Application of Discounted Cash Flow Model in Company Valuation- A Case Study of Netflix

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ABSTRACT

In recent years, the Internet has profoundly changed the way people live, work and play in a form of rapid development. With this trend, the activities of Internet enterprises in the capital market are becoming increasingly frequent. How to use reasonable methods to value Internet enterprises has become an important issue. This paper discusses several existing enterprise valuation models and uses the discounted cash flow model to evaluate Netflix and estimates the enterprise value of Netflix based on the discounted cash flow model(DCF) and the capital asset pricing model(CAPM). The research used qualitative and quantitative methods to predict the financial data of enterprises, applying the linear regression method to predict the income and expenses of enterprises in the next six years, and qualitatively estimating the changes in the financial data of enterprises, and finally calculating WACC and corporate value. By comparing the data, this paper found that there are some differences between the calculated enterprise value and the official enterprise value, as well as some differences between the estimated debt to equity ratio and the expected ratio. This paper also discusses the reasons for the calculation differences, including the inherent defects in the application of the DCF model and the differences of data prediction.

Keywords: DCF valuation, Netflix, Linear Regression, CAPM, WACC

1. INTRODUCTION

Company valuation is a dominant theme of corporate finance, in which the valuation model exists to objectively reflect the value of the company, which is based on the current good capital market. Clear thinking about valuation and a proper valuation method to guide business decisions are preconditions for success in the current competitive circumstance [1]. The four most commonly used valuation methods are: net asset valuation, earning based Method, discounted cash flow model, dividend discounted model(DDM). The valuation model for Netflix is based on the capital asset pricing model(CAPM) and discounted cash flow model. This paper will explain the Netflix and the value and limitation of discounted cash flow model in practical application. Value investing starts with analyzing the fundamentals of a company and budgeting its stock price. That's why both entrepreneurs and investors see valuation as key, in which they can determine their control and the value of their shares [2]. Through the application of the DCF model in actual enterprise valuation, this study discloses the advantages and disadvantages of the DCF model, and puts forward ideas for the applicability of the DCF model and the application of more precise valuation models based on it for technology-oriented enterprises such as Netflix.

2. DISCOUNTED CASH FLOW VALUATION

The discounted cash flow (DCF) valuation method estimates the fundamental value of a company based on the cumulative present value of its actual cash flows [3]. As one of the best valuation models, the discounted cash flow model has been widely used in the actual valuation of companies, including stock pricing, mergers and acquisitions, financing, tax avoidance, and Shareholders to sell stocks.

Compared with the discounted cash flow model, Net Asset valuation(NAV), Earning based model and dividend discounted model(DDM) expose more disadvantages in estimating the value of Netflix.

The valuation of net assets takes the enterprise value as the sum between the book value of division net assets and the adjustment item. However, entrepreneurs and investors often focus not on the asset itself, but on the

cash flow that the asset can generate in the future. In addition, the NAV ignores off-balance sheet assets such as skilled labor and technical talent, goodwill, and mature organizational structures, which are very inappropriate for valuing a technology company like Netflix.

The equity value under earning based is the product of the company's P/E ratio and the actual profit retained inside the company after dividends. It combines stock market information with corporate information. But, in fact, finding the right P/E ratio is very difficult. The P/E ratio is based on historical performance, and it may not take account of the future growth of the company.

The dividend discount model considers that the value of a stock is equal to the present value of the dividend income that the owner can expect to receive at an appropriate discount rate during the company's operating life. Dividend discount valuation is mainly applied to the investment valuation of listed companies with slow performance growth, strong business stability, high dividend rate and continuous dividend, which is closest to the horizontal comparison method of bonds or time deposits. Therefore, high-tech companies like Netflix, which is in a period of rapid business development, are not suitable for dividend discount model valuation.

Overall, the DCF model is the best model, which is based on the future cash flow and the risk associated with the cash flow. It can be applied to a wider range of companies than net asset valuation and price-earnings ratio valuation. However, it is impossible that the estimate of both cash flows and discount rate are accurate.

3. NETFLIX

Netflix inc., headquartered in Los Gatos, California, USA, is a subscription streaming media platform [4]. Founded in 1997, it was once an online DVD and Blu-ray rental provider. Its main businesses were streaming revenue and DVD rental services. Netflix has become the industry leader over the past few years, and its market capitalization of more than $166.3 billion reflects its success [5].

Two years after the most globally disruptive event in most consumers' lifetimes, COVID-19 remains an inescapable force driving the media and entertainment industry. For the media and entertainment industries, consumers' desire to enjoy music and movies will be tempered by continued venue constraints and caution, an accumulated habit that has contributed to a gradual shift in sales to digital products and online sales. Around the world, the pandemic lockdown has made most of the family entertainment the only option. In 2020, Internet data consumption for the whole year increased by 30%, starting a higher growth trend. Rising vaccination rates and the effectiveness of controls are helping to drive global entertainment and media growth at a projected five-year CAGR of 5% as more parts of the world escape lockdowns [6].

The study assumes that Netflix is in a state of sustained growth, which the market believes it will be, generating higher margins as its business grows. The study suggests that higher margins are likely due to economies of scale on a cost-neutral basis and higher selling prices to consumers [5], which together make Netflix a more valuable company, laying the foundation for the growth model.

As a listed company, Netflix has transparent financial reports and a single business system relying on premium content to attract customers who can invest in content and cash flow from advertising and membership fees. Therefore, it is conducive to the prediction and estimation of its financial data, so this study chooses Netflix as the object of valuation.

## 4. THE VALUATION PROCESS

4.1. Linear Regression

In order to estimate the revenue and expense growth rate of Netflix in the next six years, this study adopts the method of linear regression to estimate the annual average number of members in United States and Canada (UCAN), Europe, Middle East and Africa(EMEA), Latin America (LATAM) and Asia-Pacific (APAC), the average monthly price per paying membership and the four main expense subjects of Netflix in the period of 2021-2027 through the data of quarterly and annual financial statements of Netflix in recent three years. Due to the finiteness of the report data and the internal error of the linear regression method, the deviation of the predicted value is inevitable, but the linear regression only has reference significance for the data estimation of the model, and the establishment of the model focuses more on qualitative analysis. The pictures below show several subjects with obvious linear relationships.
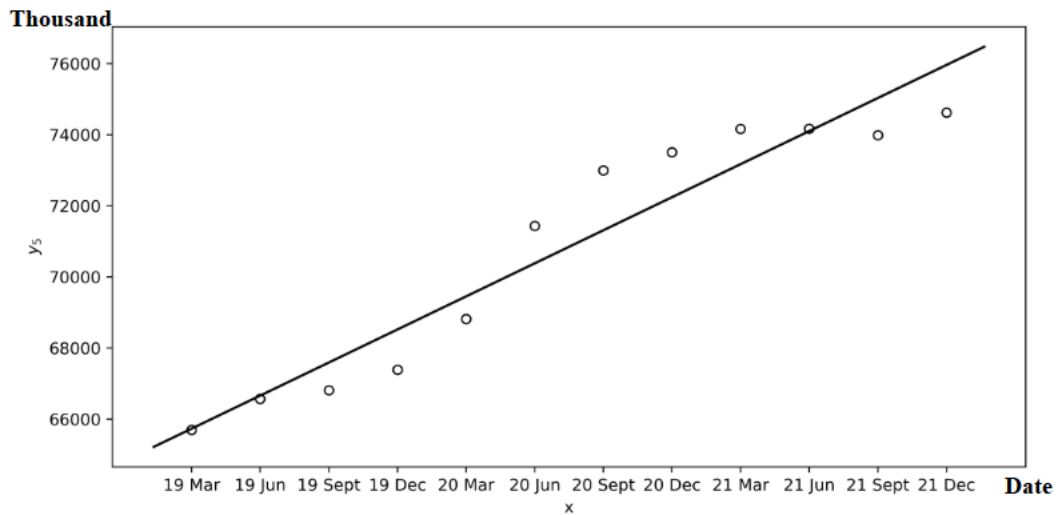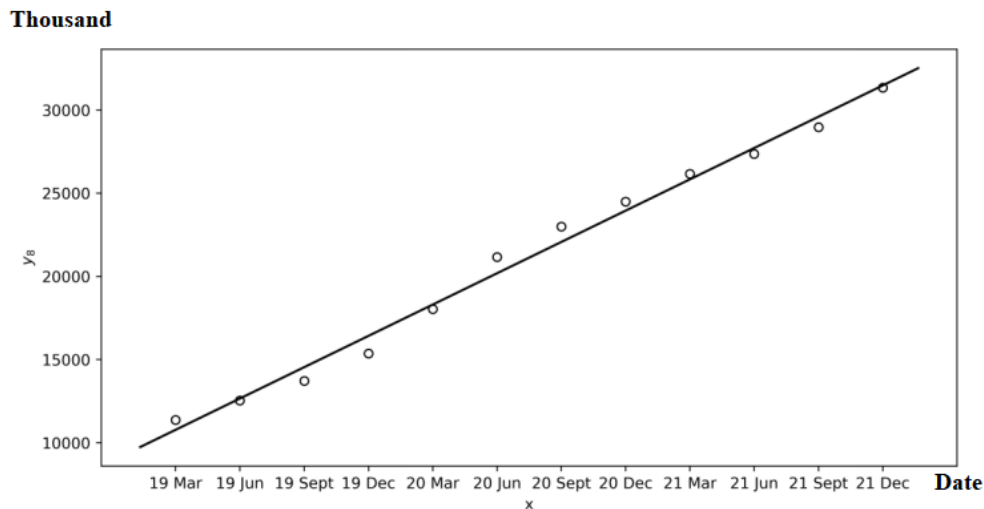
Figure1. Average paying memberships of United States and Canada (UCAN) for twelve quarters 2019-2021
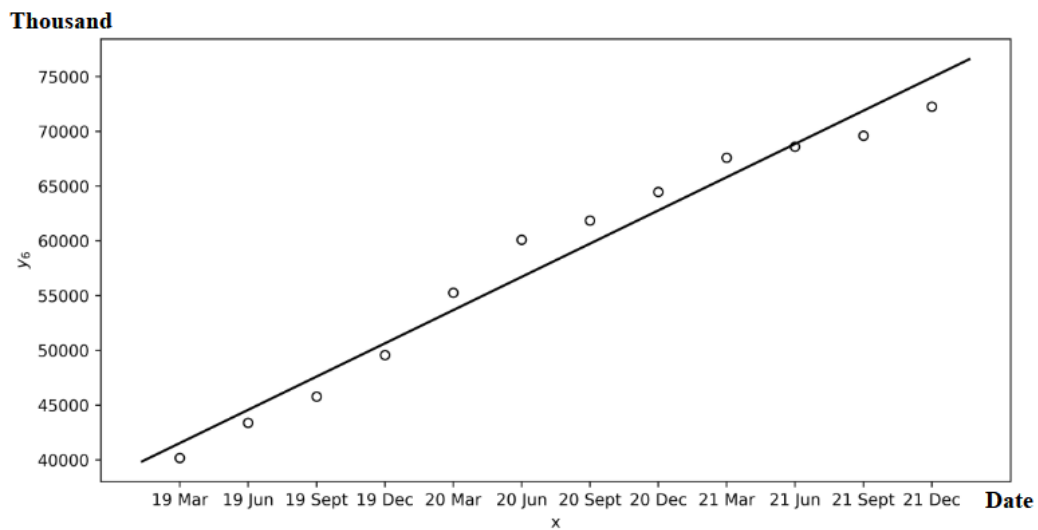
Figure 2. Average paying memberships of Europe, Middle East and Africa (EMEA) for twelve quarters 2019-2021
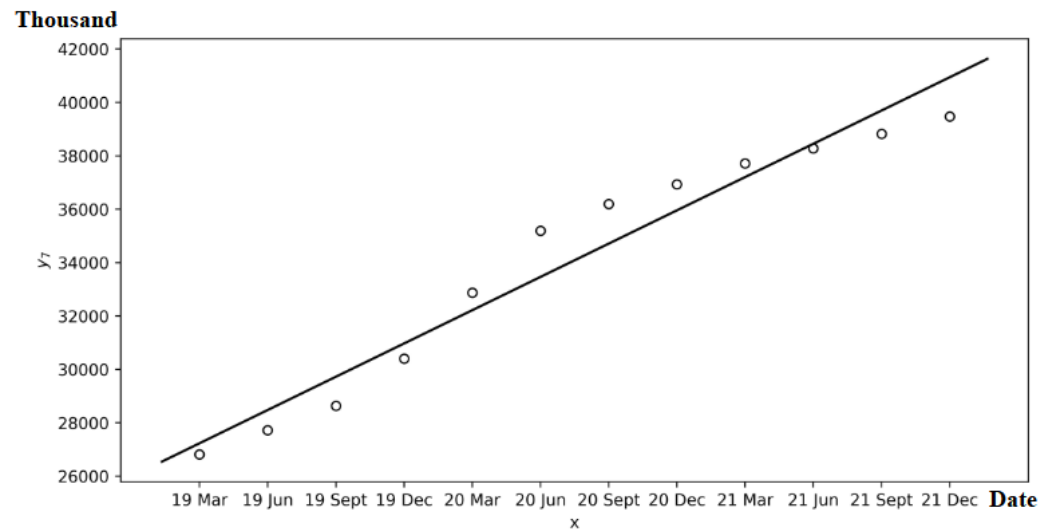
Figure 3. Average paying memberships (unit: thousand) of Latin America (LATAM) for twelve quarters 2019-2021

Thousand

Figure 4. Average paying memberships of Average paying memberships for twelve quarters 2019-2021

These four figures show the average number of paid members in Netflix's four operating regions over a 12-quarter period from 2019 to 2021. You can see that the average number of paid members has increased to some extent in all four regions. A simplified estimate predicts that UCAN, EMEA, LATAM and APAC will increase their average payer membership by 9%, 8%, 4% and 5%, respectively. Similarly, this study uses the same method to simplify the prediction of the average monthly membership fee paid per person for UCAN, EMEA, LATAM and APAC. It is estimated that they will grow at the rate of 9%, 4%, 8% and 2%.

It can be said that due to the limitation of data, the established regression equation only helps this study to establish the estimated growth or decline rate subjectively, rather than make an accurate prediction based on the acquisition and analysis of a large amount of data.

In the process of statistical data, some data points are abnormal and greatly different from other data. This shows that there is no numerical linear relationship between these data. In the linear equation, data in 2022 is predicted by using the past 12 quarter points, because the author do not collect enough sample size for the next seven years to make a more accurate prediction of data. Therefore, in the six years of data forecast, the research adopted the methods of qualitative analysis, mainly considering the company's share price, revenue and profit and other financial indicators in recent years. The results are as follows:

Table 1. Netflix's average number of members and major revenue projections for 2021-2027

Period (years)			2021	2022	2023	2024	2025	2026	2027
Average monthly price per paying member ship	UCAN	$	14.56	15.87	17.30	18.86	20.55	22.40	24.42
	EMEA	$	11.63	12.10	12.58	13.08	13.61	14.15	14.72
	LATAM	$	7.73	8.35	9.02	9.74	10.52	11.36	12.27
	APAC	$	9.56	9.75	9.95	10.15	10.35	10.56	10.77
Average paying member ships	UCAN	p	74,234,000	79,430,380	87,373,418	92,615,823	100,025,089	109,027,347	116,659,261
	EMEA	p	69,518,000	75,774,620	81,078,843	86,754,362	94,562,255	103,072,858	111,318,687
	LATAM	p	38,573,000	39,344,460	40,524,794	42,145,786	43,410,159	45,580,667	47,403,894
	APAC	p	28,461,000	30,453,270	32,280,466	33,248,880	34,578,835	36,307,777	38,849,322
Subscription	UCAN	%	113%	112%	111%	110%	110%	109%	109%

revenue growth growth	EMEA	%	111%	101%	92%	84%	76%	69%	63%
	LAT AM	%	114%	114%	114%	115%	115%	115%	116%
	APAC	%	118%	105%	93%	83%	74%	66%	58%
DVD revenues		$	182,348,000	173,595,296	160,263,177	140,570,038	118,114,818	86,038,991	46,318,217
		%	-3%	-5%	-8%	-12%	-16%	-27%	-46%
Cost of revenues		$	6,412,955,692	6,906,095,292	7,158,829,352	7,233,099,155	7,242,526,129	7,302,567,841	7,496,024,125
Marketing		$	2,545,146,000	2,740,817,198	2,841,119,587	2,870,594,992	2,874,336,269	2,898,164,981	2,974,941,840
Technology and development		$	2,273,885,000	2,449,785,267	2,539,437,111	2,565,782,688	2,569,126,700	2,590,425,176	2,659,049,533
General and administrative		$	1,351,621,000	1,455,159,656	1,508,412,383	1,524,061,519	1,526,047,844	1,538,699,027	1,579,461,537

4.2. Calculation

WACC refers to the effective cost of capital of a company or the opportunity cost of acquiring capital for a company [7]. It is calculated as the return that capital providers expect from the next best investment. WACC is calculated as a weighting of the cost of equity and the cost of debt, where the weighting refers to the capitalization of the company, i.e. the percentage capitalization of the company's equity and the percentage capitalization of its debt per percentage. The WACC can be calculated as follows:

$$WACC = \frac{D}{V}r_D + \frac{E}{V}r_E \quad (1)$$

Where:

$\frac{D}{V}$: the percentage of corporate debt in value

$\frac{E}{V}$: the proportion of equity in value

r_D: the actual debt financing cost rate of the enterprise after considering taxes

r_E: proportional cost of equity

The cost of equity, which is included in WACC calculation, is often calculated using CAPM model, and the formula is as follows:

$$E(r_i) = r_f + \beta_i[E(r_m) - r_f] \quad (2)$$

Where:

$E(r_i)$: expected return on security i

$E(r_m)$: expected market return

r_f: risk free return

β_i: security beta, which is a regression coefficient, showing how security reacts to market shocks

The author will estimating cost of equity through using the linear beta pricing model, of which the capital asset pricing model(CAPM) is the most widely known. CAPM provides the required return based on the perceived level of systematic risk of an investment. Regarding the acquisition of a discount rate, it is usually derived from the CAPM framework considering the risk factor, market expected rate of return, and expectations about the risk-free rate [1]. The benefit of applying the CAPM model is that it considers only systematic risk, reflecting a reality in which most investors have diversified portfolios in which unsystematic risk has been essentially eliminated. It is generally seen as a much better method of calculating the cost of equity than the DVM in that it explicitly takes into account a company's level of systematic risk relative to the whole stock market. However, the short-term government security, which is a substitute for the risk free return, is not fixed and changes according to economic environment. Also, the assumption of a single-period time horizon is inconsistent with the multi-period nature of investment appraisal.

The CAPM suggests that shares move with the market. If the market moves by 1%, and the beta is1.5, then the return on the share would move by 1.5%. The beta indicate the sensitivity of the return on shares with the return on the market. When beta is greater than 1, stocks will rise faster in a bull market and fall faster in a declining market. When beta is less than 1, a company's stock rises or falls less than the market moves. A beta of more than 1 means that a particular firm presents a greater systemic risk than a portfolio of risky assets, and conversely, a lower systemic risk than the market when the beta is less than 1.

The final value is introduced because companies generally do not estimate cash flows indefinitely. Select a time point, by stages to estimate the free cash flow of the enterprise, with the final value to replace the sum of cash flows after this time point [8]. It is assumed that the

firm will grow at a constant rate, and the termination of the firm in the NTH year can be calculated by the following formula:

$$E_n = \frac{FCF_{T+1}}{r-g} \quad (3)$$

Where:

FCF_{T+1}: Free cash flow obtained by the enterprise in period n +1

r=The weighted average cost of capital for the n+1 period

g=The constant growth rate of the firm after n+1

In the valuation process of Netflix, this research uses the capital asset pricing model to evaluate the equity cost of Netflix, in which Beta Asset and market premium in calculation are sourced from Statistia, and other key values are sourced from authoritative websites such as NYU Stern. This paper supposes that Netflix's cost of debt remains unchanged at 1.75%. On the basis of the above, the author calculates WACC. The last stage is using Free Cash Flow to calculate the NPV of Netflix in the next six years, adding the final value of the enterprise after 2027, finally getting the estimated company value and debt to equity ratio. The table below shows the final valuation result:

Table 2. Company Value Estimation 2021-2027

Period	2021	2022	2023	2024	2025	2026	2027
US risk-free	1.9%						
Market Premium	4.7%						
Beta	96%						
Target D/E Ratio	1.10						
Growth Rate	3.9%						
Compan y D/E	0.93						
Tax Rate	12.4%						
Cost of Equity	11.96%	9.56%	9.36%	10.46%	10.76%	9.96%	10.66%
Cost of Debt	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%	1.75%
WACC	6.93%	5.69%	5.59%	6.16%	6.31%	5.90%	6.26%
Discount Factor	-	0.97	0.92	0.87	0.82	0.77	0.73
FCF	2,851,601,401	-4,513,659,429	3,195,693,947	3,238,928,465	3,228,389,991	3,225,132,072	3,277,267,183
Discount ed CF	-	-4,390,449,836	2,943,959,951	2,810,713,639	2,635,204,467	2,485,910,595	2,377,248,836
NPV Forecast Period	8,862,587,651						
NPV Continu ation Period	100,674,568,671						
Enterpri se Value	109,537,156,323						
Value of Debt	20,246,449,000						
Equity	89,290,707,323						
D/E	0.23						

4.3. Data Analysis

Table 2 is the company's valuation result using the discounted cash flow model. The enterprise value finally calculated by this model is $109,537,156,323 at the end of 2021. In the estimation of model parameters, the market risk-free interest rate, market premium, beta, growth value and debt cost of Netflix are all based on the data of 2021, all of which come from authoritative websites. For the sake of calculation, this model estimates that Netflix's corporate debt will remain at a constant value of $20,246,449,000. It can be found that the final calculated D/E ratio is 0.23, which is quite different from the company's D/E ratio of 0.93 in 2021.

This study believes that this may be due to the following reasons. The first is the impact of simplifying assumptions on enterprise value estimation. Assumptions of arbitrary increases in final value can bias the results. Studies show that if the value driver is not constant at the end of the period, the growth rate in the forecast financial statements will not be constant, thus violating the assumption of the constant growth rate at the end of the period [9]. The second problem that leads to bias is that the constant cost of debt is adopted in this study. However, when the debt ratio changes, the weight changes in WACC are ignored, which will lead to bias in estimating firm value[10]. Therefore, a better solution is to recapitalize the model as a whole, including the cost of equity and the cost of debt. This solution may change the problem that the final calculated D/E ratio deviates too much from the company's previous D/E ratio.

Another reason for the bias is that the study has a positive forecast for future economic conditions, based on the development of the global economy and the mitigation of the COVID-19 pandemic. Economic conditions explain the variation between estimated and implied costs, and the implied cost of equity will decrease as investors anticipate positive economic conditions [11].

5. CONCLUSION

The discounted cash flow model emphasizes the application of cash flow in enterprise valuation. The intrinsic value of each asset can be estimated based on the characteristics of the company's cash flow and growth risk. To use a DCF model, the research needs to estimate the company's cash flows over a given lifetime and estimate the discount rate at which those cash flows are discounted to present value. The measurement of enterprise value is a complex and forward-looking method, which requires certain assumptions and predicts future cash flow and discount rate through the processing of a large amount of data. However, the practicality of the discounted cash flow model is still worth considering. The size of the discount rate, the length of the discount period, and other variables need to be determined by

subjective estimation. Facing an uncertain market, it is very difficult to predict the cash flow of a rapidly developing enterprise. Based on the above considerations, how to reasonably estimate the economic situation and how to manage liquidity and solvency in an optimal way are both the major problems to be solved based on current theories. It should be admitted that this paper simply applies the discounted cash flow model. It is expected that if the model and estimation numerical methods are improved more accurately, the advantages of the discounted cash flow model in enterprise value estimation will be better reflected.

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