

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics



Master's Thesis

Fundamental Analysis of Alphabet Inc. Stocks

Senglong PIN

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

DIPLOMA THESIS ASSIGNMENT

Senglong Pin

Economics and Management

Thesis title

Fundamental analysis of Alphabet Inc. stocks

Objectives of thesis

The aim of this diploma thesis is to determine the intrinsic value of Alphabet Inc. stocks by examining key financial metrics, such as revenue growth, profit margins, cash flow, and earnings per share. The analysis include trends, and regulatory risks to assess the overall investment opportunity presented by Alphabet Inc. stocks. The findings of this analysis will inform investment decisions and provide insights into the long-term growth prospects of Alphabet Inc. as a publicly traded company.

Methodology

The diploma thesis' methodology comprises two essential segments, each strategically designed to comprehensively achieve the intended objectives. Incorporating both qualitative and quantitative aspects, the research methodology is poised to offer a well-rounded analysis. The initial segment focuses on establishing a robust theoretical foundation for the company, prioritizing an in-depth analysis of its financial statements. The literature review section acts as the cornerstone, presenting a comprehensive overview of various financial analysis methodologies aligned with the core objectives of the dissertation.

The subsequent segment involves the practical application of relevant company data. Emphasizing the importance of this phase, it primarily centers on a meticulous examination of the company's financial statements, employing specific key ratios for a comprehensive financial statement analysis.

The study methodology will rely on a secondary data approach, gathering information primarily from the company's annual reports, financial statements, industry-related publications, and reputable financial databases. Encompassing a temporal scope from 2018 to 2022, the study is poised to conduct an in-depth evaluation of the company's performance and financial standing during this specified time frame. A comprehensive set of approaches for conducting Fundamental Analysis on Alphabet Inc. Stocks involves: Vertical and horizontal analyses, Ratio analyses, Examination of trends, and the application of Discounted Cash Flow (DCF) techniques.

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The Diploma Thesis Supervisor

Ing. Karel Malec, Ph.D.

Supervising department

Department of Economics

Electronic approval: 07. 11. 2023

prof. Ing. Lukáš Čechura, Ph.D.

Head of department

Electronic approval: 09. 11. 2023

doc. Ing. Tomáš Šubrt, Ph.D.

Dean

Prague on 10. 11. 2024

Declaration

I declare that I have worked on my master's thesis titled " Fundamental Analysis of Alphabet Inc. Stocks " by myself and I have used only the sources mentioned at the end of the thesis. As the author of the master's thesis, I declare that the thesis does not break any copyrights.

In Prague on 29 November 2024

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Fundamental Analysis of Alphabet Inc. Stocks

Abstract

This diploma thesis evaluates the financial health and intrinsic stock value of Alphabet Inc., with the study period from 2018 to 2022. The thesis is divided into two segments, theoretical and practical part. Both qualitative and quantitative methodologies are applied. With the application of fundamental analysis techniques, including vertical and horizontal analyses, ratio analysis, and the stock evaluation method both Discounted Cash Flow (DCF) and Book Value Per Share (BVPS), the study aim to reveal whether or not the company stock is properly valued. The findings conclude that Alphabet is in a solid financial position based on the outcome of liquidity being remarkable over the benchmark, exceptional profitability, strong solvency with a low debt-to-equity ratio and significant interest coverage. Alphabet's intrinsic stock value based on DCF result was \$154.45 per share while the market price was \$88.23 in 2022 meaning that the stock was highly undervalued. Surprisingly, the value which came from BVP was only \$19.61 which appears to be due to the limitations of traditional balance-sheet metrics not capturing the hidden potential of growth-oriented tech firms. Despite this contrast, all other findings such as financial metrics, DCF valuation, macroeconomic context, and expert opinions point out positively toward Alphabet as an attractive and compelling investment opportunity.

Keywords: fundamental analysis, stocks, intrinsic value, discounted cashflow, trend analysis

Fundamentální analýza akcií společnosti Alphabet Inc

Abstrakt

Tato diplomová práce hodnotí finanční zdraví a vnitřní hodnotu akcií společnosti Alphabet as, s obdobím studia 2018 až 2022. Práce je rozdělena do dvou částí, teoretické a praktické části. Jsou aplikovány jak kvalitativní, tak kvantitativní metodiky. S použitím technik fundamentální analýzy, včetně vertikálních a horizontálních analýz, poměrové analýzy a metody hodnocení akcií, jak diskontovaných peněžních toků (DCF), tak účetní hodnoty na akciích (BVPS), je cílem studie odhalit, zda akcie společnosti jsou či nejsou náležitě oceněny. Zjištění dospěla k závěru, že společnost Alphabet je v solidní finanční pozici na základě výsledku likvidity, který je v porovnání s benchmarkem pozoruhodný, výjimečné ziskovosti, silné solventnosti s nízkým poměrem dluhu k vlastnímu kapitálu a významného úrokového krytí. Vnitřní hodnota akcií společnosti Alphabet na základě výsledku DCF byla 154,45 USD za akcii, zatímco tržní cena byla v roce 2022 88,23 USD, což znamená, že akcie byly vysoce podhodnocené. Překvapivě byla hodnota, která přišla od BVP, pouze 19,61 dolaru, což se zdá být způsobeno omezeními tradičních bilančních metrik, které nezachycují skrytý potenciál růstově orientovaných technologických firem. Navzdory tomuto kontrastu všechna ostatní zjištění, jako jsou finanční metriky, ocenění DCF, makroekonomický kontext a znalecké posudky, poukazují pozitivně na Alphabet jako na atraktivní a přesvědčivou investiční příležitost.

Klíčová slova: fundamentální analýza, akcie, vnitřní hodnota, diskontovaný peněžní tok, analýza trendů

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1. Introduction

Alphabet Inc. is an American multinational company founded in 2015 as part of a corporate restructuring of Google. Google itself was originally established in 1998 by two Stanford University students, Sergey Brin and Larry Page, who later became renowned American entrepreneurs and co-founders of the company. When Alphabet was created, Google LLC became its primary subsidiary. Since then, several more subsidiaries have been established under Alphabet, such as Waymo LLC, Verily Life Sciences LLC, Calico LLC, DeepMind Technologies Limited, Nest Labs, Jigsaw, Google Fiber, Chronicle LLC, and Wing Aviation LLC. Remarkably, worldwide online search requests heavily rely on Google, which accounts for more than 70% globally. Originally a search engine company, Google now delivers over 50 Internet services and products, such as email, online document tools, and software for mobile and tablet devices (Mark and William L., 2024).

Alphabet Inc., a global tech giant, provides various types of products and platforms, which include search, YouTube, Google Maps, Chrome, Calendar, Ads, Gmail, Google Play, Android, and Google Cloud. Besides that, they also engage in hardware-related businesses, such as Pixel phones and Nest home products. In addition, Alphabet is well known for its involvement in online advertising activities via TV services, internet services, subscriptions, and research and development. Moreover, they dedicate heavily to infrastructure, data, machine learning, analytics, and AI. Alphabet operates globally and is headquartered in Mountain View, California, USA. (GlobalData, 2024).

On January 30, 2023, the closing price of Alphabet Inc. (NASDAQ: GOOG) was \$97.95 per share. Over a one-month period, the stock had a return of 10.39%, although it experienced a 27.82% decline in value over the past year. The market capitalization of Alphabet Inc. stood at approximately \$1.261 trillion, ranking it 6th on the list of the 30 Most Popular Stocks Among Hedge Funds (Eswaran, 2023).

2. Objectives and Methodology

2.1. Research Objectives

The aim of this diploma thesis is to determine the intrinsic value of Alphabet Inc. stocks by examining key financial metrics, such as revenue growth, profit margins, cash flow, and earnings per share. The analysis includes trends, and regulatory risks to assess the overall investment opportunity presented by Alphabet Inc. stocks. The findings of this analysis will inform investment decisions and provide insights into the long-term growth prospects of Alphabet Inc. as a publicly traded company.

2.2. Research Questions

The key objective of this research is to find answers to the following questions:

- How do core financial indicators affect the intrinsic valuation of Alphabet Inc. stocks?
- What insights can demonstrate whether the company's long-term investment aspects and growth are heading in the right direction?
- Considering all factors, what makes investing in Alphabet Inc. stocks an attractive option for investors?

2.3. Methodology

The diploma thesis' methodology comprises two essential segments, each strategically designed to comprehensively achieve the intended objectives. Incorporating both qualitative and quantitative aspects, the research methodology is set to provide a thorough analysis. The initial segment focuses on establishing a solid theoretical foundation for the company, prioritizing an in-depth analysis of its financial statements. The literature review section provides the basis, presenting a comprehensive overview of various financial analysis methodologies aligned with the core objectives of the thesis. The subsequent segment involves the practical application of relevant company data. Emphasizing the importance of this phase, it primarily centres on a thorough examination of the company's financial statements, employing specific key ratios for a comprehensive financial statement analysis. The study methodology will mainly rely on a secondary data approach, gathering information primarily from the company's annual reports, financial statements, industry-related publications, and reputable financial databases. Covering the period from

2018 to 2022, The study is designed to conduct an in-depth evaluation of the company's performance and financial standing during this specified time frame. A comprehensive set of approaches for conducting Fundamental Analysis on Alphabet Inc. Stocks involves: Vertical and horizontal analyses, Ratio analyses, Examination of trends, and the application of Discounted Cash Flow techniques along with Book Value Per Share method.

2.3.1. Analysis Tools and Formulas

Here are the methods and formulations which are used to analyse Alphabet Inc.'s financial performance:

- **Horizontal Analysis:** Horizontal analysis, which is also known as trend analysis, is a tool which is used to compare the line items of financial statements across time. In horizontal analysis of a balance sheet, changes in value for each line item are calculated over a specific time period and then expressed as a percentage relative to the base year's figures.

Horizontal analysis on balance sheet is formulated by:

$$\frac{\text{Current year amount} - \text{Base year amount}}{\text{Base year amount}} \times 100 \quad (1)$$

- **Vertical Analysis:** To conduct a vertical analysis of an income statement, each line item on the income statement is recalculated as a percentage of total revenue or net sales. The following formula can be used to perform a vertical analysis of an income statement:

Vertical Analysis on Income Statement is formulated by:

$$\frac{\text{Line item amount}}{\text{Total Revenue}} \times 100 \quad (2)$$

- **Gross profit ratio:** This ratio is also known as gross profit margin. It is used to indicate the company's pricing policy and it shows gross profit as a percentage of net sales. The gross profit ratio measures how efficiently a company manages its production or purchasing costs and pricing strategies. A higher gross profit ratio indicates better management efficiency in these areas. (True, 2023)

The following equations are used to order to calculate the gross profit ratios:

$$\text{Gross Profit} = \text{Net Sales} - \text{Cost of Goods Sold} \quad (3)$$

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net Sales}} \times 100 \quad (4)$$

- Operating Profit Ratio: This ratio is also used to calculate the profitability ratio and can also be called Operating Profit Margin. The operating profit ratio presents the relationship between a company's operating profit and its net revenue (or net sales). Also, It helps assess how much operating profit of the business earns when compared to its revenue from operations (Accounting Capital, 2024).

To calculate operating profit ratio, following equations are used:

$$\text{Operating Profit} = \text{Gross Profit} - \text{Operating Expenses} \quad (5)$$

$$\text{Operating Profit Ratio} = \frac{\text{Operating Profit}}{\text{Net Sales}} \times 100 \quad (6)$$

- Net Profit Ratio: The net profit ratio measures how much profit a business makes from its revenue after covering all expenses, including taxes, operating costs, and interest. Also known as the profit margin on sales, it's calculated by dividing net profit after tax by net sales. This ratio shows how efficiently a company turns its sales into profit (Javed, 2023).

To arrive net profit ratio, following equations are formulated:

$$\text{Net Profit} = \text{Operating Profit} + \text{Non Operating Income} - \text{Non Operating Expenses} - \text{Interest} - \text{Taxes} \quad (7)$$

$$\text{Net Profit Ratio} = \frac{\text{Net Profit}}{\text{Net Sales}} \times 100 \quad (8)$$

- Return on Assets Ratio: This is one of the ratios that is part of profitability ratios and can be used to show how effectively a company uses its total assets to generate net income, expressed as a percentage (Wall Street, 2024).

It is calculated by:

$$\text{Return on Assets (ROA)} = \frac{\text{Net Profit}}{\text{Total Assets}} \times 100 \quad (9)$$

- Return on Equity Ratio: There are a few key financial metrics that can show whether a business is doing well or falling behind industry standards. One

popular metric that analysts and investors can rely on is return on equity (ROE) (Investopedia, 2020).

It is calculated by:

$$\text{Return on Equity (ROE)} = \frac{\text{Net Profit}}{\text{Total Equity}} \times 100 \quad (10)$$

- Return on Capital Employed Ratio: Return on Capital Employed (ROCE) is a key financial metric used to assess a company's profitability and how efficiently it uses its capital to generate profits. It helps determine how well a company is performing and whether it's effectively utilizing its capital. Financial managers, stakeholders, and investors often use ROCE when evaluating a firm for investment, making it a valuable tool for analysing profitability and efficiency (Groww, 2024).

For the purpose of calculating ROCE, below formulars are used:

$$\text{Return on Capital Employed} = \frac{\text{Earnings before interest and tax}}{\text{Capital Employed}} \times 100 \quad (11)$$

$$\text{EBIT} = \text{Operating Profit (or Income from Operations)} \quad (12)$$

$$\text{Capital Employed} = \text{Total Assets} - \text{Current Liabilities} \quad (13)$$

Current Ratio: The current ratio measures the relationship between a company's current assets and its current liabilities. It tells whether or not the company's ability can meet its short-term obligations using its current assets. The more current assets exceed its current liabilities, the more confidence we have that the company can cover its immediate financial commitments (Drake and Fabozzi, 2012). Analysts could gain valuable insights on the firm's liquidity simply by the use of the current ratio over a selected period of time and make comparisons to its industry's average standard. It is calculated by:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \quad (14)$$

- Quick Ratio: The quick ratio, which is also known as the acid test ratio, is used to compare a company's quick assets (normally comes from current assets minus inventory) to its current liabilities. It shows the company's capacity to

meet its short-term obligations using its most liquid assets (Drake a Fabozzi 2012). This ratio is specifically used to measure a company's ability to pay its current liabilities without the need to sell any of its inventory or look for additional financing. Considered to be a more conservative metric compared to the current ratio, as it excludes the company's inventory from the calculation. A higher quick ratio indicates better liquidity and financial health, while a lower ratio suggests the company may face difficulties in meeting its short-term debt obligations. The quick ratio serves as a valuable measure of a business's liquidity, which provides precious insight just by keeping track of it over time and making necessary comparisons to its industry benchmarks. This helps investors and analysts make informed decisions when considering investing in or partnering with a company.

It is formulated as below:

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}} \quad (15)$$

- **Cash Ratio:** Cash Ratio is one of the financial which is used to analyse the liquidity of a firm. It allows analyst to see how quickly a firm can pay off their short-term debt by using their cash and cash equivalents. If the cash is too high, probably the firm is not making good use of their cash properly because the best practice is that cash should be used on their operation. On the other hand, if the cash ratio is too low, it could signal that the company might struggle to pay its bill timely (Gibson, 2013).

Here is how it formulates:

$$\text{Cash Ratio} = \frac{\text{Cash and Cash Equivalent}}{\text{Current Liabilities}} \quad (16)$$

- The Debt-to-Equity ratio is calculated as Total Debt divided by Total Equity. It reflects the proportion of a company's financing sourced from debt compared to equity. It formulated as below:

$$\text{Debt} - \text{to} - \text{Equity Ratio} = \frac{\text{Long Term Debt}}{\text{Total Equity}} \quad (17)$$

- The Debt-to-Assets ratio shows reliance on debt, with a ratio above 1.0 indicating heavy dependence and financial risk. It formulated as below:

$$\text{Debt – to – Assets Ratio} = \frac{\text{Long Term Debt}}{\text{Total Assets}} \quad (18)$$

- The Interest Coverage Ratio shows how well a company can cover interest payments with EBIT. A higher ratio indicates better capacity, while below 1.5 signals potential strain. Here is how it is calculated:

$$\text{Interest Coverage Ratio} = \frac{\text{EBIT (Earnings Before Interest and Taxes)}}{\text{Interest Expense}} \quad (19)$$

- The Equity Ratio shows the share of assets funded by equity. A higher ratio indicates stability, while a lower ratio suggests reliance on debt. It computed by:

$$\text{Equity Ratio} = \frac{\text{Total Equity}}{\text{Total Assets}} \quad (20)$$

- Discounted Cash Flow: Discounted Cash Flow (DCF) is an effective method which is used to evaluate or determine the intrinsic value of a firm by estimating the present value of its future cash flows. This method assumes that the value of a business is the total cash flows it can generate over time, discounted to account for the time value of money. For the purposes of calculating DCF, the following formulas are used:

$$\text{Intrinsic Value} = E(0) \cdot x \cdot \frac{1-x^n}{1-x} + E(0) \cdot x \cdot y \cdot \frac{1-y^n}{1-y} \quad (21)$$

$$x = \frac{1+g1}{1-d} \quad (22)$$

$$y = \frac{1+g2}{1-d} \quad (23)$$

$$\text{WACC} = w_e \cdot r_e \cdot w_d \cdot r_d \cdot (1 - \text{Tax Rate}) \quad (24)$$

$$r_d = \frac{\text{Total Interest Expense}}{\text{Total Debt}} \quad (25)$$

$$r_e = \text{Risk – Free Rate} + \beta * (\text{Market Risk Premium}) \quad (26)$$

$$W_e = \frac{\text{Market Value of Equity}}{\text{Total Market Value of Capital}} \quad (27)$$

$$W_d = \frac{\text{Market Value of Debt}}{\text{Total Market Value of Capital}} \quad (28)$$

$$\text{Market Value of Equity} = \text{Total Share} \times \text{Ending Stock Price} \quad (29)$$

$$\text{Market Value of Debt} = \text{Short Term Debt} + \text{Long Term Debt} = \text{Total Debt} \quad (30)$$

$$\begin{aligned} \text{Total Market Value of Capital} &= \text{Market value of equity} + \\ \text{Market value of debt} & \end{aligned} \quad (31)$$

$$g_1 = \left(\frac{EPS_{end}}{EPS_{begin}} \right)^{\frac{1}{n}} - 1 \quad (32)$$

- The Book Value Per Share (BVPS) method is a valuation approach that calculates the intrinsic value of a company's stock based on its net worth as recorded on the balance sheet. It determines the stock value by dividing the total shareholders' equity by the number of outstanding shares. It can be computed using the following formula:

$$\text{Book Value Per Share} = \frac{\text{Total Shareholders' Equity}}{\text{Number of outstanding share}} \quad (33)$$

2.3.2. Data Analysis

The data analysis for this thesis aimed to evaluate Alphabet Inc.'s intrinsic value using the Discounted Cash Flow (DCF) method and compare it with the Book Value Per Share (BVPS) and market price. Financial data in the period from 2018 to 2022 was collected from Alphabet's annual reports and reliable financial platforms and sources. Key metrics such as liquidity, profitability, and solvency ratios were calculated to assess Alphabet's financial health. Alongside with horizontal and vertical analyses of its balance sheet and its income statement helps to understand trends and structural composition of the company. The intrinsic value was estimated by calculating the Weighted Average Cost of Capital (WACC) and applying growth rates (g_1) based on the historical revenue and EPS trends to project future cash flows. This value was then compared with BVPS and market price to identify potential undervaluation on the company stock price. Finally, the findings

were contextualized using macroeconomic factors and expert opinions on the company to present a comprehensive assessment of Alphabet's investment potential.

2.3.3. Analysis Tools

To perform analysis and interpret the findings, it's important to select the appropriate tools and methods for the analysis. According to (Drake a Fabozzi 2012), financial ratio analysis and quantitative tools are very significant to interpret financial data effectively. Financial ratio analysis is one of the tools to use when key dimensions of a company's financial performance are to be evaluated, which potentially include Activity, Financial Leverage, Profitability, and Liquidity. These ratios are substantial for the understanding of a company's operating performance and also its financial condition, as well as assessing risks and returns. For the quantitative tools, the author selected Excel as the main tool to use for data computation, as Excel is quite a convenient and efficient tool to use for the computation of financial ratios, data arrangement, and creation of any kind of charts and graphs that make financial trends and patterns more comprehensible. This aligns with their recommendation of using visual aids such as charts and graphs to elaborate on data outcomes, which enables better interpretation and decision-making (Drake and Fabozzi, 2012).

2.3.4. Limitation of the Study

There are certain limitations with the current research which are as follows.

- The fundamental analysis of the research is only based on the management analysis and the financial analysis of the company and therefore the data which is gathered from the secondary sources with the period of 2018-2022 probably can not give the current view of the company to the investors.
- There is limited ratio analysis being performed for the financial analysis of the company, and various methods can be used for stock calculation, such as Book Value, Comparable Company Analysis (CCA), Market Capitalization, etc. Therefore, it might not give users significant insight into the of overall performance of the company and the result of the stock value of the company can be vary by applying different methods.
- There are assumptions in the calculation because there is limit to data collection which as a result can impact the result. Therefore, it's important to read carefully

and thoroughly and keep in mind that it might not be 100% accurate. However, reader can definitely compare to other sources which were calculated by experts.

3. Literature Review

The objective of this thesis is to deliver to readers with a fundamental understanding of Alphabet Inc., one of the most influential technology firms globally. This analysis is relevant for a wide range of investors, from those with average incomes to high-income individuals who are tired of placing their savings in banks with low interest rates or investing in high-risk ventures that could potentially put their hard-earned money at risk. These investors are now seeking alternative investments that can maximize returns while considering the risk factors involved. Moreover, the study aims to inform all stakeholders associated with Alphabet, providing comprehension of the company's financial performance and strategic positioning. This study examines Alphabet's financial performance to assess whether the company is performing well and is worth investing in. Through the use of fundamental analysis, including vertical and horizontal analyses, ratio analyses, and trend analysis, along with a comparison of market value versus intrinsic value using discounted cash flow (DCF) calculations, The results will deliver meaningful understanding and provide a comprehensive perspective on its investment potential background of the Study.

The technology sector is vital to the global economy as it significantly supports innovation, creating jobs for people around the world. More importantly, it fuels the global economy as the world is moving further and further to digital era. When it comes to technology, Alphabet Inc., which is parent of Google is a key player in this sector among other giant. Alphabet recorded a remarkable revenue in the first-quarter of 2023 having surpassed prediction from analysts (Love and read, 2024). This strong performance is largely attributed to Alphabet's substantial investments in artificial intelligence (AI), which have significantly increased demand for its cloud services. This results in a remarkable 28% revenue growth in that segment. Having known globally for its influence over digital advertising, cloud computing, and artificial intelligence, Alphabet has greatly impacted the daily lives of many, including students, employees, small entrepreneurs, and large corporations. Analyzing a company of this caliber is both interesting and valuable, especially for investors, analysts, and students in fields such as business and economics. It offers insights into how financial health correlates with growth in a fast-paced, competitive industry and provides meaningful learning experiences about global economic dynamics. The study of Alphabet's financial performance is further emphasized by current economic

trends and challenges, such as the post-pandemic business environment, fluctuating inflation, and regulatory obstacles, which have influenced tech companies' strategies and valuations worldwide. In addition, Alphabet's influence on the digital landscape through platforms like Google Search, YouTube, and Android presents an interesting case for examining the sustainability of not only its growth but also that of its peers. While the company's primary sector remains communication services (e.g., Google Search, YouTube, and Google Ads), it has broadened into different sectors such as Information Technology (Google Cloud services providing infrastructure, data analytics, and machine learning capabilities). Understanding its financial dynamics is beneficial not only for investors but also for stakeholders interested in Alphabet's long-term market strategy. By focusing on Alphabet, this study provides an overview of the financial framework of a leading tech giant amidst the evolving challenges and opportunities in the digital economy.

3.1. Significance of the Study

This study is significant as it provides a thorough financial analysis of Alphabet Inc. It offers valuable insights for investors, analysts, and stakeholders interested in the company's potential as an investment. As for investors, it's really important when even consider investing in any firm of their interest. So, for that purpose, this research will serve as a guide for investor to if they ever consider the option for long term investment in Alphabet. Two things are financial health and intrinsic value, which are essential for making informed decisions. With a clear goal to understanding trends and challenges of a tech company like Alphabet, a deep down in their finance is crucial. Furthermore, this research will benefit financial analysts and students in an economic field, as it demonstrates the practical application of fundamental analysis tools, such as ratio analysis, trend analysis, and discounted cash flow (DCF) valuation. All of the methods applied in this study can provide a structured approach to assessing a company's valuation, profitability, and risk. All other companies and industries can also be evaluated and analysed using these same tools. By examining Alphabet's financial strategies and market resilience, this study offers a comprehensive perspective on the company's long-term growth prospects and sustainability, aligning with the interests of both individual and all stakeholders in any kind. Financial analysis plays a critical role in understanding a company's overall performance. To identify its strengths and weaknesses in strategic decisions, financial analysis is a must. It's also important even it comes to investments,

operations, and financing a firm. A detailed review of financial data helps assess a company's value and growth potential. By applying these principles to Alphabet Inc., this study not only uncovers the company's financial strengths and challenges but also demonstrates the broader relevance of financial analysis tools in assessing firms across various industries (CEPF, 2024).

3.2. Fundamental Analysis

Fundamental analysis is an investment approach that aims to assess the intrinsic value of a security by examining various factors such as financial, economic, and qualitative factors. There is a big difference comparing to speculative strategies which normally only rely on the market trends and investor point of view, instead of carefully looking on the long-term value based on a company's financial health and potential. This approach is central to the work of Graham and Dodd in *Security Analysis* (2023) and Damodaran's *Investment Valuation* (2002), which both emphasize the importance of understanding a security's intrinsic value.

According to Graham and Dodd, fundamental analysis is based on the concept of intrinsic value, which represents the security's actual worth, which does not rely on its current market price. In Chapter 1: The Scope and Limitations of Security Analysis, they argue that intrinsic value should be estimated based on the company's financial statements, assets, earnings, and dividends, providing investors with an objective basis for investment decisions. The intrinsic value forms a "margin of safety" when a security is purchased at a price significantly below its estimated value, reducing the risk of loss even if the market fluctuates unpredictably. However, there is a limitation to of fundamental analysis, particularly in speculative markets where prices may be quite different comparing to its intrinsic value due to psychological and technical factors. While the fundamental analysis provides a reliable framework for investment, it is less effective in speculative contexts where factors like market view, investor psychology, and technical trading patterns dominate. This viewpoint highlights the need for fundamental analysis to focus on investment rather than speculation, given that speculation involves unpredictable elements that can distort market prices independently of a security's intrinsic value (Graham et al., 2023).

In addition to the foundational insights provided by Graham and Dodd, Damodaran's *Investment Valuation* (2002) emphasizes the critical role of discounted cash

flow valuation as the basic of asset valuation standing as the three primary valuation methods, alongside relative valuation and option pricing models. A solid understanding of discounted cash flow valuation fundamentals is essential for accurate relative valuations. By using DCF valuation enables investors to effectively analyse and achieve a comprehensive assessment of a security's intrinsic value (Damodaran, 2002).

3.2.1. Financial Statements

Financial statements include all the reports that provide an overview of an entity's financial performance, position, and cash movements. They consist of income statement, balance sheet, and statement of cash flows (Bragg, 2023). Financial reporting involves the process of documenting, examining, and consolidating financial information (BPP Media, 2009).

All types of the financial statements are described in the next sections.

3.2.1.1. Balance Sheet

The balance sheet is a financial document that offers a clear overview of a company's financial standing at a specific moment. It includes assets, liabilities, and shareholders' equity in detail. It presents a summary of what the company owns (assets) and its financing sources, which include liabilities (debts owed) and equity (capital provided by the owners) (Gitman and Zutter, 2012). It provides the basis in computing rate of return for investor and evaluating a company's capital structure. The balance sheet, in short, is a financial statement that picture a assets, capital and liabilities of a firm. Balance sheet can be used for financial ratio calculations and fundamental analysis along with other significant financial statements (Jason, 2024).

The Balance Sheet's equation: $\text{Assets} = \text{Liabilities} + \text{Stockholders' Equity}$

Where:

- Liabilities : These are the obligations which company owes to external parties, such as loans and accounts payables.
- Stockholders' Equity : It is the capital invested by shareholders in the company which includes common stock, accumulated retained earnings, and paid-in capital.

- **Assets** : These are the resources owned or controlled by the company whether in cash or in kind, including but not limited to cash, accounts receivable, inventory, property, and equipment.

3.2.1.2. Income Statement

The income statement, also known as the statement of comprehensive income, statement of operations, or statement of income, or profit and loss statement (P&L) holds significance as it provides an overview of a company's profitability within a specified time frame. It serves to consolidate all income and expenses over a particular period, capturing the combined effects of revenue, gains, expenses, and losses (Lessambo, 2022)

3.2.1.3. Cash Flow Statement

Statement of cash flow is one of the important indicators of the company's performance because just looking at accounting profit doesn't give the full picture of how well the company is doing. The cash flow statements focus on where the cash is coming from and where it's going, giving us a better perception of the company's financial situation in terms of how easily it can meet its short-term and long-term financial obligations or in other words its overall financial stability (BPP Media, 2009).

3.2.1.4. Statements of Shareholders' equity

A Shareholders' equity, also known as stockholder's equity, is a financial report which is a part of financial statements that shows how the company's equity worth changed from the beginning of a certain financial period to the end of that period. Retained earnings and share capital are included. A Shareholders' equity is the value of the assets that are left accessible to the shareholders after all liabilities are settled. It indicates the company's value. It is one of the financial components that analysts use to comprehend the company's financial growth and gives information about equity-related activity to financial statement users (WallStreetMojo, 2024)

3.2.1.5. Note to Financial Statements

The notes to the financial statements are an essential part of financial reporting, offering additional insights that complement the main financial statements. According to (Gibson, 2013) in his book, notes provide detailed disclosures on accounting policies and

decisions made during the preparation of financial statements, including methods for inventory valuation and depreciation. These notes are crucial for understanding specific line items and for gaining a full picture of a company's financial status. Furthermore, Gibson highlights that certain elements, such as contingent liabilities and significant subsequent events, are required in the notes to ensure transparency and to inform stakeholders of potential risks or future financial impacts.

Additionally, as Johnson (2023) explains in an online article, notes to the financial statements form the final section and include comprehensive insights on the accounting decisions made by accountants. These notes also provide explanations for key factors affecting specific financial items, offering shareholders and other stakeholders detailed information about the accounting choices and external factors influencing the organization's financial health. Together, these notes enhance the transparency and reliability of the financial statements, making them a valuable resource for a completed understanding of the company's financial situation.

3.2.2. Financial Statement Analysis

Financial statement analysis includes the process of analysing on the financial statement. This process normally involves selecting, assessing, and interpreting financial data to evaluate a company's performance and financial stability. The objective is to collect the information which can offer useful information to a broad audience of the readers who are interested in the financial statements. For example, reviewing the financial statement can measure its financial situation, as to reveal whether the company can meet its debt obligation (short & long term), check how well it uses its assets, see if it's providing a fair return to shareholders, etc. Although the information used in financial analysis is based on historical data, the goal is to provide useful insights or recommendations that satisfy all readers.

In investment, it's very crucial that we pay close attention to the financial information so we don't miss out the important warning signs. Some financial issues would have been easily identified early with basic analysis and common sense. While not all the fraud or manipulation of financial information is easy to spot, certain bad signs might alert the analysts to potential issues. These include such as revenue growth does not match with industry trends or it seems very unrealistic given the economic conditions, profits growing

is much faster than the cash flow from the operations, and the debts appears to be removed from the balance sheet. (Drake and Fabozzi, 2012).

3.2.2.1. Vertical Analyses

Vertical analysis, also called “common size analysis” demonstrates every item of the financial reports (income statement, balance sheet, and cash flow statement as a fraction of original value (i.e., total assets or net sales). For example, when vertical analysis is used on balance sheet, it involves converting each item on the sheet into a percentage relative to the total assets. (Lessambo, 2022). When vertical analysis was performed on an income statement, each item in the statement is shown as a percentage of the total sales.

3.2.2.2. Horizontal Analyses

Horizontal analysis examines a set of financial statement data over a duration of time. According to the FASB, for any financial year, a firm should present an income statement as for two year financial year, previous and current. In a given financial year, the balance sheet includes data from prior years' statements. The cash flow statements for a specific financial year incorporate details from earlier years. Horizontal analysis simplifies the process of evaluating variations in reported financial data (Lessambo, 2022). The horizontal analysis looks at amounts on the financial statements over the past years. This same tool is also used to analyse every element listed in both balance sheet and income statement. This enables the readers of financial statements to learn the changes in each items relative to changes in other items. Horizontal analysis is alternatively known as trend analysis.

3.2.3. Trend Analysis

Trend analysis is a statistical method for identifying patterns or shifts in data over time, supporting in predictions about future business dynamics and supporting strategic decision-making. It's commonly used across fields like finance, marketing, supply-chain management, economics, healthcare, and environmental science, as it provides organizations with a way to develop data-driven strategies based on historical trends.

However, trend analysis has its limitations. Past patterns may not always predict future outcomes properly due to the fact that some unexpected factors or changing

conditions can happen. For a comprehensive approach to planning, it's better to use trend analysis alongside other analytical tools and current market insights (David, 2024)

3.2.3.1. Revenue Growth Trend

Revenue Growth Trend is the analysis of changes in revenue over time to identify patterns and trends in a company's revenue growth. This approach involves examining revenue data on a yearly, quarterly, or even monthly basis to understand whether revenue is consistently increasing, decreasing, or remaining stable. In addition to tracking revenue figures, a Revenue Growth Trend analysis also considers external and internal factors that may influence growth, such as market conditions, seasonal patterns, product launches, customer preferences, and marketing efforts. This analysis helps in assessing the effectiveness of business strategies, understanding market demand, and making data-driven forecasts for future growth (Polymer, 2023).

3.2.3.2. Rate of Growth Trend

Rate of Growth Trend is the analysis of the rate at which a company's revenue are increasing or decreasing over time. This trend focuses on tracking the speed and consistency of growth over specific periods, such as quarterly or annually, to determine the company's financial stability, market position, and overall business health. By examining the rate of growth, businesses can gain insights into the effectiveness of their strategies, market demand, and operational efficiency. For both new and established companies, maintaining a positive rate of growth trend is often a critical goal, as it supports long-term growth, competitiveness, and sustainability in the market (Digital, 2024)].

3.2.4. Ratio analysis

Ratio analysis is a method used to evaluate financial health by examining key metrics, which provides insights into profitability, liquidity, asset management, and capital structure, helping organizations understand financial strengths and weaknesses across different sectors (Kim and Ayoun, 2005). Additionally, ratio analysis offers a rapid financial assessment by analyzing selected items from financial statements, enabling comparisons with competitors or industry standards and identifying key factors such as earnings quality and unusual financial items. (Lessambo, 2022)

3.2.4.1. Liquidity Ratios

Liquidity Ratios is another type of financial ratio which is typically used to assist in figuring out whether or not a company can manage to settle its immediate debts (CFI, 2024). Three commonly used indicators which of the financial ratios are the current ratio, quick ratio, and cash ratio. For each of these ratios, the current liabilities are put at the bottom part of the fraction (denominator), while the liquid assets amount are put at the top (numerator).

3.2.4.1.1. Current Ratio

The current ratio is another financial metric and the most convenient liquidity ratio to figure out and understand. It is very easy for literally anyone to locate the current assets and current liabilities on a company's balance sheet by dividing the current assets by the current liabilities then the answer to current ratio will be shown (CFI, 2024).

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \quad (14)$$

3.2.4.1.2. Quick Ratio

The quick ratio is a more demanding measurement of liquidity comparing to the current ratio. They share a common structure, with current assets as the numerator and current liabilities as the denominator. However, the quick ratio only looks at certain types of current assets. Only liquid assets like cash, accounts receivable, and marketable securities are included, leaving out inventory and prepaid expenses as they are less readily convertible to cash. Therefore, the quick ratio provides a more accurate assessment of a company's capability to meet its immediate financial obligations (CFI, 2024)

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}} \quad (15)$$

3.2.4.1.3. Cash Ratio

The cash ratio goes a step further in evaluating liquidity. This ratio only looks at a company's most easily convertible assets, which are cash and marketable securities. These are the assets of the company which can quickly use to cover the short-term liabilities.

When it comes to how demanding the assessments of liquidity are, one can think of the current ratio, quick ratio, and cash ratio as simple, moderate, and challenging, respectively.

$$\text{Cash Ratio} = \frac{\text{Cash and Cash Equivalent}}{\text{Current Liabilities}} \quad (16)$$

3.2.4.1.4. Operating Cash Flow Ratio

Operating cash flow refers to the cash of a company which generates through its regular business activities. It demonstrates on whether or not the business can provides enough positive cash flow to sustain and expand its operations without depending on external sources for funding. The statement of cash flows is classified into three categories: operating, investing, and financing cash flows.

The Operating cash flow ratio is used to determine the ability of a firm to cover its current liabilities with the cash flow it generates from regular business operations. This ratio supports on the assessment of a company's short-term liquidity. In contrast to net income, cash flow is seen as such a more accurate measure because earnings can be more really easily manipulated. To calculate the Operating cash flow ratio, it can be divided the by current liabilities. Operating cash flow refers to the cash a company earns from its usual business activities (Investopedia, 2022).

3.2.4.2. Profitability Ratios

Profitability ratios are a type of financial metric used to evaluate how well a business is making an earnings compared to its revenue, operating costs, assets, or shareholders' equity during a specific period. These ratios are some of the most commonly used tools in financial analysis because they provide a good picture on company's financial performance and overall condition. Still, they appear to be most effective when used for comparisons, rather than being pure analysis in separately. Profitability ratios are frequently paired with efficiency ratios with the focus on how effectively a company uses its internal assets to generate income rather than profits after costs analysis (Hayes, 2024).

3.2.4.3. Solvency Ratios

Solvency is an important indicator of a company's long-term financial health. It measures how efficiently companies handle their long-term debt obligation. The main ratios such as the debt-to-equity (D/E) ratio, the interest coverage ratio, and debt-to-assets

ratio are part of the solvency ratios. While both liquidity ratios and solvency ratios are used to evaluate the company's financial stability, Solvency ratios take a broader, long-term view (Hayes, 2024).

3.2.4.4. Efficiency Ratios

Efficiency ratios evaluates how effectively a company uses its assets and handles its liabilities during the current period or in the short term. Many different types of efficiency ratios, but they all focus on differently on measuring the time it takes to generate cash or income from customers or by selling inventory. In the examples of efficiency ratios which include the inventory turnover ratio, asset turnover ratio, and receivables turnover ratio. All these ratios assess how effectively a company utilizes its assets to generate revenue and how well it can manage those assets. As one of any financial ratio, it's most useful to compare a company's efficiency ratios to those of its competitors within the same industry (Nickolas, 2021).

3.2.4.5. Market Value Ratios

Market value ratios are essential for monitoring a company's share value. Whether you are a business owner, finance manager, or investor, these ratios are crucial for making decisions about managing and allocating your money or resources effectively. If you want to assess the market value of shares, there are several market value ratios that provide insight into a company's key financial metrics. In this discussion, we will explore a few of these important ratios along with some examples. Market value ratios are financial tools that measure and analyse stock prices, comparing them to competitors and other relevant financial data. They help track the financial performance of public companies to understand their standing in the market. Using market value ratios, you can determine whether a company's stocks are overvalued, undervalued, or fairly valued. These ratios also help identify the optimal prices at which shares should be bought or sold. In addition to evaluating the current share price of a company's stock, market value ratios assist both current and potential investors in making informed decisions about investing in shares (Deskera, 2021)

4. Practical Part

In the practical section of this thesis, we'll bring theoretical financial analysis concepts into practice by examining Alphabet Inc.'s financial health and profitability over the year from 2018 to 2022. Alphabet, as a major player in technology, serves as a unique example with its varied operations, including search, cloud computing, artificial intelligence, and more. This analysis will dive into Alphabet's financial statements and key performance metrics to reveal deeper insights into its operational strength and growth potential. This section also aims to interpret findings into useful recommendations, highlighting areas where Alphabet might need to enhance its resilience and adapt to better prepare for future challenges. This practical analysis connects financial theory with real-world application, providing valuable insights for financial research and suggesting strategies to support Alphabet's future success.

4.1. About Alphabet Inc.

- **Headquarters:** Mountain View, California, USA
- **Founded:** October 2, 2015 (as Alphabet Inc., following Google's restructuring)
- **Total revenue in 2022:** \$ 282.83 billion
- **Employees worldwide:** Approximately 190,234 (as of the end of 2022)
- **Core segments:**
 - ❖ **Google Services:** Search, YouTube, Maps, and Android
 - ❖ **Google Cloud:** Cloud computing and enterprise solutions
 - ❖ **Other Bets:** Experimental projects such as Waymo (self-driving cars) and Verily (life sciences)
- **Country operated:** Offices scattered over 50 countries globally
- **Primary markets:** The Americas, Europe, and Asia-Pacific regions

Alphabet Inc., Google's parent company, is a top global tech firm based in Mountain View, California. They provide a wide variety of products and platforms to their customers, covering multiple categories. For instance, in the area of search and information, they offer services like Google Search and Google Maps. In the realm of communication and productivity, tools such as Gmail and Google Calendar are available. In the segment like entertainment and media, there are Google Play for enormous

application and digital content, and YouTube as a leading social media and video-sharing platform which you can find literally many useful contents including education, entertainment, etc., Alphabet also offers internet software, including the Android operating system for mobile devices and the Chrome web browser. Through Google Cloud, it delivers enterprise cloud computing solutions. The company also produces hardware products, such as Pixel smartphones, smartwatches, and Google Nest home devices. With innovation vision, Alphabet invests heavily in infrastructure, data analytics, machine learning, and artificial intelligence, with operations in many important regions like the Americas, Europe, and Asia-Pacific regions. (GlobalData, 2024)

4.2. Company Products and Services

Many people around the world are likely familiar with Google primarily as a search engine—a tool for finding virtually anything or asking any random question they're curious about, often referring to Google as "Mr. Know-It-All." Beyond this popular association, however, Alphabet Inc., Google's parent company, offers an extensive range of products and services that touch almost every aspect of digital life.

The following section explores Alphabet's comprehensive product portfolio, providing insights into the company's vast influence across various industries. (Annual Report, 2022)

- Core Products and Services
 - ❖ Google Search
 - ❖ YouTube
 - ❖ Google
 - ❖ Gmail
 - ❖ Google Calendar
- Advertising and Marketing Services
 - ❖ Google Ads
 - ❖ Google AdSense
 - ❖ Google Ad Manager
 - ❖ Google Marketing Platform
 - ❖ AdMob
- Digital Content and Entertainment
 - ❖ Google Play Store

- ❖ YouTube Music
- ❖ YouTube Premium
- Software and Operating Systems
 - ❖ Android
 - ❖ Chrome OS
 - ❖ Chrome Browser
- Cloud Computing and Enterprise Solutions
 - ❖ Google Cloud Platform (GCP)
 - ❖ Google Workspace
- Hardware Products
 - ❖ Pixel Phones
 - ❖ Pixelbook and Chromebook
 - ❖ Nest Devices
 - ❖ Pixel Buds

The products and services listed above focus on Alphabet’s main offerings across areas like search, communication, advertising, digital content, and hardware. However, this list doesn’t include Alphabet’s experimental ventures and “Other Bets” projects, such as Waymo (self-driving cars) and Verily (life sciences). Last but not least, Alphabet is also known for investing in advanced technologies like Artificial Intelligence and Machine Learning through projects such as DeepMind and TensorFlow.

4.3. Customer Base and Competitive Landscape

Alphabet Inc., the parent company of Google, serves a diverse global customer base through its extensive range of products and services. Its offerings include platforms like Google Search, YouTube, Gmail, and Android. Providing services and entertainment to billions of individual users. Another segment, Google Cloud provides enterprise solutions in cloud computing, data analytics, and AI tools to businesses worldwide. Additionally, Alphabet generates significant revenue from advertisers using its Google Ads and YouTube Ads platforms. On the competitive landscape point of view, Alphabet is very competitive firm. Their Google Search is facing challenges from Bing and AI-driven tools. On their advertising business, it’s highly competing intensively with Meta Platforms and Amazon. In cloud computing, Google Cloud, they competes against other giant techs

company with on product such as Amazon Web Services and Microsoft Azure. While the company is striving to grow market share with innovations in AI. Moreover, they have Apple and Samsung as remarkable rivals like on their hardware products like Pixel and Nest devices. While Android maintains a strong presence against Apple’s iOS. The company’s focus on integrating AI across its services remains a key factor in maintaining its competitive advantage in these dynamic markets (Thompson, 2015).

4.4. Vertical and Horizontal Analyses on Company Financial Statements

4.4.1. Horizontal Analysis of Balance Sheet

In this chapter, an analysis is conducted on the trends and patterns in the balance sheet items from 2018 to 2022 using horizontal analysis. This analysis focuses on three primary sections of the balance sheet: assets, liabilities, and equity.

4.4.1.1. Horizontal Analysis of Asset

This section is dedicated to exploring the changes of the company’s assets, presented in terms of absolute differences using both monetary values and percentages, as well as financial and relative indicators.

The analysis is covered for years 2018-2022 and is conducted using Formula (1).

Table 1: Horizontal Analysis of Balance Sheet (Assets) 2018-2022

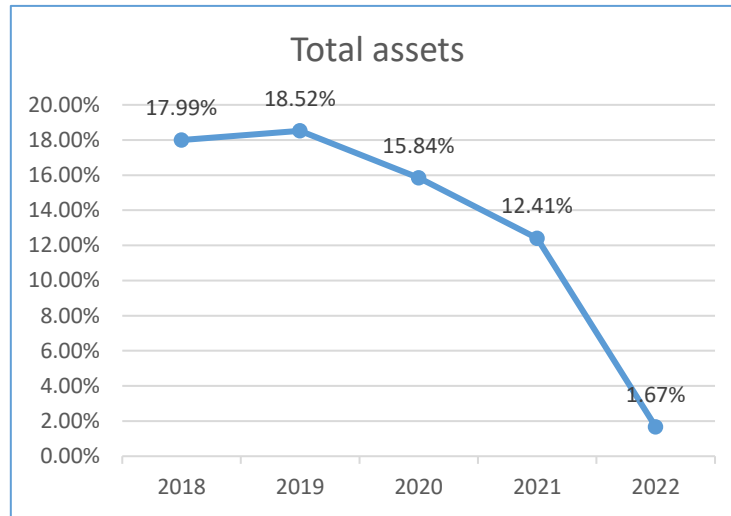
Horizontal Analysis of Balance sheet as end of 2022- Values in Million USD					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Assets					
Cash & cash equivalents	55.87%	10.76%	43.07%	-20.86%	4.46%
Marketable securities	1.41%	9.45%	8.95%	7.69%	-22.59%
Accounts receivable, net	13.65%	21.54%	22.13%	27.07%	2.43%
Inventory	47.80%	-9.76%	-27.13%	60.71%	128.21%
Other current assets	36.96%	43.28%	-9.64%	34.93%	1.06%
Total current assets	9.15%	12.46%	14.23%	7.94%	-12.41%
Property and equipment, net	40.90%	23.32%	15.08%	15.16%	15.44%
Non-marketable securities	77.38%	-5.64%	58.30%	42.73%	3.19%
Deferred income taxes	8.38%	-2.17%	50.35%	18.45%	309.74%
Operating lease assets, net	0.00%	0.00%	11.61%	6.13%	10.97%
Intangible assets, net	-17.53%	-10.86%	-26.98%	-1.94%	47.07%
Goodwill	6.81%	15.30%	2.67%	8.41%	26.15%
Other non-current assets	0.79%	-13.03%	68.79%	35.62%	23.54%
Total assets	17.99%	18.52%	15.84%	12.41%	1.67%

Source: Author’s calculations based on Alphabet Inc.’s annual reports, 2024.

The table presents the horizontal analysis of an asset with the time duration from 2018 to 2022, showing the percentage change in various asset categories for each year relative to the previous year. One of the most interesting item to discuss is the Marketable Securities of the company which shows significant fluctuations over the years.

In 2019, there was an increase in marketable securities from 1.41% to 9.45%, suggesting that Alphabet was increasing its holdings in liquid, short-term investments. However, as the pandemic's effects began to take effect in late 2019, we can see the company maintained its strategy by keeping its investment in marketable securities relatively stable for the following years. This cautious approach is reflected in the data, with marketable securities growing by 8.95% in 2020 and 7.69% in 2021. The pandemic created economic uncertainty, and Alphabet likely held onto marketable securities to make sure they had a good liquidity during this difficult times from COVID-19 and subsequent economic disruptions. Marketable securities allow companies to quickly access funds without disrupting their core operations and it is such a good strategy during unpredictable periods of times. The turning point came in 2022, there is a significant decline in marketable securities, dropping from 7.69% to -22.59%. This might indicate a strategic shift by the company, possibly reallocating funds from liquid investments into longer-term assets or operational needs. The decline could also reflect adjustments due to changing global economic conditions, such as inflation, rising interest rates, and unstable prices in market. These factors may have affected the returns on marketable securities, which as a result made Alphabet to reallocate resources toward core business investments, acquisitions, or share buybacks instead.

Figure 1: The total Assets in the years 2018-2022 (in mil.USD)



Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

The figure 1 illustrates the year-over-year percentage change in Alphabet's total assets from 2018 through 2022. It started in 2018 when total assets grew by 17.99%, indicating a period of solid growth as the company continued to expand. In 2019, this upward trend continued with a slight increase to 18.52%, reflecting Alphabet's ongoing investments and expansion prior to the COVID-19 pandemic. In 2020, as the pandemic began to impact the global economy, Alphabet still maintained growth in total assets, though at a slower rate of 15.84%. This suggests that the company managed to adapt to the challenging environment, likely maintaining liquidity and continuing strategic investments despite worldwide economic struggle. By 2021, the growth rate in total assets slowed further to 12.41%, possibly reflecting Alphabet's cautious approach in the mid of the ongoing pandemic and the beginning of economic recovery. In 2022, however, there was a huge decline in asset growth to just 1.67%. This decrease could indicate a strategic shift by Alphabet in response to post-pandemic challenges, such as inflation, rising interest rates, and market uncertainties, which may have prompted the company to take a more conservative stance in asset expansion.

4.4.1.2. Horizontal analysis of Liabilities

This section aims to analyse the changes in the company's liabilities from 2018 to 2022. Performing a horizontal analysis on liabilities offers a valuable tool for financial analysis and decision-making, providing important insights into the company's financial health and trends.

Table 2: Horizontal Analysis of Balance Sheet (Liabilities), 2018-2022

Horizontal Analysis of Balance sheet as end of 2022- Values in Million USD					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Current liabilities					
Accounts payable	39.56%	27.02%	0.50%	8.02%	-15.06%
Accrued compensation and benefits	49.29%	24.21%	30.50%	25.28%	1.00%
Accrued expenses and other current liabilities	53.98%	37.08%	29.03%	6.40%	18.17%
Accrued revenue	15.52%	28.83%	26.77%	19.95%	-6.96%
Deferred revenue	24.58%	6.95%	33.28%	29.30%	18.86%
Total current liabilities	43.16%	30.62%	25.68%	13.06%	7.85%
Long-term debt	1.08%	13.51%	205.93%	6.35%	-0.78%
Deferred revenue, non-current	16.47%	-9.60%	34.36%	11.23%	11.96%
Income taxes payable, non-current	-11.59%	-12.73%	-10.48%	3.70%	0.89%
Deferred income taxes	193.95%	34.57%	109.35%	47.63%	-90.22%
Operating lease liabilities	0.00%	0.00%	9.12%	2.18%	9.76%
Other long-term liabilities	15.89%	-28.52%	-10.46%	-2.82%	1.90%
Total liabilities	23.15%	34.99%	30.36%	10.88%	1.38%
Total Liabilities / Total Assets	4.37%	13.90%	12.53%	-1.36%	-0.28%

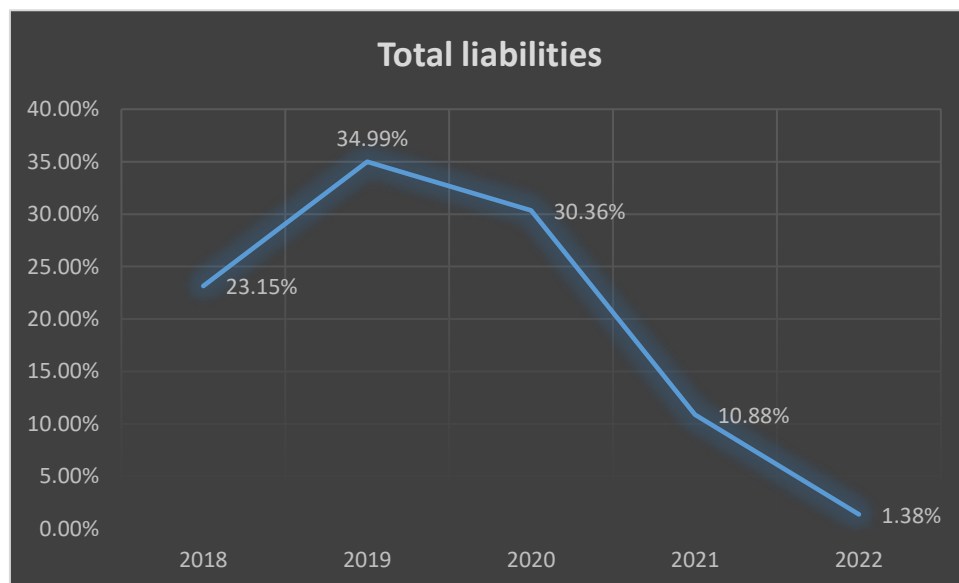
Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

On the table 2, the focus is on the horizontal analysis of a Liabilities with the time duration from 2018 to 2022, displaying two appealing items which are Long-Term Debt and Lease Obligation of the company.

Alphabet's long-term debt initially grew modestly, with an increase of 1.08% in 2018, followed by more substantial growth in 2019 (13.51%). The most significant change occurred in 2020, where long-term debt surged by 205.93%. This sharp increase was due to Alphabet issuing \$10 billion in fixed-rate senior unsecured notes, with \$5.75 billion specifically designated as Sustainability Bonds to fund environmentally and socially responsible projects, including energy efficiency, clean energy, and support for small businesses affected by COVID-19. The remaining funds were allocated for general corporate purposes, which potentially involve investments in technology, acquisitions, and research and development. In 2021, long-term debt grew only slightly at 3.86%, indicating that Alphabet did not significantly increase its debt after the substantial issuance in 2020. By 2022, long-term debt saw a slight decrease of -0.78%, suggesting that Alphabet may have started paying down some of its debt. This stabilization in debt levels reflects Alphabet's disciplined debt management and commitment to balancing growth initiatives with financial tool. (Alphabet Annual Report 2020, page 73)

Operating lease liabilities started appearing in 2019 balance sheet, reflecting new lease accounting standards that required companies to record lease commitments on the balance sheet. From 2019 onwards, Alphabet’s operating lease liabilities consistently increased, with a 9.12% growth in 2020 as the company expanded its physical infrastructure. This trend continued but at a slower pace, with an increase of 2.18% in 2021. By 2022, operating lease liabilities grew by 9.76%, indicating Alphabet’s ongoing need for leased spaces to support data centers and office locations as it scales its operations globally. By the end of 2021, Alphabet’s future lease obligations reached approximately \$15.5 billion, with a weighted average lease term of 8 years, underscoring Alphabet’s long-term commitments to leased facilities. This consistent rise in operating lease liabilities aligns with Alphabet’s strategic expansion, particularly in cloud services and other data-intensive business areas, requiring substantial infrastructure. (Alphabet Annual Report 2021, Note 4)

Figure 2: The total Liabilities in the years 2018-2022 (in mil.USD)



Source: Author’s calculations based on Alphabet Inc.’s annual reports, 2024.

The figure 2 illustrates the year-over-year percentage change in Alphabet’s total liabilities from 2018 through 2022. In 2018, total liabilities grew by 23.15%, marking a period of rising obligations as Alphabet expanded its operations. The trend kept rising in 2019, with liabilities increasing by 34.99%. This significant rise suggests that Alphabet was taking on additional liabilities. In 2020, as the COVID-19 pandemic impacted the global economy, Alphabet’s total liabilities continued to grow but at a slightly lower rate

of 30.36%. This steady increase in liabilities during a challenging economic period is totally understandable and really expected. By 2021, the growth in total liabilities had slowed considerably to 10.88%, reflecting a more cautious approach. In 2022, the trend changed drastically, with total liabilities increasing by only 1.38%. This minimal growth likely reflects Alphabet's decision to adopt a more conservative financial stance amid economic challenges. The sharp reduction in liability growth suggests that Alphabet was prioritizing stability, simply to pay existing obligations and not taking any new loan.

4.4.1.3. Horizontal Analysis of Capital

This section focuses on examining changes in the company's capital from 2018 to 2022. Conducting a horizontal analysis of capital can support strategic decision-making as it can help management make informed strategic decisions, such as when to pursue financing or invest in assets. This also helps in assessing the sustainability of the capital and informs decisions about future funding sources.

Table 3: Horizontal Analysis of Balance Sheet (Capital), 2018-2022

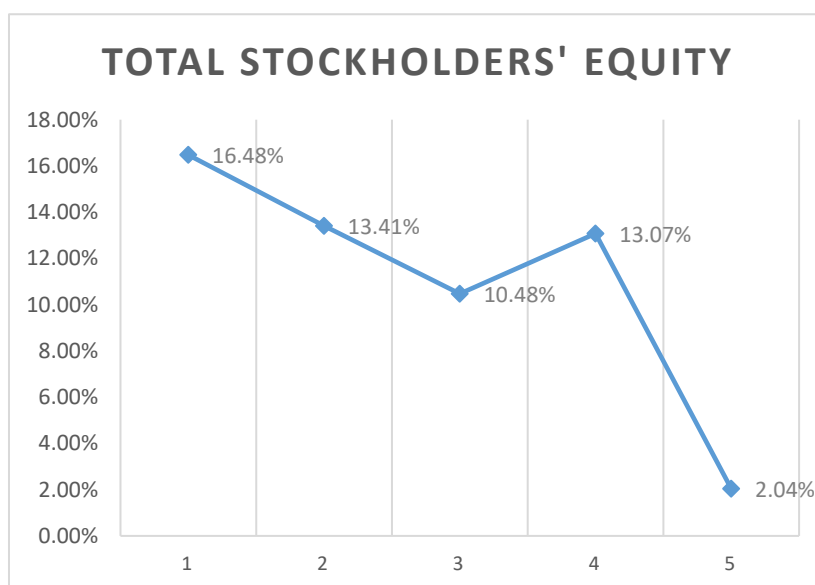
Horizontal Analysis of Balance sheet as end of 2022- Values in Million USD					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Stockholders' equity					
Common stock	11.93%	12.22%	15.74%	5.58%	11.40%
Retained earnings	19.11%	12.78%	7.41%	17.19%	2.13%
Accumulated other comprehensive loss	132.46%	-46.57%	-	-	368.45%
Total stockholders' equity	16.48%	13.41%	10.48%	13.07%	2.04%
Total liabilities and stockholders' equity	17.99%	18.52%	15.84%	12.41%	1.84%

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

From the analysis table, the company's total stockholders' equity increased by 16.48% in 2018. It demonstrated that Alphabet is reinvesting in growth and maintaining a strong financial foundation. This period was marked by increasing retained earnings at rate 19.11% and the issuance of common stock increasing at 11.93%. Clearly, it is Alphabet's ability to generate substantial profits and build a good amount of capital base. In 2019, the growth rate in total stockholders' equity slowed slightly to 13.41%. During 2020, the COVID-19 pandemic significantly impacted the global economy, and Alphabet's growth in stockholders' equity further dropped down to 10.48%. The company adopted a more conservative approach, likely focusing on liquidity preservation and careful capital management to navigate the challenging economic environment. Alphabet also issued \$10

billion in fixed-rate senior unsecured notes, which included \$5.75 billion in Sustainability Bonds. In 2021, Alphabet experienced a recovery, with stockholders' equity growth rebounding to 13.07%. This period marked Alphabet's return to a more proactive capital strategy, as economic conditions stabilized and the company continued to generate strong earnings. In 2022, however, the growth rate of total stockholders' equity slowed significantly to 2.04%. This huge decline reflects Alphabet's cautious response to the post-pandemic economic environment.

Figure 3: The total Capital in the years 2018-2022 (in mil.USD)



Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

From 2018 to 2022, Alphabet Inc. implemented substantial capital return strategies, primarily through large share buyback programs rather than dividends, to return value to shareholders. These buybacks reflect Alphabet's approach to managing its growing cash reserves, largely generated by its highly profitable core advertising business, which includes Google Search and YouTube. In 2019, Alphabet authorized a \$25 billion stock repurchase program, indicating confidence in its cash flow generation. It's noticeable that Alphabet's revenue grew by 19.3% year-over-year. It came from its strong advertising sales and the growth of its Google Cloud and Play services. Alphabet's commitment to growth through investments in AI, Google Cloud, and other hardware innovations. According to CFO of Google Porat, company's capital allocation strategy focus on prioritizing organic growth and maintaining flexibility for strategic acquisitions. This buyback initiative marked a shift toward actively returning excess cash to shareholders while focusing on Alphabet's core businesses and emerging segments like "Other Bets"

(e.g., Waymo and Verily) which provided good additional income to the company outside main business activity (Symington, 2019).

In 2020, Alphabet faced an unusual environment as the COVID-19 pandemic led to increased internet usage, boosting demand for its advertising platforms. As a result, Alphabet reported record earnings and accumulated cash of \$135 billion. However, there was also regulatory pressures, with antitrust investigations and lawsuits questioning Google's dominance in online ads. The effect from regulatory influenced Alphabet's capital strategy, as large acquisitions could attract investigation and potential legal challenges. Alphabet repurchased \$31 billion in shares in 2020, a 69% increase from the previous year to balance growth and regulatory concerns. This buyback amounted to 73% of its free cash flow, up from 59% in 2019, showing Alphabet's preference for buybacks over dividends, which provide flexibility to adjust returns based on financial needs. According to Analysts, these buybacks were a strategic response to both the company's undervalued stock (relative to peers like Facebook and Microsoft) and limitations on capital deployment due to regulatory risks. Alphabet's capital return strategy continued into 2021, with a new \$50 billion buyback authorization, nearly doubling its previous largest buyback plan. This move was supported by Alphabet's strong cash flow and profitability, as well as the company's goal of narrowing its valuation gap with peers. Alphabet's stock price surged following the announcement, reflecting investor confidence in the buyback plan as a tool to enhance shareholder value. (Patnaik et al., 2021)

Alphabet's capital strategy from 2018 to 2022 has emphasized large-scale share buybacks as a flexible way to return cash to shareholders amid record earnings and high regulatory pressures. While organic growth remains the priority, Alphabet's buybacks reflect its adaptive approach to managing capital, ensuring liquidity, enhancing shareholder value, and positioning itself for long-term growth.

4.4.2. Vertical Analysis of Income Statement

Vertical analysis of an income statement is a method used to assess the relative size of various components within the statement. Each line item is expressed as a percentage of a base figure, such as net sales or total revenue. This approach offers a clear view of how different elements contribute to the overall financial performance and helps evaluate the company's efficiency. By analysing income statements using this technique over multiple

periods, investors and analysts can monitor trends and changes in financial performance. The following table demonstrates this process, calculated using Formula 2 (Walker, 2009).

Table 4: Vertical Analysis of Income Statement from 2018-2022

Vertical Analysis of the Income Statement as end of 2022- Values in Million USD					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Total revenue	100.00%	100.00%	100.00%	100.00%	100.00%
Cost of Revenues	43.52%	44.42%	46.42%	43.06%	44.62%
Gross Revenues	56.48%	55.58%	53.58%	56.94%	55.38%
Research & Development	15.65%	16.07%	15.11%	12.25%	13.97%
Sales & Marketing	11.94%	25.68%	21.18%	20.65%	21.05%
General & Administrative	5.06%	36.71%	40.08%	42.80%	39.81%
European Commission Fines	3.71%	9.19%	0.00%	0.00%	0.00%
Income from Operations	20.12%	21.15%	22.59%	30.55%	26.46%
Other Income (Expense), Net	5.40%	3.33%	3.76%	4.67%	-1.24%
Income Before Income Taxes	25.52%	24.48%	26.34%	35.22%	25.22%
Income Taxes	3.05%	3.26%	4.28%	5.71%	4.02%
Net Income	22.46%	21.22%	22.06%	29.51%	21.20%

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

In the table above, Alphabet's financial performance is represented through a vertical analysis of its income statement from 2018 to 2022. This type of analysis breaks down each component of the income statement as a percentage of total revenue. It makes analyst to easily to see trends over time. It also helps to highlight shifts in key expense areas such as the Cost of Revenues or the company's Net Income margins.

Now, starting with the Cost of Revenues, it can be seen that there is a slight fluctuation across the years. It firstly moved from 43.52% in 2018 to 44.62% in 2022 and it peaks in 46.42% in 2020. Alphabet expand its infrastructure such as data centers and server capacity according to what they mentioned in their reports so it could be the case on this. The higher cost percentage might also reflect disruptions during 2020 or increased operational costs during the pandemic COVID-19. It seems in overall that Alphabet managed to keep their direct costs relatively stable given the scale of their operations and it is kind of commendable in such a competitive market even though maybe it could have been optimized further and that's something worth considering.

As for Research & Development (R&D) expenses, the trend here is fascinating. Alphabet consistently allocated significant resources to R&D and starting at 15.65% of revenue in 2018 with peaking at 16.07% in 2019 before it slightly declined back to 13.97% by 2022. This is likely due to Alphabet's heavy focus on innovation, particularly in AI and

Google Cloud initiatives. While this consistent spending is a positive sign of innovation, the slight decrease could indicate better efficiency in project management, or maybe just a strategic reallocation of resources. Still, It's not entirely clear and just an assumption.

Looking next at General & Administrative (G&A) costs, there's a noticeable jump particularly from 36.71% in 2019 to 40.08% in 2020. before slightly reduced to 39.81% by 2022. This increase is sensible and remarkable due to Alphabet's growing workforce and the rising cost of employee compensation. And which it has been mentioned in its reports. However, some of these costs might also include legal and compliance expenses, given Alphabet's ongoing regulatory battles during these years (having fined by EU billions of dollars). The slight decline toward the end of the period suggests some effort at managing these expenses, though it still remains quite high overall.

Finally, Net Income as a percentage of revenue shows a bit of a rollercoaster trend. It dipped slightly to 21.22% in 2019 when it began at 22.46% in 2018. But then it holds relatively stable on in 2020 at 22.06%. 2021, it shot up to 29.51% as a remarkable year of profitability. Before dropping to 21.20% in 2022. The decline in 2022 could be explained by increased in competition and higher R&D and G&A expenses, though other external factors like inflation and economic uncertainty may have played a role.

This vertical analysis provides a good picture of Alphabet's evolving priorities over these five years 2018-2022. By balancing innovation with high R&D expense as reported and still managed to control cost, It shows how the company while navigating external challenges such as like regulatory pressures and pandemic-related disruptions. That being said, certain areas like G&A costs might definitely be in need of a closer look for improvement, especially if Alphabet wants to maintain or enhance its profitability margins in the future period of time.

4.5. Trend Analysis of Revenue Growth and Growth Rate

This section is dedicated to identifying and interpreting key trends in revenue growth across two main categories of Alphabet Inc.—Google Services and Google Cloud. Understanding the revenue performance in these segments, along with their year-over-year growth rates, provides crucial insights into Alphabet's financial health and growth trajectory. This analysis sheds light on the factors driving Alphabet's revenue expansion, including the pandemic-driven boost in digital services and the company's strategic investments in cloud infrastructure. By examining these trends, we gain a clearer picture of

Alphabet's strengths, potential challenges, and how each category contributes to the company's overall performance. This analysis is essential for informing management's future strategies, guiding investment decisions, and adapting to evolving market dynamics that impact Alphabet's long-term growth.

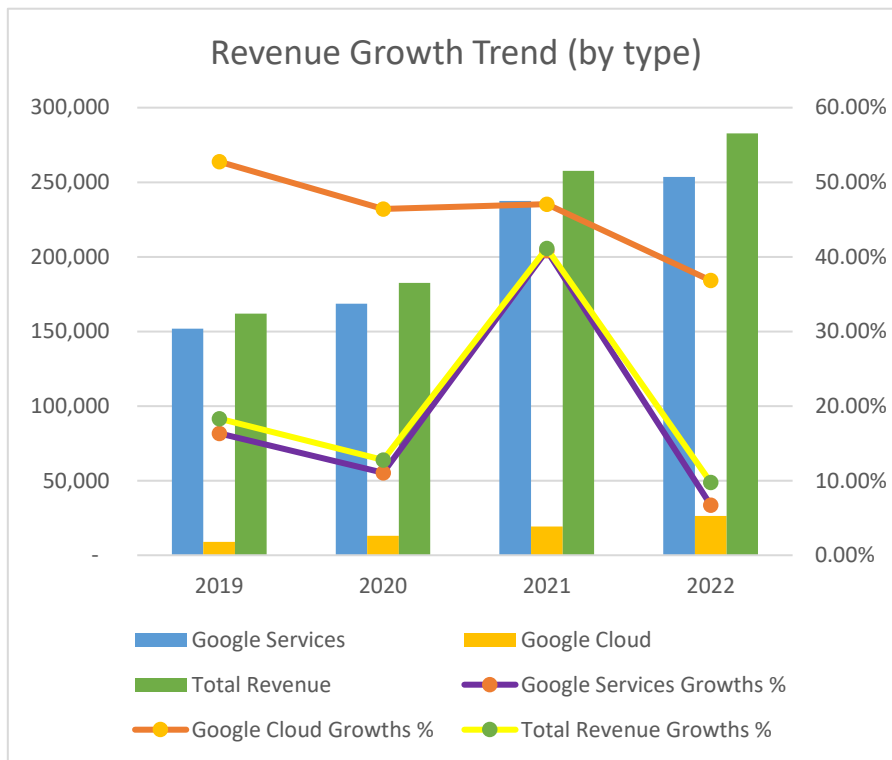
Table 5: Revenue trend by Types and Growth, 2019-2022 (in mil.USD)

Revenue Types and Growth	2019	2020	2021	2022
Google Services	151,825	168,635	237,529	253,528
Google Services Growths %	16.32%	11.07%	40.85%	6.74%
Google Cloud	8,918	13,059	19,206	26,280
Google Cloud Growths %	52.76%	46.43%	47.07%	36.83%
Total Revenue	161,858	182,528	257,638	282,837
Total Revenue Growths %	18.30%	12.77%	41.15%	9.78%

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

Based on the table 5 and figure 4 above, we can see that Google Services, Alphabet's largest revenue source, increased steadily each year from \$151,825 million in 2019 to \$253,528 million in 2022. This consistent growth highlights the sustained demand for Alphabet's core services, including Google Search, YouTube, and advertising. The growth rate of Google Services, however, shows significant fluctuations. It began at 16% in 2019, declined to 11% in 2020, then climbed greatly to 41% in 2021, before dropping horribly to 7% in 2022. The remarkable growth in 2021 likely reflects increased digital activity and advertising spending due to the pandemic, as businesses shifted to online platforms. The subsequent decline to 7% in 2022 may indicate market saturation and a normalization of digital demand as economies reopened.

Figure 4: Revenue Growth Trend, 2019-2022 (in mil. USD)



Source: Author’s calculations based on Alphabet Inc.’s annual reports, 2024.

Another revenue segment which is Google Cloud experienced substantial growth, moving from \$8,918 million in 2019 to \$26,280 million in 2022. This rapid increase emphasizes Alphabet’s strategic investments in the cloud sector to diversify its revenue base. Google Cloud’s growth rate is very strong always hitting over 30% over the period from 53% in 2019 to however slowed down a little bit to only 37% in 2022. Despite the decline in growth rates, Google Cloud remains one of Alphabet’s fastest-growing segments. The deceleration suggests that while the cloud business is scaling, its growth may be stabilizing as it matures. This aligns with industry trends, where high initial growth in cloud services eventually moderates as the market expands and competition increases.

Both Google Services and Total Revenue experienced a sharp growth increase in 2021, driven by the increased digital engagement during the pandemic. This resulted in record growth rates, especially in Total Revenue (41%). The decline in growth rates in 2022 for Google Services, Google Cloud, and Total Revenue suggests a return to pre-pandemic growth trends. Additionally, broader economic factors, such as inflation and shifts in consumer behavior, may have impacted revenue growth.

4.6. Ratio Analysis

4.6.1. Liquidity Ratios

A key financial ratio, known as a liquidity ratio, helps evaluate a company's ability to meet its short-term debt obligations. This ratio determines if the business has enough liquid or current assets to cover its current liabilities.

Table 6: Liquidity ratio of Alphabet, 2018-2022

Liquidity ratio of Alphabet, 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Current Ratio	3.92	3.37	3.07	2.93	2.38
Quick Ratio	3.89	3.35	3.05	2.91	2.34
Cash Ratio	0.48	0.41	0.47	0.33	0.32
Operating Cash Flow Ratio	1.39	1.21	1.15	1.43	1.32

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

4.6.1.1. Current Ratio

The current ratio, also known as the working capital ratio, evaluates a company's ability to meet its short-term debts due within a year. This ratio compares total current assets to total current liabilities, providing insight into the company's financial position. It highlights how effectively the company can use its most liquid assets to cover debts and other short-term obligations (Ahrendsen and Katchova, 2012). A company's liquidity can be conveniently assessed as shown below by the current ratio formula (14):

Table 7: Current Ratio of Alphabet, 2018-2022

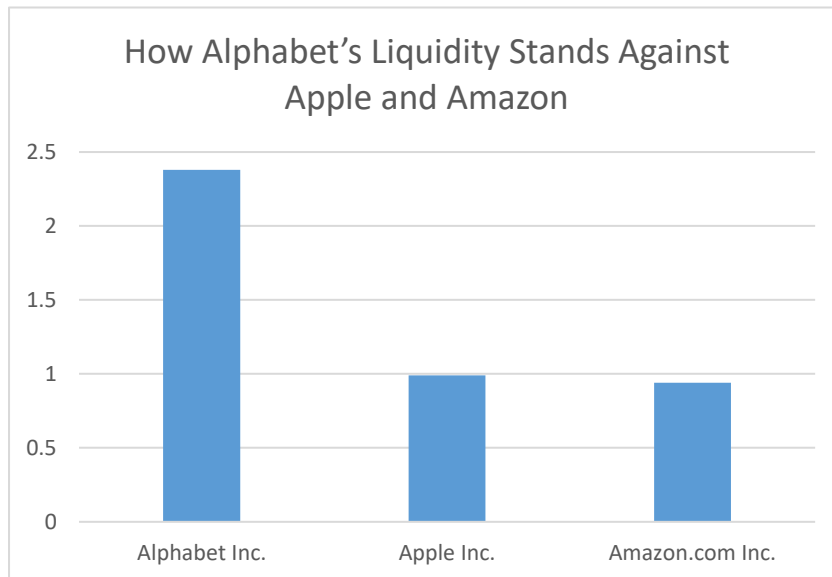
Current Ratio of Alphabet, 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Current Assets	135,676	152,578	174,296	188,143	164,795
Current Liabilities	34,620	45,221	56,834	64,254	69,300
Current Ratio	3.92	3.37	3.07	2.93	2.38

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

Alphabet Inc., the current ratio demonstrates a consistent downward trend from 2018 to 2022, reflecting changes in the company's liquidity management strategy. Alphabet's current ratio was the highest in 2018 at 3.92, indicating a strong ability to cover short-term obligations with current assets during that period. This was a sign of a very healthy liquidity position with a big amount of reserves to deal with immediate liabilities. In 2019, the current ratio slightly decreased to 3.37. Despite this reduction, the ratio remained strong. The current ratio continued to decline still to 3.07 in 2020, it appears to be an impact on the challenges posed by the COVID-19 pandemic. By 2021, the current

ratio just kept reducing to 2.93. The recovery from the pandemic and investments in both core and emerging business areas may have influenced this change. Even with the downward trend, the ratio still demonstrated a strong capacity to handle short-term obligations. In 2022, the current ratio reached its lowest point in 5 years period at 2.38.

Figure 5: Current Ratio comparison in 2022



Source: source from internet and author's work, 2024

To conclude, despite the current ratio steadily decreasing over the years, reaching 2.38 in 2022, Alphabet's liquidity remains very solid compared to its peers. For instance, as the graph demonstrates, when compared to Amazon.com Inc. (0.94) and Apple Inc. (0.99), Alphabet clearly holds a much stronger liquidity position.

4.6.1.2. Quick Ratio

The quick ratio, also called the acid test ratio, measures a company's quick assets (typically calculated as current assets minus inventory) against its current liabilities. This measures the firm's ability to cover immediate obligations using its most liquid resources. The quick ratio calculation is not much different to the current ratio. However, instead of using total current assets, inventory from the current assets is subtracted from the equation. It is then divided by the result of its current liabilities. This adjustment is made because inventory is not as easily converted into cash, which can affect its liquidity. In simple terms, liquidity refers to how quickly and effectively an asset can be turned into cash at or near its book value if needed (Walsh, 2010). It is calculated by (15) as below:

Table 8: Quick Ratio of Alphabet, 2018-2022

Quick Ratio of Alphabet, 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Current Assets	135,676	152,578	174,296	188,143	164,795
Inventories	1,107	999	728	1,170	2,670
Current Liabilities	34,620	45,221	56,834	64,254	69,300
Quick Ratio	3.89	3.35	3.05	2.91	2.34

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

As data provided by Table 9 in the year 2018, the company's quick ratio was 3.89. The higher quick ratio value points out that the company possesses sufficient liquid assets to meet its short-term liabilities. As in 2018, the liabilities rose, which led to the quick ratio of the company decreasing to only 3.35. Still, it kept declining constantly in the following years—2020, 2021, and 2022—with values of 3.05, 2.91, and 2.34, respectively, as a consequence of a consistent increase in current liabilities.

4.6.1.3. Cash Ratio

The Cash Ratio is one of the strictest liquidity measures, focusing on a entity's ability to solve its immediate debts using only its most liquid assets, like cash and current investments. It shows a good picture of how well a particular business can handle short-term obligations without relying on other assets that might consume time very long time to convert to liquid funds immediately. This ratio is subject to a high fluctuation due to cash and short-term investments are in the matter of fact frequently used or replenished for company's operation. For example, large cash inflows from sales or collections can temporarily increase the ratio, while redeploying cash into long-term investments or operations can decrease it. With higher Cash Ratio comes strong financial flexibility and its ability to cover liabilities swiftly in the matter of the company's liquidity. On the other hand, a lower ratio could raise concerns if the company can meet its immediate debts without selling assets or making other adjustments (Tracy, 2012). It is computed by (16):

Table 9: Cash Ratio of Alphabet, 2018-2022

Cash Ratio of Alphabet, 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Cash and Cash Equivalent	16,701	18,498	26,465	20,945	21,879
Short-Term Investment	92,439	101,177	110,229	118,704	91,883
Current Liabilities	34,620	45,221	56,834	64,254	69,300
Cash Ratio	3.15	2.65	2.41	2.17	1.64

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

According to Table 10, in the year 2018, Alphabet's cash ratio stood at 3.15, which indicates a strong position in liquidity as the company held sufficient cash and short-term investments to cover its current liabilities. However, the cash ratio steadily declined in the following years due to a consistent increase in current liabilities throughout the year from 2019 to 2022 with value 2.65, 2.41, 2.17 then finally arrived 1.64 in 2022. It is the sign of a significant reduction in the company's liquidity position compared to earlier years. This decline reflects the company's strategic shift in resource allocation and increasing liabilities, suggesting a possible change in its financial approach while still being able to handle short-term obligations effectively.

4.6.2. Profitability Ratios

This section focuses on the Alphabet Inc.'s financial performance through key profitability ratios. The ratios such as Gross Profit, Operating Profit, Net Profit, Return on Assets, Return on Equity, and Return on Capital Employed will be used to gain comprehensive knowledges into the company's ability to generate profits efficiently and effectively. These ratios can possibly determine Alphabet Inc.'s operational success and resource utilization adding valuable perspectives on its financial situation.

4.6.2.1. Gross Profit Ratio

The gross profit margin ratio is a very useful tool for business owners and advisors to evaluate a company's financial health. However, it's most effective when used to monitor a company's performance over time or compare it with other businesses in the same industry. This ratio doesn't just show whether your business is meeting the industry benchmark; it can also be used as a goal to surpass the industry average. According to Beniston, as your revenue grows, your cost of goods sold (COGS) should increase at a similar rate. If COGS starts showing growth faster than the revenue, it tends to be a sign of an issue. When these trends start to converge, your profitability could potentially be at risk. This could happen if your COGS increases, but you have not adjusted your pricing to match the higher costs. In another word, it might also mean that your business operations are less efficient than your competitors which leads to COGS growing faster than revenue (BDC, 2024). Gross profit ratio is also known as gross profit margin. It is used to indicate the company's pricing policy and it shows gross profit as a percentage of net sales. The

gross profit ratio measures how efficiently a company manages its production or purchasing costs and pricing strategies. A higher gross profit ratio indicates better management efficiency in these areas. (True, 2023).

The below formulas (3) and (4) are used to calculate and analyse the Gross Profit and Gross Profit Ratio:

Table 10: Gross Profit Ratio of Alphabet, 2018-2022

Gross Profit Ratio of Alphabet, 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Gross Profit	77,270	89,961	97,795	146,698	156,633
Net Sales	136,819	161,857	182,527	257,637	282,836
Gross Profit Ratio	56.48%	55.58%	53.58%	56.94%	55.38%

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

From the analysis result, the gross profit of the company was 56.48%. For a technology and internet-based company like Alphabet, this ratio is considered to be strong. However, the gross margin shows fluctuations by decreasing slightly from 56.48% in 2018 to 55.58% in 2019 then declined more to 53.58% in 2020. This might be the result from constant increasing in cost of revenues every year of the company from \$59,549 million in 2018 to \$126,203 million in 2022. All these increases in costs are likely from expenses on infrastructure like data centers and servers, as well as high traffic acquisition costs for maintaining Google's dominance in search and advertising markets. Then in 2021, it recovered back to 56.94% before declining again to 55.38% in 2022.

4.6.2.2. Operating Profit Ratio

The operating margin demonstrates how much profit a company earns from each dollar of revenue after covering variable costs, excluding interest and tax expenses. It is calculated by dividing the company's operating income by net sales. Generally, a higher operating margin indicates that the company is efficient in its operations and effective at turning sales into profit (Investopedia, 2024).

It can be computed as below by (5) and (6):

Table 11: Operating Profit Ratio of Alphabet, 2018-2022

Operating Profit Ratio of Alphabet, 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Operating Profit	27,524	34,231	41,224	78,714	74,842
Net Sales	136,819	161,857	182,527	257,637	282,836
Operating Profit Ratio	20.12%	21.15%	22.59%	30.55%	26.46%

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

The Operating Profit Ratio of Alphabet from 2018 to 2022 shows a fluctuating trend. It can be a sign of changes in operational efficiency over the years. Starting at 20.12% in 2018, the ratio saw a slight increase to 21.15% in 2019. Remarkably, the company recorded fine expenses amounting to \$5,071 million in 2018 and \$1,697 million in 2019, which might have impacted the company's operating profit ratio as a rise from such operating expenses. Then in 2020, the ratio rose further to 22.59% before jumping significantly in 2021, when the ratio reached 30.55%. However, in 2022, the ratio dropped back to 26.46%, marking a reduction in profitability relative to net sales compared to the previous year. It's also plausible that despite having a huge and consistently rising Research & Development expense, from \$21,419 million in 2018 to \$39,500 million in 2022, the company still maintained a good result in the Operating Profit Ratio.

4.6.2.3. Net Profit Ratio

The net profit ratio is another alternative way to calculate profitability ratio which estimates how much profit is left from revenue after deducting all expenses, including operating costs, interest expenses (if applicable), and income taxes. The net profit ratio (NP ratio) is commonly used to measure how much profit a business makes for every dollar of sales after taxes. By taking the figures from the income statement, it is then calculated by dividing the net profit after tax by the net sales. It's also known as profit margin on sales, and ultimately this ratio demonstrates how efficiently a company turns its sales into profit. (Javed, 2023)

To arrive net profit ratio, following equations (7) and (8) are formulated:

Table 12: Net Profit Ratio of Alphabet, 2018-2022

Net Profit Ratio of Alphabet, 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Net Profit	30,736	34,343	40,269	76,033	59,972
Net Sales	136,819	161,857	182,527	257,637	282,836
Net Profit Ratio	22.46%	21.22%	22.06%	29.51%	21.20%

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

According to the analysis table above, The Net Profit Ratio of Alphabet Inc. fluctuated over the five-year period, and here is what happened according to the results from the table above and other relevant information.

In 2018, Alphabet reported a Net Profit Ratio of 22.46%, which came from a Net Profit of \$30,736 million and Net Sales of \$136,819 million. It's worth mentioning that the company incurred \$5,071 million in European Commission fines, which had a big impact on the company's profit; however, it also benefited from a strong Other Income of \$7,389 million, which was mostly obtained from gains on equity securities. This aided the company's profitability to offset the operational and fine-related impacts mentioned previously. Also, Alphabet reported a low effective tax rate, benefiting from the U.S. Tax Cuts and Jobs Act effectively implemented in 2018, as mentioned in the 2018 annual report, which, as a result, further supported its net income. In 2019, the Net Profit Ratio slightly declined to 21.22%, despite an increase in Net Profit to \$34,343 million. This can be attributed to higher operational expenses, particularly in R&D, which increased from \$21,419 million in 2018 to \$26,018 million in 2019, as the company invested heavily in AI, cloud computing, and hardware. Another factor was the dropdown in Other Income to \$5,394 million. Also, Alphabet's tax expenses increased, which further impacted the slight decline in profitability. In 2020, Alphabet's Net Profit Ratio recovered slightly to 22.06%, with Net Profit reaching \$40,269 million. As the world increasingly revolved around technology, the pandemic clearly influenced even more digital platforms and usage; hence, advertising revenue significantly boosted Net Sales to \$182,527 million. The continued growth in cloud services and digital ad revenue also helped stabilize profitability. In 2021, the company experienced the highest result in Net Profit Ratio at 29.51%, which was the highest in the analyzed period. Net Profit was \$76,033 million, driven by record-high Net Sales of \$257,637 million. One big indicator was the significant Other Income of \$12,020 million, which was almost twice the amount compared to previous years. A big part of this came from equity security gains. The company also controlled its cost structure effectively, even while making significant investments in Google Cloud infrastructure and AI technologies. In 2022, the Net Profit Ratio fell sharply to 21.20%, likely due to Net Profit dropping to \$59,972 million. This decline can be attributed to several factors, such as the Non-Operating Losses in 2022 within the five-year analysis, amounting to \$3,514 million, which primarily resulted from losses on equity securities and foreign currency fluctuations. Another factor was the rising costs: inflation, increased competition, and ongoing investments in AI and cloud services escalated operational expenses, contributing to the profitability decline.

4.6.2.4. Return on Assets Ratio

The Return on Assets (ROA) ratio is a subset of profitability ratios. It can be used to show how effectively a company uses its total assets to generate net income, expressed as a percentage (Wall Street, 2024). It can be calculated by formula (9) as below.

Table 13: Return on Assets Ratio of Alphabet, 2018-2022

Return on Assets 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Net Profit	30,736	34,343	40,269	76,033	59,972
Total Assets	232,792	275,909	319,616	359,268	365,264
Return on Assets	13.20%	12.45%	12.60%	21.16%	16.42%

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

With the table analysis provided, Alphabet started with a healthy ROA of 13.20% when net profit was \$30,736 million and total assets were \$232,792 million. This indeed demonstrates strong asset utilization and profitability, even though the European Commission fines of \$5,071 million slightly impacted overall performance. The performance dropped in 2019 despite the increase in net profit to \$34,343 million. This might be due to a significant increase in total assets (up by \$43 billion), which contributed to investments in AI, cloud services, and infrastructure. In 2020, ROA improved slightly to 12.60%, likely due to higher advertising revenue and increased digital platform usage during the pandemic. In 2021, it was a very successful year for the company and the best ROA record during the analysis period, with ROA jumping from 12.60% in 2020 to 21.16%. This impressive performance came from factors like high advertising revenue, cost efficiency, and gains from equity securities. However, ROA dropped sharply to 16.42% in 2022 mainly because of inflation, record losses on equity securities, and foreign currency fluctuations.

4.6.2.5. Return on Equity Ratio

Return on Equity Ratio (ROE) is among the key financial metrics that can show whether a business is doing well or falling behind its industry benchmark. A financial metric that analysts and investors can count on is return on equity. (Investopedia, 2020). It is calculated using (10) as below:

Table 14: Return on Equity Ratio of Alphabet, 2018-2022

Return on Equity 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Net Profit	30,736	34,343	40,269	76,033	59,972
Shareholders' Equity	177,628	201,442	222,544	251,635	256,144
Return on Equity	17.30%	17.05%	18.09%	30.22%	23.41%

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

Here's an analysis based on the table:

In 2018, Alphabet's ROE indicates that the company generated a return of 17.30% on its shareholders' equity. This figure shows good profitability and efficient use of equity. This came from the net profit of \$30,736 million and the shareholders' equity of \$177,628 million. In 2019, there was a slight decrease in ROE to 17.05%. This resulted from the combination of slightly increased equity (\$201,442 million) and moderate net profit growth (\$34,343 million). In 2020, Alphabet's ROE improved to 18.09%, reflecting better profitability management during a challenging global economic environment. The increase in net profit to \$40,269 million played a significant role, even as equity grew to \$222,544 million. Based on the table, the ROE rose sharply to 30.22% in 2021. This is definitely due to the huge profit growth of \$76,033 million, which caused this phenomenal increase. At the end of 2022, the ROE declined back to 23.41%, even with an excellent performance to earn a net profit of \$59,972 million that year.

4.6.2.6. Return on Capital Employed Ratio

Return on Capital Employed (ROCE) is a crucial financial metric that evaluates both a company's profit generation and its capital efficiency. It is used to determine how well a company is performing and whether it's effectively utilizing its capital. Financial managers, stakeholders, and investors often apply ROCE when evaluating a firm for investment, making it a very valuable tool for analysing profitability and efficiency (Groww, 2024).

For the purpose of calculating ROCE, below are calculated by formulars (11), (12), and (13):

Table 15: Return on Capital Employed Ratio of Alphabet, 2018-2022

Return on Capital Employed Ratio 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
EBIT	27,524	34,231	41,224	78,714	74,842
Capital Employed	198,172	230,688	262,782	295,014	295,964
Return on Capital Employed Ratio	13.89%	14.84%	15.69%	26.68%	25.29%

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

Alphabet's ROCE improved steadily from 13.89% in 2018 to 26.68% in 2021, showing that the company got better at using its capital to make returns. This growth happened because Earnings before interest and tax (EBIT) grew a lot faster than the amount of capital the company used, which was \$198,172 million. The big jump in 2021 was especially noticeable since EBIT almost doubled from \$41,224 million in 2020 to \$78,714 million in 2021, while capital employed only increased slightly from \$262,782 million in 2020 to \$295,014 million in 2021. In 2022, ROCE dropped slightly to 25.29%, which shows that efficiency leveled off as EBIT and sales growth slowed down. Overall, Alphabet did a great job making the most out of its capital during high-growth years and still maintained strong efficiency when growth slowed.

4.6.2.7. Cross-Analysis: Return on Capital Employed (ROCE) (%), Revenue Growth (%), and Gross Profit Margin (%)

The earlier analysis showed that Alphabet's ROCE improved steadily from 2018 to 2021, with a slight drop in 2022. To understand what caused these changes, it's important to look at more than just ROCE. While ROCE shows how efficiently Alphabet used its capital, it doesn't explain how factors like revenue growth and gross profit margins played a role. In this section, we'll compare ROCE with revenue growth and gross profit margins to get a clearer picture of how Alphabet managed to balance efficiency, market growth, and profitability during this time.

Table 16: Return on Capital Employed Ratio of Alphabet, 2018-2022

Year	Revenue (million USD)	Revenue Growth (%)	Gross Profit Margin (%)	ROCE (%)
2018	136,819	23.42%	56.48%	13.89%
2019	161,857	18.30%	55.58%	14.84%
2020	182,527	12.77%	53.58%	15.69%
2021	257,637	41.15%	56.94%	26.68%
2022	282,836	9.78%	55.38%	25.29%

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

In 2018, Alphabet achieved an ROCE of 13.89% which were mainly supported by a strong gross profit margin of 56.48% and revenue growth of 23.42%. The relatively low ROCE might indicate that while the company's revenue expansion was booming, its ability to efficiently utilize capital was still developing. ROCE in 2019 improved to 14.84%, as EBIT outgrew the capital employed. As the growth in revenue was slowing down to 18.30% and at the same time, gross profit margin was dropping slightly to 55.58%, it could mean that the COGS might need a little bit of attention. In 2020, it's impressive that ROCE increased to 15.69% despite the tough global conditions. Revenue growth slowed to 12.77%, which is understandable given the ongoing crisis, but the company still managed to maintain a solid gross profit margin of 53.58%. This shows Alphabet's ability to stay operationally efficient even when dealing with external challenges like rising costs or market uncertainties. The year 2021 was such an incredible year with a standout performance due to the surge of ROCE to 26.68%. This was due to EBIT nearly doubled up from previous year to \$78,714 million in 2021. Revenue growth was the highest among the whole analysed period at 41.15%. It seems that the company was taking advantage of the high-demand period on digital when the global shift towards digital solutions, accelerated by the pandemic. As a matter of fact, almost all kinds of businesses and even consumers were increasingly relying on technology to sell their products online when employers had no choice but to let their staff work from home due to the lockdown. This, as a result, pushed digital expenses such as communication. People, while unable to leave their homes for any outside activities for leisure, had no choice but to spend their time entertaining themselves with online entertainment, like watching Netflix, for example, and some even picked up the habit of online shopping. These changes in consumer behavior contributed to a boost in Alphabet's performance. The gross profit margin also improved to 56.94%, which simply means that the company enhanced profitability and operational leverage. The synchronization of revenue growth and profitability truly highlights Alphabet's efficient use of capital during its peak growth years. In 2022, ROCE fell off slightly to 25.29%, which matched a noticeable slowdown in revenue growth to 9.78% and a small shrink in gross profit margin to 55.38%. This shows that while Alphabet's efficiency remained steady, it was slightly lower during this slower growth period.

4.6.2.8. Earnings Per Share & Earnings Per Share Growths

This analysis looks at Alphabet’s Earnings Per Share (EPS) and its growth trends from 2018 to 2022, as shown in Table 19 and Figure 4. The goal is to understand how Alphabet’s profitability has changed over time, highlighting key moments of growth and decline. This section gives a clearer picture of how well the company has performed financially. It’s also noticeable that Alphabet stock was slipped in 2018 so EPS from previous year had to be adjusted accordingly by dividing it by 20.

Formula (1) is used to calculate EPS trend:

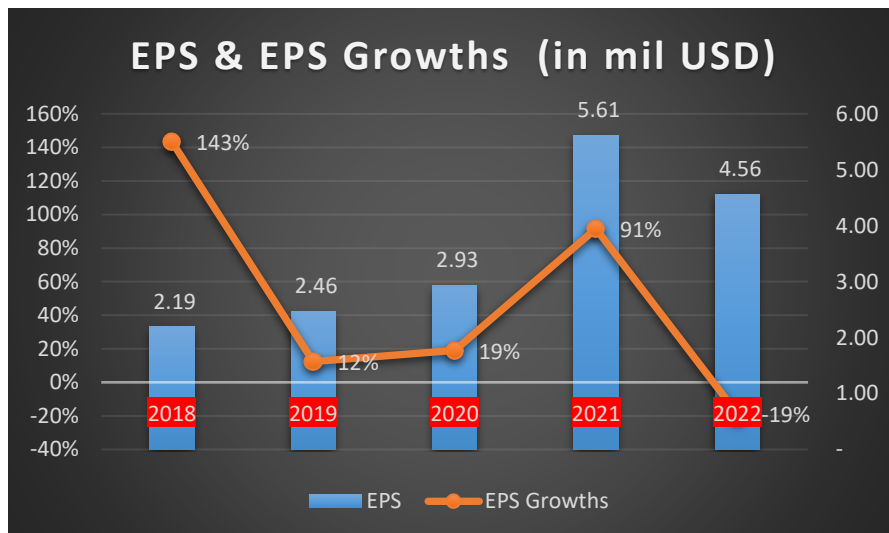
Table 17: EPS & EPS Growths of Alphabet, 2018-2022

EPS & EPS Growths (in USD)					
	2018	2019	2020	2021	2022
EPS	2.19	2.46	2.93	5.61	4.56
EPS Growths	143%	12%	19%	91%	-19%

Source: Author’s calculations based on Alphabet Inc.’s annual reports, 2024.

The table above and the accompanying chart below illustrate the trends in Alphabet Inc.’s Earnings Per Share (EPS) and its corresponding growth rates from 2018 to 2022. The table shows EPS values and yearly growth rates while the chart below visually compares these trends. Detailed analysis provided under the chart as below:

Figure 6: EPS & EPS Growths Trend in the years 2018-2022 (in mil.USD)



Source: Author’s calculations based on Alphabet Inc.’s annual reports, 2024.

From 2018 to 2020, EPS increased steadily from \$2.19 in 2018 to \$2.93 in 2020, with an amazing growth rate of 143% in 2018. Then, in 2019, it slowed down to only 12% before moving back up to 19% in 2020. With EPS reaching \$5.61, it caused a significant 91% increase in 2021, making it the highest growth period among the analysed timeframe. In

2022, the growth unbelievably declined to a negative value of -19%, which happened because the EPS dropped from \$5.61 in 2021 to only \$4.56 in 2022.

4.6.3. Solvency Ratios

4.6.3.1. Debt-to-Equity Ratio

The Debt-to-Equity ratio highlights on how a company is financed, specifically through its debt. With higher ratio means the company relies more on debt, which increases the risk of company potentially unable to meet their financial obligations. This ratio also indicates on how much of the debt could be covered by equity if the company were to liquidate (Hayes, 2024). For the purpose of this thesis, Long-term debt is used as it fits better with industry comparisons because it excludes short-term operational liabilities like accounts payable which tend to vary frequently. Another reason is that investors are likely focused on long-term value creation as well as the company's ability to finance projects for instance AI development and data centers, hence this metric might be more and suitable to apply. To calculate the Debt-to-Equity ratio, formula (17) is used:

Table 18: Debt-to-Equity Ratio of Alphabet, 2018-2022

Debt-to-Equity Ratio 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Long-Term Debt	4,012	4,554	13,932	14,817	14,701
Shareholders' Equity	177,628	201,442	222,544	251,635	256,144
Debt-to-Equity Ratio	0.0226	0.0226	0.0626	0.0589	0.0574

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

The table above illustrates the Debt-to-Equity Ratio for Alphabet Inc. from 2018 to 2022. This ratio is a key indicator of the company's financial leverage which reflects the proportion of debt financing compared to their shareholders' equity. It starts in 2018 with a value of 0.0226 and remains the same in the following year 2019. There was a noticeable increase in the ratio to 0.0626 in 2020, which appears to be the result of a significant increase in long-term debt from \$4,554 million in 2019 to \$13,932 million in 2020. If we look at the table, there is no significant growth in shareholders' equity during this period, suggesting that the company might rely more on debt to finance investments or operations amidst the uncertainties of the COVID-19 pandemic. However, there was a slight decline in the ratio from 0.0589 in 2021 to 0.0574 in 2022. The steady level of long-term debt combined with a significant increase in equity which rose to \$251,635 million in 2021 and

further to \$256,144 million in 2022, it suggests that the company focused on adding more equity rather than relying on debt to strengthen its financial operation.

4.6.3.2. Debt-to-Assets Ratio

The Debt-to-Assets ratio measures the proportion of a company's total debt relative to its total assets to highlight the company's reliance on debt for funding its operations. More than that, it also indicates the company's ability to repay its debts using its available assets. A higher ratio, which is in particular above 1.0, may suggest that the company relies heavily on debt and might struggle to meet its financial obligations (Hayes, 2024). For the purpose of computing Debt-to-Assets ratio, (18) is used.

Table 19: Debt-to-Assets Ratio of Alphabet, 2018-2022

Debt-to-Assets Ratio 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Long-Term Debt	4,012	4,554	13,932	14,817	14,701
Total Assets	232,792	275,909	319,616	359,268	365,264
Debt-to-Assets Ratio	0.0172	0.0165	0.0436	0.0412	0.0402

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

In 2018, the Debt-to-Assets Ratio stood at 0.0172, which suggests that there is really a minimal fraction of the company's total assets financed through the long-term debt. Then, in 2019, a slightly lower value of 0.0165 was recorded. This could be interpreted as the company's financial strategy relying on limited debt. However, there was a big leap in the ratio to 0.0436, which might be influenced by the global crisis demanding big use of cash to finance operations, increasing its long-term debt from \$4,554 million in 2019 to \$13,932 million. Finally, the ratio calmed down slowly to 0.0412 in 2021 and further declined to 0.0402 in 2022. The decrease in the ratio from 2020 onward is largely attributed to the growth in total assets from \$319,616 million in 2020 to \$365,264 million in 2022. From this result very far from 1.0, there is absolutely no sign of difficulty for the company to pay debt at all which suggests that the company is doing a really good job on this financial aspect.

4.6.3.3. Interest Coverage Ratio

The interest coverage ratio demonstrates the extent to which a company's earnings can accommodate its current interest payments. In simple terms, it indicates the margin of safety a company has to cover interest payments on its debt during a specific period. A

higher ratio is generally better, as it shows the company is in a stronger position to meet its interest obligations. If the ratio drops to 1.5 or lower, it could signal that the company may struggle to pay the interest on its debts (Hayes, 2024). The Interest Coverage Ratio is measurement to see whether a company can meet its interest obligations from its earnings before interest and taxes (EBIT). A higher ratio indicates a stronger capacity to handle interest payments. (18) is used for below table:

Table 20: Return on Assets Ratio of Alphabet, 2018-2022

Interest Coverage Ratio 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
EBIT	27,524	34,231	41,224	78,714	74,842
Interest Expense	114	100	135	346	357
Interest Coverage Ratio	241.44	342.31	305.36	227.50	209.64

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

In 2018, Alphabet had an Interest Coverage Ratio of 241.44. This huge ratio definitely tell that there is no problem for the company to cover its interest expenses at all. In 2019, This ratio increased significantly to 342.31 which improved their efficiency in meeting interest obligations even further. This is likely due to the fact that there was rise in EBIT from \$27,524 million in 2018 to \$34,231 million in 2019 and the reduction in interest expense from \$114 million in 2018 to \$100 million in 2019. In 2020, despite an increase in interest expense to \$135 million, the ratio remained strong at 305.36. By 2021, the ratio dropped to 227.50 which might be the cause from significant increase in interest expense to \$346 million. The ratio further declined to 209.64 because the interest expenses slightly rose to \$357 million while EBIT decreased to \$74,842 million when compared to \$78,714 million in 2021. Still, in brief, the company maintained a high Interest Coverage Ratio throughout the period. This is truly remarkable and it is a sign which demonstrate its strong financial stability and ability to meet interest obligations without much effort. However, the declining trend in recent years suggests that rising interest costs may require monitoring.

4.6.3.4. Equity Ratio

The equity ratio shows how much of a company is funded by equity instead of debt. A higher ratio means the company is financially healthy; on the other hand, a lower ratio confirm that it relies more on debt than equity. The Equity Ratio provides a view of the

proportion of assets backed by equity to provide knowledge on whether the financial structure is stable or relies more on equity than debt. To arrive equity ratio result, (19) is applied.

Table 21: Equity Ratio of Alphabet, 2018-2022

Equity Ratio 2018-2022					
Fiscal year Jan to Dec	2018	2019	2020	2021	2022
Total Equity	177,628	201,442	222,544	251,635	256,144
Total Assets	232,792	275,909	319,616	359,268	365,264
Equity Ratio	0.7630	0.7301	0.6963	0.7004	0.7013

Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

As data illustrates, in 2018, Alphabet had a high Equity Ratio of 0.7630, which means that the company used its equity to finance its assets equivalent to 76.3%. In 2019, a slight decline is shown to 0.7301. This shrink continued to 0.6963 in 2020, falling below 70% originally in 2018. With a slight increase in equity to \$222,544 million while total assets rose noticeably to \$319,616 million, it can be interpreted that the company was relying more on debt than its equity for activities such as building infrastructure or investing in projects. In 2021, we saw a rebound to 0.7004 and a slight increase to 0.7013 in 2022. Despite the fluctuation, the ratio was always almost or over 70% for the whole period. It can be concluded that Alphabet is more likely to rely on equity and less dependent on debt. There is also a good sign of management flexibility to change strategy over time, especially during a bad economic period.

4.7. Intrinsic Value Calculation and Comparison

The purpose of this section is to estimate the intrinsic value of Alphabet's stock using the Discounted Cash Flow (DCF) method and compare it with other valuation benchmarks such as the Book Value per Share (BVPS) and the actual market price. By overviewing these valuation methods altogether, this analysis shall provide reader with a more comprehensive understanding of whether Alphabet's stock whether or not it is being fairly valued, overvalued, or undervalued.

4.7.1. Discounted Cash Flow Calculation

The DCF method is a widely applied approach for estimating a company's value by forecasting its future earnings and discounting them to their present value. This method accounts for the time value of money and risks associated with future cash flows,

providing a clear view of the company's financial potential and growth prospects (Gurufocus, 2024).

Therefore, to evaluate Alphabet's intrinsic value, this study uses the DCF as the main tool for evaluation of the company intrinsic value. While other methods like the Dividend Discount Model (DDM) and Residual Income Model (RIM) are also popular for calculating intrinsic value, the DCF method is better suited for Alphabet. The DDM focuses on dividend payments, which Alphabet does not provide due to its strategy of reinvesting profits into growth. Similarly, the RIM highlights excess earnings but does not adequately capture Alphabet's fast-paced innovation and expanding revenue streams. The DCF method, on the other hand, incorporates both short-term growth opportunities and long-term value creation, making it more comprehensive for Alphabet's unique characteristics.

This analysis adopts the DCF framework as outlined by GuruFocus (2024). For the first phase, the growth stage, a higher growth rate is applied to reflect Alphabet's strong performance potential. The second phase, the terminal stage, uses a more conservative growth rate to account for long-term stability. This two-stage model provides a more realistic perspective on Alphabet's financial evolution. GuruFocus (2024) also highlight the important usage of Earnings Per Share (EPS) without Non-Recurring Items (NRI) over traditional free cash flow as this approach is based on evidence that stock prices historically correlate more closely with earnings than with free cash flow. Using EPS as the primary input ensures consistency with market behavior while simplifying the calculation process. Both WACC and the DCF method offers a reliable and detailed way to estimate Alphabet's intrinsic value. When DCF model captures Alphabet's earnings potential and strategic reinvestments, the WACC additionally supports analyst to view the cost of financing this growth. Finally, with the application of both tools shall provide a solid foundation for comparing Alphabet's intrinsic value with its market price and book value.

To calculate the discounted cash flow, (21), (22), and (23) are used:

Where:

- $E(0)$: Current earnings or EPS for the most recent year, 2022
- x : Discounted growth factor during the growth stage
- y : Discounted growth factor during the terminal stage
- n : Number of years in the growth stage = 10 years

- m: Number of years in the terminal stage = 10 years
- d: Weighted Average Cost of Capital
- g1: growth rate at growth stage
- g2: growth rate at terminal stage = 4%

To arrive at the intrinsic value of Alphabet using the DCF method, several key inputs must first be calculated. Firstly, it starts with defining the WACC due to it serves as the discount rate in the DCF formula. Next, the growth rate during the growth stage (g1) is determined using company historical performance data. Once these figures are calculated, the final step is to apply the DCF formula, combining all inputs to compute Alphabet's intrinsic value. The following sub-sections break down each of these steps in detail, ensuring a comprehensive and methodical approach to the valuation process.

4.7.1.1. Weighted Average Cost of Capital

The first critical component in the DCF calculation is the Weighted Average Cost of Capital (WACC). Its value represents the cost of financing, accounting for both equity and debt. WACC will be used as the discount rate and it will ensure that future cash flows are adjusted to their present value.

The WACC represents the average after-tax cost a company incurs to finance its operations, including funding from sources such as common stock, preferred stock, bonds, and other debt (Investopedia, 2024). It is essentially the rate the company expects to pay to utilize its capital. WACC is often used to determine the required rate of return (RRR) because it consolidates, in a single metric, the returns expected by bondholders and shareholders for providing capital. A company with volatile stock or risky debt will typically have a higher WACC, as investors demand greater returns to compensate for the increased risk. In the case of Alphabet, WACC becomes a particularly important factor due to its strategic focus on innovation and growth. With the firm making a big effort actively in investments in areas such as artificial intelligence, data centers, and cloud services, it should be reasonable to try and understand the cost of its capital. More importantly, it is also critical to evaluate whether the company is creating value for its investors. Given Alphabet's relatively low debt levels compared to equity and its ability to generate consistent revenue growth, its WACC reflects a lower risk profile, which reinforces the company's strong financial position.

There is one key point to the calculation of Alphabet's WACC. There was an unavailability of market value data for the company's debt. This is a challenge and really expected because the author might have problems accessing all available data and free data for the purpose of the thesis. To resolve this, the author instead used the book value of debt as a substitution since it's totally acceptable. This value was determined by summing Alphabet's short-term and long-term debt as reported in its balance sheet. While the book value may not perfectly capture potential differences between the market and book values of debt, it is still widely accepted as an alternative in financial analysis. This approach is constructed so that Alphabet's debt is adequately accounted for in the WACC calculation. In addition, there are also specific assumptions that were made for other critical inputs, such as the risk-free rate, which was set at 3.00% to fit the yield on U.S. Treasury bonds at the end of 2022. Alphabet's beta (β) was calculated as 1.082. (β) is used to measure the stock's volatility in relation to the market. Furthermore, the market risk premium was assumed to be 4.05%, based on recommended U.S. equity risk premium data for the same period ending in 2022. Using these inputs, Alphabet's cost of equity was estimated at 7.38%. Together, these adjustments and assumptions would definitely ensure the accurate calculation of Alphabet's WACC; although some data cannot be obtained, the analysis should remain reliable and aligned with established financial methodologies.

To calculate WACC, (24), (25), (26), (27), (28), (29), (30), (31) are applied:

Where:

- w_e : Weight of Equity (Proportion of equity in the total capital structure)
- r_e : Cost of equity
- w_d : Weight of Debt (Proportion of debt in the total capital structure)
- r_d : Cost of debt
- Tax Rate: Corporate tax rate in US = 21%

$$WACC = 7.31\%$$

Detailed calculation, see appendix from page 84

4.7.1.2. Calculate growth rate (g1)

After calculating the WACC, the next step involves estimating Alphabet's growth rate (g1) during the initial growth stage. This rate captures the company's projected

earnings growth based on historical trends and forms a crucial input for the DCF model. Once (g_1) is determined properly, the analysis the intrinsic value calculation is sure to reflect Alphabet's performance trajectory during its high-growth period.

The growth rate during the growth stage (g_1) has been calculated using the Compound Annual Growth Rate (CAGR) formula. CAGR represents the annualized growth rate of Alphabet's EPS over a specific period and is computed as follows, to arrive the result, (32) is used:

Where:

- $EPS_{begin} = 2.19$ (EPS in 2018)
- $EPS_{end} = 4.56$ (EPS in 2022)
- $n = 5$ (number of years)

$$g_1 = \left(\frac{4.59}{2.19}\right)^{1/5} - 1 = 15.80\%$$

4.7.1.3. Application of Discounted Cash Flow

With the key components, WACC and growth rate (g_1), are now prepared, the calculation of the DCF can proceed by using (17) to arrive below result:

$$\text{Intrinsic Value} = \mathbf{154.45}$$

Detailed calculation, see appendix from page 84

After the calculation, the intrinsic value of Alphabet using the DCF method is estimated to be 209.69. This result captures the combination of Alphabet's growth potential across both the high-growth and terminal stages by adjusting for the time value of money using the WACC. Now that the intrinsic value was determined, next, the focus will be to compare this estimate to Alphabet's book value and actual market price. This comparison will help assess whether the stock is fairly valued, undervalued, or overvalued.

4.7.2. Comparative Analysis: Intrinsic Value (DCF), Book Value Per Share, and Market Price

This section is designed to provide more comprehensive insight by comparing the intrinsic value of Alphabet's stock resulted from DCF method, with its Book Value Per Share (BVPS) and the actual market price of the stock in 2022. The purpose of this analysis is to evaluate and see how these three metrics align and to determine whether or

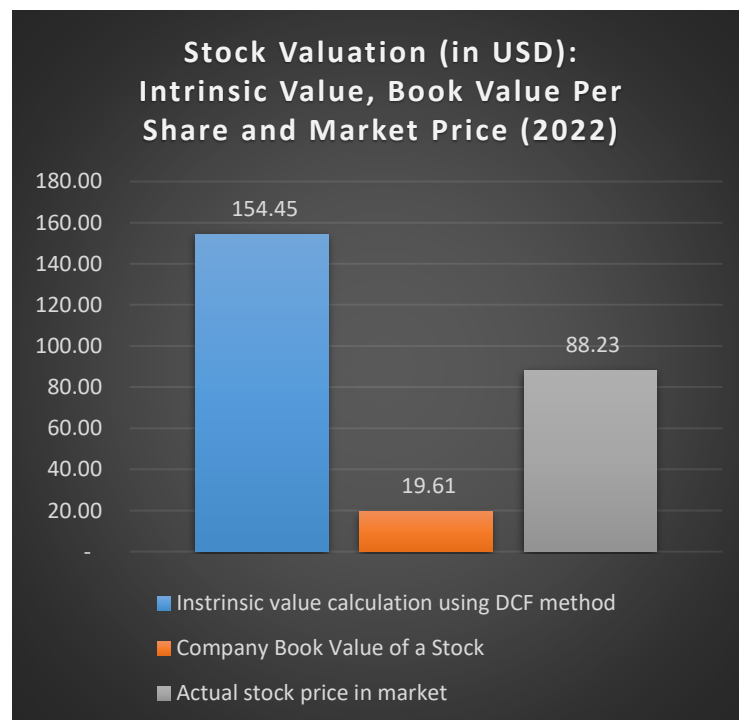
not Alphabet's stock is properly valued. By comparing the three results with different methods, this analysis highlights the key factors contributing to the differences between accounting-based valuation, market perception, and intrinsic value.

BVPS represents the accounting value of a company's equity on a per-share basis. It is calculated by dividing the total common shareholders' equity by the number of outstanding common shares. It is quite convenient in the case of Alphabet Inc., which does not possess preferred stock, as the total shareholders' equity can be used directly without having to subtract the value of preferred stock. BVPS is a straightforward method to use. The requirement is to obtain the company's balance sheet, which is available and can be found in the company's annual report. It can be further compared to the stock's market price to get a clearer picture of whether the stock is trading above or below its actual value. This comparison helps investors evaluate whether a stock might be overvalued or undervalued based on its net asset value (Investopedia, 2024).

To arrive the result of BVPS, use (33):

$$\text{Book Value Per Share} = 19.61 \text{ USD/share}$$

Figure 7: Current Ratio comparison in 2022



Source: Author's calculations based on Alphabet Inc.'s annual reports, 2024.

Alphabet's valuation highlights a compelling narrative when comparing its Intrinsic Value, BVPS, and Market Price. The intrinsic value which was calculated using the DCF model valued at \$154.45 per share. In contrast, the market price of \$88.23 per share as of 2022 suggests significant undervaluation. This difference might be due to the cause of several factors potentially. To seek more insights into the topic, the discussion should be involved on the interaction between Alphabet's financial metrics, macroeconomic factors, and strategic positioning.

Alphabet's profitability metrics reinforce the credibility of its intrinsic value. The Return on Capital Employed (ROCE) remained strong at 25.29% in 2022, even as it declined from the peak of 26.68% in 2021. This finding surely point out that Alphabet was very efficient in using its capital during a period a tricky period of bad economic condition. Similarly, the Net Profit Ratio of 21.00% in 2022, though lower than previous years, still shows strong overall profitability despite growing costs and increased regulatory pressures. The stability in profitability aligns with Alphabet's CAGR in EPS of 15.80% from 2018 to 2022. This show its ability to maintain consistent earnings growth over time. External pressures in 2022, including inflation, interest rate hikes, and a downturn in the broader tech sector, likely suppressed Alphabet's market price. According to the U.S. Federal Reserve, interest rates increased by over 4 percentage points during 2022, raising the cost of capital and negatively impacting growth-oriented companies (Federal Reserve, 2024). These macroeconomic conditions, compounded by regulatory challenges in Alphabet's core advertising business, may have overshadowed its strong fundamentals and contributed to the gap between market and intrinsic values (Reuters, 2023). The significant difference between Alphabet's intrinsic value of \$154.45 per share and its BVPS of \$19.64 per share highlights the limitations of static, accounting-based valuation methods. BVPS excludes intangible assets and future earnings potential, which are critical drivers of Alphabet's value. Alphabet's strategic investments in Google Cloud, which generated an additional \$6.3 billion in revenue in 2022, and its advancements in AI and autonomous vehicles, further validate its high intrinsic value. Alphabet's valuation is driven by its potential for future growth. Its leadership in artificial intelligence (AI) and the monetization of YouTube through premium subscriptions and ad revenue proof why they are such a promising and incredible tech company with strong potential for sustained profitability. All these initiatives position them to capitalize as well as ensuring its ability to recover from temporary setbacks like what happened in 2022 on their EPS being declined. With such

strategic positioning aligns with the assumptions in the DCF model shall already justify why the intrinsic value is significantly higher than its market price.

Ultimately, Alphabet's market price of \$88.23 per share appears undervalued relative to its intrinsic value of \$154.45. While short-term headwinds influenced its 2022 performance, the company's strong profitability metrics, innovation-driven growth strategy, and favorable long-term prospects suggest that Alphabet represents a compelling opportunity for long-term investors.

5. Results and Discussion

This section presents the findings of the analysis and provides an interpretation of the analyzed results. It is divided into two parts. Starting with the Discussion session, the findings are analysed and interpreted with economical context. Following with Recommendation part, where author provides suggestions based on the findings offered. First start with the Alphabet management, following by future researcher and finally the investor. This structure ensures a clear connection between the analysis result, its context and significance along with useful insights.

5.1. Discussion

Alphabet Inc., as a global technology leader, has continually leveraged innovation to maintain its dominance in digital advertising, cloud computing, and artificial intelligence markets. In this thesis, the author aimed to assess Alphabet's financial health and its intrinsic stock value by using two different kind of methods, DCF and BVPS. After both results are revealed, a comparative valuation metrics is applied to DCF finding, BVPS finding and the market price. For the data, the financial statement of the company from 2018 to 2022 was collected and used by extracting from the Alphabet's annual reports and only reputable financial platforms. After all the financial information such as annual reports are ready, they are transfered into spreadsheet Excel. Then the analysis of key financial metrics—liquidity, profitability, and solvency—were analyzed alongside horizontal and vertical trends in the company's balance sheet and income statement. All these are analysis are crucial to get a fundamental understanding of the financial situation and potentially served as an explanation to the intrinsic value which was the final and main objective of the thesis. From the calculation of the intrinsic value side, it was calculated using the WACC and growth rates derived from revenue and EPS trends. Finally, once all analyses were completed, all the findings from the analysis results were contextualized with macroeconomic factors and expert opinions to provide reader a comprehensive assessment of Alphabet's its financial health and intrinsic value. It shall also address our main question of whether the stock is under or overvalued and its attractiveness as a long-term investment opportunity.

Alphabet's liquidity metrics reflect its strong short-term financial position. The current ratio was consistently above 3.0. This indicates the company's ability to cover

liabilities using current assets. This liquidity proved to be very essential as a mean to stay agile during crises such case like the COVID-19 pandemic as it ensures that Alphabet could maintain operations and at the same time supporting its strategic investments. With quick ratio being consistently exceeded 2.5, it strongly tells that Alphabet rather reliance on cash reserves than in its inventory. It should make sense as it is within the type of asset-light business model. Alphabet's cash flow stability enabled it to navigate significant challenges such as a case when the company had to pay €6.76 billion fine to EU during period 2018 and 2019 as stated in their Annual Report in Income Statement, without disrupting its investment in AI and cloud services. Expert perspectives align with this analysis. Kiplinger emphasized Alphabet's sturdy cash reserves shows how liquidity enables the company to fund innovation while maintaining operational stability (Kiplinger, 2023). Alphabet's ability to allocate resources efficiently reinforces its leadership in the tech industry.

Alphabet's profitability ratios underscore its ability to generate consistent returns. The gross profit margin being on the average around 56% is a good sign and it reflects effectiveness in their cost management and revenue generation. At 30.55%, their operating profit margin peaked in 2021. It demonstrates Alphabet's efficiency during the surge in digital demand. Although the margin declined to 26.46% in 2022 due to rising operational costs, it remains well above industry averages which is a good feat. Moving on to the net profit margin, according to the analysis, the company's average profit margin is in average of 25%, and in 2021, it peak at 29.51%. On their ROCE, the best performance year was 26.68% in 2021 then there was a slight decline to 25.29% in 2022. With the ROE, reaching 30.22% in 2021, it shows that the company is very capable on maximizing its shareholder returns during growth periods. All of these metrics align with some other expert analyses. AOL Finance argues that Alphabet's strong profitability metrics and undervalued stock price make it "too cheap to ignore," especially considering its leadership in AI and advertising (AOL, 2023). Similarly, the Motley Fool also highlight Alphabet's ability to adapt and thrive amidst economic and competitive challenges and for this fact, it's convincing that their long-term investment is pretty much secured (Motley Fool, 2023).

Alphabet's solvency ratios emphasize its low-risk financial management. The debt-to-equity ratio is consistently below 0.5. That means Alphabet prefer equity over debt to finance which reduces its vulnerability to economic volatility. Similarly, the interest coverage ratio, exceeding 20x, reflects Alphabet's capacity to comfortably meet debt

obligations, even during inflationary pressures in 2022. On the Experts opinion such as Investor's Business Daily have noted Alphabet's prudent financial management as a key factor in its ability to fund growth initiatives while maintaining stability (Investor's Business Daily, 2023). Additionally, according to another source, MSN Money forecasts Alphabet's market capitalization could reach \$3 trillion by 2025. This is largely due to its strategic investments and financial resilience (MSN, 2023).

The horizontal analysis of Alphabet's balance sheet reveals steady growth in total assets. This comes from their investments in intangible assets such as AI and cloud infrastructure. Despite regulatory fines in 2018 and 2019, Alphabet's shareholder equity still managed to go faster than its liabilities. Some Experts have noted that Alphabet's focus on emerging technologies positions it to capitalize on future growth opportunities while maintaining competitive differentiation and this really align with the result from the vertical analysis which shows that the company rely on intangible assets to back up its innovation-driven strategy.

Alphabet's revenue growth was at its peak in 2021 with 41.15%. That was due to increased demand for digital services during the pandemic. Its revenue sources mostly came from Platforms like Google and YouTube because most business shift their attention heavily to online advertising and streaming. However, revenue growth slowed to 9.78% in 2022 which might come from the effect of uncertain economic conditions and another impact is on the rising of inflation. Moving on to the critical part on the analysis which is the intrinsic value calculation. From the result using the DCF method, the intrinsic resulted at \$154.45 per share. It seems that the stock value was heavily undervalued because it significantly exceeds the market price which was \$88.23 as of 2022. On the other hand, the stock value from another valuation method, BVPS, was only at \$19.61 as it appears to be unreliable method because this does not take into account many factors such as intangible value of the company and only purely base on the balance sheet item. BVPS estimates the per-share value based on the company's net asset value and indicates how much a shareholder could theoretically receive in cash if the company were liquidated, for instance due to bankruptcy (Anon, 2024). Hence, it's more logical to trust the DCF result since it incorporates a broader range of components that BVPS does not consider. Back into the practical world where attention might be with companies like Apple Inc. and Microsoft Corp. who might have generated higher EPS, the Alphabet's stock is still a compelling investment due to its leadership in technologies such as AI and its diversified revenue

streams. In addition to that, Analysts also predict that Alphabet's market capitalization could reach \$3 trillion by 2025, driven by advancements in AI, cloud computing, and monetization of platforms like YouTube (Barron's, 2023; MSN, 2023).

In summary, Alphabet's intrinsic value proof that the company stock is very undervalued despite its strong financial foundation. With its continuous development and innovation in technology, there is definitely a huge intangible value being miscalculated using classic method such as BVPS or pure speculation from the market which is still limited its full growth potential.

5.2. Recommendation

For Alphabet, it is recommended that the company takes a proactive action toward its regulatory challenges. Make sure to be compliant with all regulations imposed to retain both reputation and trust from investor. Furthermore, this prevents dealing with complicated situations that could lead to unnecessary expenses and wasted time.

For the Future research, it is strongly encouraged that the study is conducted in a longer study period and potentially use more methods for comparison purpose to see the difference in their results for more comprehensive analysis. The application of other valuation models such as the Dividend Discount Model or Residual Income Model are highly recommended.

For investors, while the thesis demonstrates that Alphabet's stock is undervalued, investors should conduct further research which focus on developments post to 2022. Be considerate to use more recent data and alternative valuation methodologies as previously mentioned. Keeping an eye on Alphabet's progress in addressing regulatory challenges can also be really critical too. Moreover, apart from BVPS result, the rest of the findings including DCF result consistently indicate the positive result on the company potential. If it is not convincing enough, expert opinions really put on more weight into these conclusions. Alphabet's financial strength, innovation-driven approach, and strong position make them a topic of discussion in the industry for its attractive investment opportunity shining out among others.

Conclusion

Alphabet Inc. stands as one of the most influential companies in the global technology landscape with its continuous innovation and its leadership in technologies such as cloud computing and artificial intelligence. This thesis aimed to evaluate Alphabet's financial health and intrinsic stock value through the Discounted Cash Flow (DCF) method. Other valuation metric, the Book Value Per Share (BVPS) is also applied for more comprehensive analyses along with market price being taken into account. By analyzing financial data from 2018 to 2022, this study provides a deep understanding on the Alphabet's financial performance which include income statement and balance sheet metrics, liquidity, profitability, solvency, and its company intrinsic value.

On Alphabet's liquidity ratios which includes the company current ratio has the value being consistently over 3.0 with the quick ratio exceeding 2.5. This indicates its exceptional ability to meet short-term obligations. Despite its regulatory challenges in 2018 and 2019, when it was fined by EU in total €6.76 billion recorded in its income statement, Alphabet's cash reserves and strong operational cash flow still enabled it to maintain strategic investments in AI and cloud services. Experts at Kiplinger emphasized Alphabet's strong liquidity as a key of its innovation-driven strategy which ensures operational stability even during macroeconomic disruption (Kiplinger, 2023).

The profitability analysis shows Alphabet's ability to generate excellent returns. A gross profit margin being in average of 56% with the operating profit margin peaked at 30.55% in 2021 demonstrate its efficient cost management. Although the margins slightly declined in 2022 due to rising costs, the net profit margin is still managed to be kept at good ratio at 21.20% in 2022. Its ROCE was at 26.68% in 2021 when The ROE was 30.22% in 2021. With all these results, it strongly evidence Alphabet ability to meet its shareholder expectation and value. Unsurprisingly, there was Analysts at AOL Finance described Alphabet as "too cheap to ignore," noting its ability to adapt to challenges while maintaining profitability and expanding its technological dominance (AOL, 2023).

Alphabet's solvency ratios result in debt-to-equity ratio being consistently below 0.5. And the average interest coverage ratio over the analyzed period was 265.25 which exceeds 200x its interest obligations. These metrics illustrate that Alphabet can meet its obligations comfortably and still has enough to invest in more project or spend in R&D for future growth. Experts at Investor's Business Daily and MSN Money forecast that

Alphabet's market capitalization could reach \$3 trillion by 2025 which further fuels its leadership in AI and cloud computing (Investor's Business Daily, 2023; MSN, 2023).

The horizontal balance sheet analysis provides additional evidence of Alphabet's financial resilience with the result from the revealed the steady growth in its total assets. On its shareholder equity side, it shows consistent expanding which outgrow its liabilities. These findings validate the use of forward-looking valuation models like DCF in capturing Alphabet's true economic potential. On the other side, looking at the finding from the vertical analysis of income statement over these five years 2018-2022. It appears that the company was doing a good job by balancing innovation with high R&D expense as reported and still managed to control cost while navigating external challenges. That being said, certain areas like G&A costs might definitely be in need of a closer look for improvement, especially if Alphabet wants to maintain or enhance its profitability margins in the future period of time.

Valuation metrics further assures the investment appeal of Alphabet. So, the calculated intrinsic value of \$154.45 per share by using the DCF model result in the stock value being far exceeds the market price of \$88.23 as of 2022. It strongly proofs that the stock was significantly under its true valuation. In contrast, the other classic valuation method, BVPS, presents stock value at only \$19.61. Arguably, this old-fashioned method is not very effective in reflecting the true value of a high-tech company like Alphabet, as it seems to overlook the company intangible asset and growth potential. This discrepancy is attributed to temporary macroeconomic challenges and market mispricing as emphasized by experts at Barron's and Motley Fool who predict strong future growth driven by advancements in AI, cloud computing, and digital advertising (Barron's, 2023; Motley Fool, 2023). While companies like Apple Inc. and Microsoft Corp. generate higher EPS, Alphabet's diversified revenue streams and strategic monetization of platforms like Google Cloud and YouTube position it as an even more compelling long-term investment.

In summary, all the analysis conducted demonstrates Alphabet's solid financial performance. It also proof that the company is pretty much underrated due to its intrinsic value being far exceeds its market price. The findings also emphasize the importance of forward-looking valuation approaches, such as the application of DCF model to recognize the value of such tech companies. In contrast to BVPS, it purely estimates the per-share value based on the company's net asset in the case if the company were to liquidate such as in the case of bankruptcy. It shows how much a shareholder could theoretically receive in

cash (Anon, 2024). All other results point out positively on the company unparalleled growth potential. This further supported by expert opinions which makes the outcome even more powerful. The investor should not underestimate the company's potential even though there are other firms which might look promising. This thesis should be convincing enough for readers to potentially become investors by purchasing Alphabet's stock because of its highly attractive investment opportunity, combining financial strength, innovative capabilities, and solid outlook in the fast-changing technology sector.

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List of abbreviations

AI: Artificial Intelligence
BVPS: Book Value Per Share
CAGR: Compound Annual Growth Rate
COGS: Cost of Goods Sold
DCF: Discounted Cash Flow
DDM: Dividend Discount Model
EBIT: Earnings Before Interest and Tax
EPS: Earnings Per Share
R&D: Research and Development

RIM: Residual Income Model
ROA: Return on Assets
ROCE: Return on Capital Employed
ROE: Return on Equity
WACC: Weighted Average Cost of Capital

Appendix

WACC=(we×re)+(wd×rd×(1–Tax Rate))	
$r_d = \frac{\text{Total Interest Expense}}{\text{Total Debt}}$	0.024267555
$r_e = \text{Risk – Free Rate} + \beta * (\text{Market Risk Premium})$	7.38%
$W_e = \frac{\text{Market Value of Equity}}{\text{Total Market Value of Capital}}$	0.99
$W_d = \frac{\text{Market Value of Debt}}{\text{Total Market Value of Capital}}$	0.01
tax rate	21%
WACC =	7.31%

Calculate the growth rate (g1), Compound Annual Growth Rate (CAGR), we use the following formula:

$$CAGR = \left(\frac{EPS_{end}}{EPS_{begin}} \right)^{\frac{1}{n}} - 1$$

$$= (G7/C7)^{(1/5)} - 1$$

g1 =	15.80%
-------------	---------------

Intrinsic Value = Future Earnings at Growth Stage + Terminal Value

$$= E(0) * x * (1 - x^n) / (1 - x) + E(0) * x^n * y * (1 - y^m) / (1 - y)$$

where $x = (1 + g1) / (1 + d)$, and $y = (1 + g2) / (1 + d)$

Parameters:

E(0) – current earnings			
d – discount rate	d = Weighted Average Cost of Capital (WACC)		
g1 – growth rate at growth stage	15.80%		
g2 – growth rate at terminal stage	4.00%		
n – number of years at the growth stage	10 years		
m – number of years at the terminal stage	10 years		
			$= E(0) * x * (1 - x^n) / (1 - x) + E(0) * x^n * y * (1 - y^m) / (1 - y)$
E(0)		=	\$4.59
x	g1	=	15.80%
	d	=	7.31%
x		=	1.08
y	g2	=	4.00%
	d	=	7.31%
y		=	0.97
n		=	10
m		=	10
		=	154.45
Actual stock price as of 2022		=	88.23

NasdaqGS - Nasdaq Real Time Price - USD

Alphabet Inc. (GOOGL)

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↔ Compare

● Time to buy GOOGL?

167.65 **+2.89 (+1.75%)** **167.71** **+0.06 (+0.04%)**

At close: November 25 at 4:00 PM EST

Pre-Market: 7:46 AM EST

Dec 01, 2022 - Dec 31, 2022

Historical Prices

Daily

Currency in USD

Date	Open	High	Low	Close	Adj Close	Volume
Dec 30, 2022	86.98	88.30	86.57	88.23	88.01	23,986,300
Dec 29, 2022	86.62	88.85	86.61	88.45	88.23	23,333,500
Dec 28, 2022	86.98	88.04	85.94	86.02	85.81	19,523,200
Dec 27, 2022	88.80	88.94	87.01	87.39	87.17	20,097,300
Dec 23, 2022	87.11	89.55	87.07	89.23	89.01	23,003,000
Dec 22, 2022	88.16	88.54	86.32	87.76	87.54	27,658,300
Dec 21, 2022	89.08	90.22	88.32	89.58	89.36	24,745,600
Dec 20, 2022	88.11	89.18	87.44	89.02	88.80	23,453,800
Dec 19, 2022	90.26	90.56	88.21	88.44	88.22	29,493,000
Dec 16, 2022	90.76	91.33	89.52	90.26	90.04	58,011,800
Dec 15, 2022	93.13	93.64	90.01	90.86	90.64	40,107,000
Dec 14, 2022	95.20	96.87	93.60	95.07	94.84	28,733,600
Dec 13, 2022	97.76	99.53	95.03	95.63	95.39	40,593,700
Dec 12, 2022	92.71	93.56	91.61	93.31	93.08	29,420,000
Dec 9, 2022	93.77	94.26	92.75	92.83	92.60	28,225,400
Dec 8, 2022	95.38	95.58	93.45	93.71	93.48	32,213,300
Dec 7, 2022	96.41	96.88	94.72	94.94	94.71	31,045,400
Dec 6, 2022	99.30	99.78	96.42	96.98	96.74	24,910,700
Dec 5, 2022	99.40	101.38	99.00	99.48	99.23	24,405,100
Dec 2, 2022	99.05	100.77	98.90	100.44	100.19	21,480,700
Dec 1, 2022	101.02	102.25	100.25	100.99	100.74	28,687,100

Year Ended December 31,

2022

	Class A	Class B	Class C
Basic net income per share:			
Numerator			
Allocation of undistributed earnings	\$ 27,518	\$ 4,072	\$ 28,382
Denominator			
Number of shares used in per share computation	5,994	887	6,182
Basic net income per share	\$ 4.59	\$ 4.59	\$ 4.59
Diluted net income per share:			
Numerator			
Allocation of undistributed earnings for basic computation	\$ 27,518	\$ 4,072	\$ 28,382
Reallocation of undistributed earnings as a result of conversion of Class B to Class A shares	4,072	0	0
Reallocation of undistributed earnings	(230)	(30)	230
Allocation of undistributed earnings	\$ 31,360	\$ 4,042	\$ 28,612
Denominator			
Number of shares used in basic computation	5,994	887	6,182
Weighted-average effect of dilutive securities			
Add:			
Conversion of Class B to Class A shares outstanding	887	0	0
Restricted stock units and other contingently issuable shares	0	0	96
Number of shares used in per share computation	6,881	887	6,278
Diluted net income per share	\$ 4.56	\$ 4.56	\$ 4.56

METRIC	3 MONTHS ENDED JUNE 30, 2019	3 MONTHS ENDED JUNE 30, 2018	CHANGE
Google revenue	\$38.782 billion	\$32.512 billion	19.3%
Google operating income	\$10.388 billion	\$8.959 billion	16%
Other bets revenue	\$162 million	\$145 million	11.7%

Google products

For all ▲

- Android
- Android Auto
- Android TV
- Calendar
- Cars with Google built-in
- Chrome
- Chrome Enterprise
- Chromebook
- Chromecast
- Contacts
- Digital Wellbeing
- Docs
- Drive
- Earth
- Expeditions
- Family Link
- Files
- Finance
- Flights
- Forms
- Gboard
- Gemini
- Gmail
- Google Alerts
- Google Arts & Culture
- Google Assistant
- Google Authenticator
- Google Chat
- Google Classroom
- Google Fi Wireless
- Google Find My Device
- Google Fit
- Google Fonts
- Google Health Studies
- Google Home
- Google Input Tools
- Google Maps
- Google Meet
- Google One
- Google Pay
- Google Photos
- Google Play
- Google Play Books
- Google Play Games
- Google Play Pass
- Google Play Protect
- Google Shopping
- Google TV
- Google Tasks
- Google Wallet
- Google Workspace
- Groups
- Keep
- Lens
- Messages
- Nest
- News
- PhotoScan
- Pixel
- Pixel Buds
- Pixelbook
- Scholar
- Search
- Sheets
- Sites
- Slides
- Snapseed
- Translate
- Travel
- Voice
- Waze
- Wear OS by Google
- YouTube
- YouTube Kids
- YouTube Music
- YouTube TV
- YouTube VR