iscte

INSTITUTO UNIVERSITÁRIO DE LISBOA

Following the Oracle: Berkshire's Portfolio Valuation

Gonçalo Melo Toste Belerique Ormonde

Master in Finance

Supervisor: PhD, Rui Manuel Meireles dos Anjos Alpalhão Invited Associate Professor ISCTE-IUL

October, 2021



Department of Finance

Following the Oracle: Berkshire's Portfolio Valuation

Gonçalo Melo Toste Belerique Ormonde

Master in Finance

Supervisor: PhD, Rui Manuel Meireles dos Anjos Alpalhão Invited Associate Professor ISCTE-IUL

October, 2021

Acknowledgements

I would like, in the first place, to thank my parents, Carlos Jorge and Celina, for all their unconditional support and patience throughout these last 5 years of academic track. I appreciate all their effort and dedication to provide me with the best conditions and education. Without you none of this would have been possible. Also want to leave a special thanks to my siblings Bernardo and Constança, to all members of my family, to Mariana, to Rui, and all my friends and colleagues that motivated, supported, and interacted with me for the last 5 years.

I leave here a significant and special acknowledgment to Professor Rui Alpalhão for his guidance, tips, recommendations, feedback, and availability throughout the project. An acknowledgment also to Professor António Freitas Miguel for his support and availability during the Master-period. Finally, a word of gratitude to all the academic and teaching staff of ISCTE Business School that I have crossed paths with during the last years, between Bachelor and Master, that directly or indirectly contributed to this milestone.

Resumo

A Berkshire Hathaway Inc. é um conglomerado com um número considerável de subsidiárias abrangível a vários tipos de negócios, sendo que à data do relatório o conglomerado é gerido por Charles Munger e Warren Buffet. Tem nos últimos anos trazido imensa atenção pelos impressionantes retornos anuais, superiorizando, por exemplo, o índice S&P 500 bem como outros *benchmarks* de mercado.

Foi realizada uma avaliação pela aplicação do modelo DCF a cada uma das oito ações em análise (i.e. as ações com um peso de 2% ou mais no total portfolio) de forma a obter o seu justo valor a 31 de dezembro de 2020, aplicação do modelo SoP-DCF para a determinação do potencial total em numerário da carteira, avaliação relativa para uma visão mais informativa destas ações e a aplicação do modelo de desconto de conglomerado. Os resultados obtidos sugerem que, a 31 de dezembro de 2020, a carteira de investimentos da Berkshire Hathaway se encontra subvalorizada e a filosofia do *value investing* defendida por Warren Buffet aplica-se na prática através das suas decisões de investimento. Por fim, a performance da Berkshire não compromete as conclusões da hipótese do EMT com o Oráculo a não ter poder na forma forte e algum espaço nas formas semiforte e fraca.

Palavras-chave: Berkshire Hathaway, Mercados Financeiros, Avaliação de Empresas, Value Investing

JEL Classification: G30; G32

Abstract

Berkshire Hathaway Inc. is a multinational conglomerate holding and conglomerate company with a considerable number of subsidiaries engaged in various business activities. At the time of this analysis, the conglomerate is managed by both Charles Munger and Warren Buffet. Throughout the years, Berkshire has brought to itself generalized attention for their successive annual returns beating, for example, S&P 50 index as well as other market benchmarks.

A valuation was carried out through the enforcement of the DCF model to each of the eight holdings' stocks in analysis (i.e. the stocks with a weight of 2% or more in the portfolio) in order to determine their fair value as of December 31st of 2020, the SoP-DCF model to obtain the total potential of the portfolio, relative valuation for a more informative vision on these stocks, as well as the appliance of the conglomerate discount model. The results suggest that, as of December 31st of 2020, the investment portfolio of Berkshire is undervalued, and the value investing endorsed by Warren Buffet is applicable in practice through his investment decision. Finally, Berkshire's performance does not compromise the main conclusions of the EMT hypothesis with the "Oracle" not having power in the strong form, whereas a significant power in the weak and semi-strong forms.

Keywords: Berkshire Hathaway, Financial Markets, Valuation, Value Investing **JEL Classification**: G30; G32

Table of Contents

Acknowledgements	i
Resumo	.iii
Abstract	v
Exhibit Index	.ix
Appendix Index	. xi
Glossary	ciii
Introduction	1
1. Literature Review	3
1.1. Valuation Analysis	4
1.1.1. Discounted Cash Flow Models	4
1.1.1.1. Weighted Average Cost of Capital	6
1.1.1.2. Terminal Value	8
1.1.1.3. Perpetuity Growth Rate	9
1.1.1.4. Limitations	9
1.1.2. Conglomerates and SoP Model	10
1.1.2.1. Conglomerate Discount and Closed-End Fund Discount	11
1.1.3. Relative Valuation	12
1.2. Investment Styles	13
1.2.1. Value Investing and Fundamental Analysis	13
1.2.1.1. Variants	15
1.2.1.2. Investment Decision Making	15
1.2.1.3. Limitations	16
1.2.2. Active Management versus Passive Management	16
1.3. Mutual Funds	17
1.4. Portfolio Risk Measurement	18
1.5. Modern Portfolio Theory and Efficient Market Theory	19
2.1. Berkshire Hathaway's History	21
2.2. Warren Buffet - "The Oracle"	23
2.3. Share Price and Shareholder Structure	25
2.4. Berkshire at the Present Time	26
2.4.1. Business Segments	26
2.4.2. Governance	28
3. Investment Portfolio	29
3.1. Investment Strategy	29
3.2. Changes in Portfolio Composition	31
3.3. Performance and Financial Analysis	35
3.3.1. Profitability	35
3.3.2. Cash Flow Management	36

.3.3. Capital Structure	\$7
.3.4. Rating	38
.4. Macro, Industry and Peer Overview	;9
.4.1. AAPL	0
.4.2. AXP, BAC, and USB	1
.4.3. KHC and KO	2
.4.4. MCO	3
.4.5. VZ	4
. Valuation of Investment Portfolio4	-5
.1. DCF Model	-5
.1.1. Cost of Capital	-5
.1.1.1. Cost of Equity (K _e)	5
.1.1.2. Cost of Debt (K _d)	6
.1.1.3. Cost of Preferred Equity (K _{pe})	6
.1.1.4. Capital Structure	6
.1.1.5. WACC	17
.1.2. FCFF and Target Price	17
.1.3. Sensitivity Analysis	8
.2. Relative Valuation	9
.3. Valuation Summary	9
onclusion5	;3
eferences5	55
.ppendixes5	;9

Exhibit Index

Exhibit 1	
Exhibit 2	
Exhibit 3	
Exhibit 4	
Exhibit 5	
Exhibit 6	
Exhibit 7	
Exhibit 8	
Exhibit 9	
Exhibit 10	
Exhibit 11	

Appendix Index

Appendix A	59
Appendix B	61
Appendix C	
Appendix D	
Appendix E	67
Appendix F	69
Appendix G	71
Appendix H	
Appendix I	
Appendix J	77
Appendix K	
Appendix L	
Appendix M	
Appendix N	85
Appendix O	
Appendix P	89
Appendix Q	
Appendix R	
Appendix S	
Appendix T	
Appendix U	
Appendix V	101
Appendix W	103
Appendix X	105
Appendix Y	107
Appendix Z	109
Appendix AA	111
Appendix AB	113
Appendix AC	115
Appendix AD	117
Appendix AE	121
Appendix AF	125

Glossary

- AAPL Apple Inc.
- APT Arbitrage Pricing Theory
- AXP American Express Co.
- BAC Bank of America Corp.
- BNSF Burlington Northern Santa Fe
- BRK.A Berkshire Hathaway Class A Shares
- BRK.B Berkshire Hathaway Class B Shares
- CAPEX Capital Expenditures
- CAPM Capital Asset Pricing Model
- CEO Chief Executive Officer
- $CF-Cash\ Flow$
- CFI Corporate Finance Institute
- COV-Covariance
- CPI Consumer Price Index
- DCF Discounted Cash Flow
- EBIT Earnings Before Interest and Taxes
- EBITDA Earnings Before Interest, Taxes, Depreciations and Amortizations
- EPS Earnings Per Share
- ERP-Equity Risk Premium
- ETF Exchange Traded Fund
- EUR Euro Currency
- EURIBOR Euro Interbank Offered rate
- EV Enterprise Value
- FCF Free Cash Flow
- FCFE Free Cash Flow to Equity
- FCFF Free Cash Flow to Firm
- FED Federal Reserve
- GAAP Generally Accepted Accounting Principles
- GDP Gross Domestic Product
- GEICO Government Employees Insurance Company
- ICR -- Interest Coverage Ratio
- IMF -- International Monetary Fund
- KHC Kraft Heinz Co.
- KO Coca-Cola Co.
- LIBOR London Interbank Offered Rate

- LLC Limited Liability Company
- MCO -Moody's Corp.
- MPT Modern Portfolio Theory
- NAV Net Asset Value
- NOPAT Net Operating Profit After Tax
- NPV Net Present Value
- NYM New York Mellon
- NYSE New York Stock Exchange
- OECD Organization for Economic Co-operation and Development
- PBV Price-to-Book-Value Ratio
- PE-Price-to-Earnings Ratio
- PS Price-to-Sales Ratio
- QE Quantitative Easing
- ROE Return on Equity
- ROIC Return on Invested Capital
- S&P 500 Standard and Poor's 500
- SoP Sum of the Parts
- TV Terminal Value
- $US-United \ States$
- USA United States of America
- $USB-U.S. \ Bancorp$
- USD United States Dollar
- VZ Verizon Communications Inc.
- WACC Weighted Average Cost of Capital
- YTM Yield-to-Maturity

Introduction

The research presented throughout this report aims to provide a valuation of Berkshire Hathaway's investment portfolio in order to attest the *value investing* philosophy defended by Warren Buffet as well as give additional reliable information to potential investors in Class A and Class B shares of Berkshire. To do so, we will determine the total numerical potential of the portfolio at the very end of 2020.

Berkshire Hathaway is an American conglomerate that operates in areas such as insurance and reinsurance, investment portfolio of insurance business, railroad, utility and energy, service retailing and manufacturing. It employs, at the time of the report, up to 360,000 people worldwide. The conglomerate, founded back to 1839, went public in 1964 and, nowadays, presents to the market on two class's group of shares: Class A (BRK.A) and Class B (BRK.B). The first is listed on NYSE and the second is integrating part of S&P 500. At the end of 2020, Berkshire reported revenues of \$245.51 billion, gross profit of \$53.58 billion and net income of \$21.92 billion.

Following the introduction, we present the literature review in which we provide is provided an insight in a selected range of topics, methodologies and theories that have been studied by different authors throughout the years as well as discussion of certain concepts to introduce the reader to the following report. Then the second section introduces Berkshire in the present time where the history, "oracle of Omaha", share price, shareholder structure, business segments and governance will be brought into discussion. Moreover, we will go through the detailed analysis of the conglomerate's investment portfolio since its inception, as well as financial analysis to each of the eight top holdings to be analysed. Thus, their respective macro, industry, and peer overview.

Finally, we will proceed to the portfolio's valuation that starts with the necessary establishment of a set of assumptions followed by the application of the DCF model, SoP-DCF model, sensitivity analysis and relative valuation. It ends up determining the total numeric potential of the investment portfolio relative to the closing price as of 31st December of 2020 (with the respective conglomerate discount accounted) to then give an investment recommendation and attest if Buffet "practices what he preaches". Finally, we will see if Berkshire's performance compromises the main conclusions and assumptions of the EMT hypothesis.

1. Literature Review

The concept of value may contain different definitions according to the various individuals' perspectives, circumstances, and general pre-conception. It is indeed the core of economic thinking as well as modern economics, where the firm's value (the "enterprise value") gain special attention. The value of an asset, firm, project, partnership or, as in this dissertation, an investment portfolio, is a crucial metric to shareholders and investors since it represents the very basis when investing and making financial decisions (Damodaran, 2006). It is crucial that managers and firm's boards may guide shareholders via value creation as well as maximizing a firm's collective value to all present and future shareholders. Firms can create value for their owners by investing cash now to generate extra cash in the future (Koller *et al*, 2015).

Every major resource-allocation to be decided by a certain firm will be based on some calculation of what that move is worth. This is a key driver for the overall performance of the business thus every move should generate an added value (Luehrman, 1997). The main goal here is to obtain a fair value or an intrinsic value rather than a price. This concept is an elusive concept where it is understood to be that value which is justified by the facts such as the assets, earnings, dividends, prospectus, among others (Graham, 1934).

Every analyst aims at finding this fair value however it is a fact that no one has the capacity to prove whether the value is 100% "right" or "wrong" (Koller *et al*, 2015). The assumptions and valuations should take into consideration risk, timing, and cash. The result will vary even considering the use of the same generic approach, depending on the assumptions made (Luehrman, 1997; Young *et al*, 1999).

Nowadays, there is a significant number of models and theories coming out nearly every day which will naturally lead to a generalized overload. This will constitute an issue as the more valuation approaches and techniques exist, the weaker the results we obtain (Young *et al*, 1999). This wide range of models make very different assumptions on pricing however they do share some similar characteristics so can be classified in broader terms (Damodaran, 2005).

The use of the *Discounted Cash Flow* Model, which expresses the value of an asset or security as a function of the present value from the future cash flows, is suggested with significant consensus. Additionally, *relative valuation*, that makes estimation to the value of an underlying by using the pricing of "comparable" assets relative to a common variable (e.g. earnings, cashflows, book value or sales), is a widely used shortcut (Damodaran, 2002). In this dissertation, we will focus on the Sum of the Parts Model with DCF valuations of individual holdings. Each of those units will have different valuation multiples (i.e. on relative valuation) according to appropriate choice of peers and performance along the way (Koller *et al*, 2015).

1.1. Valuation Analysis

1.1.1. Discounted Cash Flow Models

A business generates a significant stream of cash flows, to which the owners of the company and shareholders have an equity ownership claim on the upcoming ones (Pinto *et al*, 2010). Analysts have developed along the years a group of valuation models known as *discounted cash flow* valuation models. These aim to view and identify the intrinsic value of a common stock or security as the present value of its expected future cash flows (Williams, 1938). Additionally, to forecast the future cash flows in and out of the firm and then discount them at a discount rate that properly reflects the riskiness of those cash flows (Luehrman, 1997).

A discounted cash flow valuation will be, most of the times, the starting point for all the other proposed methods (Pinto *et al*, 2010). We should start by considering the two-stage Discounted Cash Flow model, where in the former is an equivalent period of explicit forecast while the latter assumes a perpetuity approach scenario (i.e. containing a perpetual growth rate). The value for the first one is referred to be the TV, which accounts for a large part of the estimated EV. In fact, determining the length of the forecasts is a critical task in any DCF model (Cassia *et al*, 2007). The very basics of the DCF refers to the general present value rule, where the value of any asset or security is the present value of expected cash flows that this one generates (Damodaran, 2005; Pinto *et al*, 2010).

$$V_0 = \sum_{t=1}^{t=n} \frac{CFt}{(1+r)^t}$$
(1)

Where,

n - Life of the asset

CFt - Cash Flow in time t

r - Discount rate from cash flow's riskiness

The value of the company can be obtained by discounting the net cash flows (i.e. deducted from all operating expenses, reinvestments, and taxes) to the firm at the weighted cost of all different components of financing, excluding the impacts of debt and equity (Damodaran, 2005).

$$V_{\text{firm}} = \sum_{t=1}^{t=n} \frac{\text{FCFF}_t}{(1 + \text{WACC})^t} + \frac{\text{TV}}{(1 + \text{WACC})^t}$$
(2)

Over a certain period, a firm can add to cash by selling goods and services. In this case, we will call it *cash flow from operations*, and it is the critical part of this generalized concept. This cash can be affected either by the sale or purchase of assets (includes investment and disinvestment) or through financing activities. Furthermore, the free cash flow to the firm (FCFF) is the part of the cash flow that is being generated by the firm's operations that the bondholders

and stockholders can withdraw without impairing the firm (Pinto *et al*, 2010). The FCFF is a measure of performance that considers the net amount of cash generated after the adjustment to taxes, expenses, variations of investments, and variations of working capital (Damodaran, 2005).

$$FCFF = EBIT * (1 - t) + Depreciation - Capex - \Delta WCap.$$
(3)

Decoding the formula, we can see that the depreciation is a cost that is included in the financial statements of a firm, but not a cash expense thus still needs to be considered for tax purposes. Due to this, we use the *EBIT* x (1 - t) and add the depreciation value again. All expenditures that are crucial to keep the business running, daily, need to be deducted since it does not represent available cash (Pinto *et al*, 2010).

Another *free cash flow* approach is from the perspective of equity (FCFE) and deducts from the FCFF all payments to debtholders (interest and principal repayments) net of new debt issues. The debt has claim on the cash of the firm that must be satisfied before any payment to stockholders thus money that is paid on debt is not available to common stockholders. This approach is, therefore, a post-debt free cash flow metric, the baseline free cash flow valuation model for equity and represents cash flow that can be redeployed outside the firm without affecting the capital investments on the side of it as well as a measuring to what can afford to pay out in dividends (Young *et al*, 1999; Pinto *et al*, 2010).

$$FCFE = FCFF - Interest * (1 - t) + Net Borrowings$$
(4)

$$FCFE = Net Income - Capex - \Delta WCap. + New Debt - Debt Repayments$$
 (5)

To assess the firm's equity through the equity's cash flows we must discount it to a cost that meets the risk that is related to that equity value. For that purpose, the FCFE will be discounted to the present value at the general cost of equity (Damodaran, 2002).

Equity Value =
$$\sum_{t=1}^{t=n} \frac{FCFE}{(1 + Cost of Equity)^t}$$
(6)

Valuing firms using the free cash flow concepts is quite popular in current investment practice since it can be calculated for almost any firm. However, these are most suitable when the firm is not-dividend-paying, is dividend-paying but dividends significantly exceed or fall short of free cash flow to equity, free cash flows align with the company's profitability within a forecast horizon with which the analyst is comfortable and, in the case, where the potential investor takes a control perspective (Pinto *et al*, 2010).

1.1.1.1. Weighted Average Cost of Capital

The overall required rate of return of a firm's providers of capital is usually referred to as the cost of capital. It is nothing more than an opportunity cost that represents in fact the return that any firm might expect to get from other new investments with the same risk profile (Luehrman, 1997). This cost is estimated by using the firm's after-tax WACC or for short a weighted average of required rates of return for the different sources of capital (Pinto *et al*, 2010; Damodaran, 2016).

The opportunity cost is based on the value of time, return on risk-free investments for not using a certain amount of money in other riskier moves. A risk premium effect is included, that may reflect the risk a potential investor is willing to take according to its profile. Furthermore, it considers a tax-adjusted discount rate situation that adds this effect by selecting the correspondent value of interest tax shields associated with available debt of the individual (Luehrman, 1997).

The weights on all components of the cost of capital should reflect their market value proportions since these best measures how the existing firm is being financed. These are the cost of equity, after-tax cost of debt and cost of preferred stock which represent the riskiness of the equity investment in the firm, a function of the default risk of the firm and a function of its intermediate standing: risk between debt and equity, respectively (Damodaran, 2002).

The WACC being a combination of the cost of capital and the required rate of return on capital, calling it "cost of capital" can lead to misleading interpretations (Fernandez, 2002). The WACC has the assumption that it equals the capital structure of the company and the adjusted tax effect deducted from its absolute value. This contributes to reducing the value of WACC overall resulting in the increase of the present value of future cash flows when compared to scenario of non-tax adjusted opportunity cost (Luehrman, 1997; Pinto *et al*, 2010).

WACC =
$$\frac{D}{D+E} * Kd * (1-t) + \frac{E}{D+E} * Ke$$
 (7)

Where,

WACC \rightarrow Weighted Average Cost of Capital D \rightarrow Debt Market Value E \rightarrow Equity Market Value $K_d \rightarrow$ Cost of Debt $K_e \rightarrow$ Cost of Equity t \rightarrow Tax Rate

Cost of Equity

One of WACC's components is the cost of equity, which can be determined by estimating the expected return on the market portfolio adjusted to the risk profile of the firm being valued. For this purpose, the CAPM is used to determine the risk adjustment factor (Koller *et al*, 2015). The model emerged from the mean-variance (Markowitz (52), (59) framework to become the first

model for risk and return in finance (Damodaran, 2012). This cost represents the return that the stockholders require for a pre-defined company (Koller *et al*, 2015). It has been widely used and became the standard in real-world analysis of risk as well as return (Damodaran, 2002; Echbo *et al*, 1992).

This model adjusts for company-specific risk using beta, which measures how a company's stock price responds to movements in the overall market performance. Potential investors will require a high return to hold a stock that contains a high correlation with the market thus increasing the volatility of the market portfolio. Therefore, only beta risk is priced with the remaining risk (i.e. idiosyncratic) may be diversified by holding multiple securities (Koller *et al*, 2015). Furthermore, this model differs in fact from Fama-French or APT in that actual way that the risk is defined. It considers the risk-free rate, the market risk premium (i.e. difference between the expected return on a market portfolio and the return on riskless bonds) and the risk of each firm in comparison to the average firm (Koller *et al*, 2015; Pinto *et al*, 2010; Damodaran, 2002).

$$\mathbf{E}_{\mathrm{Ri}} = \mathbf{R}_{\mathrm{f}} + \beta_{\mathrm{l}} * [\mathbf{E}_{\mathrm{Rm}} - \mathbf{R}_{\mathrm{f}}] \tag{8}$$

$$\beta_{l} = \beta_{u} * (1 + (1 - t) * \frac{D}{E})$$
(9)

Where,

 $E_{Ri} \rightarrow Expected Return$ $R_{f} \rightarrow Risk-Free Rate$ $E_{Rm} \rightarrow Expected Return on Market$ $\beta_{l} \rightarrow Levered Beta$ $\beta_{u} \rightarrow Unlevered Beta$ $D \rightarrow Debt$ $E \rightarrow Equity$

For calculation and literature purposes, it is important, at this moment, to mention the incorporated assumptions in the model. It assumes, in the first place, the inexistence of transaction costs and that every individual (or potential investor) has access to the same information. Furthermore, this information is already reflected in asset prices and that investors, in addition, cannot find undervalued or overvalued assets in the marketplace (Damodaran, 2012). The assumptions mentioned before will allow investors to keep a diversified profile without additional costs. Others include the fact that all investors will hold combinations of the riskless asset and the market index fund, there exists a riskless asset whose returns are known with certainty and investors can lend and borrow at the same riskless rate arriving then at their optimal allocations (Damodaran, 2016; Pinto *et al*, 2010).

Cost of Debt

Another component of the WACC is the *cost of debt*, that measures the current cost to the firm of borrowing funds to finance projects and is dependent on a certain number of variables such as the risk-free rate, the default risk and the tax advantage associated with debt (Damodaran, 2002). To approximate the after-tax cost of debt for an investment-grade firm, the company's after-tax YTM on its long-term debt must be taken into consideration.

In the cases of firms whose debt trades infrequently (or not at all), the company's debt rating must be used to estimate the YTM. It is important to notice that the after-tax cost of debt is considered to incorporate the tax shield into the WACC. However, there are exceptions to the rule mentioned before as well as situations where the analyst may face challenges to determine the actual cost of debt. There are no liquid markets for corporate bonds therefore no-market information is available (Koller *et al*, 2015).

When there is no rating available to estimate the cost of debt, there exists some alternatives such as estimate a *synthetic rating* or take into consideration recent borrowing history. The former states the process of looking at the most recent borrowings made by a firm thus we can get a sense of the types of default spreads being charged the firm. The latter considers the process where the analyst plays the role of a ratings agency by making a general assessment to rated firm and examine the financial characteristics shared by firms within each rating class. On this basis the ICR will be determined for our specific case (Damodaran, 2002). Finally, the cost of debt is computed for parameter values that are typical for high-grade and low-grade debt. While using the promised yield as the cost of debt may be adequate for high-grade debt, it is likely to cause significant errors for high-yield bonds (Cooper *et al*, 2001).

$$Cost of Debt = PreTax Cost of Debt * (1 - Effective Tax Rate)$$
(10)

$$Effective Tax Rate = \frac{Income Tax Expense}{Pretax Income GAAP}$$
(11)

Interest Coverage Ratio =
$$\frac{\text{Earning Before Interests and Taxes}}{\text{Interest Expenses}}$$
(12)

1.1.1.2. Terminal Value

Seen as a key input for the DCF model, the TV stands for the value of the asset valued at the end of the investment time-horizon. Also, an expectation for how the firm's growth will be in perpetuity (Damodaran, 2002; Young *et al*, 1999). Various approaches can be used to estimate this value. The first considers a scenario where the current value of that specific asset can be assumed to increase at the expected inflation rate to finally arrive at the TV, however the danger resides on the assumption that the value of the asset is reasonable and then tries to assess the true value of the asset. The second assumes that the cash flows in the terminal year will continue to

grow at a constant rate "forever" after that considering a WACC, growth rate (g) and the expected cash flow on n+1 as it follows (Damodaran, 2002).

Terminal Value =
$$\frac{\text{Expected CF}_{n+1}}{r-g}$$
 (13)

This translates as the value of a business (or project) after the forecasted period in the situation that the cash flows in the future can be estimated. A growth rate is considered in a perpetuity growth approach. However, this perpetuity perspective may make some analysts uncomfortable, something that can be solved requiring more cash to be set aside each year to ensure that the lifetime horizon can be extended (Damodaran, 2002).

Furthermore, it is relevant for the purpose of this dissertation to mention the work of Damodaran on the limitations side or specific advice for analysts. It is stated that, when a firm is in a multiple business, it is likely that some of these businesses are already in *stable growth* whereas others are in *high growth*. If we forecast CFs until the entire firm is in *stable growth*, we will be forecasting CFs for mature businesses for extended periods. Another issue relies on the possibility that firm may *spin-off*, *split-off* or divest businesses that they feel are being undervalued by the market to then radically alternating the firm's makeup in stable growth (Damodaran, 2018).

1.1.1.3. Perpetuity Growth Rate

A firm's earnings *growth rate* is a function of its return on equity and the amount of earnings reinvested in the business. To determine the future cash flows this variable needs to be accurately determined. When calculating the *growth rate*, a key factor is the expected inflation. In a stable market the inflation should be close to the expected growth rate. In tight markets, with low vacancy rates, it is possible for the expected *growth rate* to be higher than the expected inflation rate at until market recovering (Damodaran, 2002; Havnaer, 2013). The *growth rate* typically represents the compounded annualized rate of growth of a firm's revenues, dividends, earnings or, economically speaking, the GDP (Graham *et al*, 2009).

1.1.1.4. Limitations

Even though being the most popular and most used model when valuing assets or projects, the DCF model comes with some limitations that should not be ignored in the end. There is a considerable portion of a company's asset information that is not shared to the public, so assumptions need to be made. Therefore, the fair value that is being determined when using this model might not be close to the "true" fair value (Damodaran, 2002). Another issue relies on the discount rates incorporated in the model since these are considerably difficult to estimate for most

investments (or projects). Additionally, estimating cash flows for a time horizon from 5 to 10 years is tedious and difficult to do, as in the estimation of the terminal value.

Finally, DCF valuation does not reflect market conditions in the situation where it is strong or weak at the time of the valuation process (Damodaran, 2002; Pinto *et al*, 2010). The problems may increase with the presence of the WACC in the final equation since this parameter is more suitable for firms with relative static capital structures. The more complicated the more likely it is for mistakes to "pop-up" in the model (Luehrman, 1997; Jaros *et al*, 2015). Having to forecast uncertain future business results is another criticism of the DCF model as well as how much the terminal value compromises far too much of a firm's value overall. This type of models typically includes discrete cash flow projections and the value at the end of this period is then estimated using a multiple or by assuming that the firm grows at a constant rate into perpetuity. Moreover, it is stated that it is uncommon to see DCF models being used in certain firms where the terminal value represents 60-70% of a company's total fair value (Havnaer, 2013).

1.1.2. Conglomerates and SoP Model

Globalization in recent decades turned out to be crucial in the way we value firms since this parameter will highly impact the process overall. It is here that the concept of *conglomerates* emerges, standing for a subset of companies that are diversified not only across countries but across businesses. These firms are in fact difficult to value since they incorporate diverse businesses, bundled, and then sold as single packages. Their valuation should reflect parameters such as risk, cash flow and growth characteristics across all segments and regions that they might operate (Damodaran, 2018).

Furthermore, there are many challenges along the way to the analyst in order to attribute a reasonable valuation such as operations in many different countries or markets (emerging vs. developed economies), risk parameters available for the aggregate but not for the components, taxes to be paid reflect a mix of marginal tax rates and jurisdictions, large, centralized costs. There is no way to check what the actual costs in each division are, intracompany transactions and complex holding structures so they often set up quasi-independent or independent subsidiaries for some businesses and then have holdings in these subsidiaries that can be classified in various ways (Damodaran, 2018).

For valuation purposes, we must consider the disaggregated valuation process rather than the aggregated. The former considers the situation where it is preferred to value a firm by valuing its parts separately such as fundamental and growth differences, transactional reasons, and management reasons (Damodaran, 2018). From here we arrive in the segmental valuation models: Sum of the Parts (i.e. SoP) model. *Segmental valuation* models are more likely to be employed in financial analysis's reports for firms that adopt a product or/and service segmentation approach. They are not used so frequently. In fact, analysts are more likely to use this segmental valuation

when they analyse larger firms and the use of this type of information is not associated with an improvement in their revenue and EBITDA forecasts (Demerens *et al*, 2017).

Within this type of valuation models, the SoP model clearly emerges as the most popular. This model, that is mostly ignored by researchers and academics, is based on the knowledge that the business segments of a certain firm or conglomerate have different profitability and growth characteristics (Cholou et al, 2020). It is argued that the adoption of a SoP valuation framework makes sense when there is substantial variation in the economic fundamentals such as profitability, growth, cash flow and risk on the multiple firm's business units (Koller et al, 2015; Damodaran, 2018). These business units, or so-called *operating segments*, are components that have available individual financial information, earn revenues, and incur expenses from their involvement in general specific economic transactions. Its performance is typically evaluated by the firm's chief operating decision-maker. Managers identify more operating segments if their firms are more difficult to analyse and evaluate by investors (or creditors) thus decreasing the information asymmetries with their capital providers (Cholou et al, 2020). On the other hand, a firm with multiple segments are likely to engage in earnings management schemes and tend to report artificially higher (lower) earnings for segments with high (low) multiples. This may lead to overvaluation of multi-national and multi-segment firms if a simple multiple-based SoP model is employed (You, 2013).

The *SoP* approach seems theoretically ideal to estimate the value of a multi-segment firm if we expect that it will outperform DCF, when this model is used separately to value the firm (Cholou *et al*, 2020). This typically uses earnings multiples (based on EBITDA) to value the individual business parts of the firm (Cholou *et al*, 2020; Schmidlin, 2014). Additionally, it is defended that mixed classification system is employed with characteristics of both a product and geographical based segmentation with the common use of some crucial ratios such as EV/EBITDA, EV/EBIT and EV/Sales (Kuglitsch *et al*, 2016).

As a final consideration, when analysts use DCF within a SoP valuation framework, they are more likely to report only a summary of their estimates for the terminal growth rate and WACC without displaying a full spreadsheet with their forecasts (Penman, 2013; Schmidlin, 2014). The value derived using the SoP model is sometimes called the breakup or private market value (Pinto *et al*, 2010).

1.1.2.1. Conglomerate Discount and Closed-End Fund Discount

The *conglomerate discount* can be defined as the consensual tendency of markets to value a conglomerate at less than the sum of the parts. The existence of conglomerate discount reflects the weaker competitive position of firms that choose to diversify into other industries (Burch *et al*, 2000). The discount incorporates the higher ability of a conglomerate to undertake more

positive-NPV investment projects, since the process of conglomeration helps to reduce financial constraints unlike single-segment firms (Bodnaruk *et al*, 2009).

Conglomeration provides managers with the ability to move resources among segments in response to industry conditions or restrictions and will tend to be valued at a discount relative to the value inputted from single-segment firms in the industries in which they operate (Burch *et al*, 2000). The reduction in valuation is based solely on the chosen organizational structures and has nothing to do with the validity or sustainability of the group sector's individual business models (Heppelmann *et al*, 2009). The conglomerate discount may be quantified to approximately between 13% and 15% varying on how large the conglomerate might be (Berger *et al*, 1995).

A *closed-end fund* is a collective investment firm that typically holds other publicly traded securities and may issue a fixed number of shares that then trade in the stock market just like an ordinary stock. Its shares are typically issued at NAV plus a fee to defray underwriting costs. The fund's market capitalization is fixed, and the stock price has only an indirect link with the value of the assets corresponding to each share. These types of funds are characterized by the troubled behaviour of the discount as well as often being traded at prices different from their NAV (Dimson *et al*, 1998; Malkiel *et al*, 2005; De Long et al, 1991).

While the discount on individual fund tends to reflect the average discount for the industry, some funds have experienced violent fluctuations that cannot be related to market conditions. The discount may be explained by agency costs, the loss of potential tax-timing options and explanations based on segmented markets (Dimson *et al*, 1998). Furthermore, several other factors do affect the discount: dividend yields, unrealized capital gains, turnover, expense ratios, illiquid assets, among others (Malkiel *et al*, 2005). Evidence from studies have found that discounts are very persistent with an average level of 8%, returns from the underlying assets are close and discounts at "any" lags also predict future fund returns (Malkiel *et al*, 2005).

1.1.3. Relative Valuation

An alternative way to the conventional ways of valuation is the *relative valuation*, which estimates an asset's value relative to that of another asset. The idea behind states that similar assets should sell at similar prices thus valuation using price multiples or enterprise value multiples (Pinto *et al*, 2010). It has a focus on finding assets that are cheap (or expensive) relative to how similar assets are being priced by the market right now. There exists the need to standardize the values and can be accomplished relative to the earnings that these assets generate, relative to book or replacement value, relative to revenues generated or sector-specific metrics (Damodaran, 2012; Damodaran, 2002).

The first includes the so-called *earnings multiples* that are characterized as one of the more intuitive ways to think of the value of any asset. When buying a stock, it is common to look at the price paid as a multiple of the earnings per share generated by the company thus the PE ratio is

considered and it stands for the ratio of a stock's market price to the company's earnings per share (Damodaran, 2012; Pinto *et al*, 2010). A PE ratio that is low relative to the PE of another closely comparable stock is relatively undervalued relative to the comparison stock and vice-versa. When buying a business, it is common to examine the value of the operating assets of the business as a multiple of the EBIT or EBITDA and the same rule mentioned before it is applied (Damodaran, 2012).

The second includes *book value multiples*, where accountants are the main driver of value according to their rules and is heavily influenced by what was paid originally for the asset and any accounting adjustments made since. The PBV ratio that immediately emerges can vary widely across sectors depending upon the growth potential and the quality of the investments in each. The value of the firm is used, as well as the book value, of those operating assets. An alternative considers the use of the replacement cost of assets through Tobin's Q (Tobin, 1970; Damodaran, 2012).

The third includes *revenue multiples*, which are an alternative approach to the ones mentioned before to access the relationship between the value of an asset and the revenues it generates. The PS ratio emerges, where the market value per share is divided by the revenues generated per share to equity investors or value-to-sales ratio for firm value. With these multiples it becomes far easier to compare firms in different markets with different accounting systems (Damodaran, 2012; Pinto *et al*, 2010).

The fourth mentions *sector-specific multiples*, which are multiples that are specific to a sector where analysts will always adequate the multiple to the specific sector dividing the market value of these firms by some specific-relevant parameter. However, can result in persistent overvaluations or undervaluation of sectors relative to the rest of the market so investors have no sense on what high, low, or average is on this specific measure. The "right answer" will vary from firm to firm in the same sector (Damodaran, 2002).

1.2. Investment Styles

1.2.1. Value Investing and Fundamental Analysis

Fundamental analysis may be considered the easiest way to value a firm and aims to reveal its actual current value. It aims to predict future profits, dividends, and the risk to calculate the true value of the stocks. Can then be stated as the "knowledge of the rules and fixed steps access to its objectives of determining the intrinsic value of shares in stock markets, through a general framework to study the expected economic forecasts, leading to sectors which generate an increase in sales and profits, therefore measuring the strength of financial firms, efficiency of management and business opportunities based on historical financial statements and current

conditions, then, compare them to market values to identify investment opportunities" (Wafi *et al*, 2015; Baresa *et al*, 2013; Graham *et al*, 2009).

On another perspective, this analysis can be defined as an attempt to determine the discounted present value of all payments that the investor will receive from a specific stock thus each deviation from that level indicates that the stock is overvalued or undervalued. Each investor is, therefore, interested in buying stocks with a market value lower value than its intrinsic value (Wafi *et al*, 2015).

Two main approaches to this analysis surge: *top-down* and *bottom-up*. The former represents an investment strategy that is based on the analysis of the entire economy to then analyse the sectors and the companies within these. The latter states a strategy where the investor first focuses on a particular company thus exploring the business model as well as the respective growth prospects. It is important to highlight that the aim of this analysis is not only to find a successful company but rather find firms that may be worth more than other investors estimate (Graham *et al*, 2009; Baresa *et al*, 2013).

Introduced back in the 30s, *value investing* can be referred as the action to buy or sell stocks based on a perceived gap between current market price and intrinsic value (i.e. present value of the expected future payoffs to shareholders). It provides guidelines that can point the investor into the direction of "good" stocks and, on the other flip of the coin, steer the investor away from the "bad" stocks (Browne, 2007; Lee, 2014). Graham's masterpieces from 1934 and 1949 are considered part of the *bible* of value investing. The former defends, on Graham's vision, that by "analysing securities we are engaging in a deciding process to determine which securities, from a significant range of them, should we invest in. Also, he states that "an investment must keep the principal safe as well as deliver a return and thus any kind of investment that does not meet these conditions is pure speculation". This process contains three functions: descriptive, selective, and critical (Graham *et al*, 1934).

The latter, the most relevant from these, points out the irrationality and groupthink that is often rampant in the stock market. Investors should always aim to profit from the whims of the stock market rather than participate in it. Some personal and academic lessons taught Graham to minimize downside risk through investing in firms whose shares traded far below the firm's liquidation value. Another relevant contribution was the introduction of *Mr. Market*. According to Graham "it turns up every day at the stockholder's office offering to buy or sell his shares at a different price and individual investors have the power to accept or reject those offers". Also, it is most advisable for an investor to concentrate on the real-life performance of their companies rather than paying attention to the changing sentiments of *Mr. Market* as determining the value of the stocks (Graham, 1949).

In fact, *value investing* is deriving the intrinsic value of a common stock independent of its market price and for that analysing a company's assets, earnings, and dividend pay-outs can help

identify this value to then be compared to its market price. When an investor buys a stock at a price less than its intrinsic value, they are essentially purchasing it at a "discount". Once the stock is trading at its intrinsic value, they must sell it right away (Graham, 1949).

Graham also advocated that we should identify a margin of safety on the side of the investor that can be provided with the irrationality of investors, the inability to predict the future, and the fluctuations of the stock market. The investor must diversify the portfolio and purchase stocks in firms with high dividend yields plus low debt-to-equity ratio. He also advocated to invest in firms that pay dividends rather than keeping all their profits "inside-house" (Graham, 1949). Furthermore, it is recognized that *value investing* is consistently associated with positive abnormal returns, and we can observe that firms trading at lower pricing multiples, stronger balance sheets, sustainable cash flows, higher profitability, lower volatility, lower beta, and lower distress risk earn higher future stock returns. Also, it requires a long-time horizon (Lee, 2014). Graham has always viewed value investing as consisting of two key elements such as finding quality companies and buying them at reasonable prices. These elements can be applied into a generalized formula (Lee, 2014; Graham, 1949):

Value Investing = Cheapness + Quality
$$(14)$$

1.2.1.1. Variants

Value investing can be described into three main variants: *mechanical, cerebral,* and *big data*. The former bases the distinction between value and growth investing on measures of PE or PBV. The intermediate, used by value investors like Ben Graham, Warren Buffett or Charlie Munger, states further that on the previous one it also depends on other criteria, such as management quality, solid moats, competitive advantages, and other qualitative factors. The latter is where investors start with the conventional measures of cheapness (i.e. low PBV and low PE) and then look for an additional criterion such as poring over the data and looking at historical returns using databases as well as powerful statistical tools (Cornell *et al*, 2021).

1.2.1.2. Investment Decision Making

The value investors can be classified into three groups depending on how they approach investment decision making: *passive*, *contrarian*, and *activist* value investing. The first refers to buying and holdings stocks based on 10 screens originally described by Graham in 1949. Any stock that passes all ten would make a worthwhile investment according to Graham. The second is based on the premise that the market overreacts to bad news. For the third, the target firms are not only cheap but also badly run (Cornell *et al*, 2021).

1.2.1.3. Limitations

But the real question emerges: does value investing still works in the present time? According to Cornell and Damodaran, it has lost its way at three major levels: became *rigid*, *ritualistic*, and *righteous*.

The first states, for example, value investing has been steadfast in its view that firms that do not have significant tangible assets (relative to their market value) are not investment candidates keeping many value investors out of technology stocks. Moreover, focus on dividends has caused adherents to concentrate their holdings in utilities, financial service firms and older consumer product firms, as younger companies have shifted toward returning cash in buybacks (Cornell *et al*, 2021). The second refers to the fact that the rituals of value investing are well established from the annual meeting in Omaha, to claim that individual investment education is incomplete unless the reading of Ben Graham's Intelligent Investor and Security Analysis as well as an unquestioning belief that anything said by Warren Buffett or Charlie Munger must be right. The final refers to the scenario where some value investors seem to feel entitled to high returns because they have followed all the rules and rituals. Additionally, they view investors who deviate from the script as shallow speculators, who will fail in the long term.

In resume, as practiced by some of its advocates has evolved into a "religion" (Cornell *et al*, 2021). In the opinion of both authors, value investing "needs to get over its discomfort with uncertainty and be more willing to define value broadly, to include not just countable and physical assets in place but also investments in intangible and growth assets".

1.2.2. Active Management versus Passive Management

To aim a certain return on investor's investment portfolio, two main investment strategies exist for the investment manager to use: *active management* and *passive management*. It is therefore crucial to differentiate both. The former involves taking a position based on a forecast about the future. The neutral position is to hold each stock in the proportion it represents of the market index with any difference from these proportions representing an investing bet based on forecasting. The latter is represented by the index fund that is designed to replicate exactly a well-defined index of common stock (e.g. S&P 500), meaning that the fund buys each stock in the index in exactly the proportion it represents of the index (Elton *et al*, 2014).

Active management can be divided into two groups: market-timers and sector-selectors. The first change the beta on the portfolio according to forecasts of how the market will do thus to change the beta on the overall portfolio. The weight is increased for undervalued securities and decrease it for overvalued securities. The second directly involves security selection with the exception that the unit of interest is an entire sector. Therefore, based on analysis a positive or negative bet will be made on a sector and in consequence to a certain stock. It involves, in resume, changes to the portfolio based upon the manager's judgement after detailed research and

assessment, and aims to outperform the relevant index, rising faster or falling more slowly (Elton *et al*, 2014; Russell, 2007).

In *passive management* managers face a series of decisions in designing an investment portfolio, with the most important being the trade-off between tracking error and transaction costs. There are commonly used certain approaches in constructing an index fund: hold each stock in the proportion it represents of the index, mathematically form a portfolio of not more than a specified number of stocks (which best tracks the index historically and algorithms can be used) and find a smaller set of stocks that matches the index in the percentage invested in a prespecified set of characteristics, with these commonly being sector, industry, quality, and size of capitalization. This type of management occurs when investment portfolio changes are required in response to changes in specific external references (Elton *et al*, 2014; Russell, 2007).

The case of putting active versus passive management's discussion will never see an end, with significant pluses to both sides. The content of forecasts used in active management must be sufficiently large to overcome these costs: cost of paying the forecasters relative to passive managers, cost of diversifiable risk (i.e. active portfolios have more diversifiable risk), cost of higher transaction cost (i.e. active decisions require turnover as opposed to an index fund), and an index fund has a very low level of turnover in contrast with active (Russel, 2007).

1.3. Mutual Funds

A fund tends to mean the hard cash that constitutes the initial capital that is available to be invested as well as the "vehicle" through which the resulting investments are made and consequently managed. *Mutual funds* are a form of collective investment, allowing a significant number of investors to pool their individual wealth and participate in a larger or diversified investment portfolio than would otherwise be possible. Investments may be in shares, debt securities, money market securities or a combination of those. Funds may be further classified according to asset orientation and investment objective.

The earliest ever mutual fund goes back to 1849 in Switzerland with the US only establishing the first in 1894 as a "fixed trust" in which each unit represented a proportion of a fixed investment portfolio. In resume, mutual funds are vehicles which provide the investor of moderate means with the same advantage as large capitalists in diminishing risk (Russell, 2007; Jain *et al*, 2014). These funds are run by fund managers, who then choose to appoint other professional bodies to undertake such as investment managers, marketing firms, selling agents, administrators, and registrars or transfer agents.

Those can be divided into three types: *open-ended*, *closed-ended* and *exchange-traded* fund. The first are authorized to have a variable amount of capital in issue, with shares issued to investors whenever they pay in a lump sum by way of a regular savings scheme as well as can be bought and sold anytime during the trading day. Can be divided into equity, hybrid, bond, and money market funds. The second one has a predetermined, finite amount of capital in issue with new shares not being created/cancelled daily, thus shares are traded on an exchange and have a price determined by supply and demand which may differ from the fund's NAV. Can be divided into bond and stock. The third one trades at a price determined by supply and demand and can be bought or sold at that price during the day. However, at the close of the trading day investors can create more shares of ETFs (Russell, 2007; Elton *et al*, 2014).

There are several benefits of mutual funds that may lead the investors to put their personal wealth on these, such as small initial investment required, spread of risk on variety of holdings number, geographic, industry and economic, professional fund management, cheaper dealing, convenience, reinvestment of income and tax benefits (Russell, 2007).

1.4. Portfolio Risk Measurement

Investors who invest in certain assets expect to earn returns over the time horizon holding the asset. The actual returns over its holding period may be different from the expected returns. This difference between actual and expected returns defines *financial risk*. It can also be defined as the prospect of financial loss (or gain) due to unforeseen changes in underlying risk factors (Dowd, 2002; Damodaran, 2002). Risk may arise from *firm-specific* actions or *market-wide* actions, with the former affecting few investments and the latter affecting many investments.

There are two types of risk: *default* risk and *equity* risk. The former is measured by the likelihood that the promised cash flows might not be delivered. Investments with higher default risk should have higher interest rates and the premium that we demand over a riskless rate is the default premium (since the borrower may default on interest and principal payments on the borrowing). The widely most used measure of firm's default risk is its *bond rating*. The latter arises on investments where there are no-promised cash flows but there are expected cash flows. This is best measured by looking at the variance of actual returns around the expected returns, with greater variance indicating greater risk (Damodaran, 2002). In order to determine the market exposure of a certain investment portfolio (or mutual fund), it is used the *beta coefficient* as well calculating the cost of equity. For this purpose, it is standardized the risk measure by dividing the covariance of each asset with the market portfolio by the variance of the market portfolio:

Beta of Asset i =
$$\frac{\text{Covariance of Asset i w/Mkt Portfolio}}{\text{Variance of Mkt Portfolio}} = \frac{\text{Cov}_{\text{m}}}{\sigma_{\text{m}}^2}$$
 (15)

Assets that are riskier than the average will have betas that are greater than one and assets that are less risky than average will have betas that are less than one. The riskless asset will have a beta of zero (Damodaran, 2002; Jaksic *et al*, 2015; Elton, 1997).

1.5. Modern Portfolio Theory and Efficient Market Theory

One of the key issues along the years facing an individual is how to efficiently allocate wealth among a range of alternative assets. Markowitz formulated the portfolio problem as a choice of the mean and variance of an assets' portfolio, proving constant variance hold, maximizing expected return, and holding constant expected return to minimize variance. This led to the formulation of an *efficient frontier* from which the investor could choose the preferred portfolio, depending on the respective risk profile. Thus, an investor must consider how each security comoves with all other securities. Furthermore, taking these co-movements into account results in the ability to construct a portfolio that had the same expected return and less risk than a portfolio constructed by ignoring the interactions between securities (Elton, 1997; Markowitz, 1952).

MPT quantifies the concept of diversification by introducing the statistical notion of a covariance. In essence, the adage means that putting all your money in investments that may all go broke at the same time is not a very prudent investment strategy, since if any one single investment goes broke it is very likely due to its high correlation with the other investments, that the other investments are also going to go broke, leading to the entire portfolio going broke (Fabozzi, 2002; Markowitz, 1952).

The theory dictates that given estimates of the returns, volatilities, and correlations of a set of investments or assets and constraints on investment choices, it is possible to perform an optimization that results in the risk or return or mean-variance efficient frontier. This frontier is efficient because underlying every point on this frontier is a portfolio that results in the greatest possible expected return for that level of risk or results in the smallest possible risk for that level of expected return. The portfolios that lie on the frontier make up the set of so-called efficient portfolios (Markowitz, 1952).

MPT is widely used in asset allocation. Almost all asset managers and financial advisors determine an optimal portfolio for their clients by performing an asset allocation analysis using a set of asset classes. They begin by selecting a set of asset classes (i.e. domestic large-cap and small-cap stocks, long-term bonds, international stocks, etc). To obtain estimates of the returns and volatilities and correlations, they generally start with the historical performance of the indexes representing these asset classes. Then, are used as inputs in the mean-variance optimization which results in an *efficient frontier*. Then, using some criterion they pick an optimal portfolio as well as to implement this portfolio using either index or actively managed funds (Fabozzi, 2002; Markowitz, 1952).

The *EMT Hypothesis* or *Random Walk Theory* is the proposition that current stock prices reflect available information about the value of the firm and there is no way to earn excess profits by using this information. Many investors try to identify securities that are undervalued and are expected to increase in value for the future, particularly those that will increase more than others

thus they believe that can select securities that will outperform the market. They use a variety of forecasting and valuation techniques to aid them in their investment decisions (Clarke, 2000). A market is said to be "efficient" if prices adjust quickly and, on average, without bias, to new information.

Moreover, the EMT asserts that it exists three different levels of market efficiency: *weak*, *semi-strong* or *strong*. The first claims that all available public information will be reflected in the securities' prices but may not reflect new information that is not yet available. Technical analysis does not work, and fundamental analysis may only provide information to produce returns above market averages in the short-term. The second defends a mix of both the strong and weak form and implies that all public information is determined into the stock's price. Both fundamental analysis cannot be used. The third states that both private (insider) and public information is reflected into the stock's price, so no investor can gain extra advantage over the market. However, while prices are rationally based, changes in prices are expected to be random and unpredictable, because new information, by its very nature, is unpredictable. Therefore, stock prices are said to follow a *random walk* (Clarke, 2000; Fama, 1965).
2.1. Berkshire Hathaway's History

Berkshire Hathaway Inc. is a multinational conglomerate holding and conglomerate company with a considerable number of subsidiaries engaged in various business activities. With origins in textile, the group has extended to insurance, retailing, manufacturing, publishing, and banking. A group run by the world known "oracle" Warren Buffet and Charles Munger, Berkshire has become in the recent past legendary mainly due to its investment portfolio. This one over the years has beaten the S&P 500 as well as other benchmark indices. It will be our focus throughout the dissertation.

Berkshire Hathaway and its subsidiaries are involved in several different businesses, from which we can highlight Insurance Group & Investment Portfolio, BNSF Railway, McLane Company, Service & Retailing, Berkshire Hathaway Energy Company and Manufacturing Business. The group has begun as Berkshire Cotton Manufacturing Company in Massachusetts back to 1889. Exactly forty years later other four firms merged into the firm renaming the conglomerate as Berkshire Fine Spinning Associates (an operation that started to account as almost 25 percent of the cotton business in the US).

Just like in every major diversified corporation or group, there is a crucial moment where the firm deviates from its, then, only business activity. With Berkshire, this moment occurred in 1955 when the firm merged with Hathaway Manufacturing Company resulting in Berkshire Hathaway Inc. as we know it today. Ten years have passed, and a major change came along in the group's management with Warren Buffet to purchase enough stock to control the conglomerate.

Their operations gradually moved from New Bedford to Omaha. This diversification process continued with the acquisition, back in 1967, of both National Indemnity Company and National Fire & Marine Insurance Company with the main purpose of helping Berkshire overcome the cyclical nature of textile business. These operations were followed by the acquisitions of Sun Newspapers and Illinois National Bank & Trust Company. It was clear that Warren Buffet tended to acquire firms whose main management and products/services he particularly liked.

The years passed and the conglomerate continued its fast-paced expansion and diversification (between 1970 and 1979) with the acquisition of controlling interests in Blue Chip Stamps, Wesco Financial Corporation, Home & Automobile Insurance Company, GEICO, Cypress Insurance Company, Buffalo Evening News, Diversified Retailing Company, Columbia Insurance Company and Southern Casualty Insurance Company.

We were in 1982 and the group instituted an unusual corporate philanthropy program that won praise from shareholders by allowing them to direct a portion of the company's charitable contributions. Furthermore., these responded enthusiastically with over 95% of them participating in each year since the program's inception. By this time, Berkshire's performance was buoyed by their investment portfolio. A year after, the firm acquired 90 percent of the Nebraska Furniture Mart.

This above-mentioned period proved a heady time for Berkshire with several monumental agreements and the denouement of its textiles business. By 1985 the acquisition of the American Broadcasting Company was confirmed. Warren Buffet, said he saw the investment climate changing, with good prospects for firms like television networks that had intangible assets rather than heavy investments in plants and equipment. In the same, Berkshire agreed to acquire Scott & Fetzer Company and reached an agreement with Fireman's Fund Insurance Company of 7% stake in the business. In the next year, Scott & Fetzer deal was finalized and went on to acquire 84% of Fechheimer Bros. Company.

Just before the crash in October 19th of 1987, Berkshire had bought \$700 million worth of preferred stock in Salomon Inc., the Wall Street investment firm whose fortunes were closely tied to the market. In 1988 a major event was coming through: the listing of Berkshire's stock on the NYSE with the move designed to reduce transaction costs for shareholders. Thus, Berkshire became the highest-priced stock on the exchange. The conglomerate bought significant shares of the Gillette Company, US Air Group, Champion International Corporation, over 6% of Coca-Cola Company and an 80% interest in Borsheim.

In the 90s, the conglomerate acquires extra shares in H.H. Brown Shoe Company, Guinness PLC, Central States Indemnity, Lowell Shoe Company, and General Dynamics Corporation. Further on, it added major stock holdings of two firms to its portfolio such as Gannett Company Inc., PNC Bank Corporation, Helzberg's Diamond Shops and R.C. Willey Home Furnishings. We can say that the conglomerate changed course from a strategic *long-term investment* to one still very much interested in investing but leaning more heavily toward acquiring and operating these investment opportunities.

After that, Berkshire began the process of taking GEICO private. At this moment, news brought the planned issuance of \$100 million in new Class B stock valued at 1-30 to the price of its predecessor. The recapitalization was done almost entirely to discourage brokers from marketing unit trusts and seducing clients with the Berkshire name. Buffett was attempting to make the company's stock available at a lower price without going through "expense-laden unit trusts" pretending to be Berkshire clones.

Then, the *DotCom bubble* came in with Berkshire to up its investments in Dairy Queen, Allied Domecq, and Executive Jet. Furthermore, General Reinsurance Corporation was added to the conglomerate. In 1999, the group registered half of the previous year's earnings per share with consequent criticism of Buffett. By this time, the acquisition of the power company MidAmerican Energy, CORT Business Services, Ben Bridge Jewellers, Justin Industries, Benjamin Moore Paint and Johns Manville Corporation were completed. The first years of the 21st century offered an emphatic answer, when revenues back to 2003 reached \$63 billion and nearly eclipsing the \$100 billion mark three years later. Additionally, the group registered a net worth gain of \$16.9 billion in 2006 to break the record in US business history. In October of this same year, the price of a Berkshire's Class A share went above \$100,000. Between 2002 and 2006, the conglomerate acquired the Pampered Chef, Fruit of the Loom, Larson-Juhl, Clayton Homes, McLane Company, Business Wire, Forest River, Medical Protective Company, Applied Underwriters, PacifiCorp., TTI, ISCAR and British RE.

Buffett announced that three individuals would replace him, filling his roles as chairman, chief executive officer, and chief investment officer. However, he reportedly only selected candidates to take over his duties as CEO. Berkshire was entering the year of 2007, spending roughly \$1.3 billion to more than double the conglomerate's stake in Johnson & Johnson and to increase its interest in Sanofi Aventis. Buffett also jumped into the railroad industry during the first half of 2007, investing more than \$3 billion stake in BNSF. In late 2012 the conglomerate also acquired Oriental Trading Company. Berkshire \$28-billion-purchase of H. J. Heinz in 2013 is also a textbook example of the conglomerate's investment strategy.

Nowadays, the conglomerate operates as a holding company with a highly decentralized structure without integrated business functions (i.e. sales, marketing, purchasing, legal, and human resources). The firm owns a diverse group of firms from a variety of industries, with its core subsidiaries being insurance, reinsurance, freight rail transportation, utilities, and energy generation companies. The insurance business constitutes 65% of total revenue and are conducted through numerous domestic and foreign-based insurance entities. It operates primarily in the US, though it provides insurance & reinsurance to clients in the Asia and Pacific, Canada, and Europe regions. Furthermore, it processes around 392,000 employees around the globe and sales of \$255 billion.

2.2. Warren Buffet - "The Oracle"

On August 30th of 1930 the today well-known "Oracle of Omaha" Warren Edward Buffett, was born son of Howard Buffet, a stockbroker-turned-congressman. Buffet displayed, from a very early age, an amazing aptitude for business. When he was eleven years of age, he purchased three shares of Cities Service Preferred at \$38 per share. After some volatility that brought the price down, the shares rebounded to \$40 to then jump towards \$200. The experience taught him a valuable lesson that would define his entire career: patience is a virtue.

In 1947 Buffet was delivering newspapers, however his father urged him to the attend Wharton School at the University of Pennsylvania. Later, he transferred to the University of Nebraska-Lincoln (graduating in three years) and, after being rejected by Harvard Business School, he enrolled with Columbia side to meet Ben Graham and David Dodd. Eventually, Graham published the famous "Security Analysis" book at the age of 40. At this time, Graham came up with the principle of *intrinsic value*, a measure of a business's true worth. He became an idyllic figure to the young Buffet, with Warren being the only student to ever earn a A^+ in one of Graham's classes.

As he was returning home after graduating, he took a job at his father's brokerage house. In this beginning, Buffett's investments were predominately limited to a Texaco station and some real estate with neither being successful. Eventually, his mentor Graham called one day to invite Buffet to come to work for him, He would spend his days analysing S&P reports as well as searching for investment opportunities. During this period the differences between the prodigy and the mentor began to emerge. The first became interested in how a company worked and company's management, while the second wanted numbers after all.

In 1956 Warren Buffett was managing around \$300,000 in capital. For the next five years, Buffett's partnerships rose to an impressive 251% profit. Six years later, his partnership had capital of up to \$7.2 million with 14% as Warren's personal stake. In that same year, Charlie Munger moved back to Omaha to become (until today) Vice-Chairman of Berkshire. In 1969, Buffet decided to liquidate the partnership and informed his partners that he was "unable to find any bargains in the current market". It is important to remember that Buffet accumulated 49% of common stock on Berkshire and named himself director following terrible management. Two years earlier Buffet acquired National Indemnity for \$8.6 million dollars. A year after, in 1970, Warren was naming himself Chairman of the Board of Berkshire Hathaway and wrote for the first time the so-called and well-known "letter to the shareholders".

From 1965 to 1975, the conglomerate's book value rose from \$20 per share to up to \$95. During this period Warren himself made the final purchases of Berkshire's stock. In 1976, Buffet saw another opportunity when GEICO's stock fell to \$2 per share. In fact, the basic business was still intact with most of the problems being caused by a non-professional management team. At a certain point in time, Warren's reputation was so notable that when a rumour of buying a stock emerged it was to shoot its price up 10% or even more. Also, Berkshire Hathaway's stock was trading at almost \$300 a share and Buffett's personal wealth was almost counting for up to \$140 million. At the end of the decade, the group was trading on the stock exchange at \$8,000 a share.

In the 90s, the stock catapulted as high as \$80,000 per share. However, Warren Buffett was confident and continued to follow his theory of allocating capital to good businesses that were selling below intrinsic value (later on so-called value investing). Between 1989 and 2006, Buffet has served as director of Citigroup Global Markets Holdings, Graham Holdings Company and The Gillette Company. We were in June of 2006 when Warren Buffet announced that he would give his entire fortune away to charity thus committing to 85% of it to Gates Foundation, turning out to be the largest act of charity in the United States' history.

2.3. Share Price and Shareholder Structure

Founded back to 1839, Berkshire Hathaway went public in 1964 with a cost per share between the \$19 and \$20 to the current value and processes nowadays the highest price of any stock in the US. In present time, Berkshire processes two class's group of shares resulting from a stock split of 50-to-1 in 1996 both Class A (BRK.A) and Class B (BRK.B). A *stock split* occurs when a firm lowers the price of its stocks by splitting each existing share into more than one share with a subsequent reduction of a higher to a lower per-share trading price without changing shareholder's wealth and relative shareholdings.

A share of Class B common stock has the rights of 1/1,500th of a share of Class A common stock except that a Class B share has 1/10,000th of the voting rights of a Class A share. Each share of a Class A common stock is convertible at any time, at the holder's option, into 1,500 shares of Class B common stock (not the other way around). In the end the investor gets 6.66x as much voting power from the class A shares. Both shares follow almost perfectly a mirror trend between each other, with significant Class A predominance. The main reason for the stock split relies on the intention from the Board to allow all investors to be able to purchase the stock directly instead of having to go through unit trusts or mutual funds that mirror Berkshire's holdings.

The first class is listed on the NYSE and the second one is a constituent of S&P500. Even though we only consider the Class A in the graph, the start date is the inception for the Class B shares. Additionally, both indexes referred previously are multiplied by ten to meet Berkshire's Class A shares dimension. Berkshire Class A shares have appreciated around 920% compared since 1996 to an inferior valuation of almost 700% for S&P500 index (with dividends), and up to 250% for the side of NYSE index (see *exhibit 1*). Berkshire as mentioned before has an investment portfolio with only US-listed-stocks. To this document's analysis we will consider all holdings with more than two percent proportion of the portfolio (i.e. 8 holdings in a total of 47). Furthermore, see *appendix A* for their graphic stock performance.



Exhibit 1 – Stock performance of Berkshire Hathaway's Class A versus S&P500 index (including dividends) and NYSE index, in a 10 times proportion, between 1996 and 2020 (Source: Bloomberg, Berkshire Hathaway)

According to the conglomerate's official source, Berkshire as of February 16^{th} of 2021 had approximately 1,600 record holders of its Class A common stock and 18,900 record holders of its Class B common stock. The conglomerate on the first class processes a total of 0.64 million shares outstanding and 1.34 billion for the second class. All these shares are quoted on NYSE. The main shareholders of Class A and Class B are Warren Buffet, with almost 40%, and Vanguard Group, with a little over 10%, respectively (see *appendix B*). The total number of shares outstanding of Berkshire may total, therefore, up to 1.35 billion. Regarding the overall equity, almost 73% was held by institutional investors and the rest to individual investors. The distribution of some of firm's earnings to a class of shareholders might occur, however the board of directors from Berkshire has decided since 1967 not to go forward with this distribution.

2.4. Berkshire at the Present Time

2.4.1. Business Segments

Based in Omaha (Nebraska), Berkshire Hathaway Inc. is a multinational conglomerate holding and conglomerate firm with a considerable number of subsidiaries engaged in a various business activity (see *appendix C*). The group is managed on a decentralized basis, meaning that the processes of planning and decision-making are delegated or attributed away from a central headquarters. These subsidiaries engage in many business activities: Insurance & Reinsurance, Investment Portfolio of Insurance, Railroad, Utility & Energy, Service Retailing and Manufacturing. It employs up to 360,000 worldwide as of end of 2020. In terms of weight, the service retailing account for the biggest slice (see *appendix D*).

The *Insurance and Reinsurance* activities are conducted through numerous domestic as well as foreign-based insurance entities, and provide it on property, casualty, life, accident, and health risks worldwide. Alone on this business, the group employs up to 51,000 people. On the *Insurance* side, the insurer assumes the risk of loss from persons or organizations that are directly subject to the risks. The number of competitors within the industry is not known with insurers and reinsurers competing based on reliability, financial strength and stability, financial ratings, underwriting consistency, service, business ethics, price, performance, capacity, policy terms and coverage conditions. On the *reinsurance* side, the reinsurer assumes defined portions of risks that other direct insurers or reinsurers assumed in their own insuring activities. Berkshire's reinsurance includes Berkshire Hathaway Reinsurance Group.

The type and volume of business written is dependent on market conditions, including prevailing premium rates and coverage terms. The level of underwriting activities often fluctuates significantly from year to year depending on the perceived level of price adequacy in specific insurance and reinsurance markets as well as from the timing of particularly large reinsurance transactions. Both parts provide reinsurance on property, life, retroactive, and periodic payment annuity. The well-known *investment portfolio* of Berkshire, that is primarily managed by

Berkshire's CEO, is included in this business. The portfolio includes investments on publicly UStraded equity securities, which are concentrated in relatively few issuers, fixed maturity securities, cash investments and short-term investments. This will be the focus of this dissertation and further on will be studied in deep.

The *Railroad* activities occur through BNFS and BNSF Railway with the second totalling up to 35,000 employees. The first transports a range of products and commodities derived from manufacturing, agricultural and natural resource industries. BNSF's financial performance is influenced by general and industry economic conditions at the international, national, and regional levels. Approximately 37% of revenues derive from consumer products, 26% from industrial products, 24% from agricultural products and 13% to coal. The business environment in which BNSF operates is highly competitive. Depending on the specific market, deregulated motor carriers and other railroads, as well as river barges, ships, and pipelines, may exert pressure on price and service levels. The presence of advanced, high service truck lines with expedited delivery, subsidized infrastructure and minimal empty mileage continues to affect the market for non-bulk, time-sensitive freight.

The *Utility & Energy* activities include the generation, transmit, store, distribute and supply of energy. It also includes a diversified portfolio of independent power projects, a liquefied natural gas export, import and storage facility, and a residential real estate brokerage firm as well as respective networks. The whole business employs up to 24,000 people. On the *non-energy* side, we identify HomeServices of America, Inc. (i.e. HomeServices) that provides traditional residential real estate brokerage services, offers mortgage originations and mortgage banking, title and closing services, property and casualty insurance, home warranties, relocation services and other home-related services.

The *Manufacturing* business can be divided into three main categories: *industrial* products, *building* products, and *consumer* products. The former accounts for the manufacturing of chemicals, metal cutting tools, components for aerospace, and power generation applications. The intermediate produces prefabricated, site-built residential homes, flooring products, insulation, roofing products, engineered products, building, engineered components, paint, coatings, and bricks. The latter manufactures recreational vehicles, alkaline batteries, various apparel products, jewellery, and custom picture framing products. The business employs up to 179,000 people.

Finally, the *Service* business provides grocery and foodservice distribution, professional aviation training programs, shared aircraft ownership programs, distribution of electronic components, franchising and servicing of quick service restaurants, media businesses, and logistics businesses. Overall, it employs up to 45,000 people. On the side of *Retailing* business, it includes automotive, home furnishings and several other operations that sell various consumer products to consumers. Employs up to 25,000 people. In addition to Berkshire's core business,

the conglomerate owns 26.6% of the outstanding common stock of Kraft Heinz, a 50% joint venture interest in Berkadia, a 38.6% interest in Pilot Travel Centres LLC and a 50% joint venture interest in ETT.

2.4.2. Governance

Just like in any organization, it is important to structure the rules, practices, and processes used to manage a certain firm or group. The respective *Board of Directors* is the primary forces influencing general corporate governance. Berkshire is no exception to the rule. The conglomerate's governance is "responsible for overseeing the management of the business and affairs of the Company, acting as the ultimate decision-making body of the firm except on those matters reserved to or shared with the shareholders of the Company under the laws of Delaware".

Regarding the number of members, the board processes, in the present time, 14 in total divided into four management directors, two non- management, and eight independent directors. The board has three committees: *Audit, Governance,* and *Executive* (see *appendix E*). Responsibilities rely on exercising their "business judgment to act in what they reasonably believe to be in the best interests of the Company and its shareholders, and to conduct themselves in accordance with their duties of care and loyalty". As a note, "only directors who are neither an employee of the Company or a subsidiary nor a spouse of an employee receive compensation for serving on the Board".

Another issue that is important to remind relies on the management succession and the firm must assure the appropriate successor to the current CEO in the event of his death or disability. The CEO reports "annually to the Board on executive management succession planning and makes available his recommendation on succession in the event he was disabled". On this proposition, the board regularly review succession planning and the "strengths and weaknesses of certain individuals currently employed by the firm who could succeed the CEO".

3. Investment Portfolio

In terms of revenues, the segment of *Insurance & Reinsurance* represents up to 30% of the total cake. Inside this one, Berkshire holds significant sums of invested assets such as a large portfolio of publicly US-traded equities. In a way, there are "no targeted allocations by investment type or attempts to match investment asset and insurance liability durations". This results in one of the largest investment portfolios, of publicly traded stocks, in the world.

Those invested assets derive, mainly, from shareholder capital as well as funds provided from policyholders through insurance and *float* on the reinsurance side. This last one stands for the approximate amount of net policyholder funds generated through underwriting activities that is available for investment. As of 31st December of 2020, the *float* totalled up to \$138 billion. On a quarterly and annually basis, Berkshire Hathaway reports to the Securities and Exchange Commission changes in the current positions held through fillings made available to the public in the section of "Investments" (annual letter to shareholders) where, furthermore, Buffet updates in more detail the current position on the common stock investments in terms of number of shares held, firm name, percentage of company owned, total cost and market valuation at that time.

The first official, and available, chairman's letter goes back to the 1977 annual report, however investments started to occur far back. At this exact year, Berkshire reported that these equity holdings, independently, had a total cost of \$107 million and total market value of \$181 million (according to Berkshire's publicly available documents). Since 2010, the portfolio is managed by Buffet together with Todd Combs and Ted Weschler. To this dissertation we will only focus on evaluating the investment portfolio through the valuation of all integrated stocks with more than 2% of weight in the whole "cake", as mentioned before.

3.1. Investment Strategy

The investment portfolio of Berkshire is no more than the extend of Munger and Buffet's investment philosophy, which can be resumed to the so-called *value investing*. As mentioned before in the Literature Review section, value investing stands for buying stocks which may trade at a discount to their intrinsic value. Typically, investors that defend this vision tend to look at low multiples of assets or profits. It requires a long-term investment horizon.

According to the annual report of 1977, Berkshire selects marketable equity securities in much the same way that any typical investor would evaluate a business for acquisition in its entirety thus all these four topics must be met: a business that can be understood, favourable long-term prospects and growth potential, operated by honest and competent people and available at a very attractive price. On the words of Buffet "we ordinarily make no attempt to buy equities for anticipated favourable stock price behaviour in the short term" and "if their business experience continues to satisfy us, we welcome lower market prices of stocks we own as an opportunity to

acquire even more of a good thing at a better price". Furthermore, when prices are appropriate, on the conglomerate's vision, they are willing to take significant large positions in a range of selected firms with the expectation that excellent business results by these corporations might translate over the long-term into excellent market value. An example explored in the report is Capital Cities. Buffet tends to choose underperforming stocks that offer attractive dividend yields. Other factors to be met, something that is common to Berkshire's firms already owned, are firms that are profitable and solid, produce significant cash flows to reinvest, unique businesses with strong market positions and franchises, cash and cash equivalent in significant levels, and a margin of safety on stocks.

Buffet takes special consideration into the probability of losing capital on a transaction in backing strong and diligent managers and in evaluating the intrinsic value of a certain possible transaction, also defined as the discounted value of the cash that can be taken out of the business in its remaining life. Additionally, considers as the cash figure the *owner earnings*. It stands, according to shareholder's letter of 1986, as the "reported earnings *plus* depreciation, depletion, amortization, and certain other non-cash charges and *less* the average annual amount of capitalized expenditures for plant and equipment that the business requires to fully maintain its long-term competitive position and its unit volume" (Buffet, 1986). Buffet finally produces an analysis that compares the fluctuations of market price and intrinsic value to then select the appropriate moment to purchase or sell a certain stock.

As stated in the 2017 annual report, both Buffet and Munger note that they view the "marketable common stocks that Berkshire owns as interests in businesses and not as ticker symbols to be bought or sold based on their chart patterns, the target prices of analysts or the opinions of media pundits". It is then believed that "if the businesses of the investees are successful" the investments "will be successful as well". Furthermore, in terms of acquisitions, there are "four building blocks that add value to Berkshire: sizable stand-alone acquisitions, bolt-on acquisitions that fit with businesses we already own, internal sales growth and margin improvement at our many, and investment earnings from our huge portfolio of stocks and bonds" (Buffet, 2017).

Additionally, both emphasize that they "do not measure the progress of investments by what their market prices do during any given year" but rather "evaluate their performance by the two methods" used, the first in which are tested the improvement in earnings and the second on whether their "moats" (i.e. superiorities they possess that make life difficult for competitors) have widened during the year (Buffet, 2007). In 2020 both reinform that view "Berkshire's holdings of marketable stocks" as "a collection of businesses" as well as sharing proportionately in their long-term prosperity" nor operations' control (Buffet, 2020).

3.2. Changes in Portfolio Composition

As mentioned before, the investment portfolio is managed since 2016 by Buffet, Bombs and Weschler. These last two manage alone more than \$10 billion with Buffet learning about those investment decisions that they made by looking into monthly trade sheets. Included in this amount, roughly \$3.8 billion is about pension trust assets of certain Berkshire subsidiaries.

For the purpose of analysing allocation changes over the years (and future analysis or models), it will be considered the top eight firms included in the investment portfolio in terms of total cost in US Dollars till that specific year, intervals of 10 years and some other specific periods that we seem to be relevant for the analysis. We start with 1977, the first year made publicly available by Berkshire on their investment portfolio. From here on we selected the years 1977, 1987, 1997, 2007, 2008, 2009, 2017 and 2020 (see *appendix F*).

Berkshire started, back to 1977, by investing a total of almost \$110 million in a group of roughly nine equities divided into communications, public entities, metals, media, and marketing. The conglomerate followed the strategy described before and well detailed in their annual report: "want the business to be one that we can understand, with favourable long-term prospects, operated by honest and competent people, and available at a very attractive price" (Buffet, 1977).

We can notice that ten years have passed (i.e. 1987), and the total cost invested more than doubled to reach up to half a billion US dollars. In this year, however, the group started to divide these holdings into the *permanent holdings* and *marketable securities*. In the former, we can notice that three firms fill out the list: Capital Cities, GEICO Corporation and The Washington Post Company. For the latter, are considered large quantities of marketable securities for the insurance firms., which may be selected through "long-term common stock investments, medium term fixed-income securities, long-term fixed income securities, short-term cash equivalents, and short-term arbitrage commitments" (Buffet, 1987).

In 1987, Capital Cities remained in the portfolio and was highly reenforced to a total registered cost of \$518 million ending as the largest holding by far (see *appendix* F). This comes after commentaries in the previous years: "Capital Cities possesses both extraordinary properties and extraordinary management; these management skills extend equally to operations and employment of corporate capital" (Buffet, 1977). In 1997, the total cost was registering almost \$7.5 billion with American Express and Coca-Cola as the main holdings and ownership of 10.70% and 8.10%, respectively.

We are in 1997 and the total money invested for the portfolio was more than five times larger. In fact, the results speak by itself with book value per share rising by 11% through Class A and Class B shares (for the past 43 years a positive cumulative annual growth rate of 21%) and the net worth registering more than \$12 billion. Enjoying these good results, the group made a

profound diversification in their portfolio with one individual acquisition cost reaching as high as $(5.7 \text{ billion with Well Fargo (see$ *appendix F* $)})$.

The year of 2007 was a special year that would generate one of the darkest periods in the economy worldwide. A specific number of financial institutions have, however, experiencing staggering problems resulting from the so-called *weakened lending practices*. There was this expectation from Americans and other parties that house prices would forever rise. This made borrower's income and cash equity seem unimportant to lenders. Thus, with house prices falling, institutions are being exposed (Buffet, 2007).

We are in 2008 and the group was expecting that insurance-industry profit margins would fall significantly as well as prices down. Indeed, the group could not expect a worst scenario: the financial crisis of 2008 arrived. The worst economic disaster since the stock market crash of 1929, started with the subprime lending crisis back to 2007 and expanded into a global banking network with special emphasis on the bust of Lehman Brothers in September of 2008 despite government intervention. The year was devastating as well for corporate and municipal bonds, real estate, and commodities. By the fourth quarter, the credit crisis, with tumbling home and stock prices, had produced a paralyzing fear that engulfed the country. Thus, led to business contraction, and that in turn led to even greater fear, so on and so forth. The Treasury and FED have gone, in poker terms, with all in. Major industries have become too dependent on Federal assistance, and they will be followed by cities and states bearing mind-boggling requests. This strong and immediate action by government was essential in any case, had one occurred, the consequences for every area of our economy would have been cataclysmic (Buffet, 2008).

Adding to all this we can identify a highly speculative real estate market, more and more exotic financial products, and weak regulation. The investment portfolio suffered, in concordance, a significant negative shift in terms of value measured by the market, and according to Berkshire's reports, of up to negative 35%. However, the total amount invested at the end of this year was not very different from those registered in 2007. Additionally, Wells Fargo saw a slight reinvestment as well as Kraft Foods. The news here is ConocoPhillips with a total registered cost of more than \$7 billion (see *appendix F*), with the investment decision being made by Buffet on the basis that "oil and gas prices were near their peak" (Buffet, 2008).

Be it 2009, saw a significant recovery compared to the former year with net gain reaching \$21.8 billion increasing the book value per-share of both stock classes to 20% yearly. Berkshire's portfolio suffered some changes starting with the acquisition from the conglomerate of Burlington Northern Santa Fe adding 65,000 new shareholders to those halves million already existing. Then, the group realized the sales of ConocoPhillips, Moody's, P&G and J&J much in anticipation of BNSF acquisition for the remaining 77.5%. The total cost decreased non-significantly and the value measured by the market (according to Berkshire's reports) was up by 20% on a year basis.

The top-8 holdings remained the same, despite the new addition of Wal-Mart Stores Inc. to a total registered cost of 1.89 billion US Dollars (see *appendix F*).

We are in 2017 and many changes were registered. The net gain reached \$65.3 billion (increase of 200% for the referred interval), increasing the book value per share of both stock classes to a value of 19% yearly. However, it is important to notice that only \$36 billion came from Berkshire's operations with the remain coming from the rewritten US Tax Code back to December of 2017. Another important change relies on a new accounting rule to be applied to both future quarterly and annual reports: *GAAP*. It states that "the net change in unrealized investment gains and losses in stocks" Berkshire holds "must be included in all net income figures" the conglomerate reports (Buffet, 2017).

On the side of Berkshire's investment portfolio, Berkshire excludes Kraft Heinz holding since the conglomerate is "part of a control group and therefore must account for this investment on the equity method". Additionally, Kraft is carried "at a GAAP figure of \$17.6 billion" and "a cost basis of \$9.8 billion" as of the year of 2017 (Buffet, 2017). In comparison with 2009, the total sum cost reached up to \$75 billion and value measured by the market (according to Berkshire's reports) of \$171 billion, registering an increase of 116% and 189%, respectively. Furthermore, it is noticeable Apple's holding as main Berkshire's bet, reinvestment enforcement of Wells Fargo, introduction of Phillips 66, Bank of America Corp., The Bank of NYM Corp., Delta Airlines Inc., and Southwest Airlines Company (see *appendix F*).

At the end of the year of 2020, Berkshire was able to earn more than \$42 billion according to the mentioned-before GAAP rule subdivided into operating earnings, realized capital gains, gain from increase of net unrealized capital gains and loss from write-down in value of subsidiary and affiliate. As stated in the annual report, the focus of Berkshire is to both to increase operating earnings and acquire large/favourably situated businesses. However, operating earnings fell almost 10% and "no sizable acquisitions" registered. Furthermore, the write-down of \$11 billion is attributed to "purchase of Precision Castparts" (Buffet, 2020). Once again, Berkshire excludes Kraft Heinz holdings for the reasons presented before now with a GAAP figure of \$13.3 billion.

In comparison with this last analysed year, the total sum cost was registered on up to \$109 billion and Berkshire's reported market value of \$281 billion thus increases of 45% and 65%, respectively. Reinvestment enforcements were made to Apple Inc., Bank of America Corp. and US Bancorp with Verizon Communications, Chevron Corp. and Merck & Co. Inc. entering on the top-8 holdings (see *appendix F*). Additionally, it is noticeable the \$10 billion investment on Occidental Petroleum. See *appendix G* for the complete list of holdings.

Berkshire's Top-Eight Portfolio Holdings

Apple Inc. (**AAPL**) is a name that speaks by itself, designing, manufacturing, and marketing personal computers and related personal computing as well as mobile communication devices (i.e. industries consumer discretionary and technology). Additionally, a variety of related software, services, peripherals, and networking solutions globally through online stores, retail stores, direct sales force, third-party wholesalers, and resellers. Up to 55% of Apple's sales comes from outside Americas. The group totals more than 100,000 employees and net income of \$57 billion in 2020. Accounts for almost half of Berkshire's portfolio with 43.61% and 887 million shares held.

Bank of America Corp. (**BAC**) operates as a financial holding company (i.e. industries banking and financial services) offering saving accounts, deposits, mortgage and construction loans, cash or wealth management, certificates of deposit, investment funds, credit and debit cards, insurance, mobile, and online banking services in areas such as banking, investing, asset management, and risk management. The firm is among the US largest banks by assets, operates one of the country's most extensive branch networks with 4,500 locations and 17,000 ATMs. Its US operations account for almost the total number in sales. It totals 212,201 employees, net income of \$17 billion in the past year, 11.34% of total investment portfolio of Berkshire and 1 billion shares held.

With roughly 135 years of history, Coca-Cola (**KO**) is a well-known firm among the common investor responsible for the manufacture, market and distribution of soft drink concentrates, syrups, and juice-drink products (i.e. industry consumer staples). Their operations extend to the US and more than 200 countries internationally with a portfolio of brands like Minute Maid, Powerade, Dasani, and Honest Tea. It processes the world's largest beverage distribution system, up to 70% of its sales comes from outside the United States, totals 80,300 employees, net income of \$8 billion, 8.13% of Berkshire's investment portfolio and 400 million shares held.

American Express Co. (**AXP**) is a global payment and travel company with products and services being the charge/credit payment card and travel-related services offered to consumers and businesses globally. Up to 80% of firm's sales comes from the US. The firm totals more than 63,000 employees and net income of \$3 billion at the end of 2020. It accounts for 6.79% of total conglomerate portfolio with 152 million shares held.

Kraft Heinz (**KHC**) is considered one of the largest food and beverage (i.e. industry consumer staples) firms in the world with a large portfolio of brands such as Oscar Meyer, Capri Sun, Ore-Ida, and Kool-Aid. The firm generates about 55% sales from condiments, sauces, cheese, and dairy products with operations organized across 10 specific product categories. It counts the US as its largest market of about 75% total revenue, 20% internationally and 5% to Canada. Totals 38,000 employees, net income of \$4 billion, 4.18% on the portfolio and 326 million shares held.

Verizon Communications (VZ) is an integrated telecommunications firm (i.e. industry communications) that provides wire line voice and data services, wireless services, Internet services, and published directory information. It serves up to 94 million retail connections and has activity throughout the United States as well as globally. Totals 130,100 employees, net income of \$21 billion as of 2020, 3.19% part of Berkshire's investment portfolio and 147 million shares held.

Moody's (**MCO**) is a credit rating, research, and risk analysis firm (i.e. industry technology) through credit ratings, assessment services, research, data and analytic tools, risk management, quantitatively derived credit scores, learning solutions, certification programs, company information, and business intelligence. Totals 11,500 employees, net income of \$2 billion, 2.65% part of Berkshire's investment portfolio and 25 million shares held.

US Bancorp (**USB**) is a diversified financial services firm (i.e. industry financials and banking) providing lending and depository services, cash management, foreign exchange, and investment management services through credit card services, mortgage banking, insurance, brokerage, and leasing. The firm is the holding firm for U.S. Bank, it totals 70,000 employees, net income of \$5 billion, 2.26% of investment portfolio and 131 million shares held.

In terms of *sector allocation*, we can see through *exhibit B* that the predominant sectors that Berkshire seeks to invest are Technology, Finance and Consumer Non-Durables with Health Care, Consumer Services and Public Utilities accounting for a significant portion of the portfolio. Furthermore, the technological sector seems to be the major bet from Berkshire with an almosthalf holdings attributed to Apple with 43.61% on the total portfolio (see *appendix G*).

Sector	2018	2019	2020
Technology	23.10%	31.00%	45.10%
Finance	44.10%	41.60%	25.20%
Consumer Non-Durables	18.00%	13.50%	12.30%
Health Care	1.47%	1.47%	4.45%
Consumer Services	3.81%	4.51%	4.20%
Public Utilities	0.00%	0.01%	3.46%
Energy	0.72%	0.54%	1.60%
Miscellaneous	1.27%	1.43%	1.41%
Capital Goods	2.23%	1.13%	1.12%
Transportation	4.95%	4.21%	0.00%
Others	0.02%	0.28%	1.16%
Basic Industries	0.33%	0.32%	0.26%

Exhibit 2 - Investment portfolio sector allocation between 2018 and 2020 (Source: Berkshire Hathaway, Bloomberg)

3.3. Performance and Financial Analysis

3.3.1. Profitability

To measure and evaluate the ability of a firm to use its assets to produce profit, value, or income to shareholders as well as to access the firm's bottom line for its managers. Furthermore, it will be analysed along this section certain metrics, with Berkshire Class A shares as main, that better represent *profitability* evaluation in comparison with the top eight holdings of Berkshire's investment portfolio. We can see that the conglomerate presented lower revenues by 3.58% to the former year resulting in a smaller operating income as well as net income in consequence (this last one to decrease to almost half of 2019's value), with five holdings from the top eight in analysis following the trend (see *appendix H*).

Despite that, VZ was able to generate a consequential increasing trend on their operating income. Important to notice that AAPL presents similar values to the conglomerate on both revenues and net income. EBITDA margin, for Berkshire, averaged more than 17% for the period in study and a negative trend between the years with APPL, AXP and KHC also following a negative trend meaning that those were in 2020 less profitable from firm's operations. On the case of both BAC and USB, as these represent both banks of financial institutions it is no longer reported the EBITDA. For Gross, Operating and Pre-tax Margin the conglomerate registered the same trend as before with special emphasis on the pre-tax margin. Additionally, we notice that half of the holdings in comparison were more efficient financially speaking whereas the other half dropped quite significantly (see *appendix H*).

Concerning the *return ratios* on assets, equity and invested capital all have evolved negatively by 5.64%, 11.25% and 7.87%, respectively on behalf of conglomerate. For the ROA, in fact Berkshire was less efficient using its assets to generate earnings, backed by the decrease of net income and increase in total assets, as well as six of the holdings in analysis. From these six, four are backed by a decrease on the net income. For the ROE, the conglomerate was significantly less profitable in relation to stockholders' equity as well as seven out of eight holdings. The changes on the capital structure were minimal and so this negative trend can be explained almost exclusively from net income. For the ROIC, Buffet's conglomerate was once again less efficient allocating the capital under its control to profitable investments as well as other six holdings (see *appendix I*). This last one noticeable for the significant general decrease of the net income and increase of dividends per share. Additionally, debt increased with a faster pace compared to the decrease pace of equity.

3.3.2. Cash Flow Management

In terms of *cash flow management*, conglomerate speaking, only the cash from operating activities has increased with the investing and financing activities worsening as much as 572% and 2598% to end up on negative \$37,757 million and negative \$18,236 million. This is mainly backed by decrease in net income, increase of non-cash items, decrease of net change in long-term investment and decrease in capital stock. The variation of cash ended up being positive and negative the next year. This trend was followed similarly by AAPL, the opposite with BAC, KO, AXP and positive values on both years for the remaining four holdings (see *appendix J*).

Dividends-paid play a significant part, for all eight holdings, on accounting the changes in cash at the end since Berkshire does not distribute any kind of dividends annually.

The FCF gives us the amount of cash generated by a certain business after accounting for reinvestment in non-current capital assets by the firm. For that, it considers a subtraction of the cash from operating activities and capital expenditures (i.e. funds that are used by a firm to purchase, improvement or maintenance of long-term assets). All holding, including the conglomerate, saw a positive trend apart from BAC, AXP and USB. This can be mainly derived from the decrease of cash from operating activities (see *appendix J*). The FCFF is the cash flow that is available to all funding providers of the firm, including debt, stockholders, bond investors, among others. Furthermore, FCFE is the amount of cash generated with the potential to be distributed to shareholders.

The FCFF registered a general increase apart from the financials' sector holdings with zero value, respectively. It considers the sum of net operating profit after tax and depreciation & amortization and subtracting the capital expenditures and variation of working capital, indicating that all five are backed by an increase of NOPAT from 2019 to 2020. The FCFE registered similarly an upwards trend except from KO, AXP and USB. The values in comparison with their FCF varied backed by adding the net debt issued to the calculation formula (see *appendix J*). Both AXP and USB in 2020 presented negative FCFE.

3.3.3. Capital Structure

The amount of debt and/or equity employed by a certain firm to fund its operations and assets can be referred as *capital structure*, being normally expressed as a leverage ratio that considers the division of debt and equity. Starting with total assets, we can notice that the conglomerate registered an increase of 6.85% to end up accounting for \$817.7 billion in 2020. Except from AAPL, AXP and KHC, all other holdings followed the conglomerate with significant change in numbers for BAC. Total equity and total debt also increased leading to the rise of the *leverage ratio*, showing that Berkshire brings low risk to shareholders on their stock. KHC and Berkshire showed a conservative capital structure in opposition to the other holdings. Holdings like BAC, USB, and AXP ended up having the highest leverage ratio by 9.33x, 9.31x and 7.33x, respectively (see *appendix K*).

As for *dividend* analysis, the thing that stand out immediately is that Berkshire does not distribute dividends. However, all the top eight holdings distributed both in 2019 and 2020 more than \$0.6 per share with VZ as the highest of \$2.44 and \$2.51 per share held annually, respectively. The *pay-out ratio*, in consequence, rose in almost all the cases as well as decrease in the EPS between 2019 and the year of 2020. This last one got a significant decrease for the side of the conglomerate. With a decrease on EPS, a direct decrease can be registered on the market

capitalization (i.e. how much a firm is worth as determined by the stock market). Despite that most holdings decided to raise their dividend policy (see *appendix L*). Additionally, on the financial analysis side, see *appendix AD*, *appendix AE* and *appendix AF* for additional information from the financial statements of each one of the eight-holdings in analysis.

3.3.4. Rating

Each firm is assigned to a certain rating in concordance with the agency's level of confidence that the borrower will pay its debt obligations as agreed on a long-term basis. This *agency rating* is an institution that assesses the financial strength of firms and government institutions. Here three dominate the rating business and their data will be considered to the analysis: Moody's, Fitch, and S&P (see *appendix M*). Each uses a letter and number-based scores to assess the default's level of risk. Berkshire received the same grade from Moody's and S&P but a low-tier grade from Fitch in the region of *high grade* in 2020. The outlook from all agencies was *stable* meaning that there is a low likelihood of rating change in the near to medium-term. AAPL received the same rating from Moody's and S&P on the top-tier of *high grade* in 2020 with stable outlooks (see *appendix M*).

BAC was "awarded" with ratings Baa1, A- and AA- from Moody's, S&P, and Fitch, respectively. The former located in the top-tier of *lower medium grade* in the end of the year whereas the intermediate located in the low-tier of the *upper medium grade* and the latter in the low-tier but in this case for the *high grade* in 2020. To notice the positive outlook from S&P meaning that there is a high likelihood of an upward rating revision in the near to medium-term (see *appendix M*).

On the side of KO, both Moody's and S&P attributed the same rating on the top-tier of *upper medium grade* in 2020 with Fitch assessing for the intermediate-tier on the scale for the same level. Noticeable the negative outlook from S&P meaning that there is a high likelihood of a downward rating revision in the near to medium-term (see *appendix M*).

Considering now AXP, all three agencies considered different ratings from different grades: Moody's for the low-tier of upper medium grade, Fitch for the intermediate-tier for the same grade and top-tier for *lower medium grade* from S&P in 2020. The agencies gave stable outlooks. Furthermore, KHC received the same ratings from S&P and Fitch with a noticeable difference: positive outlook from the second (see *appendix M*).

For holdings VZ and MCO, the rating given was the same with exception to a A- from Fitch to end up in the low-tier of *upper medium grade* in 2020. The outlook registered was a stable expectation. Additionally, the holding USB received different ratings from all three agencies: Moody's and S&P located the rating on the grade *upper medium* and Fitch for *high grade* in 2020. Furthermore, outlooks indicated a low likelihood of rating change in the near to medium-term (see *appendix M*).

3.4. Macro, Industry and Peer Overview

The ongoing pandemic continues to shape the path for global economic activity, with severe outbreaks continuing to weigh on growth in many countries. However, the global economy is experiencing an exceptionally strong but uneven recovery. There are certain economic indicators that can help to understand changes over the time to better asses the economic health of each region or country. Among many we decided to use the *real GDP growth*, *inflation* (CPI) rate and *ten-year treasury yield* between 2007 and 2020.

The *GDP* is the standard measure of the value added created through the production of goods and services in a country (or region) during a certain period. Also measures the income earned from that production or the total amount spent on final good and services less the imports as well as a measure of the size and health of a country's economy. The real GDP is an inflation-adjusted measure or inflation-corrected. We can see that China outperformed the growth registered for the world in contrast with the United States, Euro Area and Japan. It is visible, globally, the recession of 2008-2009 (i.e. financial crisis) by -1.67% and 2020 (i.e. pandemic) by -3.59%. The Euro Area and US are highly correlated as well as Japan. A significant recovery was registered after 2009 by 4.31% and between 2011-2018 the growth remained close to zero. China is registering a downward trend since 2010 (see **appendix N**).

The *inflation*, that is measured by CPI, is the change in the prices of a basket of goods and services that are typically purchased by specific groups of households as well as measuring the erosion of living standards. This concept can also be defined as the decline or rise of purchasing power of a given currency. It is bad news for consumers (i.e. cost of living is rising) and savers (i.e. the value of savings is falling) and good news for borrowers (i.e. the value of debt is reduced). During a recession the inflation falls and might rise during a boom in the economy as we can see through the financial crisis and beginning of the pandemic periods. China in almost every year, for the period in analysis, outperformed the world's terms of inflation whereas US and Euro Area (significantly correlated) underperformed (see *appendix O*). In 2008 and 2011, it was registered the maximum levels for the period in analysis. The world saw inflation rising to 8.95% and 4.82%, China with 5.93% and 5.55%, US with 3.84% and 3.16%, Japan with 1.38% and a deflationary scenario of -0.27%, and Euro Area with 4.08% and 3.29%, respectively. China followed world's values for the inflation (see *appendix O*).

The *ten-year treasury yield* is the current rate Treasury notes would pay investors if they bought them today. Changes in the ten-year yield of any country tell us more about the economic landscape and global market sentiment (declines in the yield generally indicate caution about global economic conditions and vice-versa). All three countries in analysis saw a generalized decline in their 10-year yield and a consequent recovery until mid-2009. Since that year, the yield tended to decline to end up, in 2020, with values of 3.20%, 0.93% and -0.57%, respectively for

China, USA, and Germany (see *appendix P*). China's yield has remained constant since 2018 in contrast with US that registered a significant negative trend on their yield. To notice negative yields in Germany since the end of 2018.

3.4.1. AAPL

Apple Inc. is inserted in the Retail & Wholesale and Technology Hardware industries with respective sectors of communications equipment, consumer electronics and computer hardware & storage for the second and e-commerce discretionary for the first. The sectors account for 50.19%, 11.15%, 19.07% and 19.59% of total revenues registered in 2020, respectively. On the *technology hardware* side, this industry represents up to 81% of the firm's total revenues with mobile phones accounting for 50.19% and 19.07% as of 2020. The former, in terms of market share globally, has seen a constant growth since 2017 to end up in 2020 as market leader with up to 24% whereas in 2021 is expected a 14.10% as market share. The latter, in terms of market share globally once again, has seen a similar scenario in the first years in analysis to end up with 8.20% and expected market share of 7.80% in 2021 (see *appendix Q*). This may indicate that the firm will see a significant decrease on their revenues globally in the next year, as these two sectors drive up to 70% of total revenues.

The industry of *technology hardware* itself totals a market capitalization of \$7.61 trillion and industry revenues of \$2.64 trillion, with the PE to reach 24.73 in 2020. A high ratio might mean that a stock's price is high relative to earnings and that it might be overvalued. The firm is analysis, Apple, accounts for almost 1/3 of the total market capitalization, up to 81% of total revenues comes from this industry and registers the highest PE even above the industry. Comparing with its peers, the firm has the highest market capitalization, price-to-earnings, and industry revenues (see *exhibit 3*).

	Market Cap.	P/E	Ind. Revenue	% Revenue
Industry	7.61	24.73	2,640	-
Apple Inc.	2.50	29.16	221	80.41
Samsung	0.38	15.63	142	64.16
Oracle Corp.	0.25	23.16	3	8.30
Cisco Systems	0.24	21.07	36	72.98
IBM	0.13	14.88	5	7.46
Sony Group Corp.	0.12	16.48	27	31.89

Exhibit 3 – Aggregate statistics for industry of Technology Hardware versus Apple Inc. and five peers in 2020; Market capitalization in trillion of US Dollars and industry revenues in billions of US Dollars (Source: Bloomberg)

On the side of *e-commerce discretionary*, this industry represents up to 20% of the firm's total revenues, a total market capitalization of \$6.74 trillion and industry revenues of \$0.71 trillion as well as a PE of 38.58 in 2020 which is considered high in comparison with the former industry in analysis. The firm accounts for 37% of the total market capitalization and registers the second lowest price-to-earnings in comparison with its peers and industry (see *exhibit 4*).

	Market Cap.	P/E	Ind. Revenue	% Revenue
Industry	6.74	38.58	705	-
Apple Inc.	2.50	29.16	54	19.59
Amazon Inc.	1.67	57.24	278	71.96
Alibaba Group	0.50	28.99	86	81.40
Netflix Inc.	0.23	50.01	239	0.96
Meituan	0.17	1011.82	13	76.24
Sea Ltd.	0.15	0.00	2	51.06

Exhibit 4 – Aggregate statistics for industry E-Commerce Discretionary versus Apple Inc. and five peers in 2020; Market capitalization in trillion of US Dollars and industry revenues in billions of US Dollars (Source: Bloomberg)

3.4.2. AXP, BAC, and USB

Now in analysis we have together AXP, BAC, and USB all belonging to either Financials, Financial Services or Banking. The first is inserted in the Financial Services and Software & Tech Services industries with, respectively, sectors of consumer finance and technology services accounting for 28.98% and 71.02% of firm's total revenues. The second located in the Banking and Financial Services industries with, respectively sectors of diversified banks, asset management, consumer finance and institutional financial services accounting for 39.25%, 4.03%, 18.73%, 15% and 22.99% of firm's total revenues. The third located in the Banking industry with respective sector of retail banking.

When comparing the total assets held, we can see an increasing trend between 2016 and 2020 with China leading in total until 2019. However, the next year the US registered a growth of 76.50% surpassing in total assets both Europe and China. The general scenario in 2020 contrasts with former years with both Europe and China decrease total assets held. In terms of ROE, Europe processes the lowest values whereas China and USA register similar values between 2016 and 2020. In 2020 all three significantly decreased in ROE, possibly deriving from the pandemic risks, or meaning that in general the management is either making bad decisions on reinvesting capital in unproductive assets (see *appendix R*).

In 2008, the worst economic disaster since the stock market crash of 1929 started. At this time, the risk premiums increased and capital losses from major financial institutions forced the central banks to advance with QE (i.e. situation where central banks purchase longer-term securities from open market to increase the money supply and encourage investment by lowering yields). Because of all of these, between 2007 and 2012 both LIBOR and EURIBOR reached the levels close to zero. From 2012 on, both went through different directions: LIBOR went up and EURIBOR the opposite. In 2015, EURIBOR reached for the first-time negative values. In 2020 they register close values (see *appendix S*).

On the *credit* side, we can see that both *consumer credit card* and *credit card debt* has seen a constant growth despite the last interval of 2019 and 2020. With a faster pace has increased the total consumer debt. Furthermore, the pandemic has made the travel industry to almost stop. American Express being a global payment and travel services firm, has also being hurt on their financials. The total assets have decreased as well as loans (see *appendix T*).

We can see that for *banking* the market capitalization totalled \$8.18 trillion in 2020, a PE of 8.98 and totalled industry revenues of \$2.22 trillion. The *financial services* totalled \$17.03 trillion in 2020, a PE of 11.04 and revenues of \$6.26 trillion. The financial transaction processors totalled \$2.56 trillion, PE of 42.79 and revenues of \$0.18 trillion. For the first it stands out a higher PE by BAC and USB compared to the industry, second largest market cap for BAC and a very dispersed industry. For the second a higher PE by BAC and AXP compared to the industry meaning that both might be overvalued. On the third, one of the lowest market capitalizations for AXP, lowest PE and highest industry revenues. For this last, the ratios presented may indicate overvaluation (see *exhibit 5*).

	Market Cap.	P/E	Ind. Revenue	% Revenue	
Industry - Banking	8.18	8.98	2,220	-	
Bank of America Corp.	0.35	13.08	28	39.25	
US Bancorp	0.08	11.88	23	100.00	
JP Morgan Chase & Co.	0.47	10.12	61	49.04	
Bank of China Ltd.	0.24	5.39	103	88.96	
China Merchants Bank Co. Ltd.	0.21	12.22	37	95.70	
Wells Fargo & Co.	0.20	12.58	71	80.69	
China Construction Bank Corp.	0.19	5.57	89	85.62	
	Market Cap.	P/E	Ind. Revenue	% Revenue	
Industry - Financial Services	17.03	11.04	6,260	-	
Bank of America Corp.	0.35	13.08	49	60.75	
American Express Co.	0.13	18.58	11	28.98	
JP Morgan Chase & Co.	0.47	10.12	63	50.96	
Toyota Motor	0.29	8.71	20	7.85	
Bank of China Ltd.	0.24	5.39	13	11.04	
China Merchants Bank Co. Ltd.	0.21	12.22	2	4.30	
Wells Fargo & Co.	0.20	12.58	17	19.31	
	Market Cap.	P/E	Ind. Revenue	% Revenue	
Industry - Fin. Trans. Processors	2.56	42.79	177	-	
American Express Corp.	0.13	18.58	26	71.02	
VISA Ins.	0.52	46.14	22	100.00	
Mastercard Inc.	0.36	51.60	15	100.00	
PayPal Holdings	0.32	81.19	21	100.00	
Sea Ltd.	0.16	0.00	0.06	1.43	
Square Inc.	0.12	319.88	10	100.00	

Exhibit 5 – Aggregate statistics from Banking, Financial Services and Financial Transaction Processors in 2020; Market capitalization in trillion of US Dollars and industry revenues in billions of US Dollars (Source: Bloomberg)

3.4.3. KHC and KO

On the Consumer Staples industry side, we identify Coca-Cola and Kraft Heinz and respective sectors of non-alcoholic beverages (carbonated soft drinks) and Packaged Food accounting for the proportion of total of revenues, respectively. Furthermore, it is crucial to analyse both sectors and the industry overall. Consumer staples processes, as of 2020, a total market capitalization of \$14.06 trillion and total revenues of \$9.04 trillion. The sector of packaged food represents almost 22% of consumer staple's total revenues whereas non-alcoholic beverages represent more than 3% of revenues. Food accounts for 28.87% and Beverages for 12.50%.

The sector of *packaged food* totals a market capitalization of \$3.01 trillion, PE of 0.16 and industry revenue of \$1.21 trillion in 2020 whereas *carbonated soft drinks* totalled \$0.71 trillion, PE of 24.25 and industry revenue of \$0.12 trillion. Starting with KHC, the firm accounts the lowest market capitalization from all five peers even accounting for 100% of total revenues as well as the lowest price-to-earnings and closest to those 0.16 registered by the industry. On the side of KO, we can notice that the firms process more than a third of the total industry's market capitalization, \$0.24 trillion, and a price-to-earnings to is very similar to the industry of 25.01 in 2020. All their revenues come from the sector of carbonated soft drinks and appears in the second of revenues after Fomento Econ-UBD (see *exhibit 6*).

	Market Cap.	P/E	Ind. Revenue	% Revenue
Industry - Packaged Food	3.01	0.16	1,210	-
Kraft Heinz Co.	0.05	11.95	26	100.00
Nestle Sa.	0.36	26.51	59	66.00
Abbott Laboratories	0.22	32.92	8	22.10
PepsiCo Inc.	0.22	25.63	48	67.94
Unilever Plc.	0.15	22.69	22	37.73
Mondelez International Inc.	0.09	24.29	26	96.05
	Market Cap.	P/E	Ind. Revenue	% Revenue
Industry - Carb. Soft Drinks	0.71	24.42	35	-
Industry - Carb. Soft Drinks Coca-Cola Co.	0.71 0.24	24.42 25.01	35 4	- 100.00
Industry - Carb. Soft Drinks Coca-Cola Co. Anheuser-Busch InBev Sa.	0.71 0.24 0.12	24.42 25.01 21.30	35 4 4	- 100.00 8.18
Industry - Carb. Soft Drinks Coca-Cola Co. Anheuser-Busch InBev Sa. Ambev Sa.	0.71 0.24 0.12 0.05	24.42 25.01 21.30 18.40	35 4 4 0.82	- 100.00 8.18 7.27
Industry - Carb. Soft Drinks Coca-Cola Co. Anheuser-Busch InBev Sa. Ambev Sa. Monster Beverage Group	0.71 0.24 0.12 0.05 0.05	24.42 25.01 21.30 18.40 38.02	35 4 4 0.82 0.29	100.00 8.18 7.27 6.38
Industry - Carb. Soft Drinks Coca-Cola Co. Anheuser-Busch InBev Sa. Ambev Sa. Monster Beverage Group Inner Mongolia Yili Co.	0.71 0.24 0.12 0.05 0.05 0.03	24.42 25.01 21.30 18.40 38.02 23.34	35 4 0.82 0.29 1	- 100.00 8.18 7.27 6.38 6.38

Exhibit 6 – Aggregate statistics from the industry of Carbonated Soft Drinks and Packaged Food in 2020; Market capitalization in trillion of US Dollars and industry revenues in billions of US Dollars (Source: Bloomberg)

3.4.4. MCO

Analysing MCO, we can point that the firm operates exclusively in the industry of Software & Tech Services with respective sector of information services (financial data & analytics). The industry alone accounts a total market capitalization of \$19.59 trillion and total revenue of \$4.58 trillion as well as players like Microsoft, Alphabet, Amazon, among others. The sector represents more than 2% of industry total revenues and more than 4% of total market capitalization. Moody's is a credit rating agency and so is important to analyse this side of their business integrated in the industry/sector. Between 2018 and 2020 it is noticeable the market leadership from S&P to end up with 50.12% of market share on this last year. Both Moody's and Fitch have been losing some space whereas DBRS has been gaining some recognition (see *appendix U*).

The sector of *financial information services* (data & analytics) totals a market capitalization of \$0.84 trillion, PE of 35.10 and industry revenue of \$52.38 billion in 2020. MCO in fact registers the second highest market capitalization, third place on total industry revenue and the second lowest price-to-earnings only surpassed by AON PLC. To notice that this PE is lower than the one registered from the industry and sector. Combined, both S&P and MCO aggregate more than

20% of total market capitalization. All their revenues come from the sector of data & analytics (see *exhibit 7*).

	Market Cap.	P/E	Ind. Revenue	% Revenue
Industry - Data & Analytics	0.84	35.10	52	-
Moody's Corp.	0.07	33.75	5	100.00
S&P Global Inc.	0.11	36.76	8	100.00
AON Plc	0.06	29.87	1	10.57
London Stock Exchange	0.06	73.63	7	75.47
MSCI Inc.	0.05	75.71	2	100.00
East Money Information Co.	0.05	48.54	0.03	2.28

Exhibit 7 – Aggregate statistics from the industry of Data & Analytics in 2020; Market capitalization in trillion of US Dollars and industry revenues in billions of US Dollars (Source: Bloomberg)

3.4.5. VZ

VZ operates exclusively in the industry of Telecommunications with respective sectors of *wireless* telecommunications and *wireline* telecommunications with 91.29% and 8.71% of total firm's revenues, respectively. Telecommunications accounts for a market capitalization of \$3.77 trillion and total revenue \$2.52 trillion. The sector of *wireless telecommunications* totals a market capitalization of \$3.29 trillion, PE of 14.14 and industry revenue of \$1.29 trillion whereas *wireline telecommunications* total a market capitalization of \$2.22 trillion, PE of 17.16 and industry revenue of \$0.45 trillion in 2020.

The firm accounts for a PE (10.67) that is lower than the one registered in both industries only behind China Mobile (7.42). It represents 7% and 10.36% of total industry market capitalization, respectively to wireless and wireline. The first is what drives almost all revenues being 91.29% in proportion. Furthermore, this industry is led by AT&T with an industry revenue of \$128.10 billion against those \$109.09 billion from VZ (see *exhibit 8*).

	Market Cap.	P/E	Ind. Revenue	% Revenue
Industry - Wireless Telecommunications	3.29	14.14	1,290	-
Verizon Communications	0.23	10.67	109	91.29
Comcast Corp.	0.28	23.90	2	1.52
Reliance Ind. Ltd.	0.20	30.04	10	13.59
AT&T Inc.	0.20	11.16	128	73.20
T-Mobile Inc.	0.17	31.26	68	100.00
China Mobile Ltd.	0.13	7.42	89	80.06
	Market Cap.	P/E	Ind. Revenue	% Revenue
Industry - Wireline Telecommunications	Market Cap. 2.22	P/E 17.16	Ind. Revenue 1,490	% Revenue
Industry - Wireline Telecommunications Verizon Communications	Market Cap. 2.22 0.23	P/E 17.16 10.67	Ind. Revenue 1,490 10	% Revenue - 8.71
Industry - Wireline Telecommunications Verizon Communications AT&T Inc.	Market Cap. 2.22 0.23 0.20	P/E17.1610.6711.16	Ind. Revenue 1,490 10 11	**************************************
Industry - Wireline Telecommunications Verizon Communications AT&T Inc. China Mobile Ltd.	Market Cap. 2.22 0.23 0.20 0.13	 P/E 17.16 10.67 11.16 7.42 	Ind. Revenue 1,490 10 11 12	% Revenue - 8.71 6.14 10.52
Industry - Wireline Telecommunications Verizon Communications AT&T Inc. China Mobile Ltd. Nippon Telegraph and Telephone Corp.	Market Cap. 2.22 0.23 0.20 0.13 0.11	P/E 17.16 10.67 11.16 7.42 11.35	Ind. Revenue 1,490 10 11 12 81	% Revenue - 8.71 6.14 10.52 71.53
Industry - Wireline Telecommunications Verizon Communications AT&T Inc. China Mobile Ltd. Nippon Telegraph and Telephone Corp. Equinix Inc.	Market Cap. 2.22 0.23 0.20 0.13 0.11 0.08	P/E 17.16 10.67 11.16 7.42 11.35 57.10	Ind. Revenue 1,490 10 11 12 81 6	% Revenue - 8.71 6.14 10.52 71.53 100.00

Exhibit 8 – Aggregate statistics from the industry of Wireless Telecommunications and Wireline Telecommunications in 2020; Market capitalization in trillion of US Dollars and industry revenues in billions of US Dollars (Source:

Bloomberg)

4. Valuation of Investment Portfolio

In order to value the investment portfolio's holdings with more than two percent in weight, be it eight holdings, we will start by determining the individual WACC for all years between 2020 and 2025 through the previous determination of Cost of Debt, Cost of Equity and Cost of Preferred Equity. Then those discount rates will be used to discount the cash flows projected for the period 2021 and 2025. After this period a perpetuity growth rate will be considered for each case in concordance with Bloomberg estimates. This will globally culminate on the so-called *DCF model*. In the end a sensitivity analysis will be taken into consideration. In terms of assumptions, the projected free cash flows, as well as all the three fundamentals' statements, to consider are Bloomberg estimates as well as the perpetuity growth rate since it considers the most information from many different sources that wouldn't otherwise be available to the common analyst.

4.1. DCF Model

4.1.1. Cost of Capital

For the calculation of the discount rate or cost of capital rate, we will take into consideration the years of 2020, 2021, 2022, 2023, 2024 and 2025 each with a different WACC. Then the WACC will result from the sum of multiplying the equity, debt (i.e. short-term plus long-term) and preferred equity weights for the cost each presents after calculations.

4.1.1.1. Cost of Equity (Ke)

Each firm's cost of equity can be obtained using formula 8 with the need to use several inputs previously referred in the Literature Review such as risk-free rate, equity risk premium and leveraged beta. Regarding the nominal risk-free rate, we used the US 10-year note treasury rate of 0.91% as of 31^{st} December of 2020. For the next 5 years, we considered the IRS forwards function for US Treasury curve on 10 years through Bloomberg Terminal. For the equity risk premium, since all firms in analysis are quoted in the US, we took into consideration the forecasted inflation rate variation in the United States for each upcoming year using sources like IMF, OECD, and USDA and then we added to the previous year's ERP (i.e. ERP2021 = [4.72% + 1.01%]). The ERP value for 2020 comes from Damodaran website on the United States side. Also, to notice that the risk-free rate, inflation rate and equity risk premium applies for all eight holdings in analysis (see *exhibit 9*).

	2020	2021	2022	2023	2024	2025
Inflation Rate US	1.25%	2.26%	2.40%	2.50%	2.48%	2.37%
Variation of Inflation Rate	-	1.01%	0.14%	0.10%	-0.02%	-0.11%
Risk-Free Rate (R _f)	0.91%	1.38%	1.61%	1.81%	1.97%	2.11%
Equity Risk Premium (ERP)	4.72%	5.73%	5.87%	5.97%	5.95%	5.84%

Exhibit 9 – Cost of Equity components between 2020 and 2025 for all eight holdings (Source: Bloomberg, IMF, OECD; USDA, Damodaran, Own Estimates)

Then for each firm, we consider the given levered beta from Bloomberg for 2020. To forecast the values for the next five years is needed to find the unlevered beta in 2020 and for that will be used formula 9. Each forecasted year will consider that formula as well as the previous year unlevered beta and the debt-to-equity ratio and effective tax rate on that year (see *appendix X*). This last one can be calculated dividing the income tax expense by the pre-tax income GAAP presented in the income statement for each year. Finally, the cost of equity for each firm and year is obtained (see *appendix V*).

4.1.1.2. Cost of Debt (K_d)

The investment portfolio holdings' cost of debt can be obtained individually by using formula 10 presented in the Literature Review. Thus, we must first find out the effective tax rate as well as the pre-tax cost of debt. This last one can be obtained through Bloomberg calculations for 2020 and the next five years will be summed to the inflation rate variation, just like done before with the ERP (see *appendix W*). In the end and using the example of Apple's cost of debt for 2021, we will obtain 1.36% (i.e. $K_d = [(1-14.86\%) * 1.60\%]$).

4.1.1.3. Cost of Preferred Equity (K_{pe})

According to the Corporate Finance Institute (CFI), the cost of preferred equity is the price it pays in return for the income it gets from issuing and selling the stock or simply the amount of money the firm pays out in a year divided by the sum they got from issuing the stock. Furthermore, can be obtained by dividing the preferred dividend by the preferred equity with the first presented in the income statement and the second in the balance sheet statements. For the eight holdings in analysis, we will only consider non-zero values be it Bank of America and US Bancorp (see *appendix X*).

4.1.1.4. Capital Structure

The capital structure is the amount of debt, equity and/or preferred equity employed by a firm to fund its assets and operations. Firstly, the market capitalization is presented in this case as the amount of equity employed. An assumption used is that the value for 2021, and next years until

2025, will have a correspondent growth rate to the one presented in the total equity (balance sheet statement). Secondly, the short and long-term debt will culminate on the aggregated debt. Thirdly, when non-zero, the preferred equity will be considered. Each component divided by the total capital structure value will result on the respective weights for the cost of equity (market capitalization), cost of debt (short and long-term debt) and cost of preferred equity (preferred equity) for each year until 2025 (see *appendix Y*). All values are shown in millions of USD. Furthermore, all estimates, once again, are from Bloomberg responsibility. See *appendix AD*, *appendix AE* and *appendix AF* for additional information from the financial statements of each one of the eight holdings in analysis.

4.1.1.5. WACC

The WACC was obtained after the computation of all its items referred before and through the application of formula 7. To notice that, as an example, the market capitalization, debt, and preferred equity's weight for 2020 from Apple Inc. determined 93.97% (i.e. [1,906,151 / 2,028,429]), 6.03% (i.e. [(15,229 + 107,049) / 2,028,429]) and 0%, respectively. Then, we must consider the cost of equity, cost of debt and cost of preferred equity for each year and each holding (see *appendix V* to *appendix X*). Finally, by multiplying the respective weights and costs we were able to obtain each proportioned cost. Thus, all three items are summed up to determine the WACC for each one of the eight holdings in analysis (see *appendix Z*).

4.1.2. FCFF and Target Price

As first step, it is important to establish the projected free cash flow to the firm to be used between 2021 and 2025 (see *appendix AA*, *appendix AD*, *appendix AE* and *appendix AF*) that use formula 3 previously presented in the Literature Review. Then formula 1 will be used to determine the present value of the free cash flows for that 5-year period, being used for that purpose each year's WACCs previously computed. Furthermore, all these five present values are summed (see *appendix AA*). To obtain the terminal value in 2025, we must determine the perpetual free cash flows to firm from 2025 on through the perpetuity growth rate estimated by Bloomberg.

Taking Apple's example (same procedure to all other seven holdings in analysis), we obtain a FCFF₂₀₂₆ of \$130,174 million with the incorporated growth rate of 5.60% (see *exhibit 10*). Then, to determine the terminal value in 2025 we must divide that previous value for the subtraction of WACC₂₀₂₅ and perpetuity growth rate to a result of \$6,341,876 million (i.e. [130,174 / (7.65% - 5.60%)]). Moreover, we must use the second part of formula 2 and calculate the present value of the terminal value in 2025. For that purpose, the WACC must be used. In the case of Apple, we obtained \$4,386,266 million Furthermore, the enterprise value can be determined through the sum of both the present value of the terminal value in 2025 and the sum of all 5-year FCFF present values (i.e. 4,386,266 + 426,805). The enterprise value, in the case of Apple, is \$4,813,072 million (see *exhibit 10*). Now to obtain the equity value, we must consider the integrating items enterprise value, net debt, preferred & minority interest (formulas 18 and 19 can illustrate that computation). For Apple's example, an equity value of \$4,882,624 million was finally obtained (see *exhibit 10*). To notice that all these items on those two formulas must refer to 2020.

$$Net Debt = ST Debt + LT Debt + Cash$$
(18)

The final step of determining the target price for all eight holdings simply consists of dividing the equity value previously determined to the shares outstanding as of 31st December of 2020. This price is expressed in US Dollars (see *exhibit 10*). For all these metrics, the main source used was both Bloomberg and correspondent eight-holdings annual reports.

	AAPL	AXP	BAC	KHC	КО	MCO	USB	VZ
Perp. Growth Rate	5.60%	2,00%	3.00%	2.00%	3.00%	3.50%	0.72%	1.50%
WACC2025	7.65%	8,55%	3.51%	6.24%	6.90%	8.19%	5.73%	4.20%
*FCF2026	130 174	11 947	4 255	4 783	12 512	3 132	8 762	27 094
*TV2025	6 341 876	182 480	832 385	112 937	321 161	66 840	174 817	1 003 002
*(+) PV of TV ₂₀₂₅	4 386 266	121 096	700 468	83 464	230 101	45 102	132 298	816 463
*(+) Sum of PVs	426 805	45 096	56 796	19 491	39 545	6 759	33 165	100 279
*(=) EV [1]	4 813 072	166 191	757 264	102 954	269 645	51 861	165 463	916 742
*(+) ST Debt ₂₀₂₀	15 229	1 878	262 891	371	2 990	94	11 766	9 374
*(+) LT Debt ₂₀₂₀	107 049	42 952	271 481	28 545	41 425	5 319	42 241	141 173
*(+) Cash ₂₀₂₀	191 830	32 965	691 067	3 417	10 914	2 696	62 580	22 171
*(=) Net Debt ₂₀₂₀ [2]	- 69 552	11 865	- 156 695	25 499	33 501	2 717	- 8 573	128 376
*P. & M. Int.2020 [3]	0	0	0	140	1 985	194	630	1 430
*EQ. Value = 1 - 2 - 3	4 882 624	154 326	913 959	77 315	234 159	48 950	173 406	786 936
**Shares Outstanding2020	16 977	805	8 651	1 223	4 302	187	1 507	4 138
Target Price (\$)	287.61	191,71	105.65	63.22	54.43	261.62	115.07	190.17

Exhibit 10 – Target price through DCF model; (*) in millions of US Dollars; (**) in million shares (Source: Bloomberg, Holdings' Annual Report, Reuters, Seeking Alpha, Own Estimates)

4.1.3. Sensitivity Analysis

As the word says, sensitivity analysis analyses how sensitive a certain chosen variable is to different values of a set of independent variables. For that purpose, we have selected as these last ones the WACC and growth rate to see how their change in value affects the target price of each holding. A deviation of $\pm 0.50\%$ was applied to both the discount rate and growth rate (see *appendix AB*). We can see that, in a ceteris paribus scenario, an increase of the WACC results in a lower target price whereas am increase of the growth rate culminates in a higher target price. Even though the deviation does not seem significant, we can see right away how much of a big

impact it is on each holdings' target price. Those prices will hit its potential maximum when the WACC decreases, and the growth rate increases.

4.2. Relative Valuation

In order to compare and complement the previously executed DCF model it is performed a relative valuation analysis. The multiples selected for this valuation are PE ratio and EV-to-EBITDA ratio. For each holding in analysis a peer group was selected consisting in 5 competitor firms. This set of peers account for firms with a very similar business model as well as the highest market capitalization. The main goal here is to find the target price of each of these eight holdings based on these two multiples of similar firms.

The EV/EBITDA's peer average was determined excluding the outliers in *yellow* as well as the average for the PE. Starting with the PE, the correspondent holding's earnings-per-share was appointed referring to end of 2020 in the income statement. Finally, both the average value and EPS's holding value are multiplied to obtain the target price. On the EV/EBITDA side, the enterprise value is determined by multiplying the peer's average (obtained with the same procedure as the PE multiple) by the correspondent holding EBITDA value in 2020. Then, the equity value is determined by subtracting both the net debt and preferred & minority interest in 2020, from the holding to the previously calculated enterprise value. Now, we finally obtain the target price by dividing the equity value by the share outstanding in 2020 (see *appendix AC*). Important to notice that the EV/EBITDA was not applied to AXP, BAC and USB as those represent financial services firms/institutions or banks. Once again, all these values were obtained through own estimates as well as financial statements of these holdings and Bloomberg.

4.3. Valuation Summary

For final valuation purposes, we will only consider the DCF model outcomes on Berkshire's investment portfolio. The main research questions to be answered here are:

- Does Buffet indeed practices what he preaches, thus the value investing philosophy?
- Does Berkshire compromise the conclusions of the EMT hypothesis?

To answer these, we start by considering the holdings that correspond to more than two percent of the portfolio. Then, as mentioned before, we arrive to the analysis of a top-eight holdings with the remaining percentage accounting for "others" (i.e. roughly 18%). For these eight, we found the stake that Berkshire Hathaway has in each as well as the shares held with the help of individual holdings' financial statements. The portfolio has a total of 3.81 billion shares and Apple accounting for almost half with 43.61% in weight as of 31st December of 2020. This information can be found using Berkshire's reports, Bloomberg, Refinitiv, Dataroma, and

Seeking Alpha. The final goal will be to find the portfolio's total potential as well as the extra gain for each stock that is not presented by Berkshire on their reports.

Now, we must find the potential between the target price determined through the DCF model and the market price as of 31st December 2020. This last can be found using Bloomberg or Refinit for the historical price. It is important to bear in mind that these eight target prices presented are valid for the purpose of this dissertation considering the models chosen and the assumptions behind. The potential is determined using the formula 20 below:

Potential (%) =
$$\frac{\text{Target Price DCF}}{\text{Market Price}} - 1$$
 (20)

Following *exhibit* 11, we can notice that the potential (5) is greater than zero in all the cases except for KO and MCO with BAC accounting for the highest with 248.56%. In total, the portfolio has an upside potential of 100.72% mostly derived by AAPL and BAC. Can be determined simply by multiplying the holding's percentage on the investment portfolio and respective potential. To notice that the row *others* assume a rigid scenario (a conservative hypothesis) where there is zero potential meaning that the intrinsic value is the same as the market price. Considering now the stake that Berkshire has in each of these eight holdings, we can see that the largest stake is allocated to KHC and AXP. This information was found through Bloomberg, Seeking Alpha, and Refinitiv. Now considering the shares held, potential and market price, we apply a multiplication between these three to obtain the total potential capital gain in the portfolio. We can see that, then, Berkshire's portfolio is undervalued in a total of \$273.23 billion (see *exhibit* 11).

If we recall the conglomerate discount section in the literature review, a conglomerate tends to be valued by the markets at less than the sum of the parts. Thus, a discount factor should be applied to those billion of undervaluation. Moreover, and considering the size of Berkshire Hathaway as a conglomerate, we selected a discount rate of 15% as the most suitable. The total upside now is diminished to a mere \$232.24 billion.

This leads to the conclusion that, in fact, Buffet is right on choosing these specific stocks, value investing stands in this portfolio and we give a BUY recommendation on both Class A and Class B shares of Berkshire Hathaway since the investor should gain an additional \$52.85 (i.e. 62.18 * [1 - 0.15]), in total, on every share held by the investment portfolio, assuming that the market price converges to the intrinsic value as expected by the followers of the *Oracle* (see *exhibit 11*). With respect to the EMT hypothesis, Berkshire Hathaway's performance does not compromise the conclusions proposed by the theory with the "Oracle" not having power in the strong form whereas a significant power in the weak and semi-strong forms. This gain is not directly applied to Berkshire's publicly traded shares since the portfolio only accounts for less than 30% of the total conglomerate's business activities.

Company	(1) % Portfolio	(2) Stake	(3) Shares	(4) Market Price	(5) Target Price DCF	(6) Potential	(6) * (3) * (4)
AAPL - Apple	43,61%	5,40%	887 135 554	132,69	287,61	116,75%	137 435 040 026
BAC - Bank of America	11,34%	11,90%	1 010 100 606	30,31	105,65	248,56%	76 100 979 656
KO - Coca Cola	8,13%	9,30%	400 000 000	54,84	54,43	-0,75%	- 164 000 000
AXP - American Express	6,79%	18,80%	151 610 700	120,91	291,71	141,26%	25 895 107 560
KHC - Kraft Heinz	4,18%	26,64%	325 634 818	43,55	63,22	45,17%	6 405 236 870
VZ - Verizon Communications	3,19%	3,50%	146 716 496	58,75	190,17	223,69%	19 281 481 904
MCO - Moody's	2,65%	13,20%	24 669 778	290,24	261,62	-9,86%	- 706 049 046
USB - US Bancorp	2,26%	9,80%	131 137 998	46,59	115,07	146,98%	8 980 330 103
Others	17,85%	N/A	737 926 642	N/A	N/A	0,00%	0,00
TOTAL	100%		3 814 932 592				273 228 127 073

Exhibit 11 – Potential's analysis to Berkshire's investment portfolio; prices in US Dollars and shares in units (Source: Bloomberg, Holdings' Annual Report, Reuters, Seeking Alpha, Own Estimates)

Conclusion

Value investors, for the last century, considered themselves to be the winners through investments, a result they attributed to patience, maturity, and good sense. This was backed up by evidence that the so-called value stocks (i.e. stocks that trade at low earnings multiples and book value multiples) earned higher returns in comparison with the growth stocks (i.e. the very opposite of value stocks). Furthermore, both Warren Buffet and Charlie Munger reinforced the value investing philosophy thus taking a crucial centre stage "as deep thinkers with profound insights on how markets work" (Cornell *et al*, 2021).

It is defended by many sources, with special emphasis to Cornell and Damodaran, that value investing has lost its way. First, both appoint that it became rigid, being the main cause to keep away many value investors out of technology stocks for most of the last three decades, due to the value investing's view that firms that do not have significant tangible assets (relative to their market value) are not investment candidates. Additionally, value investing's focus on dividends has caused excessive holdings concentration in utilities, financial services and older consumer product companies, as younger companies have shifted toward returning cash in buybacks (Cornell *et al*, 2021).

Second, both academics defend that it became ritualistic in a way that the rituals of value investing are well established: annual trek to Omaha, claim that each person's investment education is incomplete unless the reading of *Intelligent Investor* and *Security Analysis* as well as the belief that anything said by Warren Buffett or Charlie Munger has to be right. Thirdly, is stated that it became righteous such that value investors see investors who deviate from the script as shallow speculators. These also believe that high returns on investments will be a certain thing as they have followed all the rules and rituals. It has, indeed, evolved into a religion rather that an investment philosophy putted in the hands of the investor (Cornell *et al*, 2021).

The main goal of this report was to present a valuation of Berkshire's investment portfolio to access if value investing still "works" nowadays through Buffet and Munger's investment decisions as well as determine the total numeric potential of the portfolio in comparison with the actual close price as of 31st December of 2020.

In this process the DCF model, through the FCFF approach, was used in which the future cash flows were discounted at different WACCs that reflected risk reflected by both equity and debt holders on a 5-year forecasted period. It was applied to the top-eight holdings that individually represent more than 2% part of the portfolio. Then, it is summed these individual potentials on top of the closing price (at the end of 2020) in order to get the total numeric potential of the portfolio. To notice that we assumed, for all the other 39 holdings, there is no potential meaning that the intrinsic value of the stock meets the closing or market price. Additionally, this sum is discounted to the conglomerate 15% discount.

We arrived at a total undervaluation, even considering the conglomerate discount, of a mere \$232.24 billion. Even considering that the investment portfolio only accounts for less than 30% of the total conglomerate's business activities (in terms of total revenues), we give a buy recommendation on both Class A and Class B shares of Berkshire Hathaway with the investor gaining an additional \$52.85 in on every share held in total by the investment portfolio. This leads to the main conclusion that, in fact, Buffet indeed practices what he preaches and is right on choosing these specific stocks. Additionally, Berkshire's performance does not compromise the conclusions from the EMT hypothesis with the "Oracle" not having power in the strong form whereas a significant power in the weak and semi-strong forms. In the Oracle we trust.

References

- Baresa, S., Bodgan, S., & Ivanovic, Z. (2013). Strategy of Stock Valuation by Fundamental Analysis. UTMS Journal of Economics, Vol. 4, 45-51.
- Berger, A., Herring, R., & Szego, G. (1995). The Role of Capital in Financial Institutions. *Journal of Banking and Finance*, Vol. 19, no. 3-4, 393-430.
- Berkshire Hathaway Annual Reports: 1977, 1986, 1987, 1997, 2007, 2008, 2009, 2009, 2017, 2020.
- Bodnaruk, A., Massa, M., & Zhang, L. (2009). Conglomerate Discount and Financial Constraints: A Novel View to an Old Puzzle. SSRN Electronic Journal, Vol. 1, 1-34.
- Browne, C. H. (2006). *The Little Book of Value Investing*, 1st ed. New Jersey: John Willey & Sons, Inc.
- Burch, T., Nanda, V., & Narayanan, M. (2000). Industry Structure and the Conglomerate Discount: Theory and Evidence. SSRN Electronic Journal, Vol. 1, 1-37.
- Campa, J., & Kedia, S. (2001). Explaining the Diversification Discount. *The Journal of Finance*, Vol. 57, no. 4, 1731-1762.
- Cassia, L., Plati, A., & Vismara, S. (2007). Equity Valuation Using DCF: A Theoretical Analysis of the Long-Term Hypotheses. *Investment Management and Financial Innovations*, Vol. 4 (1), 91-107.
- Cholou, G. & Demirakos, E. (2020). How do Financial Analysis Implement the Sum of the Parts Valuation Framework? *International Review of Financial Analysis*, Vol. 70, no. 101514.
- Clarke, J., Jandik, T., & Mandelker, G. (2000). The Efficient Markets Hypothesis. *University of Arkansas*, Vol. 1., no.10, 1-23.
- Cooper, I. & Davydenko, S. (2001). *The Cost of Debt*. Working Paper, London Business School, 1-16.
- Cornell, B., Damodaran, A. (2021). Value Investing: Requiem, Rebirth or Reincarnation. *NYU Stern School of Business Forthcoming*, 1-34.
- Damodaran, A. (2002). *Investment Valuation: Tools and Techniques for Determining the Value of any Asset*, 2nd ed. New York: John Wiley & Sons Inc.
- Damodaran, A. (2005). The Value of Synergy. *New York University Stern School of Business*, Vol. 1, 1-47.
- Damodaran, A. (2006). Valuation Approaches and Metrics: A Survey of the Theory and Evidence. *New York University Stern School of Business*, Vol. 1, 1-77.
- Damodaran, A. (2012). *Investment Philosophies: Successful Strategies and the Investors Who Made Them Work*, 2nd ed. New Jersey: John Wiley & Sons Inc.

- Damodaran, A. (2016). *The Cost of Capital: The Swiss Army Knife of Finance*. Working Paper, New York University Stern.
- Damodaran, A. (2018). The Dark Side of Valuation: Valuing Young, Distressed and Complex Businesses, 3rd ed. Iowa: Pearson Education, Inc.
- De Long, J. B., Shleifer, A., Summers, L., & Waldmann, R. (1991). The Survival of Noise Traders in Financial Markets. *The Journal of Business*, Vol. 64, no. 1, 1-19.
- Demerens, F., Delvaille, P., Manh, A., & Paré, J. (2017). The Use of Segmental Information by Financial Analysts and Forecast Accuracy: A Study on European Intermediate-Size Companies. *Thunderbird International Business Review*, Vol. 59 (5).
- Dimson, E., & Minio-Kozerski, C. (1998). Closed-End Funds: A Survey. Wiley Online Library - Financial Markets, Vol. 8, no. 2, 1-41.
- Dowd, K. (2002). *An introduction to market risk measurement*, 1st ed. London: John Wiley & Sons Ltd.
- Eckbo, B. E., & Masulis, R. (1992). Adverse Selection and the Rights Offer Paradox. *Journal of Financial Economics*, Vol. 32, no. 3, 293-332.
- Elton, E. J., Gruber, M. J., & Goetzmann, W. N. (2014). Modern portfolio theory and investment analysis. *The Journal of Law & Economics*, Vol. 13, no. 2, 263-277.
- Elton, J. E., & Gruber, M. J. (1997). Modern portfolio theory: 1950 to date. *Journal of Banking* & *Finance*, Vol. 21.
- Fabozzi, F, Gupta, F., & Markowitz, H. M. (2002). The Legacy of Modern Portfolio Theory, *The Journal of Investing*, Vol. 11, 7-22.
- Fama, E. F. (1965). Random Walks in Stock Market Prices. *Financial Analysts Journal*, Vol. 21, no.5, 55-59.
- Fama, F. E., & French, K. R. (1992). The Cross-Section of Expected Stock Returns. *The Journal of Finance*, Vol. 47, no. 2, 427-465.
- Farrel, J. L. (1985). The Dividend Discount Model: A Premier. *Financial Analysts Journal*, Vol. 41, no. 6, 16-25.
- Fernández, P. (2002). Valuing Companies by Cash Flow Discounting: Ten Methods and Nine Theories. Working Paper, no. 451, IESE Business School.
- Graham, B. & Dodd, D. (2009). *Security Analysis*, 6th ed. Colorado: The McGraw-Hill Companies Inc.
- Graham, B. (1949). *The Intelligent Investor*, 1st ed. New York: HarperBusiness Essentials.
- Graham, B., & Dodd, D. (1934). Security Analysis, 1st ed. New York: McGraw-Hill Education.
- Havnaer, K. (2013). Advisor Perspectives: DCF vs. Multiples. Working Paper, Jensen Investment Management, 1-4.
- Heppelmann, S., & Hoffleith, M. (2009). Holding Structure from Conglomerate Discount to Management Value Added. Working Paper, Stern Stewart Research, Vol. 36, 1-15.
- Jain, M., Singal, P., & Dwivedi, A. (2014). Performance Evaluation of Mutual Funds: A study of Selected Researches. *GGGI Management Review*, Vol. 4.
- Jaksic, M., Lekovic, M., & Milanovic, M. (2015). Measuring the performance of mutual funds a case study. *Industrija*, Vol. 43.
- Jaros, J. & Bartosova, V. (2015). To the Capital Structure Choice: Miller and Modigliani Model. *Procedia Economics and Finance*, Vol. 26, 351-358.
- Koller, T., Goedhart, M., & Wessels, D. (2015). *Valuation: Measuring and Managing the Value of Companies*, 6th ed. New Jersey: John Wiley & Sons Inc.
- Kuglitsch, F. G., Drewes, H., Adám, J., & Rózsa, S. (2016). The Geodesist's Handbook. *Journal of Geodesy*, Vol. 90, no. 10, pp. 907-1205.
- Lee, C. M C. (2014). Value Investing: Bridging Theory and Practice. *China Accounting and Finance Review*, Vol. 16, no. 2, 10-38.
- Lev, B., & Ohlson, J. (1982) Market-Based Empirical-Research in Accounting: A Review, Interpretation, and Extension. *Journal of Accounting Research*, Vol. 20, 249-322.
- Luehrman, T. (1997). Using APV: A Better Tool for Valuing Operations. *Harvard Business Review*, 1-8
- Malkiel, B. G. G., & Xu, Y. (2005). The Persistence and Predictability of Closed-End Fund Discounts. *SSRN Electronic Journal*, Vol. 1, 1-40.
- Markowitz, H. (1952). Portfolio Selection. The Journal of Finance, Vol. 7, 77-91.
- Penman, S. (2013). *Financial Statement Analysis and Security Valuation*, 1st ed. New York: McGraw-Hill Higher Education.
- Pinto, J., Henry, E., Robinson, T., & Stowe, J. (2010). *Equity Asset Valuation*, 2nd ed. New Jersey: John Wiley & Sons Inc.
- Rusell, R. (2007). *An Introduction to Mutual Funds Worldwide*, 1st ed. London: John Wiley & Sons Ltd.
- Schmidlin, N. (2014). The Art of Company Valuation and Financial Statement Analysis, 1st ed. London: John Wiley & Sons Ltd.
- Wafi, A. S., Hassan, H., & Mabrouk, A. (2015). Fundamental Analysis vs Technical Analysis in the Egyptian Stock Exchange. *International Journal of Business and Management Study*, Vol. 2, no. 2, 212-218.
- Williams, J.B. (1938). The Theory of Investment Value. *Journal of Political Economy*, Vol. 47, no.2, 276-278.
- You, H. (2013). Valuation-Driven Profit Transfer among Corporate Segments. *Review of Accounting Studies*, Vol. 19, 805-838.

Young, M., Sullivan, P., Nokhasteh, A., & Holt, W. (1999). All Roads Lead to Rome: An Integrated Approach to Valuation Models. Working Paper, Goldman Sachs Investment Research, Portfolio Strategy, 1-32.

Appendixes



Appendix A – Shares performance, in US Dollars, of Berkshire's top-8 holdings between 2010 and 2020 (Source: Bloomberg)

Holder Name	Nr. Shares	% Outstanding
Warren Buffet	248 734	38,88%
Fidelity Investments	37 879	5,92%
David Gottesman	17 911	2,80%
First Manhattan Co.	14 525	2,27%
Norges Bank Inv. Man.	7 504	1,17%
Alceda Fund Man. SA	5 010	0,78%
Charles Munger	4 458	0,70%
Others	303 726	47,48%
BRK.A's Total	639 747	100%
Holder Name	Nr. Shares	% Outstanding
Vanguard Group Inc.	135 790 660	10,17%
BlackRock Inc.	108 093 482	8,10%
State Street Corp.	75 157 212	5,63%
William Gates	42 104 399	3,15%
Geode Capital Man.	28 082 073	2,10%
Northern Trust Corp.	19 942 156	1,49%
BNY Mellon	14 773 223	1,11%
Others	911 131 150	68,25%
BRK.B's Total	1 335 074 355	100%

Appendix B – Berkshire's shareholder structure division for Class A shares and Class B shares as of 31st December 2020 (Source: Bloomberg, Berkshire Hathaway, Own Estimates)

Railroad	Utility and Energy	Insurance & Reinsurance	Serv	ice Retailing	Manufacturing	
BNSF	BHE Pipeline Group	Berkshire's Investment Portfolio	Ben Bridge Jeweller	OTC	Acme	JM
BNSF Railway	NV Energy	BH Specialty	BHA	Pampered Chef	Benjamin Moore	Justin Brands
	PacifiCorp.	BHHC	Borsheims	WPLG	Garan	Larson-Juhl
	BHE Renewables	CSI	NFM	R.C. Willey	BH Shoe Holdings Group	LSPI
	BHE Transmission	GEICO	Flight Safety	See's	Brooks Sports	Lubrizol
	Northern Natural	General Re Group	Helzberg	Star	Clayton	Marmon
	HomeServices	GUARD	Dairy Queen	TTI	CTB	MiTek
	MEC	MedPro	Jordan's	XTRA	Duracell	PCC
		MLMCIC	Louis	Affordable Housing Partners	FOL	Richline Group
		NIPG	McLane	Business Wire	Forest River	Scott Fetzer
	USLI		NetJets	Charter Brokerage	Fechheimer	Shaw
	-		CORT		IMC	

Appendix C – Hierarchical division of Berkshire's subsidiaries among the five different segments as of 31st December 2020 (Source: Berkshire Hathaway, Bloomberg)



Service Retailing Insurance & Reinsurance Manufactoring Utility & Energy Railroad

Appendix D – Hierarchical division of Berkshire's subsidiaries among the five different segments as of 31st December 2020 in terms of total revenues (Source: Berkshire Hathaway, Bloomberg, Own Estimates)

Name	Title	Compensation
Warren Buffet	CEO	380,000
Charles Munger	Vice-Chairman	100,000
Gregory Abel	Vice-Chairman - Non- Insurance	19,014,250
Ajit Jain	Vice-Chairman - Insurance	19,014,250
Marc Hamburg	CFO	3,264,250
Daniel Jaksich	Vice-President Controller	N/A
Mark Millard	Vice-President	N/A
Rebecca Amick	Director Internal Auditing	N/A
Kerby Ham	Treasurer	N/A

Appendix E – Berkshire's Executive committee as of 31^{st} December 2020 with respective annual compensation in USDollars (Source: Bloomberg and Berkshire Hathaway)

	1977		
Company	Nr. Shares	Cost	
Government Employee Ins.	1,986,953	19	
Kaiser Aluminium & Chemical Corp.	324,580	11	
Capital Cities Communications Inc.	220,000	11	
The Washington Post Co. Class B	934,300	11	
Knight-Ridder Newspapers Inc.	226,900	8	
The Interpublic Group of Comp. Inc.	592,650	5	
Ogilvy & Mather International Inc.	170,800	3	
Kaiser Industries Inc.	1,305,800	1	

	1987		
Company	Nr. Shares	Cost	
Capital Cities Inc.	3,000,000	518	
GEICO Corp.	6,850,000	46	
The Washington Post Co.	1,727,765	10	

	1997			
Company	Nr. Shares	Cost		
American Express Co.	49,456,900	1,393		
The Coca-Cola Co.	200,000,000	1,299		
Travelers Group Inc.	23 73 198	604		
The Gillette Co.	48,000,000	600		
Wells Fargo & Co.	6,690,218	412		
The Walt Disney Co.	21,563,414	381		
Freddie Mac	63,977,600	329		
The Washington Post Co.	1,727,765	11		

	2007			
Company	Nr. Shares	Cost		
Wells Fargo & Co.	303,407,068	6,677		
Burlington Northern Santa Fe	60,828,818	4,731		
Kraft Foods Inc.	124,393,800	4,152		
Johnson & Johnson	64,271,948	3,943		
US Bancorp	75,176,026	2,417		
Anheuser-Busch Companies Inc.	35,563,200	1,718		
Sanofi-Aventis	17,170,953	1,466		
Tesco PLC	227,307,000	1,326		

	2008	
Company	Nr. Shares	Cost
ConocoPhillips	84,896,273	7,008
Wells Fargo & Co.	304,392,068	6,702
Kraft Foods Inc.	130,272,500	4,330
US Bancorp	75,145,426	2,337
Johnson & Johnson	30,009,591	1,847
Sanofi-Aventis	2,111,966	1,827
Tesco PLC	227,307,000	1,326
The Coca-Cola Co.	200,000,000	1,299

	2009	
Company	Nr. Shares	Cost
Wells Fargo & Co.	334,235,585	7,394
Kraft Foods Inc.	130,272,500	4,330
ConocoPhillips	37,711,330	2,741
US Bancorp	76,633,426	2,371
Sanofi-Aventis	25,108,967	2,027
Wal-Mart Stores Inc.	39,037,142	1,893
Johnson & Johnson	28,530,467	1,724
Tesco PLC	234,247,373	1,367

	2017			
Company		Nr. Shares		Cost
Apple Inc.		166,713,209	2	0,961
Wells Fargo & Co.	4	482,544,468	1	1,837
Phillips 66		74,587,892	4	5,841
Bank of America Corp.	,	700,000,000	4	5,007
US Bancorp		103,855,045	3	3,343
The Bank of NYM Corp.		53,307,534	2	2,230
Delta Airlines Inc.	53,110,395	2	2,219	
Southwest Airlines Co.	47,659,456	1	1,997	
		202	0	
Company		Nr. Shares		Cost
Apple Inc.		907,559,761	l	31,089
Bank of America Corp.		1,032,852,00	6	14,631
Kraft Heinz Co.		325,634,818		9,800
Verizon Communications Inc.		146,716,496		8,691
US Bancorp		148,176,166		5,638
Chevron Corp.		48,498,965		4,024
The Bank of NYM Corp.		66,835,615		2,918
Merck & Co. Inc.		28,697,435		2,390

Appendix F – Top eight investment portfolio stocks, in terms of total cost, as of 1977, 1987, 1997, 2007 to 2009, 2017 and 31st December of 2020; cost in millions of US Dollars (Source: Berkshire Hathaway, Own Estimates)

Company	% Portfolio	Shares
AAPL - Apple	43.61%	887.135.554
BAC - Bank of America	11.34%	1.010.100.606
KO - Coca Cola	8.13%	400.000.000
AXP - American Express	6 79%	151 610 700
KHC - Kraft Heinz	4.18%	325.634.818
VZ - Verizon Communications	3 19%	146 716 496
MCO - Moody's	2.65%	24 669 778
USB - US Bancorp	2.26%	131 137 998
DaVita	1.57%	36.095.570
Chevron	1.52%	48,498,965
Charter Communications	1.28%	5.213.461
Bank of NYM	1 14%	72 357 453
General Motors	1.12%	72.500.000
Verisign	1.03%	12.815.613
AbbVie	1.01%	25.533.082
Merck & Co.	0.87%	28.697.435
Visa Inc.	0.81%	9.987.460
Bristol-Myers Sauibb	0.77%	33.336.016
Liberty SiriusXM Series C	0.70%	43,208,291
Snowflake Inc.	0.64%	6,125,376
Amazon.com Inc.	0.64%	533,300
Mastercard Inc.	0.60%	4,564,756
Wells Fargo	0.59%	52,423,867
StoneCo Ltd.	0.44%	14,166,748
Kroger Co.	0.39%	33,534,017
STORE Capital Corp.	0.31%	24,415,168
RH	0.29%	1,732,548
T-Mobile US Inc.	0.26%	5,242,000
Synchrony Financial	0.26%	20,128,000
Axalta Coating Systems Ltd.	0.25%	23,420,000
Liberty Sirius XM Series A	0.24%	14,860,360
Globe Life Inc.	0.22%	6,353,727
Marsh & McLennan	0.18%	4,267,825
Liberty Global Inc.	0.16%	18,010,000
Teva Pharmaceutical Ind. Ltd.	0.15%	42,789,295
Sirius XM Holdings Inc.	0.12%	50,000,000
Suncor Energy Inc.	0.09%	13,849,207
Biogen Inc.	0.06%	643,022
Liberty Global Inc. C	0.06%	7,346,968
Procter & Gamble	0.02%	315,400
Johnson & Johnson	0.02%	327,100
Mondelez International	0.01%	578,000
Vanguard S&P 500 ETF	0.01%	43,000
Liberty LiLAC Group C	0.01%	1,284,020
Liberty LiLAC Group A	0.01%	2,630,792

Appendix G – Complete holdings list of Berkshire's investment portfolio as of 31st December of 2020 with the weight and number of shares held (Source: Berkshire Hathaway, Bloomberg, Morningstar, Dataroma, Seeking Alpha, Own Estimates)

		BRK.A	AAPL	BAC	KO	AXP	KHC	VZ	MCO	USB
Davanuas	2019	254,616	260,174	91,466	37,280	43,556	24,977	131,868	4,829	27,325
Revenues	2020	245,510	274,515	85,661	32,999	36,087	26,185	128,292	5,371	25,241
Operating	2019	33,309	63,930	33,657	10,557	8,650	4,614	30,683	2,104	8,794
Income	2020	28,975	66,288	19,951	9,532	4,296	5,550	31,943	2,447	6,051
Net	2019	81,417	55,256	27,430	8,920	6,759	3,530	19,265	1,422	7,046
Income	2020	42,521	57,411	27,430	7,747	3,135	3,497	17,801	1,778	4,959
EBITDA	2019	17.60%	29.39%	0.00%	31.61%	27.82%	16.98%	39.08%	47.48%	0.00%
Margin	2020	16.70%	28.72%	0.00%	32.97%	20.79%	12.45%	39.16%	50.25%	0.00%
Gross	2019	39.36%	37.82%	80.33%	60.77%	92.53%	32.62%	58.50%	71.21%	83.74%
Margin	2020	32.95%	38.23%	91.23%	59.31%	94.51%	35.05%	60.09%	68.29%	92.02%
Operating	2019	32.24%	24.57%	35.90%	27.06%	19.35%	12.29%	23.04%	41.38%	37.56%
Margin	2020	20.63%	24.15%	22.21%	27.25%	11.90%	8.13%	22.45%	44.46%	26.05%
Pre-tax	2019	31.38%	28.94%	35.90%	28.94%	19.35%	10.65%	17.24%	37.48%	37.56%
Margin	2020	19.46%	29.53%	22.21%	29.53%	11.90%	3.93%	18.68%	41.50%	26.05%

Appendix H – Profitability metrics of top-8 Berkshire's holdings in comparison with the conglomerate for 2019 and 2020; Revenues, Operating Income and Net Income in millions of US Dollars (Source: Berkshire Hathaway,

Bloomberg, Own Estimates)

		BRK.A	AAPL	BAC	KO	AXP	KHC	VZ	MCO	USB
ROA	2019	10.67%	15.69%	1.15%	10.52%	3.49%	1.89%	6.92%	14.37%	1.44%
	2020	5.03%	17.33%	0.68%	8.92%	1.61%	0.35%	5.85%	15.68%	0.95%
ROE	2019	21.05%	55.92%	10.73%	49.61%	29.24%	3.75%	33.64%	265.55%	14.54%
	2020	9.80%	73.69%	6.73%	40.48%	13.18%	0.70%	27.55%	163.04%	10.01%
ROIC	2019	15.15%	24.76%	3.52%	12.76%	7.90%	2.20%	12.41%	26.73%	6.19%
	2020	7.28%	28.20%	2.24%	10.56%	4.04%	0.62%	9.24%	28.87%	4.43%

Appendix I – Return ratios of top-8 Berkshire's holdings in comparison with the conglomerate for 2019 and 2020 (Source: Berkshire Hathaway, Bloomberg, Own Estimates)

		BRK.A	AAPL	BAC	KO	AXP	KHC	VZ	MCO	USB
CFO	2019	38,687	69,391	61,777	10,471	13,632	3,552	35,746	1,675	4,889
	2020	39,773	80,674	37,993	9,844	5,591	4,929	41,768	2,146	3,716
CEI	2019	-5,621	45,896	-80,630	-3,976	-16,707	1,511	-17,581	36	-21,560
Сгі	2020	-37,757	-4,289	-177,665	-1,477	11,632	-522	-23,512	-1,077	-15,440
CFF	2019	730	-90,976	3,377	-9,004	-519	-3,913	-18,164	-1,563	17,623
	2020	-18,236	-86,820	355,819	-8,070	-9,068	-3,331	1,325	-351	51,899
A Cash	2019	33,796	24,311	-15,476	-2,509	-3,594	1,150	1	148	952
	2020	-16,220	-10,435	216,147	297	8,155	1,076	19,581	718	40,175
FCF	2019	22,708	58,896	61,777	8,417	11,987	2,784	17,807	1,606	4,889
FCF	2020	26,761	73,365	37,993	8,667	4,113	4,333	23,576	2,043	3,716
FCFF	2019	25,863	61,902	0	9,180	0	3,897	21,440	1,784	0
	2020	29,932	75,824	0	9,534	0	5,305	26,855	2,215	0
ECEE	2019	28,785	50,972	45,171	7,554	14,078	956	12,576	1,477	12,922
FUFE	2020	33,552	75,738	47,067	6,994	-16,117	3,136	37,845	2,731	-8,554

Appendix J – Cash flow and Cash metrics from the top-8 Berkshire's holdings in comparison with the conglomerate for 2019 and 2020; All metrics in millions of US Dollars (Source: Berkshire Hathaway, Bloomberg, Own Estimates)

		BRK.A	AAPL	BAC	KO	AXP	KHC	VZ	MCO	USB
Assets	2019	817,729	338,516	2,434,079	86,381	198,321	101,450	291,727	10,265	495,426
	2020	873,729	323,888	2,819,627	87,296	191,367	99,830	316,481	12,409	553,905
C	2019	428,563	90,488	264,810	21,098	23,071	51,749	62,835	837	52,483
Equity	2020	451,336	65,339	272,924	21,284	22,984	50,243	69,272	1,763	53,725
Debt	2019	389,166	248,028	2,169,269	65,283	175,250	49,701	228,892	9,428	442,943
	2020	422,393	258,549	2,546,703	66,012	168,383	49,587	247,209	10,646	500,180
Leverage	2019	0.91	2.74	8.19	3.09	7.60	0.96	3.64	11.26	8.44
Ratio	2020	0.94	3.96	9.33	3.10	7.33	0.99	3.57	6.04	9.31

Appendix K – *Capital structure and leverage ratio from the top-8 holdings in comparison with Berkshire in 2019 and 2020; Assets, Equity and Debt in millions of US Dollars (Source: Berkshire Hathaway, Bloomberg, Own Estimates)*

		BRK.A	AAPL	BAC	KO	AXP	KHC	VZ	MCO	USB
Market	2019	551,834	972,269	311,209	236,898	100,837	38,608	253,940	44,559	90,960
Cap.	2020	537,026	1,906,151	262,206	235,292	97,333	42,781	243,115	54,304	70,211
EDC	2019	14893.12	2.99	2.83	2.13	8.20	2.88	4.81	7.87	4.24
EPS	2020	13748.78	3.31	1.96	1.95	3.77	2.85	4.94	9.64	3.06
DPS	2019	-	0.75	0.66	1.60	1.64	1.60	2.44	2.00	1.58
	2020	-	0.80	0.72	1.64	1.72	1.60	2.51	2.24	1.68
Pay-out	2019	-	0.25	0.23	0.75	0.20	0.56	0.51	0.25	0.37
Ratio	2020	-	0.24	0.37	0.84	0.46	0.56	0.51	0.23	0.55

Appendix L – Dividend's data metrics from the top-8 Berkshire's holdings in comparison with the conglomerate for 2019 and 2020; EPS and DPS in US Dollars and Market Capitalization in millions of US Dollars (Source: Berkshire Hathaway, Bloomberg, Own Estimates)

	BRK.A	AAPL	BAC	KO	AXP	KHC	VZ	MCO	USB
Moody's	Aa2	Aa1	Baa1	A1	A3	-	Baa1	-	A2
Outlook	Stable	Stable	Stable	Stable	Stable	-	Stable	-	Stable
S&P	AA	AA+	A-	A+	BBB+	BB+	BBB+	BBB+	A+
Outlook	Stable	Stable	Positive	Negative	Stable	Stable	Stable	Stable	Stable
Fitch	AA-	-	AA-	А	А	BB+	A-	BBB+	AA-
Outlook	Stable	-	Stable	Stable	Stable	Positive	Stable	Stable	Stable

Appendix M – Credit profile from the top-8 Berkshire's holdings in comparison with Berkshire for 2020 (Source: Bloomberg, Moody's, Fitch, S&P Agency)



Appendix N – Real GDP growth between 2007 and 2020 (Source: World Bank Group, FED, IMF, Own Estimates)



Appendix O – Inflation (CPI Index) rate between 2007 and 2020 (Source: World Bank Group, FED, IMF)



Appendix P – Ten-year treasury yield between 2007 and 2020 (Source: FED, BCE, Bloomberg, Own Estimates)

	2017	2018	2019	2020	2021F
Samsung	18.90%	18.70%	18.80%	19.10%	18.80%
Huawei	10.70%	16.10%	15.20%	8.40%	10.10%
Apple	19.60%	18.20%	20.00%	23.40%	14.10%
Xiaomi	7.10%	7.60%	8.90%	11.20%	16.90%
OPPO	6.90%	7.80%	8.30%	8.80%	16.50%
Others	36.80%	31.60%	28.70%	29.10%	23.60%
	2017	2018	2019	2020	2021F
Lenovo	20.80%	22.50%	24.10%	24.90%	24.30%
HP	21.00%	21.70%	22.20%	21.20%	22.60%
Dell	15.10%	16.20%	16.80%	16.40%	17.00%
Apple	7.20%	6.90%	7.00%	8.20%	7.80%
Acer	6.50%	6.10%	5.70%	5.90%	7.30%
Asus	6.80%	6.00%	5.50%	6.00%	6.00%
Others	22.60%	20.60%	18.70%	17.40%	15.00%

Appendix Q – Global market share on smartphones (first table) and personal computers (second table) between 2017 and 2020 with 2021 as estimate (Source: Statista, Own Estimates)


Appendix R - Total assets held, in trillions of US Dollars, and ROE between 2016 and 2020 for USA, Europe, China and Worldwide (Source: Bloomberg, FED, ECB, Deloitte)



Appendix S - *Graph of EURIBOR and LIBOR between 2007 and 2020 for 1, 3, 6 and 12 months (Source: Bloomberg)*



Appendix T - Graph of credit card debt and consumer as well as total debt in the US between 2016 and 2020 in billions of USD (Source: Bloomberg, FED and American Express)



■S&P ■Moody's ■Fitch ■DBRS ■Others

Appendix U - Market share evolution for 2018, 2019 and 2020 as ponderation of total credit ratings attributed worldwide (Source: SEC)

Following the Oracle – Berkshire's Portfolio Valuation

	2020	2021	2022	2023	2024	2025
Levered Beta	1.01	1.00	0.99	0.99	0.98	0.98
Unlevered Beta	0.96	0.96	0.96	0.96	0.96	0.96
Debt-to-Equity Ratio	0.06	0.06	0.05	0.04	0.03	0.02
Effective Tax Rate	14.43%	14.86%	19.72%	19.72%	19.72%	19.72%
Risk-Free Rate (Rf)	0.91%	1.38%	1.61%	1.81%	1.97%	2.11%
Equity Risk Premium (ERP)	4.72%	5.73%	5.87%	5.97%	5.95%	5.84%
AAPL's Cost of Equity	5.68%	7.12%	7.44%	7.71%	7.81%	7.81%
	2020	2021	2022	2023	2024	2025
Levered Beta	1.42	1.81	-0.43	0.78	0.93	0.99
Unlevered Beta	1.06	1.06	1.06	1.06	1.06	1.06
Debt-to-Equity Ratio	0.46	0.96	-1.89	-0.35	-0.16	-0.10
Effective Tax Rate	27.03%	26.82%	25.64%	25.64%	25.64%	25.64%
Risk-Free Rate (Rf)	0.91%	1.38%	1.61%	1.81%	1.97%	2.11%
Equity Risk Premium (ERP)	4.72%	5.73%	5.87%	5.97%	5.95%	5.84%
AXP's Cost of Equity	7.61%	11.73%	-0.93%	6.49%	7.53%	7.87%
	2020	2021	2022	2023	2024	2025
Levered Beta	1.25	1.17	1.28	1.45	1.80	2.43
Unlevered Beta	0.43	0.43	0.43	0.43	0.43	0.43
Debt-to-Equity Ratio	2.04	2.15	2.48	2.98	4.00	5.83
Effective Tax Rate	5.80%	19.73%	19.73%	19.73%	19.73%	19.73%
Risk-Free Rate (Rf)	0.91%	1.38%	1.61%	1.81%	1.97%	2.11%
Equity Risk Premium (ERP)	4.72%	5.73%	5.87%	5.97%	5.95%	5.84%
BAC's Cost of Equity	6.81%	8.07%	9.13%	10.48%	12.69%	16.31%
	2020	2021	2022	2023	2024	2025
Levered Beta	0.86	1.24	1.23	1.22	1.21	1.20
Unlevered Beta	0.82	0.82	0.82	0.82	0.82	0.82
Debt-to-Equity Ratio	0.68	0.68	0.67	0.65	0.64	0.62
Effective Tax Rate	92.11%	23.42%	23.42%	23.42%	23.42%	23.42%
Risk-Free Rate (Rf)	0.91%	1.38%	1.61%	1.81%	1.97%	2.11%
Equity Risk Premium (ERP)	4.72%	5.73%	5.87%	5.97%	5.95%	5.84%
KHC's Cost of Equity	4.97%	8.50%	8.85%	9.12%	9.20%	9.14%
	2020	2021	2022	2023	2024	2025
Levered Reta	0.99	1.03	1.02	1.02	1 01	1.00
Unlevered Reta	0.55	0.86	0.86	0.86	0.86	0.86
Debt-to-Equity Ratio	0.19	0.24	0.00	0.22	0.00	0.00
Effective Tax Rate	20 32%	18 94%	18 94%	18 94%	18 94%	18 94%
Risk-Free Rate (Rf)	0.91%	1 38%	1.61%	1 81%	1 97%	2 11%
Equity Risk Premium (ERP)	4.72%	5.73%	5.87%	5.97%	5.95%	5.84%
KO's Cost of Fanity	5 580/	7 270/	7 620/	7 88%	7 96%	7 9 20/
NO 5 COSI OI EQUILY	5.50%	1.4170	1.0270	1.0070	1.7070	1.7570

	2020	2021	2022	2023	2024	2025
Levered Beta	1.13	1.10	1.08	1.07	1.07	1.06
Unlevered Beta	1.05	1.05	1.05	1.05	1.05	1.05
Debt-to-Equity Ratio	0.10	0.06	0.04	0.03	0.02	0.02
Effective Tax Rate	20.28%	20.28%	20.28%	20.28%	20.28%	20.28%
Risk-Free Rate (Rf)	0.91%	1.38%	1.61%	1.81%	1.97%	2.11%
Equity Risk Premium (ERP)	4.72%	5.73%	5.87%	5.97%	5.95%	5.84%
MCO's Cost of Equity	6.24%	7.66%	7.96%	8.22%	8.32%	8.32%
	2020	2021	2022	2023	2024	2025
Levered Beta	1 14	1 10	1.06	1.02	0.99	0.96
Unlevered Beta	0.70	0.70	0.70	0.70	0.70	0.70
Debt-to-Equity Ratio	0.77	0.72	0.76	0.57	0.52	0.46
Effective Tax Rate	17.62%	19.71%	19.71%	19.71%	19.71%	19.71%
Risk-Free Rate (Rf)	0.91%	1.38%	1.61%	1.81%	1.97%	2.11%
Equity Risk Premium (ERP)	4.72%	5.73%	5.87%	5.97%	5.95%	5.84%
USB's Cost of Equity	6.29%	7.70%	7.82%	7.90%	7.86%	7.70%
	2020	2021	2022	2022	2024	2025
	2020	2021	2022	2023	2024	2025
Levered Beta	0.62	0.59	0.57	0.56	0.55	0.53
Unlevered Beta	0.42	0.42	0.42	0.42	0.42	0.42
Debt-to-Equity Ratio	0.62	0.55	0.49	0.45	0.41	0.37
Effective Tax Rate	23.44%	27.26%	27.26%	27.26%	27.26%	27.26%
Risk-Free Rate (Rf)	0.91%	1.38%	1.61%	1.81%	1.97%	2.11%
Equity Risk Premium (ERP)	4.72%	5.73%	5.87%	5.97%	5.95%	5.84%
VZ's Cost of Equity	3.84%	4.75%	4.96%	5.14%	5.22%	5.22%

Appendix V – Top-8 holdings' cost of equity and respective components for 2020 as well as forecasted years 2021-2025 (Source: Bloomberg, Damodaran, Holdings' Annual Report, Own Estimates)

	2020	2021	2022	2023	2024	2025
Effective Rate	14.43%	14.86%	19.72%	19.72%	19.72%	19.72%
Pre-Tax Cost of Debt	0.59%	1.60%	1.74%	1.84%	1.82%	1.71%
AAPL's Cost of Debt	0.50%	1.36%	1.40%	1.48%	1.46%	1.37%
	2020	0001	2022	2022	2024	2025
	2020	2021	2022	2023	2024	2025
Effective Rate	27.03%	26.82%	25.64%	25.64%	25.64%	25.64%
Pre-Tax Cost of Debt	0.88%	1.89%	2.03%	2.13%	2.11%	2.00%
AXP's Cost of Debt	0.64%	1.38%	1.51%	1.58%	1.57%	1.49%
	2020	2021	2022	2023	2024	2025
Effective Rate	5.80%	19.73%	19.73%	19.73%	19.73%	19.73%
Pre-Tax Cost of Debt	0.52%	1.53%	1.67%	1.77%	1.75%	1.64%
BAC's Cost of Debt	0.49%	1.23%	1.34%	1.42%	1.40%	1.32%
	2020	2021	2022	2023	2024	2025
Effective Rate	92.11%	23.42%	23.42%	23.42%	23.42%	23.42%
Pre-Tax Cost of Debt	0.91%	1.92%	2.06%	2.16%	2.14%	2.03%
KHC's Cost of Debt	0.07%	1.47%	1.58%	1.65%	1.64%	1.55%
	2020	2021	2022	2023	2024	2025
Effective Rate	20.32%	18.94%	18.94%	18.94%	18.94%	18.94%
Pre-Tax Cost of Debt	0.86%	1.87%	2.01%	2.11%	2.09%	1.98%
KO's Cost of Debt	0.69%	1.52%	1.63%	1.71%	1.69%	1.60%
	2020	2021	2022	2023	2024	2025
Effective Rate	20.28%	20.28%	20.28%	20.28%	20.28%	20.28%
Pre-Tax Cost of Debt	0.90%	1.91%	2.05%	2.15%	2.13%	2.02%
MCO's Cost of Debt	0.72%	1.52%	1.63%	1.71%	1.70%	1.61%
	2020	2021	2022	2023	2024	2025
Effective Rate	17.62%	19.71%	19.71%	19.71%	19.71%	19.71%
Pre-Tax Cost of Debt	0.74%	1.75%	1.89%	1.99%	1.97%	1.86%
USB's Cost of Debt	0.61%	1.41%	1.52%	1.60%	1.58%	1.49%
L	I					
	2020	2021	2022	2023	2024	2025
Effective Rate	2020 23.44%	2021 27.26%	2022 27.26%	2023 27.26%	2024 27.26%	2025 27.26%
Effective Rate Pre-Tax Cost of Debt	2020 23.44% 0.86%	2021 27.26% 1.87%	2022 27.26% 2.01%	2023 27.26% 2.11%	2024 27.26% 2.09%	2025 27.26% 1.98%

Appendix W – Top-8 holdings' cost of debt and respective components for 2020 as well as forecasted years 2021-2025 (Source: Bloomberg, Holdings' Annual Report, Holdings' Annual Report, Own Estimates)

	2020	2021	2022	2023	2024	2025
Preferred Dividend	1 421	1 520	1 520	1 520	1 520	1 520
Preferred Equity	24 510	0	0	0	0	0
BAC's Cost of Preferred Equity	5.80%	0.00%	0.00%	0.00%	0.00%	0.00%
	2020	2021	2022	2023	2024	2025
Preferred Dividend	2020 338	2021 317	2022 317	2023 317	2024 317	2025 317
Preferred Dividend Preferred Equity	2020 338 6 176	2021 317 0	2022 317 0	2023 317 0	2024 317 0	2025 317 0

Appendix X – Top-8 holdings' cost of preferred equity and respective components for 2020 and forecasted years 2021-2025 (Source: Bloomberg, Holdings' Annual Report, Own Estimates)

Following the Oracle – Berkshire's Portfolio Valuation

	2020	2021	2022	2023	2024	2025
Market Capitalization	1 906 151	2 371 134	2 861 212	3 431 770	4 329 458	5 449 469
Short-Term Debt	15 229	23 605	24 499	25 582	27 393	28 826
Long-Term Debt	107 049	107 049	107 049	107 049	107 049	107 049
Preferred Equity	0	0	0	0	0	0
AAPL's Total Capital Structure	2 028 429	2 501 787	2 992 759	3 564 401	4 463 899	5 585 344

	2020	2021	2022	2023	2024	2025
Market Capitalization	97 333	49 130	- 25 096	- 135 205	-297 614	-503 516
Short-Term Debt	1 878	4 0 4 1	4 540	5 008	5 390	5 333
Long-Term Debt	42 952	42 952	42 952	42 952	42 952	42 952
Preferred Equity	0	0	0	0	0	0
AXP's Total Capital Structure	142 163	96 123	22 396	- 87 245	-249 272	-455 231

	2020	2021	2022	2023	2024	2025
Market Capitalization	262 206	236 170	208 137	176 804	138 459	97 045
Short-Term Debt	262 891	236 705	245 041	255 293	282 022	294 382
Long-Term Debt	271 481	271 481	271 481	271 481	271 481	271 481
Preferred Equity	24 510	0	0	0	0	0
BAC's Total Capital Structure	821 088	744 357	724 659	703 579	691 961	662 907

	2020	2021	2022	2023	2024	2025
Market Capitalization	42 781	43 979	44 964	46 054	47 215	48 374
Short-Term Debt	371	1 518	1 450	1 481	1 481	1 495
Long-Term Debt	28 545	28 545	28 545	28 545	28 545	28 545
Preferred Equity	0	0	0	0	0	0
KHC's Total Capital Structure	71 697	74 042	74 959	76 080	77 242	78 414

	2020	2021	2022	2023	2024	2025
Market Capitalization	235 922	231 940	243 227	259 009	280 103	302 176
Short-Term Debt	2 990	14 457	15 267	16 069	17 198	17 578
Long-Term Debt	41 425	41 425	41 425	41 425	41 425	41 425
Preferred Equity	0	0	0	0	0	0
KO's Total Capital Structure	280 337	287 822	299 919	316 503	338 725	361 179

	2020	2021	2022	2023	2024	2025
Market Capitalization	54 304	89 835	127 615	171 428	220 630	272 557
Short-Term Debt	94	102	108	116	124	131
Long-Term Debt	5 319	5 319	5 319	5 319	5 319	5 319
Preferred Equity	0	0	0	0	0	0
MCO's Total Capital Structure	59 717	95 257	133 042	176 863	226 073	278 007

	2020	2021	2022	2023	2024	2025
Market Capitalization	70 211	78 431	89 256	100 946	112 896	127 096
Short-Term Debt	11 766	14 578	15 076	15 720	16 347	16 785
Long-Term Debt	42 241	42 241	42 241	42 241	42 241	42 241
Preferred Equity	6 176	0	0	0	0	0
USB's Total Capital Structure	130 394	135 250	146 573	158 907	171 484	186 122

	2020	2021	2022	2023	2024	2025
Market Capitalization	243 115	271 126	301 628	333 231	366 541	402 991
Short-Term Debt	9 374	7 625	7 735	7 911	7 943	8 107
Long-Term Debt	141 173	141 173	141 173	141 173	141 173	141 173
Preferred Equity	0	0	0	0	0	0
VZ's Total Capital Structure	393 662	419 924	450 537	482 315	515 658	552 271

Appendix Y – Top-8 holdings' capital structure and respective components for 2020 and forecasted years 2021-2025; in millions of US Dollars (Source: Bloomberg, Holdings' Annual Report, Own Estimates)

	2020	2021	2022	2023	2024	2025
$W_e * K_e$	5.33%	6.75%	7.11%	7.42%	7.58%	7.62%
$W_{sd+ld}\ast K_d$	0.03%	0.07%	0.06%	0.05%	0.04%	0.03%
$W_{pe} \ast K_{pe}$	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
AAPL's WACC	5.37%	6.82%	7.17%	7.48%	7.62%	7.65%
	2020	2021	2022	2023	2024	2025
W. * K.	5.21%	5.99%	1.04%	10.05%	8.99%	8.70%
W _{sd+ld} * K _d	0.20%	0.68%	3.20%	-0.87%	-0.30%	-0.16%
W _{pe} * K _{pe}	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
AXP's WACC	5.41%	6.67%	4.25%	9.18%	8.69%	8.55%
*** **	2020	2021	2022	2023	2024	2025
$W_e * K_e$	2.17%	2.56%	2.62%	2.63%	2.54%	2.39%
$W_{sd+ld} * K_d$	0.32%	0.84%	0.96%	1.06%	1.12%	1.12%
$W_{pe} * K_{pe}$	0.17%	0.00%	0.00%	0.00%	0.00%	0.00%
BAC'S WACC	2.67%	3.40%	3.58%	3.70%	3.66%	3.51%
	2020	2021	2022	2023	2024	2025
$W_e * K_e$	2.97%	5.05%	5.31%	5.52%	5.62%	5.64%
$W_{sd+ld}\ast K_d$	0.03%	0.60%	0.63%	0.65%	0.64%	0.60%
$W_{pe}\ast K_{pe}$	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
KHC's WACC	2.99%	5.65%	5.94%	6.17%	6.26%	6.24%
	2020	2021	2022	2023	2024	2025
W _e * K _e	4.70%	5.86%	6.18%	6.45%	6.59%	6.63%
W _{sd+ld} * K _d	0.11%	0.29%	0.31%	0.31%	0.29%	0.26%
W _{pe} * K _{pe}	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
KO's WACC	4.81%	6.15%	6.48%	6.76%	6.88%	6.90%
	2020	2021	2022	2022	2024	2025
W * V	5 68%	7 220/	7.64%	7.07%	2024 8 120/	2025 8 15%
$W_e \cdot K_e$	0.07%	0.00%	0.07%	0.05%	0.04%	0.020/
W_{sd+ld} K_d	0.07%	0.09%	0.00%	0.00%	0.04%	0.03%
	5 7494	7 210/	7 709/	8.029/	8 169 /	9 109/
MCOS WACC	5.7470	7.51 /0	7.7070	0.0270	0.10 /0	0.1770
	2020	2021	2022	2023	2024	2025
W _e * K _e	3.39%	4.47%	4.76%	5.02%	5.17%	5.26%
$W_{sd+ld} st K_d$	0.25%	0.59%	0.59%	0.58%	0.54%	0.47%
$W_{pe} * K_{pe}$	0.26%	0.00%	0.00%	0.00%	0.00%	0.00%
USB's WACC	3.90%	5.06%	5.35%	5.60%	5.71%	5.73%
I	2020	2021	2022	2023	2024	2025
W _e * K _e	2.37%	3.07%	3.32%	3.55%	3.71%	3.81%
$W_{sd+ld}\ast K_d$	0.25%	0.48%	0.48%	0.47%	0.44%	0.39%
W _{pe} * K _{pe}	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
VZ's WACC	2.62%	3.55%	3.81%	4.03%	4.15%	4.20%

Appendix Z – Top-8 holdings' WACC and respective components for 2020 and forecasted years 2021-2025 (Source: Bloomberg, Holdings' Annual Report, Own Estimates)

A	APL	201	92	020	2021	2022	2023	2024	2025	5
FCFI	F	61 90	02 75	5 824 8	86 737	14 667	90 533	117 495	5 123 27	71
PV o	f FCFFs	-		- 8	31 201	99 836	72 925	87 586	85 25	8
Sum	of PVs	-		-	-	-	-	-	-	426 805
	AXP	2	2019	2020	2021	2022	2023	2024	2025	1
I	FCFF		0	0	10 886	11 087	11 291	11 500	11 712	
I	PV of FCF	Fs	-	-	10 205	10 202	8 676	8 240	7 773	
5	Sum of PV	s	-	-	-	-	-	-	-	45 096
	BAC		2019	2020	2021	2022	2023	2024	2025	<u> </u>
	FCFF		0	0	21 660	17 871	12 607	4 841	4 131	
	PV of FC	FFs	-	-	21 097	16716	11 346	4 187	3 451	
	Sum of P	Vs	-	-	-	-	-	-	-	56 796
_	KHO	С	2019	2020	2021	2022	2023	2024	2025	
	FCFF		3 897	5 305	5 162	4 4 1 4	4 267	4 642	4 689	
	PV of F	CFFs	-	-	4 886	3 933	3 565	3 641	3 465	
	Sum of I	PVs	-	-	-	-	-	-	-	19 491
Г	KO		2019	2020	2021	2022	2023	2024	2025]
H	KO FCFF		2019 9 180	2020 9 534	2021 4 571	2022 10 091	2023 10 676	2024 11 564	2025 12 148	
I	KO FCFF PV of FCF	Fs 2	2019 9 180 -	2020 9 534 -	2021 4 571 4 306	2022 10 091 8 899	2023 10 676 8 774	2024 11 564 8 862	2025 12 148 8 703	
H H S	KO FCFF PV of FCF Sum of PV	Fs s	2019 9 180 - -	2020 9 534 - -	2021 4 571 4 306	2022 10 091 8 899 -	2023 10 676 8 774	2024 11 564 8 862	2025 12 148 8 703	39 545
H H S	KO FCFF PV of FCF Sum of PV MCO	Fs S	2019 9 180 - - 2019	2020 9 534 - - 2020	2021 4 571 4 306 - 2021	2022 10 091 8 899 - 2022	2023 10 676 8 774 - 2023	2024 11 564 8 862 - 2024	2025 12 148 8 703 - 2025	39 545
H H S	KO FCFF PV of FCF Sum of PV MCO FCFF	Fs S	2019 9 180 - - 2019 1 784	2020 9 534 - - 2020 2 215	2021 4 571 4 306 - 2021 5 -1 758	2022 10 091 8 899 - 2022 3 2 466	2023 10 676 8 774 - 2023 2 680	2024 11 564 8 862 - 2024 2 878	2025 12 148 8 703 - 2025 3 026	39 545
H H S	KO FCFF PV of FCF Sum of PV MCO FCFF PV of FO	Fs s CFFs	2019 9 180 - - 2019 1 784 -	2020 9 534 - - 2020 4 2 215	2021 4 571 4 306 - 2021 5 -1 758 -1 638	2022 10 091 8 899 - 2022 3 2 466 3 2 126	2023 10 676 8 774 - 2023 2 680 2 126	2024 11 564 8 862 - 2024 2 878 2 103	2025 12 148 8 703 - 2025 3 026 2 042	39 545
H H S	KO FCFF PV of FCF Sum of PV MCC FCFF PV of FC Sum of J	Fs Fs o CFFs PVs	2019 9 180 - - 2019 1 784 - -	2020 9 534 - - 2020 4 2 215 -	2021 4 571 4 306 - 2021 5 -1 758 -1 638	2022 10 091 8 899 - 2022 2 466 2 126	2023 10 676 8 774 - 2023 2 680 2 126 -	2024 11 564 8 862 - 2024 2 878 2 103	2025 12 148 8 703 - 2025 3 026 2 042 -	<u>39 545</u> 6 759
H F S	KO FCFF PV of FCF Sum of PV FCFF PV of FC Sum of D	CFFs B	2019 9 180 - - 2019 1 784 - - 2019 2019	2020 9 534 - - 2020 4 2 215 - - 2020	2021 4 571 4 306 - 2021 5 -1 758 -1 638 - 2021	2022 10 091 8 899 - 2022 2 466 2 126 - 2022	2023 10 676 8 774 - 2023 2 680 2 126 - 2023	2024 11 564 8 862 - 2024 2 878 2 103 - 2024	2025 12 148 8 703 - 2025 3 026 2 042 - 2025	<u>39 545</u> 6 759
H H S	KO FCFF PV of FCF Sum of PV FCFF PV of F0 Sum of 1 USI FCFF	CFFs B	2019 9 180 - - 2019 1 784 - - 2019 0	2020 9 534 - - - 2020 4 2 215 - - - - 2020 0	2021 4 571 4 306 - 2021 5 -1 758 -1 638 - 2021 6 520	2022 10 091 8 899 - 2022 2 466 3 2 126 - 2022 7 686	2023 10 676 8 774 - 2023 2 680 2 126 - 2023 8 080	2024 11 564 8 862 - 2024 2 878 2 103 - 2024 8 230	2025 12 148 8 703 - 2025 3 026 2 042 - 2025 8 699	<u>39 545</u> 6 759
1 1 2	KO FCFF PV of FCF Sum of PV FCFF PV of FC Sum of D FCFF PV of F PV of F	Fs 5 5 0 CFFs PVs B	2019 9 180 - - 2019 1 784 - - 2019 0 0 -	2020 9 534 - - 2020 4 2 215 - - 2020 0 2020 0	2021 4 571 4 306 - 2021 5 -1 758 -1 638 - 2021 6 520 6 206	2022 10 091 8 899 - 2022 2 466 2 126 - 2022 7 686 6 925	2023 10 676 8 774 - 2023 2 680 2 126 - 2023 8 080 6 861	2024 11 564 8 862 - 2024 2 878 2 103 - 2024 8 230 6 590	2025 12 148 8 703 - 2025 3 026 2 042 - 2025 8 699 6 583	<u>39 545</u> 6 759
H H S	KO FCFF PV of FCF Sum of PV FCFF PV of FC Sum of PV FCFF PV of FC Sum of	Fs 9 Fs 0 CFFs 0 B CFFs 1 PVs 1 PVs 1 CFFs 1 PVs 1 CFFs 1 CFF 1 CF	2019 9 180 - - 2019 1 784 - - 2019 0 0 - - 2019 0 - -	2020 9 534 - - 2020 4 2 215 - - - - 2020 0 0 -	2021 4 571 4 306 - 2021 5 -1 758 -1 638 - 2021 6 520 6 206 -	2022 10 091 8 899 - 2022 2 466 2 126 - 2022 7 686 6 925 -	2023 10 676 8 774 - 2023 2 680 2 126 - 2023 8 080 6 861	2024 11 564 8 862 - 2024 2 878 2 103 - 2024 8 230 6 590 -	2025 12 148 8 703 - 2025 3 026 2 042 - 2025 8 699 6 583 - 3	39 545 6 759 3 165
H S	KO FCFF PV of FCF Sum of PV FCFF PV of FC Sum of PV FCFF PV of FC Sum of PV	CFFs 0 CFFs 0 CFFs 0 CFFs 0 CFFs 0 CFFs 0 20	2019 9 180 - - 2019 1 784 - - 2019 0 - - 2019 0 - - - 2019 1 784 - - - - - - - - - - - - -	2020 9 534 - - 2020 2020 - 2020 0 - - 2020	2021 4 571 4 306 - 2021 5 -1 758 -1 638 - 2021 6 520 6 206 - 2021	2022 10 091 8 899 - 2022 2 466 2 126 - 2022 7 686 6 925 - 2022	2023 10 676 8 774 - 2023 2 680 2 126 - 2023 8 080 6 861 -	2024 11 564 8 862 - 2024 2 878 2 103 - 2024 8 230 6 590 - 2024	2025 12 148 8 703 - 2025 3 026 2 042 - 2025 8 699 6 583 - 3 2025	39 545 6 759 3 165
FC	KO FCFF PV of FCF Sum of PV FCFF PV of FC Sum of D FCFF PV of F Sum of Sum of FFF	Fs 5 s 1 O CFFs 7 B CFFs 7 PVs 20 20 21	2019 9 180 - - 2019 1 784 - - 2019 0 - - 2019 1 784 - - - 2019 1 784 - - - - - - - - - - - - -	2020 9 534 - - 2020 4 2 215 - - 2020 0 - - - - - - - - - - - - -	2021 4 571 4 306 - 2021 5 -1 758 -1 638 - 2021 6 520 6 206 - 2021 20598	2022 10 091 8 899 - 2022 2 466 2 126 - 2022 7 686 6 925 - 2022 19 354	2023 10 676 8 774 - 2023 2 680 2 126 - 2023 8 080 6 861 - 2023 2 2068	2024 11 564 8 862 - 2024 2 878 2 103 - 2024 8 230 6 590 - 2024 2 4 818	2025 12 148 8 703 - 2025 3 026 2 042 - 2025 8 699 6 583 - 3 2025 26 694	<u>39 545</u> 6 759 3 165
I I S F C PV	KO FCFF PV of FCF Sum of PV FCFF PV of FV Sum of I Sum of VZ FFF of FCFFs	CFFs 0 CFFs 0 CCFFs 0 CCFF 0 C	2019 9 180 - - 2019 1 784 - - 2019 0 - - 2019 1 784 - - - - - - - - - - - - -	2020 9 534 - - 2020 4 2 215 - - 2020 0 - - 2020 20 20 20 855 -	2021 4 571 4 306 - 2021 5 -1 758 -1 638 - 2021 6 520 6 206 - 2021 20 598 19 892	2022 10 091 8 899 - 2022 2 466 2 126 - 2022 7 686 6 925 - 2022 19 354 17 961	2023 10 676 8 774 - 2023 2 680 2 126 - 2023 8 080 6 861 - 2023 22 068 19 603	2024 11 564 8 862 - 2024 2 878 2 103 - 2024 8 230 6 590 - 2024 24 818 21 094	2025 12 148 8 703 - 2025 3 026 2 042 - 2025 8 699 6 583 - 3 2025 2 6 694 2 1 729	39 545 6 759 3 165

Appendix AA – Top-8 holdings' FCFF and respective valuation components for 2020 and forecasted years 2021-2025; in million US Dollars (Source: Bloomberg, Holdings' Annual Report, Own Estimates)

	AAPL	WACC
	287,61	6,65% 7,15% 7,65% 8,15% 8,65%
	4,60%	297,76 240,12 201,49 173,84 153,10
ate	5,10%	386,08 292,81 236,25 198,35 171,22
⁄th R	5,60%	558,50 379,49 287,97 232,47 195,28
Grow	6,10%	1044,44 548,72 373,05 283,24 228,78
Ū	6,60%	11249,10 1025,65 539,16 366,76 278,62
L		
	AXP 191,7	WACC 17,55% 8,05% 8,55% 9,05% 9,55%
at a	1,00%	6 197,19 182,81 170,43 159,65 150,21
4 D	$\frac{2}{3}$ 1,50%	6 210,91 194,37 <u>180,27</u> 168,12 157,55 6 227 11 207 84 191 62 177 78 165 86
11002	2,50%	6 246,51 223,74 204,84 188,92 175,35
	3,009	6 270,17 242,78 220,44 201,90 186,29
F	BAC	WACC
	1 05,65	2,51% 3,01% 3,51% 4,01% 4,51% 109.05 66.26 51.82 44.59 40.24
Rate	2,50% 4	4348,71 107,43 <u>65,46</u> 51,31 44,21
wth	3,00%	-64,00 4265,37 105,84 64,69 50,80
Gro	3,50% 4.00%	-19,42 -62,29 4184,02 104,29 63,93 -4 77 -18 57 -60 62 4104 62 102 78
	+,0070	
	KH 63.2	C WACC 2 5 24% 5 74% 6 24% 6 74% 7 24%
Γ	رون ا 1,00 ي	% 65,72 56,78 49,58 43,66 38,73
	1,50°	% 75,58 64,41 55,63 48,57 42,77
'	12,00°	% 88,47 74,08 63,12 54,52 47,59
1	$5^{2,50}_{3,00}$	% 106,08 86,73 72,61 61,87 53,43 % 131,54 104,00 85,03 71,18 60,64
L		
	<u>KC</u> 54.4	WACC 3 5 90% 6 40% 6 90% 7 40% 7 90%
	<u>ع</u> 2,00	% 56,39 48,95 43,05 38,27 34,32
	2,50	% 64,86 55,36 48,06 42,28 37,59
	3,00	% 76,24 63,67 54,36 47,20 41,53
	5,50 5 _{4,00}	% 116,99 90,67 73,48 61,39 52,43
	MCG	WACC
	261,6	2 7,19% 7,69% 8,19% 8,69% 9,19%
¢	2,50% ي	6 270,33 241,07 217,09 197,10 180,20
, D,	3,009	6 301,50 265,77 237,08 213,55 193,94
out	3,50%	6 341,11 296,37 261,32 233,17 210,09 6 393 14 335 25 291 35 256 97 229 35
Ċ	5 4,509	6 464,52 386,32 329,52 286,45 252,72
	LICD	WACC
	115,0	7 4,73% 5,23% 5,73% 6,23% 6,73%
to to	0,289- ي	% 118,47 108,24 99,77 92,64 86,57
P.a.	0,229	6 129,09 116,77 106,74 98,43 91,44
owf	0,729	6 142,35 127,19 115,11 105,28 97,13
ځ	5 1,729	6 182,11 156,93 138,10 123,52 111,90
	V7.	WACC
	190,1	7 3,20% 3,70% 4,20% 4,70% 5,20%
to.	0,509	6 197,98 161,80 135,50 115,55 99,92
2 4	2 1,009	6 245,85 194,08 158,61 132,82 113,26
	2.009	6 461,27 315,61 236.33 186.55 152.44
Ċ	2,50%	6 799,78 452,33 309,48 231,74 182,92

Appendix AB – Top-8 holdings' target price sensitivity analysis to WACC and perpetuity growth rate; in US Dollars (Source: Bloomberg, Holdings' Annual Report, Own Estimates)

Peer Group	EV/EBITDA	P/E
LG Display	4,70	24,32
TSM	15,54	30,83
IBM	8,93	19,49
Quanta Services	10,74	23,43
Texas Instruments	21,10	27,02
Peer's Average	15,79	26,40
AAPL		
EBITDA2020	78 844	-
EV	1 245 128	-
(-) Net Debt2020	- 69 552	-
(-) Pref. & Min. Interest2020	-	-
Eq. Value	1 314 680	-
Shares Outstanding2020	16 977	-
AAPL's EPS	-	3,31
Target Price (\$)	77,44	87,38

Peer Group	P/E				
VISA Inc.	49,95				
Western Union	66,16				
Discover Financial Services	24,84				
Capital One Financial Corp.	18,90				
FleetCor Technologies	33,60				
Peer's Average	43,64				
AXP					
AXP's EPS	3,77				
Target Price (\$)	164,51				

Peer Group	P/E
BankUnited	16,60
Barclays Bank	13,49
HSBC Holdings PLC	16,09
JP Morgan Chase & Co.	14,04
NatWest Group	16,21
Peer's Average	16,30
BAC	
BAC's EPS	1,88
Target Price (\$)	30,64

EV/EBITDA	P/E
16,34	24,56
13,61	13,13
12,21	16,67
7,46	11,43
12,18	7,82
13,58	13,74
6 681	-
90 748	-
25 499	-
140	-
65 109	-
1 223	-
-	2,86
53,24	39,30
	EV/EBITDA 16,34 13,61 12,21 7,46 12,18 13,58 6 681 90 748 25 499 140 65 109 1 223 - 53,24

Peer Group	EV/EBITDA	P/E
PepsiCo Inc.	9,87	28,34
Monster Beverage Corp.	27,41	35,03
Keurig Dr. Pepper Inc.	16,79	33,92
Primo Water Corp.	11,11	0,00
Boston Beer Co. Inc.	37,94	64,02
Peer's Average	23,31	32,43
KO		
EBITDA2020	11 421	-
EV	266 245	-
(-) Net Debt2020	33 501	-
(-) Pref. & Min. Interest2020	1 985	-
Eq. Value	230 759	-
Shares Outstanding2020	4 302	-
KO's EPS	-	1,80
Target Price (\$)	53,64	58,37

Peer Group	EV/EBITDA	P/E
S&P Global Inc.	19,73	33,82
AON Plc	15,93	24,85
MSCI Inc.	38,95	62,39
Equifax Inc.	17,81	45,24
FactSet Research Systems Inc.	24,11	33,67
Peer's Average	19,39	34,40
MCO		
EBITDA2020	2 758	-
EV	53 485	-
(-) Net Debt2020	2 717	-
(-) Pref. & Min. Interest2020	194	-
Eq. Value	50 574	-
Shares Outstanding2020	187	-
MCO's EPS	_	9,48
Target Price (\$)	270,31	326,06

Peer Group	P/E
Wells Fargo & Co.	72,92
Truist Financial Corp.	15,19
Fifth Third Bancorp	14,85
First Republic Bank Ca.	25,20
M&T Bank Group	12,53
Peer's Average	16,94
USB	
USB's EPS	3,06
Target Price (\$)	51,84

Peer Group	EV/EBITDA	P/E
T-Mobile Inc.	9,58	31,26
Iridium Communications Inc.	19,30	0,00
AT&T Inc.	6,36	11,16
China Mobile Ltd.	1,40	7,42
Comcast Corp.	10,83	22,68
Peer's Average	11,52	21,70
VZ		
*EBITDA2020	53 388	-
*EV	614 906	-
*(-) Net Debt2020	128 376	-
*(-) Pref. & Min. Interest2020	1 430	-
*Eq. Value	485 100	-
**Shares Outstanding2020	4 138	-
VZ's EPS	_	4,94
Target Price (\$)	117,23	107,28

Appendix AC – Top-8 holdings' target price through relative valuation for two multiples; (*) millions of US Dollars; (**) millions of shares (Source: Bloomberg, Holdings' Annual Report, Own Estimates)

AAPL	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Revenue	260 174	274 515	356 802	370 319	386 690	414 062	435 726
- Cost of Revenue	161 782	169 559	210 010	219 007	229 199	246 810	259 971
Gross Profit	98 392	104 956	146 792	151 312	157 491	167 252	175 754
- Operating Expenses	34 462	38 668	44 260	48 109	52 760	50 137	51 545
Operating Income (Loss)	63 930	66 288	102 531	103 204	104 731	117 116	124 210
- Non-Operating (Income) Loss	-1 838	-721	-2 804	-4 287	-7 375	-8 637	-11 912
Pre-tax Income (Loss), Adjusted	65 768	67 009	105 335	107 491	112 106	125 753	136 122
- Abnormal Losses (Gains)	31	-82	0	0	0	0	0
Pre-tax Income (Loss), GAAP	65 737	67 091	105 335	107 491	112 106	125 753	136 122
- Income Tax Expense (Benefit)	10 481	9 680	20 774	21 199	22 109	24 800	26 845
Income (Loss) from Cont. Ops	55 256	57 411	84 561	86 292	89 997	100 953	109 276
- Minority Interest	0	0	0	0	0	0	0
Net Income, GAAP	55 256	57 411	84 561	86 292	89 997	100 953	109 276
- Preferred Dividends	0	0	0	0	0	0	0
Net Income Avail to Common, GAAP	55 256	57 411	84 561	86 292	89 997	100 953	109 276
+ Net Abnormal Losses (Gains)	24	-65	0	0	0	0	0
Net Income Avail to Common, Adj	55 280	57 346	84 561	86 292	89 997	100 953	109 276
Basic Weighted Avg Shares	18 471	17 352	16 793	16 427	16 060	15 694	15 327
Basic EPS, GAAP	2.99	3.31	5.03	5.25	5.60	6.43	7.12
Diluted Weighted Avg Shares	18 596	17 528	16 970	16 603	16 236	15 870	15 503
Diluted EPS, GAAP	2.97	3.28	4.98	5.20	5.54	6.36	7.04

AXP	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Revenue	43 556	36 087	41 058	46 127	50 880	54 761	54 183
- Total Non-Interest Expense	34 906	31 791	67 340	74 386	82 627	92 450	91 475
Operating Income (Loss)	8 650	4 296	-26 282	-28 259	-31 748	-37 690	-37 292
- Abnormal Losses (Gains)	221	0	-17 208	-10 969	-3 095	7 384	21 374
Pre-tax Income (Loss), GAAP	8 4 2 9	4 296	-9 073	-17 290	-28 652	-45 074	-58 666
- Income Tax Expense (Benefit)	1 670	1 161	-2 326	-4 433	-7 346	-11 556	-15 041
Income (Loss) from Cont. Ops	6 759	3 135	-6 747	-12 857	-21 306	-33 517	-43 625
- Minority Interest	0	0	0	0	0	0	0
Net Income, GAAP	6 759	3 135	-6 747	-12 857	-21 306	-33 517	-43 625
- Preferred Dividends	81	79	80	80	80	80	80
- Other Adjustments	47	20	0	0	0	0	0
Net Income Avail to Common, GAAP	6 6 3 0	3 038	-6 827	-12 937	-21 386	-33 597	-43 705
+ Net Abnormal Losses (Gains)	174	0	0	0	0	0	0
Net Income Avail to Common, Adj	6 804	3 038	-6 827	-12 937	-21 386	-33 597	-43 705
Basic Weighted Avg Shares	828	805	802	796	791	785	779
Basic EPS, GAAP	8.00	3.77	-9.69	-4.32	-11.44	-22.53	-29.83
Diluted Weighted Avg Shares	830	806	803	797	792	786	780
Diluted EPS, GAAP	7.99	3.77	-9.68	-4.32	-11.42	-22.50	-29.79

BAC	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Revenue	91 466	85 661	88 458	91 573	95 405	105 393	110 012
- Total Non-Interest Expense	57 809	65 710	138 181	138 488	143 972	161 290	168 358
Operating Income (Loss)	33 657	19 951	-49 723	-46 915	-48 567	-55 897	-58 346
- Abnormal Losses (Gains)	903	956	-41 268	-36 740	-34 991	-33 112	-32 019
Pre-tax Income (Loss), GAAP	32 754	18 995	-8 455	-10 175	-13 576	-22 785	-26 328
- Income Tax Expense (Benefit)	5 324	1 101	-1 668	-2 007	-2 678	-4 495	-5 194
Income (Loss) from Cont. Ops	27 430	17 894	-6 788	-8 168	-10 898	-18 290	-21 134
- Minority Interest	0	0	0	0	0	0	0
Net Income, GAAP	27 430	27 430	-6 788	-8 168	-10 898	-18 290	-21 134
- Preferred Dividends	1 432	1 421	1 520	1 520	1 520	1 520	1 520
Net Income Avail to Common, GAAP	25 998	26 009	-8 308	-9 688	-12 418	-19 810	-22 654
+ Net Abnormal Losses (Gains)	713	755	0	0	0	0	0
Net Income Avail to Common, Adj	26 711	26 764	-8 308	-9 688	-12 418	-19 810	-22 654
Basic Weighted Avg Shares	9 391	8 753	8 491	8 171	7 851	7 531	7 212
Basic EPS, GAAP	2.77	1.88	-0.98	-1.19	-1.58	-2.63	-3.14
Diluted Weighted Avg Shares	9 4 4 3	8 797	8 535	8 215	7 895	7 575	7 255
Diluted EPS, GAAP	2.75	1.87	-0.97	-1.18	-1.57	-2.62	-3.12

КНС	2019	2020	FY 2021	FY 2022	EV 2023	EV 2024	FY 2025
Revenue	24 977	26 185	25 206	24 064	24 584	24 591	24 811
- Cost of Revenue	16 782	17 020	16 666	15 860	16 168	16 122	16 234
Gross Profit	8 195	9 165	8 540	8 204	8 4 1 6	8 469	8 577
- Operating Expenses	3 581	3 615	3 455	3 336	3 339	3 299	3 290
Operating Income (Loss)	4 614	5 550	5 085	4 868	5 078	5 171	5 287
- Non-Operating (Income) Loss	301	974	700	771	758	759	754
Pre-tax Income (Loss), Adjusted	4 313	4 576	4 385	4 097	4 320	4 412	4 533
- Abnormal Losses (Gains)	0	0	0	0	0	0	0
Pre-tax Income (Loss), GAAP	4 313	4 576	4 385	4 097	4 320	4 412	4 533
- Income Tax Expense (Benefit)	2 380	4 215	1 027	959	1 012	1 033	1 062
Income (Loss) from Cont. Ops	1 933	361	3 358	3 137	3 308	3 379	3 471
- Minority Interest	-2	5	-12	-12	-12	-12	-12
Net Income, GAAP	3 530	3 497	3 370	3 149	3 320	3 391	3 483
- Preferred Dividends	0	0	0	0	0	0	0
Net Income Avail to Common, GAAP	3 530	3 497	3 370	3 149	3 320	3 391	3 483
+ Net Abnormal Losses (Gains)	0	0	0	0	0	0	0
Net Income Avail to Common, Adj	3 530	3 497	3 370	3 149	3 320	3 391	3 483
Basic Weighted Avg Shares	1 221	1 223	1 223	1 223	1 223	1 223	1 223
Basic EPS, GAAP	2.89	2.86	2.76	2.57	2.71	2.77	2.85
Diluted Weighted Avg Shares	1 224	1 228	1 228	1 228	1 228	1 228	1 228
Diluted EPS, GAAP	2.88	2.85	2.74	2.56	2.70	2.76	2.84

КО	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Revenue	37 280	32 999	37 918	40 042	42 146	45 106	46 105
- Cost of Revenue	14 618	13 368	15 055	15 756	16 441	17 514	17 841
Gross Profit	22 662	19 631	22 863	24 286	25 705	27 592	28 263
- Operating Expenses	12 105	10 099	11 907	12 418	12 971	13 790	13 886
Operating Income (Loss)	10 557	9 532	10 956	11 868	12 733	13 801	14 378
- Non-Operating (Income) Loss	-901	240	1 416	332	283	223	151
Pre-tax Income (Loss), Adjusted	11 458	9 292	9 540	11 535	12 450	13 579	14 226
- Abnormal Losses (Gains)	672	-457	0	0	0	0	0
Pre-tax Income (Loss), GAAP	10 786	9 749	9 540	11 535	12 450	13 579	14 226
- Income Tax Expense (Benefit)	1 801	1 981	1 807	2 185	2 358	2 572	2 695
Income (Loss) from Cont. Ops	8 985	7 768	7 733	9 351	10 092	11 007	11 532
- Minority Interest	65	21	37	37	37	37	37
Net Income, GAAP	8 920	7 747	7 696	9 314	10 055	10 970	11 495
- Preferred Dividends	0	0	0	0	0	0	0
Net Income Avail to Common, GAAP	8 920	7 747	7 696	9 314	10 055	10 970	11 495
+ Net Abnormal Losses (Gains)	251	688	0	0	0	0	0
Net Income Avail to Common, Adj	9 171	8 4 3 5	7 696	9 314	10 055	10 970	11 495
Basic Weighted Avg Shares	4 276	4 295	4 294	4 279	4 264	4 249	4 234
Basic EPS, GAAP	2.09	1.80	1.79	2.18	2.36	2.58	2.72
Diluted Weighted Avg Shares	4 314	4 323	4 322	4 307	4 292	4 277	4 262
Diluted EPS, GAAP	2.07	1.79	1.78	2.16	2.34	2.56	2.70

МСО	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Revenue	4 829	5 371	5 848	6 180	6 615	7 074	7 478
- Operating Expenses	2 725	2 924	3 084	3 256	3 411	3 631	3 850
Operating Income (Loss)	2 104	2 447	2 764	2 924	3 204	3 443	3 627
- Non-Operating (Income) Loss	188	159	170	190	179	166	153
Pre-tax Income (Loss), Adjusted	1 916	2 288	2 593	2 734	3 026	3 277	3 474
- Abnormal Losses (Gains)	106	59	0	0	0	0	0
Pre-tax Income (Loss), GAAP	1 810	2 2 2 9	2 593	2 734	3 026	3 277	3 474
- Income Tax Expense (Benefit)	381	452	526	554	614	665	705
Income (Loss) from Cont. Ops	1 429	1 777	2 067	2 180	2 412	2 613	2 770
- Minority Interest	7	-1	-1	-1	-1	-1	-1
Net Income, GAAP	1 422	1 778	2 068	2 181	2 413	2 614	2 771
- Preferred Dividends	0	0	0	0	0	0	0
Net Income Avail to Common, GAAP	1 422	1 778	2 068	2 181	2 413	2 614	2 771
+ Net Abnormal Losses (Gains)	87	47	0	0	0	0	0
Net Income Avail to Common, Adj	1 509	1 825	2 068	2 181	2 413	2 614	2 771
Basic Weighted Avg Shares	189	188	187	185	184	183	182
Basic EPS, GAAP	7.51	9.48	11.09	11.77	13.11	14.29	15.24
Diluted Weighted Avg Shares	192	189	188	187	186	185	183
Diluted EPS, GAAP	7.42	9.39	10.99	11.66	12.99	14.16	15.10

USB	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Revenue	27 325	25 241	22 713	23 488	24 492	25 469	26 151
- Total Non-Interest Expense	18 531	19 190	35 443	34 943	36 337	38 313	39 339
Operating Income (Loss)	8 794	6 051	-12 730	-11 455	-11 845	-12 844	-13 188
- Abnormal Losses (Gains)	0	0	-27 381	-28 689	-29 951	-31 327	-32 723
Pre-tax Income (Loss), GAAP	8 794	6 0 5 1	14 652	17 235	18 105	18 482	19 535
- Income Tax Expense (Benefit)	1 716	1 066	2 888	3 397	3 569	3 643	3 850
Income (Loss) from Cont. Ops	7 078	4 985	11 764	13 838	14 537	14 839	15 684
- Minority Interest	32	26	35	35	35	35	35
Net Income, GAAP	7 046	4 959	11 729	13 802	14 501	14 804	15 649
- Preferred Dividends	331	338	317	317	317	317	317
- Other Adjustments	0	-13	0	0	0	0	0
Net Income Avail to Common, GAAP	6 715	4 634	11 412	13 485	14 184	14 487	15 332
+ Net Abnormal Losses (Gains)	0	0	0	0	0	0	0
Net Income Avail to Common, Adj	6 715	4 634	11 412	13 485	14 184	14 487	15 332
Basic Weighted Avg Shares	1 581	1 509	1 485	1 440	1 395	1 350	1 305
Basic EPS, GAAP	4.25	3.06	7.69	9.37	10.17	10.73	11.75
Diluted Weighted Avg Shares	1 583	1 510	1 486	1 441	1 396	1 351	1 306
Diluted EPS, GAAP	4.24	3.06	7.68	9.36	10.16	10.73	11.74

VZ	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Revenue	131 868	128 292	134 782	136 738	139 839	140 411	143 307
- Cost of Revenue	54 726	51 201	55 952	55 740	57 721	57 024	57 603
Gross Profit	77 142	77 091	78 830	80 998	82 117	83 387	85 703
- Operating Expenses	46 459	45 148	46 756	47 779	48 328	48 859	49 948
Operating Income (Loss)	30 683	31 943	32 074	33 219	33 790	34 528	35 755
- Non-Operating (Income) Loss	4 041	4 729	6 002	5 904	5 787	5 578	5 303
Pre-tax Income (Loss), Adjusted	26 642	27 214	26 072	27 315	28 002	28 949	30 452
- Abnormal Losses (Gains)	3 909	3 247	0	0	0	0	0
Pre-tax Income (Loss), GAAP	22 733	23 967	26 072	27 315	28 002	28 949	30 452
- Income Tax Expense (Benefit)	2 945	5 619	7 106	7 445	7 633	7 891	8 300
Income (Loss) from Cont. Ops	19 788	18 348	18 965	19 870	20 370	21 059	22 152
- Minority Interest	523	547	502	502	502	502	502
Net Income, GAAP	19 265	17 801	18 463	19 368	19 867	20 556	21 650
- Preferred Dividends	0	0	0	0	0	0	0
Net Income Avail to Common, GAAP	19 265	17 801	18 463	19 368	19 867	20 556	21 650
+ Net Abnormal Losses (Gains)	-677	-2 666	0	0	0	0	0
Net Income Avail to Common, Adj	19 942	20 467	18 463	19 368	19 867	20 556	21 650
Basic Weighted Avg Shares	4 138	4 140	4 138	4 138	4 138	4 138	4 138
Basic EPS, GAAP	4.82	4.94	4.46	4.68	4.80	4.97	5.23
Diluted Weighted Avg Shares	4 140	4 142	4 140	4 140	4 140	4 140	4 140
Diluted EPS, GAAP	4.81	4.94	4.46	4.68	4.80	4.97	5.23

Appendix AD – Top-8 holdings respective INCOME STATEMENT for 2019 and 2020 as well as five forecasted years; in millions of US Dollars (Source: Bloomberg and Own Estimates)

AAPL	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Cash, Cash Equivalents & STI	100 557	90 943	114 779	158 012	176 334	222 581	273 483
+ Accounts & Notes Receiv	22 926	16 120	27 540	28 584	29 847	31 873	33 632
+ Inventories	4 106	4 061	5 219	5 442	5 695	6 1 1 6	6 460
+ Other ST Assets	35 230	32 589	45 465	47 187	49 273	52 761	55 522
Total Current Assets	162 819	143 713	193 003	239 225	261 150	313 331	369 097
+ Property, Plant & Equip, Net	37 378	45 336	30 089	15 582	18 943	10 838	1 638
+ LT Investments & Receivables	105 341	100 887	100 887	100 887	100 887	100 887	100 887
+ Other LT Assets	32 978	33 952	33 952	33 952	33 952	33 952	33 952
Total Noncurrent Assets	175 697	180 175	164 928	150 421	153 782	145 677	136 477
Total Assets	338 516	323 888	357 932	389 647	414 932	459 008	505 574
+ Payables & Accruals	46 236	42 296	52 305	64 783	67 558	75 927	80 195
+ ST Debt	16 240	15 229	23 605	24 499	25 582	27 393	28 826
+ Other ST Liabilities	43 242	47 867	40 743	42 286	44 155	47 281	49 755
Total Current Liabilities	105 718	105 392	116 652	131 568	137 296	150 601	158 776
+ LT Debt	91 807	107 049	107 049	107 049	107 049	107 049	107 049
+ Other LT Liabilities	50 503	46 108	52 953	52 953	52 953	52 953	52 953
Total Noncurrent Liabilities	142 310	153 157	160 002	160 002	160 002	160 002	160 002
Total Liabilities	248 028	258 549	276 654	291 570	297 298	310 603	318 778
+ Preferred Equity and Capital	0	0	0	0	0	0	0
+ Share Capital & APIC	45 174	50 779	50 779	50 779	50 779	50 779	50 779
+ Retained Earnings	45 898	14 966	30 499	47 298	66 855	97 626	136 018
+ Other Equity	-584	-406	0	0	0	0	0
Equity Before Minority Interest	90 488	65 339	81 278	98 077	117 634	148 405	186 797
+ Minority/Non-Controlling Interest	0	0	0	0	0	0	0
Total Equity	90 488	65 339	81 278	98 077	117 634	148 405	186 797
Total Liabilities & Equity	338 516	323 888	357 932	389 647	414 932	459 008	505 574

AXP	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Cash & Cash Equivalents	24 446	32 965	34 781	9 816	-23 411	-67 768	-117 559
+ ST and LT Investments	8 406	21 631	0	0	0	0	0
+ Net Receivables	56 794	43 434	52 820	59 341	65 455	70 255	69 705
+ Total Consumer Loans	92 007	75 987	0	0	0	0	0
+ Total Loans	92 007	75 987	0	0	0	0	0
+ Net Loans	89 624	70 643	70 643	70 643	70 643	70 643	70 643
+ Net Fixed Assets	4 834	5 015	6 194	7 609	9 189	10 777	12 440
+ Total Intangible Assets	3 582	4 117	4 117	4 117	4 117	4 117	4 117
+ Total Deferred Tax Assets	3 468	5 034	0	0	0	0	0
+ Total Derivative Assets	68	31	0	0	0	0	0
+ Other Assets	7 099	8 497	13 531	13 531	13 531	13 531	13 531
Total Assets	198 321	191 367	182 086	165 057	139 524	101 555	52 876
+ Demand Deposits	52	45	0	0	0	0	0
+ Interest Bearing Deposits	72 445	85 583	0	0	0	0	0
+ Other Deposits	790	1 247	0	0	0	0	0
+ Total Deposits	73 287	86 875	0	0	0	0	0
+ ST Borrowings & Repos	6 442	1 878	4 041	4 540	5 008	5 390	5 333
+ LT Debt	57 835	42 952	42 952	42 952	42 952	42 952	42 952
+ Total Deferred Tax Liabilities	2 007	2 334	0	0	0	0	0
+ Total Derivative Liabilities	341	588	0	0	0	0	0
+ Other Liabilities	35 338	33 756	0	0	0	0	0
Total Liabilities	175 250	168 383	46 993	47 492	47 960	48 342	48 285
+ Preferred Equity and Hybrid Capital	0	0	0	0	0	0	0
+ Share Capital & APIC	11 937	12 042	12 042	12 042	12 042	12 042	12 042
+ Retained Earnings	13 871	13 837	-440	-17 968	-43 969	-82 320	-130 942
+ Other Equity	-2 737	-2 895	0	0	0	0	0
Equity Before Minority Interest	23 071	22 984	11 602	-5 926	-31 927	-70 278	-118 900
+ Minority/Non-Controlling Interest	0	0	0	0	0	0	0
Total Equity	23 071	22 984	11 602	-5 926	-31 927	-70 278	-118 900
Total Liabilities & Equity	198 321	191 367	58 595	41 566	16 033	-21 936	-70 615

BAC	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Cash, Cash Equivalents & STI	30 152	36 430	429 017	408 591	386 648	373 881	343 553
+ Interbanking Assets	413 112	654 637	0	0	0	0	0
+ LT Investments	702 023	883 704	438 249	438 249	438 249	438 249	438 249
+ Total Commercial Loans	517 657	499 065	0	0	0	0	0
+ Total Consumer Loans	465 769	428 796	0	0	0	0	0
+ Other Loans	9 158	9 243	0	0	0	0	0
+ Total Loans	992 584	937 104	0	0	0	0	0
+ Net Loans	983 168	918 302	0	0	0	0	0
+ Net Fixed Assets	10 561	11 000	10 582	10 164	9 746	9 328	8 910
+ Total Intangible Assets	70 612	70 612	71 102	71 102	71 102	71 102	71 102
+ Total Deferred Tax Assets	16 690	20 002	0	0	0	0	0
+ Total Derivative Assets	40 485	47 179	0	0	0	0	0
+ Other Assets	167 276	177 761	197 273	197 273	197 273	197 273	197 273
Total Assets	2 434 079	2 819 627	1 146 223	1 125 379	1 103 019	1 089 834	1 059 087
+ Demand Deposits	417 024	668 372	0	0	0	0	0
+ Interest Bearing Deposits	1 017 779	1 127 108	0	0	0	0	0
+ Total Deposits	1 434 803	1 795 480	0	0	0	0	0
+ ST Borrowings & Repos	274 549	262 891	236 705	245 041	255 293	282 022	294 382
+ LT Debt	248 990	271 481	271 481	271 481	271 481	271 481	271 481
+ Pension Liabilities	6 148	6 691	0	0	0	0	0
+ Total Deferred Tax Liabilities	10 246	12 555	0	0	0	0	0
+ Total Derivative Liabilities	38 229	45 526	0	0	0	0	0
+ Other Liabilities	156 304	152 079	0	0	0	0	0
Total Liabilities	2 169 269	2 546 703	508 186	516 522	526 774	553 503	565 863
+ Preferred Equity and Hybrid Capital	23 401	24 510	0	0	0	0	0
+ Share Capital & APIC	91 723	85 982	85 982	85 982	85 982	85 982	85 982
+ Retained Earnings	156 319	164 088	159 842	130 663	98 049	58 136	15 030
+ Other Equity	-6 633	-1 656	0	0	0	0	0
Equity Before Minority Interest	264 810	272 924	245 824	216 645	184 031	144 118	101 012
+ Minority Controlling Interest	0	0	0	0	0	0	0
Total Equity	264 810	272 924	245 824	216 645	184 031	144 118	101 012
Total Liabilities & Equity	2 434 079	2 819 627	754 010	733 166	710 806	697 621	666 874

KHC	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 20025
+ Cash, Cash Equivalents & STI	2 279	3 417	6 833	8 220	9 514	11 165	12 779
+ Accounts & Notes Receiv	1 973	2 063	1 531	1 462	1 493	1 489	1 507
+ Inventories	2 721	2 554	2 660	2 532	2 581	2 567	2 592
+ Other ST Assets	1 1 2 4	2 788	1 979	1 889	1 930	1 930	1 948
Total Current Assets	8 097	10 822	13 003	14 103	15 518	17 151	18 825
+ Property, Plant & Equip, Net	7 055	7 438	7 193	6 961	6 714	6 493	6 257
+ Goodwill & Intangibles	84 198	79 756	79 756	79 756	79 756	79 756	79 756
+ Other LT Assets	1 558	1 814	1 814	1 814	1 814	1 814	1 814
Total Noncurrent Assets	92 811	89 008	88 763	88 531	88 284	88 063	87 827
Total Assets	100 908	99 830	101 766	102 634	103 802	105 214	106 653
+ Payables & Accruals	5 034	5 608	5 460	5 311	5 136	5 183	5 233
+ ST Debt	1 028	371	1 518	1 450	1 481	1 481	1 495
+ Other ST Liabilities	1 813	2 082	1 612	1 539	1 572	1 573	1 587
Total Current Liabilities	7 875	8 061	8 590	8 300	8 189	8 2 3 7	8 314
+ LT Debt	28 216	28 545	28 545	28 545	28 545	28 545	28 545
+ Other LT Liabilities	13 610	12 981	12 981	12 981	12 981	12 981	12 981
Total Noncurrent Liabilities	41 826	41 526	41 526	41 526	41 526	41 526	41 526
Total Liabilities	49 701	49 587	50 116	49 826	49 715	49 763	49 840
+ Preferred Equity and Hybrid Capital	0	0	0	0	0	0	0
+ Share Capital & APIC	56 840	55 108	55 108	55 108	55 108	55 108	55 108
- Treasury Stock	271	344	344	344	344	344	344
+ Retained Earnings	-3 060	-2 694	-3 114	-1 956	-676	687	2 048
+ Other Equity	-1 886	-1 967	0	0	0	0	0
Equity Before Minority Interest	51 623	50 103	51 650	52 808	54 088	55 451	56 812
+ Minority/Non-Controlling Interest	126	140	0	0	0	0	0
Total Equity	51 749	50 243	51 650	52 808	54 088	55 451	56 812
Total Liabilities & Equity	101 450	99 830	101 766	102 634	103 802	105 214	106 653

КО	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Cash, Cash Equivalents & STI	11 175	10 914	18 191	19 909	21 855	24 567	26 661
+ Accounts & Notes Receiv	3 971	3 144	3 878	4 096	4 311	4 601	4 716
+ Inventories	3 379	3 266	3 273	3 425	3 574	3 797	3 878
+ Other ST Assets	1 886	1 916	5 693	6 012	6 328	6 773	6 923
Total Current Assets	20 411	19 240	31 035	33 442	36 068	39 738	42 178
+ Property, Plant & Equip, Net	12 210	12 325	12 128	12 345	12 525	12 888	13 131
+ LT Investments & Receivables	854	812	812	812	812	812	812
+ Goodwill & Intangibles	26 766	28 550	28 550	28 550	28 550	28 550	28 550
+ Other LT Assets	26 140	26 369	26 369	26 369	26 369	26 369	26 369
Total Noncurrent Assets	65 970	68 056	67 859	68 076	68 256	68 619	68 862
Total Assets	86 381	87 296	98 895	101 517	104 324	108 357	111 040
+ Payables & Accruals	11 202	11 364	11 026	11 761	12 282	13 198	13 482
+ ST Debt	15 528	2 990	14 457	15 267	16 069	17 198	17 578
+ Other ST Liabilities	243	247	1 076	1 1 3 6	1 196	1 280	1 308
Total Current Liabilities	26 973	14 601	26 559	28 163	29 546	31 676	32 368
+ LT Debt	28 627	41 425	41 425	41 425	41 425	41 425	41 425
+ Other LT Liabilities	9 683	9 986	9 986	9 986	9 986	9 986	9 986
Total Noncurrent Liabilities	38 310	51 411	51 411	51 411	51 411	51 411	51 411
Total Liabilities	65 283	66 012	77 970	79 574	80 957	83 087	83 779
+ Preferred Equity and Hybrid Capital	0	0	0	0	0	0	0
+ Share Capital & APIC	18 914	19 361	19 361	19 361	19 361	19 361	19 361
- Treasury Stock	52 244	52 016	52 016	52 016	52 016	52 016	52 016
+ Retained Earnings	65 855	66 555	53 580	54 598	56 022	57 925	59 916
+ Other Equity	-13 544	-14 601	0	0	0	0	0
Equity Before Minority Interest	18 981	19 299	20 925	21 943	23 367	25 270	27 261
+ Minority/Non-Controlling Interest	2 117	1 985	0	0	0	0	0
Total Equity	21 098	21 284	20 925	21 943	23 367	25 270	27 261
Total Liabilities & Equity	86 381	87 296	98 895	101 517	104 324	108 357	111 040

МСО	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Cash, Cash Equivalents & STI	1 930	2 696	-165	1 157	2 657	4 330	6 081
+ Accounts & Notes Receiv	1 419	1 4 3 0	1 561	1 650	1 766	1 883	1 996
+ Other ST Assets	330	383	417	441	472	504	533
Total Current Assets	3 679	4 509	1 813	3 247	4 895	6 718	8 610
+ Property, Plant & Equip, Net	748	671	526	394	268	147	32
+ Goodwill & Intangibles	5 2 2 0	6 380	6 380	6 380	6 380	6 380	6 380
+ Other LT Assets	618	849	849	849	849	849	849
Total Noncurrent Assets	6 586	7 900	7 755	7 623	7 497	7 376	7 261
Total Assets	10 265	12 409	9 568	10 870	12 392	14 094	15 872
+ Payables & Accruals	773	998	0	0	0	0	0
+ ST Debt	89	94	102	108	116	124	131
+ Other ST Liabilities	1 0 5 0	1 1 3 0	1 230	1 300	1 392	1 488	1 573
Total Current Liabilities	1 912	2 222	1 333	1 408	1 507	1 612	1 704
+ LT Debt	4 663	5 319	5 319	5 319	5 319	5 319	5 319
+ Other LT Liabilities	2 853	3 105	0	0	0	0	0
Total Noncurrent Liabilities	7 516	8 4 2 4	5 319	5 319	5 319	5 319	5 319
Total Liabilities	9 428	10 646	6 652	6 727	6 826	6 931	7 023
+ Preferred Equity and Hybrid Capital	0	0	0	0	0	0	0
+ Share Capital & APIC	645	738	738	738	738	738	738
- Treasury Stock	9 250	9 748	9 748	9 748	9 748	9 748	9 748
+ Retained Earnings	9 656	11 011	11 927	13 153	14 575	16 173	17 859
Equity Before Minority Interest	1 051	2 001	2 917	4 143	5 565	7 163	8 849
+ Minority/Non-Controlling Interest	225	194	0	0	0	0	0
Total Equity	837	1 763	2 917	4 143	5 565	7 163	8 849
Total Liabilities & Equity	10 265	12 409	9 568	10 870	12 392	14 094	15 872

USB	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Cash & Cash Equivalents	142 263	193 868	203 128	212 061	221 802	231 689	243 096
+ Net Fixed Assets	3 702	3 468	3 311	3 158	3 006	2 891	2 787
+ Goodwill & Intangibles	10 332	10 572	10 572	10 572	10 572	10 572	10 572
+ Other LT Assets	35 817	35 290	35 290	35 290	35 290	35 290	35 290
+ Other Assets	303 312	310 707	0	0	0	0	0
Total Assets	495 426	553 905	252 300	261 081	270 670	280 442	291 745
+ ST Borrowings & Repos	23 723	11 766	14 578	15 076	15 720	16 347	16 785
+ LT Debt	41 213	42 241	42 241	42 241	42 241	42 241	42 241
+ Other Liabilities	378 007	446 173	0	0	0	0	0
Total Liabilities	442 943	500 180	56 819	57 317	57 961	58 588	59 026
+ Preferred Equity and Hybrid Capital	6 176	6 176	0	0	0	0	0
+ Share Capital & APIC	8 304	8 339	8 339	8 339	8 339	8 339	8 339
- Treasury Stock	24 440	25 930	25 930	25 930	25 930	25 930	25 930
+ Retained Earnings	63 186	64 188	77 606	85 889	94 834	103 978	114 844
+ Other Equity	0	0	0	0	0	0	0
Equity Before Minority Interest	53 113	54 355	60 015	68 298	77 243	86 387	97 253
+ Minority/Non-Controlling Interest	630	630	0	0	0	0	0
Total Equity	52 483	53 725	60 015	68 298	77 243	86 387	97 253
Total Liabilities & Equity	495 426	553 905	116 834	125 615	135 204	144 976	156 279

VZ	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Cash, Cash Equivalents & STI	2 594	22 171	26 186	30 674	37 750	47 226	58 509
+ Accounts & Notes Receiv	25 429	23 917	24 190	24 541	25 098	25 132	25 720
+ Inventories	1 422	1 796	1 429	1 424	1 474	1 453	1 471
+ Other ST Assets	8 028	6 710	5 909	5 994	6 1 3 0	6 155	6 282
Total Current Assets	37 473	54 594	57 715	62 633	70 453	79 966	91 983
+ Property, Plant & Equip, Net	114 609	117 364	120 831	125 355	127 465	127 365	126 352
+ Goodwill & Intangibles	128 946	130 283	130 283	130 283	130 283	130 283	130 283
+ Other LT Assets	10 699	14 240	14 240	14 240	14 240	14 240	14 240
Total Noncurrent Assets	254 254	261 887	265 354	269 878	271 988	271 888	270 875
Total Assets	291 727	316 481	323 068	332 511	342 441	351 854	362 858
+ Payables & Accruals	26 179	25 443	25 413	25 978	26 607	26 475	26 817
+ ST Debt	14 038	9 374	7 625	7 735	7 911	7 943	8 107
+ Other ST Liabilities	4 651	4 843	5 228	5 304	5 424	5 447	5 559
Total Current Liabilities	44 868	39 660	38 266	39 018	39 942	39 865	40 483
+ LT Debt	119 105	141 173	141 173	141 173	141 173	141 173	141 173
+ Other LT Liabilities	64 919	66 376	66 376	66 376	66 376	66 376	66 376
Total Noncurrent Liabilities	184 024	207 549	207 549	207 549	207 549	207 549	207 549
Total Liabilities	228 892	247 209	245 815	246 567	247 491	247 414	248 032
+ Preferred Equity and Hybrid Capital	0	0	0	0	0	0	0
+ Share Capital & APIC	13 848	13 833	13 833	13 833	13 833	13 833	13 833
- Treasury Stock	6 820	6 719	6 719	6 719	6 719	6 719	6 719
+ Retained Earnings	53 147	60 464	70 139	78 830	87 835	97 326	107 712
+ Other Equity	1 220	264	0	0	0	0	0
Equity Before Minority Interest	61 395	67 842	77 253	85 944	94 949	104 440	114 826
+ Minority/Non-Controlling Interest	1 440	1 4 3 0	0	0	0	0	0
Total Equity	62 835	69 272	77 253	85 944	94 949	104 440	114 826
Total Liabilities & Equity	291 727	316 481	323 068	332 511	342 441	351 854	362 858

Appendix AE – Top-8 holdings respective BALANCE SHEET for 2019 and 2020 as well as five forecasted years; in millions of US Dollars (Source: Bloomberg and Own Estimates)

AAPL	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Net Income	55 256	57 411	84 561	86 292	89 997	100 952	109 276
+ Depreciation & Amortization	12 547	11 056	25 457	25 170	7 534	18 770	20 161
+ Non-Cash Items	1 249	5 845	-13 155	-179	-217	-362	-287
+ Chg. in Non-Cash Work Cap	339	6 362	-2 569	11 211	1 258	5 922	2 165
Cash from Operating Activities	69 391	80 674	94 294	122 495	98 573	125 282	131 315
+ Change in Fixed & Intang	-10 495	-7 309	-10 211	-10 663	-10 894	-10 665	-10 962
+ Net Cash from Acq & Div.	-624	-1 524	0	0	0	0	0
+ Other Investing Activities	57 015	4 544	0	0	0	0	0
Cash from Investing Activities	45 896	-4 289	-10 211	-10 663	-10 894	-10 665	-10 962
+ Dividends Paid	-14 119	-14 081	-14 376	-15 246	-16 192	-15 934	-16 637
+ Cash From (Repayment) Debt	-7 924	2 373	8 376	894	1 083	1 811	1 433
+ Cash (Repurchase) of Equity	-66 116	-71 478	-54 247	-54 247	-54 247	-54 247	-54 247
+ Other Financing Activities	-2 817	-3 634	0	0	0	0	0
Cash from Financing Activities	-90 976	-86 820	-60 247	-68 599	-69 356	-68 370	-69 451
Net Changes in Cash	24 311	-10 435	23 836	43 233	18 322	46 247	50 902
FCF	58 896	73 365	84 084	111 832	87 678	114 617	120 353
FCFF	61 902	75 824	86 737	114 667	90 533	117 495	123 271
FCFE	50 972	75 738	92 459	112 726	88 761	116 428	121 786
Cash Paid for Taxes	15 263	9 501	20 774	21 199	22 109	24 800	26 845
Cash Paid for Interest	3 423	3 002	-3 287	-4 789	-7 899	-9 198	-12 502

AXP	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Net Income	6 759	3 135	-6 827	-12 937	-21 386	-33 597	-43 704
+ Depreciation & Amortization	1 188	1 543	160	160	160	160	160
+ Provision for Loan Losses	3 573	4 7 3 0	0	0	0	0	0
+ Non-Cash Items	709	-7	0	0	0	0	0
+ Net Ch in Operating Capital	1 403	-3 810	-9 386	-6 521	-6 114	-4 800	550
Cash from Operating Activities	13 632	5 591	-16 053	-19 298	-27 340	-38 237	-42 993
+ Net Change in Fixed Assets	-1 645	-1 478	-1 339	-1 575	-1 740	-1 748	-1 823
+ Net Change in Investments	-3 663	-13 199	0	0	0	0	0
+ Net Ch in Loans & Interbank	-11 047	26 906	0	0	0	0	0
+ Net Cash from Acq & Div.	-352	-597	0	0	0	0	0
Cash from Investing Activities	-16 707	11 632	-1 339	-1 575	-1 740	-1 748	-1 823
+ Dividends Paid	-1 422	-1 474	-1 401	-1 436	-1 460	-1 599	-1 763
+ Cash From (Repayment) Debt	2 172	-20 151	2 163	499	468	382	-57
+ Cash (Repurchase) of Equity	-4 599	-985	-3 155	-3 155	-3 155	-3 155	-3 155
+ Net Change in Deposits	3 330	13 542	0	0	0	0	0
Cash from Financing Activities	-519	-9 068	-2 392	-4 092	-4 147	-4 372	-4 974
Net Changes in Cash	-3 362	8 519	-19 784	-24 965	-33 227	-44 357	-49 791
FCF	11 987	4 1 1 3	-17 392	-20 873	-29 080	-39 985	-44 816
FCFF	0	0	-17 392	-20 873	-29 080	-39 985	-44 816
FCFE	14 078	-16 117	-15 229	-20 374	-28 612	-39 603	-44 873
Cash Paid for Taxes	1 700	2 200	-2 326	-4 433	-7 346	-11 556	-15 041
Cash Paid for Interest	3 400	2 000	-17 208	-10 969	-3 096	7 383	21 372

BAC	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Net Income	27 430	17 894	-8 308	-9 688	-12 418	-19 810	-22 654
+ Depreciation & Amortization	1 729	1 843	418	418	418	418	418
+ Provision for Loan Losses	3 590	11 320	0	0	0	0	0
+ Non-Cash Items	-14 333	-11 787	0	0	0	0	0
+ Net Ch in Operating Capital	43 361	18 723	0	0	0	0	0
Cash from Operating Activities	61 777	37 993	-7 890	-9 270	-12 000	-19 392	-22 236
+ Net Change in Investments	-24 007	-189 969	0	0	0	0	0
+ Net Ch in Loans & Interbank	-68 824	-1 047	0	0	0	0	0
+ Other Investing Activities	12 201	13 351	0	0	0	0	0
Cash from Investing Activities	-80 630	-177 665	0	0	0	0	0
+ Dividends Paid	-5 934	-7 727	-6 597	-7 297	-8 000	-7 908	-8 257
+ Cash From (Repayment) Debt	-16 249	9 386	-26 186	8 335	10 253	26 728	12 360
+ Cash (Repurchase) of Equity	-24 501	-5 916	-12 195	-12 195	-12 195	-12 195	-12 195
+ Net Change in Deposits	53 327	360 677	0	0	0	0	0
+ Other Financing Activities	-3 266	-601	0	0	0	0	0
Cash from Financing Activities	3 377	355 819	-44 978	-11 156	-9 943	6 625	-8 092
Net Changes in Cash	-15 844	218 903	-52 868	-20 426	-21 943	-12 767	-30 329
FCF	61 777	37 993	-7 890	-9 270	-12 000	-19 392	-22 236
FCFF	0	0	-7 890	-9 270	-12 000	-19 392	-22 236
FCFE	45 171	47 067	-58 585	-934	-1 747	7 336	-9 876
Cash Paid for Taxes	4 359	2 894	-1 668	-2 007	-2 678	-4 495	-5 194
Cash Paid for Interest	22 196	8 662	-41 268	-36 740	-34 991	-33 112	-32 019

КНС	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Net Income	1 935	356	3 370	3 149	3 320	3 390	3 483
+ Depreciation & Amortization	994	969	1 1 3 0	1 1 1 8	1 140	1 134	1 130
+ Non-Cash Items	856	3 157	339	17	-8	0	-3
+ Chg. in Non-Cash Work Cap	-233	447	277	50	-257	65	8
Cash from Operating Activities	3 552	4 929	5 117	4 334	4 195	4 589	4 617
+ Change in Fixed & Intang	-768	-596	-885	-887	-893	-913	-894
+ Net Cash from Acq & Div.	1 676	0	0	0	0	0	0
+ Other Investing Activities	603	74	0	0	0	0	0
Cash from Investing Activities	1 511	-522	-885	-887	-893	-913	-894
+ Dividends Paid	-1 953	-1 958	-1 963	-1 991	-2 040	-2 027	-2 122
+ Cash From (Repayment) Debt	-1 828	-1 197	1 147	-69	31	0	13
+ Other Financing Activities	-132	-176	0	0	0	0	0
Cash from Financing Activities	-3 913	-3 331	-815	-2 060	-2 009	-2 026	-2 109
Net Changes in Cash	1 144	1 1 38	3 416	1 387	1 294	1 651	1 615
FCF	2 784	4 333	4 232	3 447	3 303	3 677	3 723
FCFF	3 897	5 305	5 162	4 4 1 4	4 267	4 642	4 689
FCFE	956	3 1 3 6	5 379	3 378	3 334	3 677	3 737
Cash Paid for Taxes	974	1 027	1 027	959	1 012	1 033	1 062
Cash Paid for Interest	1 306	1 286	1 215	1 263	1 260	1 261	1 261

KO	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Net Income	8 920	7 747	7 696	9 313	10 055	10 970	11 494
+ Depreciation & Amortization	1 365	1 536	1 677	1 733	1 833	1 827	1 966
+ Non-Cash Items	-180	-129	-2 949	-259	-256	-360	-122
+ Chg. in Non-Cash Work Cap	366	690	-1 079	365	157	404	87
Cash from Operating Activities	10 471	9 844	5 346	11 152	11 788	12 840	13 426
+ Change in Fixed & Intang	-1 076	-988	-1 480	-1 949	-2 013	-2 190	-2 210
+ Net Cash from Acq & Div.	-5 113	-863	0	0	0	0	0
+ Other Investing Activities	2 213	374	0	0	0	0	0
Cash from Investing Activities	-3 976	-1 477	-1 480	-1 949	-2 013	-2 190	-2 210
+ Cash From (Repayment) Debt	-1 841	-1 862	11 467	810	802	1 1 2 9	381
+ Other Financing Activities	-227	310	0	0	0	0	0
Cash from Financing Activities	-9 004	-8 070	3 412	-7 485	-7 829	-7 938	-9 122
Net Changes in Cash	-2 509	297	7 277	1 718	1 946	2 712	2 094
FCF	8 4 1 7	8 667	3 865	9 203	9 775	10 651	11 216
FCFF	9 180	9 534	4 571	10 091	10 676	11 564	12 148
FCFE	7 554	6 994	15 332	10 013	10 577	11 779	11 597
Cash Paid for Taxes	2 1 2 6	1 268	1 807	2 185	2 358	2 572	2 695
Cash Paid for Interest	921	935	512	498	458	410	343

МСО	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Net Income	1 422	1 778	2 068	2 181	2 413	2 614	2 771
+ Depreciation & Amortization	200	220	242	243	246	256	260
+ Non-Cash Items	134	-63	-3 039	46	60	64	56
+ Chg. in Non-Cash Work Cap	-81	211	-1 129	-89	-116	-117	-113
Cash from Operating Activities	1 675	2 146	-1 858	2 381	2 603	2 817	2 974
+ Change in Fixed & Intang	-69	-103	-97	-111	-120	-135	-145
+ Net Cash from Acq & Div.	-162	-897	0	0	0	0	0
+ Other Investing Activities	267	-77	0	0	0	0	0
Cash from Investing Activities	36	-1 077	-97	-111	-120	-135	-145
+ Dividends Paid	-378	-420	-463	-502	-539	-564	-633
+ Cash From (Repayment) Debt	-129	688	8	6	8	8	7
+ Cash (Repurchase) of Equity	-946	-452	-452	-452	-452	-452	-452
+ Other Financing Activities	-110	-167	0	0	0	0	0
Cash from Financing Activities	-1 563	-351	-907	-948	-983	-1 008	-1 078
Net Changes in Cash	147	765	-2 861	1 322	1 500	1 673	1 751
FCF	1 606	2 043	-1 954	2 270	2 483	2 682	2 828
FCFF	1 784	2 215	-1 758	2 466	2 680	2 878	3 026
FCFE	1 477	2 7 3 1	-1 946	2 276	2 491	2 690	2 836
Cash Paid for Taxes	458	514	526	554	614	665	705
Cash Paid for Interest	167	132	231	247	240	232	223

USB	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
+ Net Income	6 914	4 959	11 412	13 485	14 184	14 487	15 332
+ Depreciation & Amortization	502	527	157	152	152	115	104
+ Provision for Loan Losses	1 504	3 806	0	0	0	0	0
+ Non-Cash Items	-773	-3 595	0	0	0	0	0
+ Net Ch in Operating Capital	-3 258	-1 981	0	0	0	0	0
Cash from Operating Activities	4 889	3 716	11 569	13 638	14 336	14 602	15 436
+ Net Change in Investments	-8 672	-12 427	0	0	0	0	0
+ Net Ch in Loans & Interbank	-10 777	-3 022	0	0	0	0	0
+ Other Investing Activities	-2 111	9	0	0	0	0	0
Cash from Investing Activities	-21 560	-15 440	0	0	0	0	0
+ Dividends Paid	-2 745	-2 852	-2 613	-2 694	-2 731	-2 835	-1 963
+ Cash From (Repayment) Debt	8 364	-11 932	2 812	497	644	627	438
+ Cash (Repurchase) of Equity	-4 437	-1 171	-2 509	-2 509	-2 509	-2 509	-2 509
+ Net Change in Deposits	16 441	67 854	0	0	0	0	0
Cash from Financing Activities	17 623	51 899	-2 309	-4 705	-4 596	-4 716	-4 034
Net Changes in Cash	952	40 175	9 260	8 933	9 741	9 886	11 402
FCF	4 889	3 716	11 569	13 638	14 336	14 602	15 436
FCFF	0	0	11 569	13 638	14 336	14 602	15 436
FCFE	12 922	-8 554	8 205	14 135	14 981	15 230	15 873
Cash Paid for Taxes	941	1 025	2 888	3 397	3 569	3 643	3 850
Cash Paid for Interest	4 404	2 199	-27 381	-28 689	-29 951	-31 327	-32 723
VZ	2019	2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
VZ + Net Income	2019 19 265	2020 17 801	FY 2021 18 463	FY 2022 19 368	FY 2023 19 867	FY 2024 20 556	FY 2025 21 650
VZ + Net Income + Depreciation & Amortization	2019 19 265 16 682	2020 17 801 16 720	FY 2021 18 463 16 940	FY 2022 19 368 17 304	FY 2023 19 867 19 463	FY 2024 20 556 19 717	FY 2025 21 650 20 068
VZ + Net Income + Depreciation & Amortization + Non-Cash Items	2019 19 265 16 682 6 512	2020 17 801 16 720 7 191	FY 2021 18 463 16 940 1 187	FY 2022 19 368 17 304 -10	FY 2023 19 867 19 463 -16	FY 2024 20 556 19 717 -3	FY 2025 21 650 20 068 -15
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap	2019 19 265 16 682 6 512 -6 713	2020 17 801 16 720 7 191 56	FY 2021 18 463 16 940 1 187 63	FY 2022 19 368 17 304 -10 220	FY 2023 19 867 19 463 -16 22	FY 2024 20 556 19 717 -3 -144	FY 2025 21 650 20 068 -15 -265
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities	2019 19 265 16 682 6 512 -6 713 35 746	2020 17 801 16 720 7 191 56 41 768	FY 2021 18 463 16 940 1 187 63 36 653	FY 2022 19 368 17 304 -10 220 36 881	FY 2023 19 867 19 463 -16 22 39 337	FY 2024 20 556 19 717 -3 -144 40 126	FY 2025 21 650 20 068 -15 -265 41 438
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang	2019 19 265 16 682 6 512 -6 713 35 746 -18 837	2020 17 801 16 720 7 191 56 41 768 -20 318	FY 2021 18 463 16 940 1 187 63 36 653 -20 407	FY 2022 19 368 17 304 -10 220 36 881 -21 828	FY 2023 19 867 19 463 -16 22 39 337 -21 573	FY 2024 20 556 19 717 -3 -144 40 126 -19 617	FY 2025 21 650 20 068 -15 -265 41 438 -19 055
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div.	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1	2020 17 801 16 720 7 191 56 41 768 -20 318 -520	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0	FY 2023 19 867 19 463 -16 22 39 337 -21 573 0	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 0	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div. + Other Investing Activities	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1 1 257	2020 17 801 16 720 7 191 56 41 768 -20 318 -520 -2 674	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0 0	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0 0	FY 2023 19 867 19 463 -16 22 29 337 -21 573 0 0	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 0 0	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0 0
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div. + Other Investing Activities Cash from Investing Activities	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1 1 257 -17 581	2020 17 801 16 720 7 191 56 41 768 -20 318 -520 -2 674 -23 512	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0 0 -20 407	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0 0 -21 828	FY 2023 19 867 19 463 -16 22 39 337 -21 573 0 0 0 -21 573	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 0 0 -19 617	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0 0 -19 055
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div. + Other Investing Activities Cash from Investing Activities + Dividends Paid	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1 1 257 -17 581 -10 016	2020 17 801 16 720 7 191 56 41 768 -20 318 -520 -2 674 -23 512 -10 232	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0 0 -20 407 -10 482	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0 0 -21 828 -10 676	FY 2023 19 867 19 463 -16 22 39 337 -21 573 0 0 -21 573 -10 863	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 0 0 -19 617 -11 065	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0 0 -19 055 -11 264
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div. + Other Investing Activities Cash from Investing Activities + Dividends Paid + Cash From (Repayment) Debt	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1 1 257 -17 581 -10 016 -5 231	2020 17 801 16 720 7 191 56 41 768 -20 318 -520 -2 674 -23 512 -10 232 14 269	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0 0 -20 407 -10 482 -1 749	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0 0 -21 828 -10 676 111	FY 2023 19 867 19 463 -16 22 39 337 -21 573 0 0 -21 573 -10 863 175	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 0 -19 617 -11 065 32	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0 0 -19 055 -11 264 164
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div. + Other Investing Activities Cash from Investing Activities + Dividends Paid + Cash From (Repayment) Debt + Other Financing Activities	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1 1 257 -17 581 -10 016 -5 231 -2 917	2020 17 801 16 720 7 191 56 41 768 -20 318 -520 -2 674 -23 512 -10 232 14 269 -2 712	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0 -20 407 -10 482 -1 749 0	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0 0 -21 828 -10 676 111 0	FY 2023 19 867 19 463 -16 22 39 337 -21 573 0 0 -21 573 -10 863 175 0	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 0 0 -19 617 -11 065 32 0	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0 0 -19 055 -11 264 164 0
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div. + Other Investing Activities Cash from Investing Activities + Dividends Paid + Cash From (Repayment) Debt + Other Financing Activities	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1 1 257 -17 581 -10 016 -5 231 -2 917 -18 164	2020 17 801 16 720 7 191 56 41 768 -20 318 -520 -2 674 -23 512 -10 232 14 269 -2 712 1 325	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0 0 -20 407 -10 482 -1 749 0 -12 231	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0 0 -21 828 -10 676 111 0 -10 566	FY 2023 19 867 19 463 -16 22 39 337 -21 573 0 0 -21 573 -10 863 175 0 -10 687	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 0 0 -19 617 -11 065 32 0 -11 033	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0 0 -19 055 -11 264 164 0 -11 100
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div. + Other Investing Activities Cash from Investing Activities + Dividends Paid + Cash From (Repayment) Debt + Other Financing Activities Cash from Financing Activities	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1 1 257 -17 581 -10 016 -5 231 -2 917 -18 164	2020 17 801 16 720 7 191 56 41 768 -20 318 -520 -2 674 -23 512 -10 232 14 269 -2 712 1 325	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0 -20 407 -10 482 -1 749 0 -12 231	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0 0 -21 828 -10 676 111 0 -10 566	FY 2023 19 867 19 463 -16 22 39 337 -21 573 0 0 -21 573 -10 863 175 0 -10 687	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 -19 617 -11 065 32 0 -11 033	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0 0 0 -19 055 -11 264 164 0 -11 100
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div. + Other Investing Activities Cash from Investing Activities + Dividends Paid + Cash From (Repayment) Debt + Other Financing Activities Cash from Financing Activities Cash from Financing Activities	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1 1 257 -17 581 -10 016 -5 231 -2 917 -18 164	2020 17 801 16 720 7 191 56 41 768 -20 318 -520 -2 674 -23 512 -10 232 14 269 -2 712 1 325 19 581	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0 -20 407 -10 482 -1 749 0 -12 231 4 015	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0 0 -21 828 -10 676 111 0 -10 566 4 487	FY 2023 19 867 19 463 -16 22 39 337 -21 573 0 0 -21 573 -10 863 175 0 -10 687 7 076	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 0 0 -19 617 -11 065 32 0 -11 033 9 476	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0 0 0 -19 055 -11 264 164 0 -11 100
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div. + Other Investing Activities Cash from Investing Activities + Dividends Paid + Cash From (Repayment) Debt + Other Financing Activities Cash from Financing Activities Net Changes in Cash FCF	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1 1 257 -17 581 -10 016 -5 231 -2 917 -18 164 1 17 807	2020 17 801 16 720 7 191 56 41 768 -20 318 -520 -2 674 -23 512 -10 232 14 269 -2 712 1 325 19 581 23 576	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0 -20 407 -10 482 -1 749 0 -12 231 4 015 16 246	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0 0 -21 828 -10 676 111 0 -10 566 4 487 15 053	FY 2023 19 867 19 463 -16 22 39 337 -21 573 0 0 -21 573 -10 863 175 0 -10 687 7 076 17 764	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 0 0 -19 617 -11 065 32 0 -11 033 9 476 20 509	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0 0 -19 055 -11 264 164 0 -11 100 11 283 22 383
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div. + Other Investing Activities Cash from Investing Activities + Dividends Paid + Cash From (Repayment) Debt + Other Financing Activities Cash from Financing Activities Cash from Financing Activities Net Changes in Cash FCF FCFF	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1 1 257 -17 581 -10 016 -5 231 -2 917 -18 164 1 17 807 21 440	2020 17 801 16 720 7 191 56 41 768 -20 318 -2 674 -23 512 -10 232 14 269 -2 712 1 325 19 581 23 576 26 855	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0 0 -20 407 -10 482 -1 749 0 -12 231 4 015 16 246 20 598	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0 0 -21 828 -10 676 111 0 -10 566 4 487 15 053 19 354	FY 2023 19 867 19 463 -16 22 39 337 -21 573 0 0 -21 573 -10 863 175 0 -10 687 7 076 17 764 22 068	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 0 0 -19 617 -11 065 32 0 -11 033 9 476 20 509 24 818	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0 0 -19 055 -11 264 164 0 -11 100 11 283 22 383 26 694
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div. + Other Investing Activities Cash from Investing Activities + Dividends Paid + Cash From (Repayment) Debt + Other Financing Activities Cash from Financing Activities Cash from Financing Activities Net Changes in Cash FCF FCFF FCFE	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1 1257 -17 581 -10 016 -5 231 -2 917 -18 164 1 17 807 21 440 12 576	2020 17 801 16 720 7 191 56 41 768 -20 318 -520 -2 674 -23 512 -10 232 14 269 -2 712 1 325 19 581 23 576 26 855 37 845	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0 -20 407 -10 482 -1 749 0 -12 231 4 015 16 246 20 598 14 497	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0 0 -21 828 -10 676 111 0 -10 566 4 487 15 053 19 354 15 164	FY 2023 19 867 19 463 -16 22 39 337 -21 573 0 0 -21 573 -10 863 175 0 -10 687 7 076 17 764 22 068 17 939	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 0 0 -19 617 -11 065 32 0 -11 033 9 476 20 509 24 818 20 541	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0 0 -19 055 -11 264 164 0 -11 100 11 283 22 383 26 694 22 547
VZ + Net Income + Depreciation & Amortization + Non-Cash Items + Chg. in Non-Cash Work Cap Cash from Operating Activities + Change in Fixed & Intang + Net Cash from Acq & Div. + Other Investing Activities Cash from Investing Activities + Dividends Paid + Cash From (Repayment) Debt + Other Financing Activities Cash from Financing Activities Net Changes in Cash FCF FCFF FCFF Cash Paid for Taxes	2019 19 265 16 682 6 512 -6 713 35 746 -18 837 -1 1 257 -17 581 -10 016 -5 231 -2 917 -18 164 17 807 21 440 12 576 3 583	2020 17 801 16 720 7 191 56 41 768 -20 318 -520 -2 674 -23 512 -10 232 14 269 -2 712 1 325 19 581 23 576 26 855 37 845 2 725	FY 2021 18 463 16 940 1 187 63 36 653 -20 407 0 -20 407 -0 -20 407 -10 482 -1 749 0 -12 231 4 015 16 246 20 598 14 497 7 106	FY 2022 19 368 17 304 -10 220 36 881 -21 828 0 -21 828 0 -21 828 -10 676 111 0 -10 566 4 487 15 053 19 354 15 164 7 445	FY 2023 19 867 19 463 -16 22 39 337 -21 573 0 0 -21 573 0 -21 573 -10 863 175 0 -10 687 7 076 17 764 17 764 17 764 17 939 7 633	FY 2024 20 556 19 717 -3 -144 40 126 -19 617 0 -19 617 -11 065 32 0 -11 033 9 476 20 509 24 818 20 541 7 891	FY 2025 21 650 20 068 -15 -265 41 438 -19 055 0 0 -19 055 -11 264 164 0 -11 100 11 283 22 383 26 694 22 547 8 300

Appendix AF – Top-8 holdings respective CASH FLOW STATEMENT for 2019 and 2020 as well as five forecasted

years; in millions of US Dollars (Source: Bloomberg and Own Estimates)