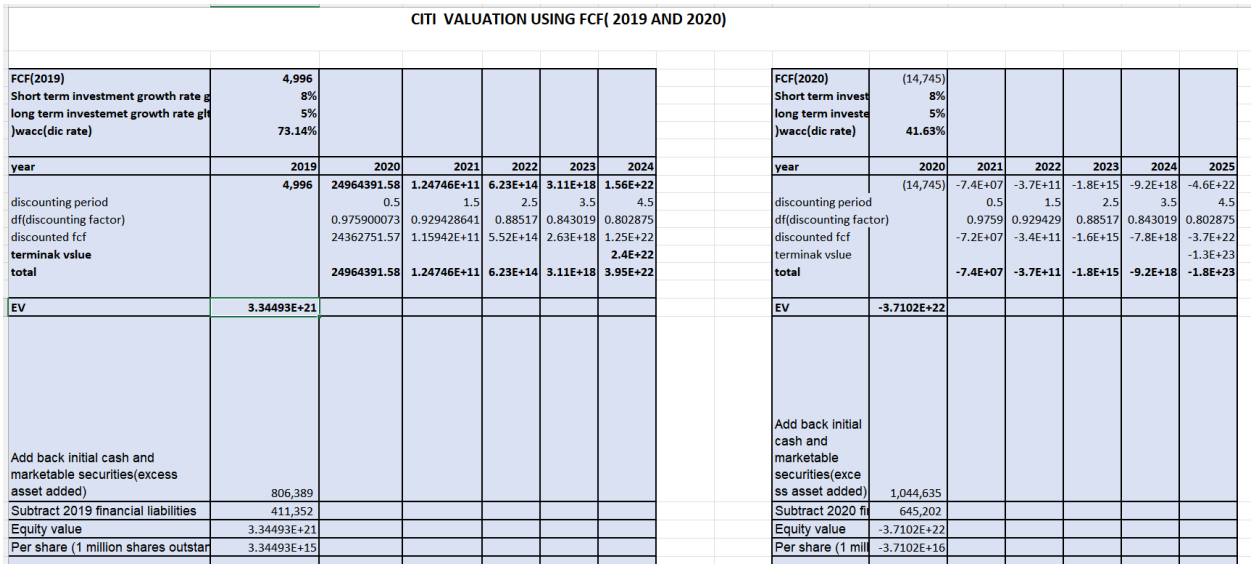
2. BAC has positive enterprise value in 2020, which from dcf model is considered as equal to present value. Also, the value of EV increased from 2019 to 2020.

## 8.2 Change in situation during and after covid

1. As we see above, projected future positive cash flows from 2019 to 2020 for BAC remains positive , indicating more money coming than going.
2. The enterprise value increased in 2020

# 9 Valuation Of CITI (DCF model):

## Screenshot of CITI Valuation report :



CITI VALUATION USING FCF( 2019 AND 2020)

| FCF(2019) | 4,996 | | | | | |
|---|---|---|---|---|---|---|
| Short term investment growth rate g | 8% | | | | | |
| long term investemet growth rate gl | 5% | | | | | |
| )wacc(dic rate) | 73.14% | | | | | |
| year | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
| | 4,996 | 24964391.58 | 1.24746E+11 | 6.23E+14 | 3.11E+18 | 1.56E+22 |
| discounting period | | 0.5 | 1.5 | 2.5 | 3.5 | 4.5 |
| df(discounting factor) | | 0.975900073 | 0.929428641 | 0.88517 | 0.843019 | 0.802875 |
| discounted fcf | | 24362751.57 | 1.15942E+11 | 5.52E+14 | 2.63E+18 | 1.25E+22 |
| terminak vslue | | | | | | 2.4E+22 |
| total | | 24964391.58 | 1.24746E+11 | 6.23E+14 | 3.11E+18 | 3.95E+22 |
| EV | 3.34493E+21 | | | | | |
| Add back initial cash and marketable securities(excess asset added) | 806,389 | | | | | |
| Subtract 2019 financial liabilities | 411,352 | | | | | |
| Equity value | 3.34493E+21 | | | | | |
| Per share (1 million shares outstar | 3.34493E+15 | | | | | |

| FCF(2020) | (14,745) | | | | | |
|---|---|---|---|---|---|---|
| Short term invest | 8% | | | | | |
| long term investe | 5% | | | | | |
| )wacc(dic rate) | 41.63% | | | | | |
| year | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
| | (14,745) | -7.4E+07 | -3.7E+11 | -1.8E+15 | -9.2E+18 | -4.6E+22 |
| discounting period | | 0.5 | 1.5 | 2.5 | 3.5 | 4.5 |
| df(discounting factor) | | 0.9759 | 0.929429 | 0.88517 | 0.843019 | 0.802875 |
| discounted fcf | | -7.2E+07 | -3.4E+11 | -1.6E+15 | -7.8E+18 | -3.7E+22 |
| terminak vslue | | | | | | -1.3E+23 |
| total | | -7.4E+07 | -3.7E+11 | -1.8E+15 | -9.2E+18 | -1.8E+23 |
| EV | -3.7102E+22 | | | | | |
| Add back initial cash and marketable securities(exce ss asset added) | 1,044,635 | | | | | |
| Subtract 2020 fi | 645,202 | | | | | |
| Equity value | -3.7102E+22 | | | | | |
| Per share (1 mill | -3.7102E+16 | | | | | |

**Table for CITI EV for 2019 and 2020**

| EV (2019) | EV (2020) |
|---|---|
| **3.34493E+21** | **-3.7102E+22** |

## 9.1 Conclusion:

**For year 2019 and 2020(during and after covid)**

1. From FCF statement, we can see that cash flows for year 2019 and 2020 changed to negative, and shows all projected cash flows as negative which means that company could not continue to pay its bills without borrowing money(financial activity) .
2. CITI has negative enterprise value in 2020 even when considering terminal value
3. Its enterprise value is negative which means financial liability is greater than EV.
4. After covid, value of CITI reduced to great extent.

5. Asset that is not generating cash flows right now can still be valued with DCF as long as those cash flows are estimated to become positive at some point in future.
6. The companies with negative cash flows are usually more difficult to value than firms with positive cash flows as its riskier and has more complex assumptions.

## 9.2 Change in situation during and after covid

- As we see above, projected future positive cash flows from 2019 for CITI turned to negative cash flows, indicating company could not continue to pay its bills without borrowing money or raising investment activity.
- The enterprise value changed from positive to negative.

**Decision using Results from DCF model of Evaluation:**

**1. Using DCF valuation, I would like to invest in BAC as:**

- Inspire projected negative cash flows for 2-year, BAC value is more and has improved and so more valuable than CITI.
  For CITI, all cash flows were negative so it's always good idea to select the one with more positive cashflows, which in this case is BAC.

# 10 METHOD 3: Weighted Average Cost of Capital (WACC)

## 10.1 Purpose:

Weighted average cost of capital (WACC) is used to access investors return on an investment in a company. It is a firm cost of capital in which each category is proportionately weighted. In investing terms, WACC shows the average rate that companies pay to finance their overall operations. WACC is calculated by incorporating equity investments from the sale of stock, as well as any operational debt they incur (with respect to the firm's enterprise value). WACC shows how much a company must earn on its existing assets to satisfy the interests of both its investors and debtors. For investing purpose in a company , this can help to determine whether its stock has room to grow or if its progress is limited by how the business is financed.

Formula for WACC:

**WACC Formula**

$$WACC = \frac{E}{D+E}(r_e) + \frac{D}{D+E}(r_d)(1-t)$$

Where:

E = market value of equity

D = market value of debt

$r_e$ = cost of equity

$r_d$ = cost of debt

t = corporate tax rate

# 11 SOURCES:

**FOR BAC**

| | | |
|---|---|---|
| Market value of Equity<br>For both year | E | https://companiesmarketcap.com/bank-of-america/marketcap/ |
| Market value of debt | D | Calculated using balance Sheet |
| Cost of Equity | re | Calculated using CAPM |
| Tax rate | tc | Calculated using Income Statement |
| Cost of debt | rd | Calculated using income statement and net debt from balance sheet |

**FOR CITI**

| | | |
|---|---|---|
| Market value of Equity<br>For both year | E | https://companiesmarketcap.com/citigroup/marketcap/ |
| Market value of debt | D | Calculated using balance Sheet |
| Cost of Equity | re | Calculated using CAPM |
| Tax rate | tc | Citigroup Inc Annual Effective Tax Rate Trends, Business Profitability Ranking, Fundamental Ratios - CSIMarket |
| Cost of Debt | rd | Calculated using income statement and balance sheet |

**For CAPM:**

| | | |
|---|---|---|
| Risk free rate | rf | https://www.macrotrends.net/2016/10-year-treasury-bond-rate-yield-chart |
| Expected market return | E(rm) | Calculated using stock return of spy used yahoo.finance to download data. Calculation shown in excel |

**Table for E(rm)**

| | 2019 | | |
|---|---|---|---|
| CMPNY | SPY | BAC | CITI |
| Mean return | 0.11% | 0.15% | 0.18% |
| Alpha | 0 | 0.000125 | 0.000117 |
| Beta(risk) | 1 | 1.240026 | 1.484119 |

| | 2020 | | |
|---|---|---|---|
| CMPNY | SPY | BAC | CITI |
| Mean return | 0.063% | -0.054% | -0.094% |
| Alpha | 0 | -0.00144 | -0.001965032 |
| Beta(risk) | 1 | 1.433073 | 1.629425905 |

**Market Return**

| | |
|---|---|
| **E(rm)(2019)** | **0.11%** |
| **E(rm)(2020)** | **0.063%** |

**Table for risk free rate(rf):**

| RISK FREE RATE(RF) USED IN THE CALCULATION | | |
|---|---|---|
| **rf(2019)** | 2.14% | https://www.macrotrends.net/2016/10-year-treasury-bond-rate-yield-chart |
| **rf(2020)** | 0.89% | |

**Table for tax rate used for CITI**

| ANNUAL EFFECTIVE TAX RATE (TC) USED ( FOR CITI) | | |
|---|---|---|
| **2019** | **2020** | SOURCE |
| 18.53% | 18.52% | Citigroup Inc Annual Effective Tax Rate Trends, Business Profitability Ranking, Fundamental Ratios - CSIMarket |

**Balance statement for calculation of net debt D**

**FOR BAC:**

| Consolidated Balance Sheet - USD ($) $ in Millions | Dec. 31, 2020 | Dec. 31, 2019 | Dec. 31, 2018 |
|---|---|---|---|
| **Assets** | | | |
| Cash and due from banks | $ 36,430 | $ 30,152 | $ 29,063 |
| Interest-bearing deposits with the Federal Reserve, non-U.S. central banks and other banks | 344,033 | 131,408 | 148,341 |
| Cash and cash equivalents | 380,463 | 161,560 | 177,404 |
| Time deposits placed and other short-term investments | 6,546 | 7,107 | 7,494 |
| Federal funds sold and securities borrowed or purchased under agreements to resell (includes $108,856 and $50,364 measured at fair value) | 304,058 | 274,597 | 261,131 |
| Trading account assets (includes $91,510 and $90,946 pledged as collateral) | 198,854 | 229,826 | 214,348 |
| Derivative assets | 47,179 | 40,485 | 43,725 |
| **Debt securities:** | | | |
| Carried at fair value | 246,601 | 256,467 | 238,101 |
| **Held-to-maturity, at cost (fair value – $448,180 and $219,821)** | 438,249 | 215,730 | 203,652 |
| Total debt securities | 684,850 | 472,197 | 441,753 |
| **Loans and leases (includes $6,681 and $8,335 measured at fair value)** | 927,861 | 983,426 | 946,895 |
| Allowance for loan and lease losses | (18,802) | (9,416) | (9,601) |
| Loans and leases, net of allowance | 909,059 | 974,010 | 937,294 |
| Premises and equipment, net | 11,000 | 10,561 | 9,906 |
| Goodwill | 68,951 | 68,951 | 68,951 |
| Loans held-for-sale (includes $1,585 and $3,709 measured at fair value) | 9,243 | 9,158 | 10,367 |
| Customer and other receivables | 64,221 | 55,937 | 65,814 |
| Other assets (includes $15,718 and $15,518 measured at fair value) | 135,203 | 129,690 | 116,320 |
| Total assets | 2,819,627 | 2,434,079 | 2,354,507 |
| **Deposits in U.S. offices:** | | | |
| Noninterest-bearing | 650,674 | 403,305 | 412,587 |
| Interest-bearing (includes $481 and $508 measured at fair value) | 1,038,341 | 940,731 | 891,636 |
| **Deposits in non-U.S. offices:** | | | |

| CALC OF TOTAL DEBT(BAC) | | | |
|---|---|---|---|
| **EXCESS ASSETS** | **2020** | **2019** | **2018** |
| federal funds and securities | 170,323 | 165,109 | 186,988 |
| Cash and cash equivalents | 380,463 | 161,560 | 177,404 |
| Federal funds sold and securities borrowed or purchased under agreements to resell (includes $108,856 and $50,364 measured at fair value) | 304,058 | 274,597 | 261,131 |
| **TOTAL** | **684,521** | **436,157** | **438,535** |
| **LIABILITIES** | **2020** | **2019** | **2018** |
| debt securities | | | |
| held at maturity | 438,249 | 215,730 | 203,652 |
| loans and leases | 927,861 | 983,426 | 946,895 |
| st borrow | 19,321 | 24,204 | 20,189 |
| Accuered | 181,799 | 182,798 | 165,026 |
| long term debt | 262,934 | 240,856 | 229,392 |
| loans and leases | 23,636 | 38,837 | 43,850 |
| st borrow | 454 | 2,175 | 742 |
| lt borrow | 7,053 | 8,718 | 10,944 |
| other liabilities | 16 | 22 | 30 |
| **TOTAL** | **1,861,323** | **1,696,766** | **1,620,720** |
| **NET DEBT** | **1,176,802** | **1,260,609** | **1,182,185** |
| **net debt in millions** | **1.1768E+12** | | |

## CITI:

| Calculation of total debt | | | |
|---|---|---|---|
| **EXCESS ASSET** | **2020** | **2019** | **2018** |
| Cash and due from banks (including segregated cash and other | $ 26,349 | $ 23,967 | $ 23,645 |
| Held-to-maturity debt securities (including $547 and $1,923 pledged to creditors as of December 31, 2020 and 2019, respectively), net of allowance | 104,943 | 80,775 | 63,357 |
| Cash and due from banks (including segregated cash and other deposits) | 281 | 108 | 270 |
| Total | ######## | 806,389 | 810,454 |
| **LIABILITIES(8NVESTEMNT(ST, LT)** | | | |
| Trading account assets (including $168,967 and $120,236 pledged to creditors at December 31, 2020 and 2019, respectively) | 8,104 | 6,719 | 0 |
| **TOTAL LIABILITY** | **399,433** | **395,037** | **388,002** |
| | | | |
| **NET DEBT** | (645,202) | (411,352) | (422,452) |
| | | | |
| **ASSUMPTION : Since the net debt is negative, so we will just consider equity re not cost of debt.** | | | |

## Assumption:

1. In case of CITI net debt calculation, we can see the values are negative for net debt, so assumed that value of debt = 0, which means equity is only source for company.
2. In calculation of Net Debt, all items which are cash or cash equivalent or current asset, which can be quickly converted to cash is under excess Asset.
3. In calculation of Total liability, included all short and long term debt, which includes all those items which company uses for financing business activities.

## Table for calculated WACC:

| | WACC (BAC) | |
|---|---|---|
| **YEAR** | **2019** | **2020** |
| | 13.40% | 7.21% |

| | WACC FOR CTI | |
|---|---|---|
| **YEAR** | **2019** | **2020** |
| | 73.14% | 41.63% |

## Table for beta value:

| | 2019 | | |
|---|---|---|---|
| CMPNY | SPY | BAC | CITI |
| Mean return | 0.11% | 0.15% | 0.18% |
| Alpha | 0 | 0.000125 | 0.000117 |
| Beta(risk) | 1 | 1.240026 | 1.484119 |

| | 2020 | | |
|---|---|---|---|
| CMPNY | SPY | BAC | CITI |
| Mean return | 0.063% | -0.054% | -0.094% |
| Alpha | 0 | -0.00144 | -0.001965032 |
| Beta(risk) | 1 | 1.433073 | 1.629425905 |

## 11.1 Conclusion:

1. As we see from above table that BAC WACC value is low as compared to CITI WACC, WACC is important because it details how much money a company must make in order to provide returns for stakeholders. An increasing WACC suggests that the company's valuation may be going down because it's using more debt and equity financing to operate. On the opposite side, a decreasing WACC shows the company is growing earnings and relying less on outside funding.
2. A lower WACC of BAC suggests that a company is in a prime position to finance projects more cheaply, either through the sale of stocks or issuing bonds on their debt. The business is producing enough through earnings to reduce the overall debt load and providing continuous returns to investors, which may encourage fundraising rounds to spur growth. Whereas CITI has a higher WACC, it suggests the company is paying more to service their debt or the capital they are raising. As a result, the company's valuation may decrease and the overall return to investors may be lower.

## 11.2 Covid before and after changes:

- For BAC, WACC value decreased from 2019 to 2020 and hence increased the company value and has lower risk.
- CITI followed the same pattern and WACC got decreased in 2020 , hence increasing the company value and risk.

# 12 INVESTEMENT DECISION:

As we are looking for less risk, so will opt for DCF valuation, according to which BAC has all positive projected cash flows along with EV. So, If I invest on BAC in 2019, can still continue in 2020.