

Alphabet

Alphabet Inc. (NASDAQ: GOOGL)
Communications – Interactive Media and Entertainment

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Krause Fund Research
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HOLD

Current Price: \$105.97
 Target Price: \$106.94-\$115.32

Investment Thesis

We recommend a **HOLD** rating for Alphabet Inc. We expect Alphabet will experience a rebound in growth after enduring short-term uncertainty due to external economic and geopolitical factors. We are confident in Alphabet's position as an innovator and service provider, and we believe the stock offers a 11.29% - 16.67% positive return.

Drivers of Investment Thesis

Growth in digital ad spending: Arising from the global shift to digital and online advertisement spending, ad revenues will continue to grow on the Search and YouTube platforms. Alphabet will also see growing ad revenues on its YouTube platform as it has acquired rights to NFL Sunday and other programs.

Google Cloud Growth: As applications convert to cloud storage globally, Alphabet will receive an uptick and clients and revenues globally.

Risks of Investment Thesis

Unfavorable Economic Factors: With uncertain economic conditions, Alphabet faces high interest rates and a potential recession, threatening short-term future growth.

Government Regulation: Antitrust concerns and lawsuits in the U.S. and the E.U. continue to threaten Alphabet's growth potential and market share globally.

Earnings Estimates

Year	2020	2021	2022	2023E	2024E	2025E
EPS	\$ 2.96	\$ 5.69	\$ 4.59	\$ 4.82	\$ 5.46	\$ 6.19
Growth	19.28%	92.54%	-19.37%	4.97%	13.34%	13.26%

LTM Stock Performance



Snapshot

Model Prices	
DCF/EP	\$115.32
DDM	\$114.14
Relative PE	\$114.50

Model Prices	
Current Price	\$108.87
52-Week Low	\$83.45
52-Week High	\$131.92

Key Statistics	
Market Capitalization	1.397T
Shares Outstanding	12.81B
Beta	1.15
Dividend Yield	0.0%
EPS (2023E)	\$4.82
P/E Ratio (TTM)	25.5
Forward P/E Ratio	21.2
2022 Revenue	\$282,836M
2023E Revenue	\$302,333M

Ratios	
ROE 2022	23.83%
ROA 2022	16.69%
Debt to Equity	43%

Company Description

Alphabet Inc. (NASDAQ:GOOGL) is a diversified technology holding company headquartered in Mountain View, California. It has the largest market share in the world for the interactive media and entertainment industry. It is best known for being the parent company of the Internet products Google and YouTube. Alphabet has three main segments. Its Google Services segment includes revenues from Google Search and ads across segments. The Google Cloud segment contains revenues from the Google Cloud Platform and Google Workspace. The Other Bets segment is made up of long-term "moonshots" like Access, Calico, CapitalG, GV, Nest, Verily, Waymo, and X. Alphabet's rapid growth is due to its diversification of products and services, which are developed internally and via acquisitions.

Executive Summary

Alphabet is dominant in the Interactive Media and Services Industry. The Google Search engine, significant presence in the advertisement market, and strong growth potential in emerging markets support its strength. The world's two most visited websites, Google and YouTube, are the most prominent contributors to Alphabet's leading position within the Communications sector in terms of both market capitalization and total revenue. With tailwinds from the Covid-19 pandemic, which saw significant e-commerce growth boosting its search engine queries and its associated revenue by \$13.5 billion YoY¹, Alphabet is looking to continue its growth via diversification, acquisitions, and further profit maximization. Notable acquisitions include YouTube, Waze, Nest, Fitbit, and Mandiant. Alphabet invested almost \$7 billion into acquisitions, the largest and most substantially being their acquisition of Mandiant. This acquisition bolstered Google's cloud services by providing even greater capabilities and services to customers to increase security¹. Additionally, Alphabet had \$24.6 billion in capital expenditures. Most of that money went to technical infrastructure, including new data centers, servers, and network equipment, as well as land and new office buildings. With Alphabet's long-term commitment to growth and innovation, paired with the stable cash flows from Google, future growth is expected to remain high before reaching a lower steady state growth rate. Our analysis justifies a higher share price for Alphabet than what it is trading at today, with an upside of 11.29% - 16.67%. Thus, we recommend a **HOLD** rating on Alphabet.

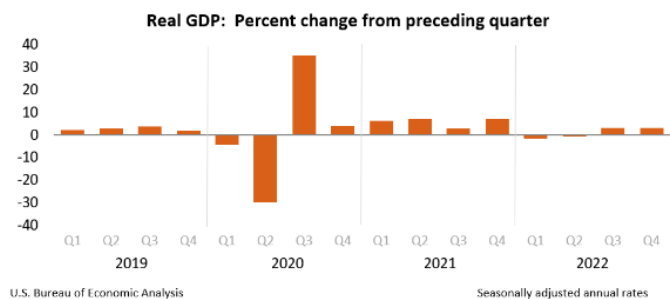
Economic Analysis

U.S. Real Gross Domestic Product (GDP)

Real GDP is an inflation adjusted measure of the value of all goods and services produced by a country. It accounts for consumption, government spending, net exports and investments. In 2022, Real GDP grew 2.1% compared to the 5.9% figure in 2021². This lower growth figure can be attributed to the rapidly rising Federal Funds rate in 2022, which carried over into 2023, as well as geopolitical tensions. The Federal Reserve began raising interest rates to curb the growing problem of inflation, which eroded the purchasing power of the dollar. These higher interest rates increased the cost of borrowing, which affected both companies and consumers. Geopolitical tensions, namely the war in Ukraine, also had a significant impact on the prices of commodities, especially wheat and energy products, as well as international relationships³.

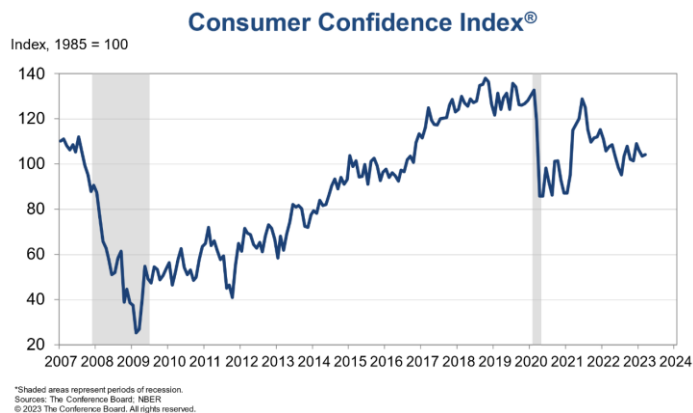
Advertising spending and Gross Domestic Product are strongly correlated. As GDP slows, consumer demand and corporate spending fall as a result. We predict the second

half of 2023 to witness waning economic distress as the Federal Reserve begins to cut interest rates, the labor market remains strong, and international tensions ease as the war in Ukraine ends. However, GDP growth may not see pre-pandemic levels as 2023Q1 saw declines in consumer and government spending as well as manufacturing.



Consumer Confidence Index (CCI)

The Consumer Confidence Index (CCI) is a survey, administered by The Conference Board, that measures the feelings of consumers regarding their expected financial situation. A higher CCI indicates optimism among consumers, which is expected to turn into spending that stimulates the economy. Conversely, a lower rating indicates pessimism that will likely lead to slower spending patterns. The CCI saw a significant rise following the pandemic but has since fallen near pandemic lows due to rising inflation rates and consistent sentiment regarding a looming recession. As of the last survey in March, consumers' outlook rose, with 18.4% assessing that business conditions were "good," up from 18.0% the month prior⁴. The six-month outlook also rose nearly 1% as the Federal Reserve used a lighter tone in its meetings, which the market believed to be a signal that the end of rate hikes was coming.



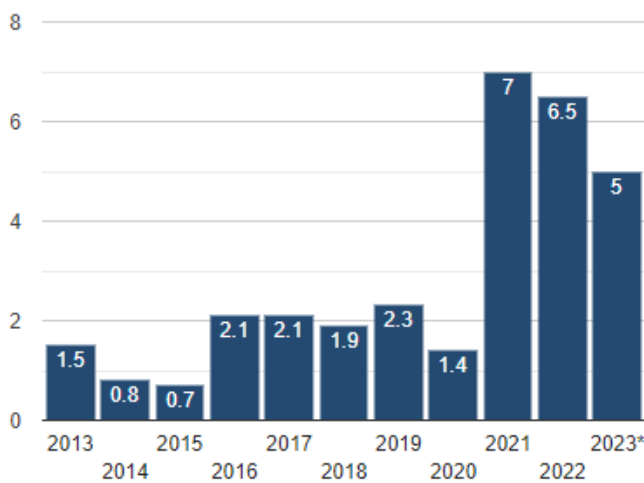
Inflation

Inflation is a rise in prices or a decline in purchasing power over time. The rate at which purchasing power declines is measured via the Consumer Price Index (CPI), which

measures the weighted average of prices of a basket of goods and services that constitute primary consumer needs, including transportation, food, and medical care. A 2% inflation rate target is used by central banks in developed nationsⁱ.

Beginning 2022, the Federal Reserve began its campaign of interest rate hikes to curb inflation rates in the US to hit its target rate. The high inflation rates in 2022 and 2023 can be attributed to high consumer demand following the pandemic, as consumers still felt the effect of their reduced spending and stimulus checks from the previous years. People globally were inclined to do what they couldn't for over a year, which has carried into 2023. Inflation has begun its decline due to the Federal Reserve's campaign, and we foresee rate cuts to begin in Q3 of this year, slowing rebuilding demand.

Chart: United States Annual Inflation Rates (2013 to 2023)



Source: usinflationcalculator.com

Industry Analysis

Within the GICS classification system, Alphabet sits within the Communications sectorⁱⁱ. Communications is divided into two industry groups, Telecommunication Services and Media & Entertainment. Telecommunication is further divided into two industries: Diversified Telecommunication Services and Wireless Telecommunication Services. Media & Entertainment is divided into three distinct industries: Media, Entertainment, and Interactive Media & Services. Alphabet falls into the Interactive Media & Services group as it engages in content and information creation and distribution through its platforms and derives revenues primarily through pay-per-click advertisements. Major players in this industry include Alphabet, Twitter, Pinterest, and Meta. Alphabet and Meta have historically controlled over 90% of the domestic digital advertisement market but

have recently lost market share with the emergence of Amazon Adsⁱⁱⁱ.

Industry Trends

Global Shift to Digital Advertising

The industry's greatest source of growth in recent years has been the shift from traditional forms of advertising – newspapers, magazines, direct mail, and radio – to the digital world. During the pandemic, retailers adapted to meet e-commerce demands, yielding a significant shift towards online advertising^{iv}. E-commerce has largely taken over traditional retailers, as seen by the decline in brick-and-mortar shops and shopping malls, and this trend is set to continue as consumers are consistently moving away from in-person shopping. This movement is perpetuated by the shift away from traditional cable and satellite TV. “Cord-cutting,” the shift from these traditional sources of television to streaming, has brought with it new avenues for advertising. Ad-supported streaming, for shows, TV, music, video games, etc., has become even more prevalent for companies that provide advertising.

Investment in Artificial Intelligence

Alphabet is not the only company that is investing capital into the development of artificial intelligence (AI) tools. ChatGPT took the world by storm following its release to the public in November 2022. Microsoft first invested in OpenAI, ChatGPT's parent company, in 2019 and has continued to invest billions with plans to incorporate the AI software into its search engine Bing^v. Many of Alphabet's peers have also begun or increased their investment, including Nvidia, Meta, Baidu, and Microsoft.

AI technology and its use is not new. Alphabet uses AI in multiple facets of its business, such as advertisement pricing, Gmail spam filters, and YouTube recommendation algorithms. The new enthusiasm for AI is due to its availability to the public, as ChatGPT has been used in all aspects of people's lives, from writing essays and code to editing resumes. Alphabet and Microsoft have both announced plans to integrate AI chatbot technology into their search engines, which threatens Google's dominance if Microsoft is to succeed first^{vi}.

Government Regulation

One of the greatest threats in the Interactive Media & Entertainment industry is government regulation, especially in the United States and the European Union. In the past two years, Alphabet subsidiary, Google, has had two antitrust lawsuits filed against it by the United States Department of Justice. Alphabet is not alone, however, as the “big five” tech giants – Alphabet, Amazon, Apple, Meta, and Microsoft – have faced growing scrutiny as governments across the globe have tried to rein in the tech giants'

influence.^{vii} Alphabet's most recent cases bought against it allege data privacy concerns, anti-competitive restrictions on Google apps, monopolization of mobile operating systems, and abuse of monopoly power in digital advertising. Many of these cases reside in European courts, but an increasing number of cases have begun litigation in the United States. Amazon, Apple, Meta, and Microsoft have all been faced with similar cases, but not in the quantity that Alphabet has.

Alphabet has begun making the necessary adjustments to appease regulators and survive litigation threats. It has begun to offer data privacy options to consumers, eliminated Chrome's third-party cookies, and scaled back its monopolization of the Android OS and the Google Play Store. Despite the near two-dozen antitrust probes into its online search and advertising businesses, Alphabet has sustained its growth through its other platforms, most notable with its growth of the Google Cloud Segment^{viii}.

Porter's 5 Forces

Existing Competition – Moderate

Mega cap companies continue to dominate this industry due to their sheer size and market share. Apple (AAPL), Amazon (AMZN), Microsoft (MSFT), and Meta (META) are all extremely well-capitalized companies that attract the best global talent and develop and release the newest and most cutting-edge products for its consumers, virtually eliminating external competition. However, competition between the tech giants is fierce and growing. In terms of ad revenue, Alphabet remains on top, but Meta and Amazon are quickly growing their advertising segments to recapture the market share that Alphabet has taken in the last decade. Bytedance, TikTok's parent company, has also become a large player. In terms of search engine capabilities, Microsoft poses a new threat with its plans to integrate AI technology into its search engine Bing. This poses a large threat to the Google search engine.

Threat of New Entrants into the Industry - Moderate

The barriers to entry into the industry remain low, especially as companies no longer need to develop or operate their own infrastructures. However, it would be very unlikely for a new player to gain any meaningful market share as the two giants, Alphabet and Meta Platforms, completely dominate the cloud services part of the industry. The digital advertising space shows more promise for entrants, as exhibited by Bytedance, which has gained a meaningful share of advertisement revenues on its social media platform, TikTok. However, Alphabet and Meta's dominant analytics divisions have provided meaningful protection from newer players.

Threat of Substitutes – Moderate

Substitution on the user side of this industry occurs frequently as consumers can very easily switch between search engines and advertising platforms. Meta poses the largest threat with its developed and successful advertising unit, but Amazon is becoming an increasingly prevalent player. However, Google's search engine makes up nearly 90% of the global market, making it unlikely that consumers would willingly switch without added incentives^{ix}.

Bargaining Power of Customers

Alphabet's customers use its advertising business to reach larger markets. An increasing demand for digital advertising services among companies has grown Alphabet's customer base tremendously, making each customer's revenue contribution minimal. In the case where a customer was to switch to a different advertising service, Alphabet would not be affected.

Bargaining Power of Suppliers – Low

Alphabet's primary source of revenue is its advertising business, which it managed within the company, eliminating a need for suppliers. As Alphabet has entered the personal and home device realms, it may see an increase in power of its manufacturers. However, Alphabet's dominance in the increasingly digital world will force suppliers to comply or lose business.

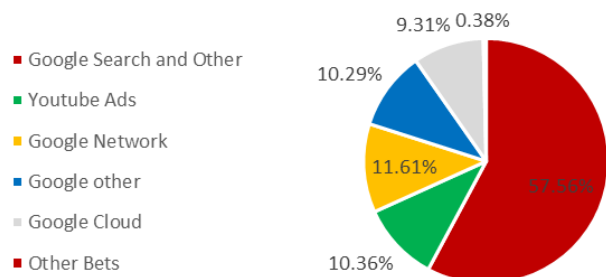
Company Analysis

Alphabet Inc. is a multinational technology conglomerate headquartered in Mountain View, California. The company was founded in 2015 as a restructuring of Google and has since become one of the world's most valuable companies, with a market capitalization of almost \$1.4 trillion as of April 2023. Alphabet's primary business is in online advertising through its Google segment, which includes Google Search, Google Ads, and other related services. The company also operates in the areas of hardware, cloud computing, and other emerging technologies through its other segments, including Google Cloud, YouTube, and Other Bets.

Alphabet generates revenue by delivering relevant, cost-effective online advertising; cloud-based solutions that provide enterprise customers of all sizes with infrastructure and platform services as well as communication and collaboration tools; sales of other products and services, such as apps and in-app purchases, and hardware; and fees received for subscription-based products^x.

Alphabet's revenue segments are broken down into the following categories:

Alphabet Revenue by Segment



Revenue Segments

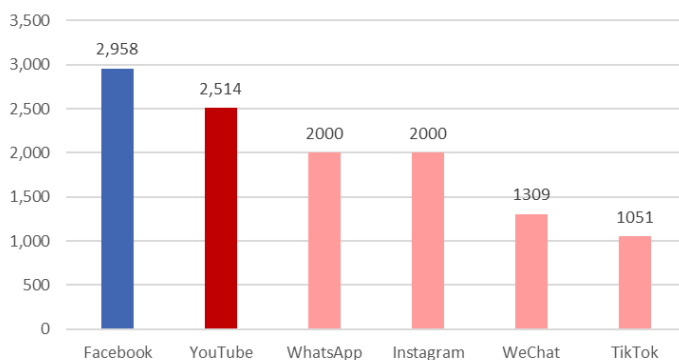
Google Search & Other

Alphabet’s Google Search and Other segment is by far the largest source of revenue for the company. It accounts for almost 58% of total revenue. This segment consists of ad revenue from Google Search, Gmail, Google Maps, and Google Play. This segment grew \$13.5 billion from 2021 to 2022. Google believes this came as a result of an increase in search queries from growth in user adoption of Google services, especially on mobile devices. Increased growth in advertiser spending and improvements on ad formatting and delivery also attributed to the growth in this segment^x.

YouTube Ads

YouTube ads contributed 10.36% of Alphabet’s total revenue for 2021. YouTube is currently the second most popular social network, behind Facebook, with over 2.5 billion active monthly users. YouTube’s ad revenue only saw a minor growth YoY at 1.38%. We forecast YouTube ad revenue to have a 5-year CAGR of 5.64%. We believe this segment will continue to grow, especially with increased brand advertising and spending by Alphabet. Also, as 5G begins to roll out, this will increase bandwidth speeds and better over connection for users, enticing the use of streaming services no matter where they are. And with YouTube as popular as it is, this will benefit Alphabet by bringing more users to the platform and generating more ad revenue.

Active Users (in Millions)



Source: [statista.com](https://www.statista.com)

Google Network Members & Properties

The entire Google Network is where advertisements may appear. The Search Network and the Display Network are the two categories into which this section can be separated. The Search Network includes ads on Google Search result pages, on other Google sites like Maps and Shopping, and on search engines that collaborate with Google to display ads. The Display Network is made up of thousands of partner websites as well as websites like YouTube and Gmail. Google’s network properties include AdSense, Ad Mob, and AdWords. These properties allow Google to buy sell advertisement space to other businesses online. The growth of display advertising, which consists of images, text, and a URL, has started to outstrip that of search advertising due to consumer trends toward social media and digital video. With a variety of Google products including YouTube and Gmail, Alphabet is well positioned to capitalize on this long-term advertising trend.

Google Other

Google Other consists of revenues from YouTube non-advertising, hardware sales, and Google Play revenues. These revenues accounted for 10.29% of total revenues in 2021 and increased by \$1 billion YoY. This growth was led by paid subscribers from YouTube’s premium services and an increase in Google Pixel’s mobile device sales. This growth was partially offset by changes in Google Play fee structure and a decrease in spending on the app^x.

Google Cloud

Google Cloud was Google largest growing revenue stream in 2022, increasing by 36.83%. The largest drivers of the Google Cloud Platform were Google Cloud’s infrastructure and platform services. Google’s workspace offerings - which include Gmail, Docs, Drive, Calendar, Meet, and more – also contributed to this large increase in revenue in this segment. Alphabet is beginning to commit to its cloud services, and so far, it is paying off for them. This can be supported by their large acquisition of Mandiant, which increased the security of their cloud services. We expect the

growth of Google cloud to continue to increase by about 20% each year.

Other Bets

Other Bets is what Google collectively reports for its non-Google businesses. These businesses are all at various stages of development, ranging from those in the R&D phase to those that are in the beginning stages of commercialization. Google's goal is for them to become thriving, successful businesses^x. Other bets do not make a significant portion of Google's revenue, 0.38% for 2022, and this is the expectation at Google. These Other Bets are considered "moonshots" and Google hopes for some of them to take off but is prepared to take a loss on them.

SWOT Analysis

Strength

Google's large user base and large market share are its biggest strengths. Google has access to a huge database of data from its big user base. To produce relevant search results and improve the user experience overall, Google can study user activity and spot developing trends and patterns as a result. More specifically, having a strong market position enables Google to maintain an advantage over its rivals. As was already established, Google dominates the market share compared to all other search engines. Increased partners and advertisers on its platform because of this negotiating tool enable Google as a business to generate more revenue. In terms of market share, Google holds an 82% stake in desktop search engines, and a 95% share in mobile search engines. This is due to Apple's Safari web browser defaulting to Google's search engine on its mobile and desktop devices^{xi}. Also, Google's Android operating System on mobile devices have held a constant market share over 80% worldwide since 2014^{xii}, where the Google web browser and search engine are defaults on the devices. This large market share of mobile devices is a strength for Alphabet, as it allows its search engine to hold a large market share and have a large user base globally. The popularity of Android devices generates a large amount of revenue for Google.

Weakness

Google's biggest weakness is its dependence on ad revenues. Between revenues from Google Search, YouTube Ads and Google Network, this is about 80% of its source of revenues and it all is ad revenue. An over reliance on these revenues can hurt Google's profits in the future. Currently many individuals online are beginning to use ad blocking applications and increased competition in advertising space are reasons that Google's dependence on ad revenues is a weakness. Google's revenue will be beginning to increase at a decreasing amount with increased competition and

increased use of ad blockers. If Google does not come up with a solution to generating revenue outside of ads, they will be in trouble in the future. Another weakness of Google is its privacy policies. Because its services interact with a plethora of consumer data, privacy is a major issue. It's such an issue that Google has been taken to court over it multiple times. Recently in 2022, Google had to pay \$392 million in a privacy settlement to over 40 states because of its unclear location tracking practices^{xiii}.

Opportunity

Google's opportunities lie mostly in Artificial Intelligence. With the recent rise in A.I. chatbots, like ChatGPT, Google has needed to compete and has begun so by creating its own A.I. software Google "Bard". This software is currently in testing in the United States and the United Kingdom. If Google hopes to compete and generate more revenue from this new opportunity, it needs to work on the full release of Bard and begin to incorporate other kinds of machine learning into its software and devices. Another opportunity for Alphabet is in cloud computing. Cloud computing is a rapidly growing market and Google has the strengths to capture a large market share. Google has the strengths of A.I., machine learning, and an abundance of data analytics from its vast user base to give Google the competitive advantage in this market. Recently Google has increased its investment into its Google cloud services and with a recent rise in the trend of companies moving their IT infrastructure to the cloud, Google could jump on this opportunity. Google's recent acquisition of Mandiant bolstered its cybersecurity to its cloud services and would make Google a safe place for companies to run their IT infrastructure through. Google currently holds only a 10% share in the market for cloud services^{xiv}. If Google can capture more market share it can generate a large amount of revenue and can decrease its dependence on ad revenues.

Threat

Google is beginning to face threats in the search engine market. Search engines like Duck Duck Go and Bing are beginning to capture more market share. Duck Duck Go's brand identity is increased privacy and has attracted users to protect themselves and their data. Bing has recently incorporated A.I. into its search engine after Microsoft recently teamed up with OpenA.I., the owner of ChatGPT. A stronger search engine could potentially pull users away from Google to get a better search experience. Another threat to Google is in Artificial Intelligence. ChatGPT is well ahead of Google, and other companies are beginning to create their own. Google is behind the competition with its Bard chat bot and if it does not improve Bard and have its release ready soon, it could potentially lose out in the most prominent market to date. Artificial Intelligence is the future and Google is going to want to be at the center of it. Another threat to Google is the risk of cyberattacks. Google may have one of the largest amounts of data stored in the

world, spanning across all its products and services from its massive user base. Google is an attractive target for cybercriminals to get access to data and information and Google needs to be prepared. In 2010 Google's network was breached and information related to surveillance and court orders from law enforcement agencies were accessed^{xv}. Another breach may be less likely to happen now as cyber security has improved since 2010, but the attractiveness of Google's data is still a reason why a cyberattack is a threat to Google.

Valuation Analysis

Revenue Decomposition

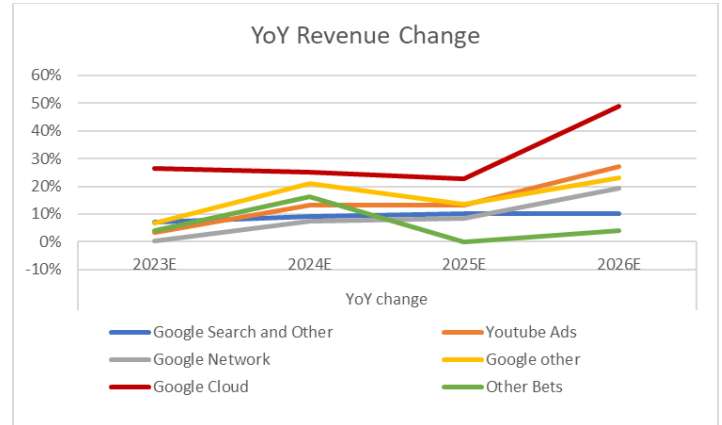
We broke down Google's revenue into 6 main segments. The largest of such being Google Search & other. This segment makes up 58% of Google's revenue, but we forecast its growth to hit a constant rate of 10% going forward. The revenue from this segment is mostly from advertisements, and with increasing competition and other threats, like ad blockers, becoming more popular, we forecast this segment to not hold as much of the weight it currently has on Google's revenue streams as it does today.

YouTube ads will face a similar situation to the Google Search & other segment, as ad blockers are more prevalent, and according to Google's most recent 10Q for Q4 2022, YouTube ad revenues were at a 8% decline as compared to Q4 2021. We expect YouTube ads to bounce back in the future, especially as more and more people are moving away from cable services and towards more streaming options. Google network is the final segment of Google's revenues that is apart of its advertising revenues. Similar to Google Search and YouTube ads, its growth slowed in 2022, but we forecast it to grow in the future at a CAGR of 6.84% over the next 5 years.

Google Cloud is the most promising segment of Google's revenue sources. Cloud computing and cloud services is going to play a large role in the future for many companies. Google has already began investing more into its cloud services and recent acquisitions prove its dedication to this segment. We expect Google Cloud's revenue to growth at a 5-year CAGR of 17.98%. Google cloud is expected to become Google's second largest income source by the end of this year according to our forecasts.

Google Other is expected to increase as more people switch away from cable. Similar to YouTube's ad projection in more revenue, the switch to streaming services will increase revenues from subscriptions of YouTube TV and YouTube premium. This segment also consists of other Google products that are increasing in demand, like Google Pixel and Google Nest. We expect this segment to grow at a 5-year CAGR of 11.12%.

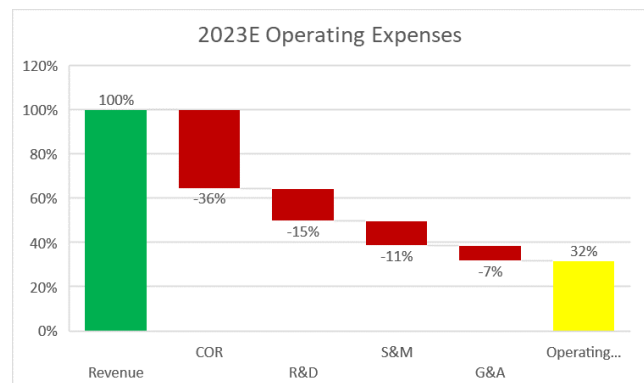
Regarding the Other Bets area, we anticipate revenues to increase modestly before rapidly declining. If a startup like Waymo, Wing, or another one succeeds, it will no longer be viewed as a "bet" and will probably move into the Google other segment. As a result, the Other Bets segment's share of overall revenues will always be just 1% or less.



Expenses

Alphabet does not provide much guidance on its expectations for operating expenses in its earnings reports. In 2022 their total cost of revenues was \$110.275 billion or 38.99% of total revenue. Google's cost of revenues can be mostly attributed to Traffic Acquisition Costs. These costs are what Google pays its distribution partners who make Google's search access points and services available. These also are payments made to Google Network ad partners. Other costs of revenues include content acquisition costs, data center expenses, inventory and other costs related to hardware sold, and other operations costs. We expect cost of revenues to hold its historical average of 35.6% of Revenues in the future.

Google Operating expenses include Research and Development, Sales and Marketing, and General and Administrative. Google saw an increase of 20% from these expenses between 2021 and 2022. We expect these costs to increase its amount of revenue in the future at average rates of 14.81%, 11.12% and 6.77%.



DCF and EP Valuation Model

We believe the Discounted Cash Flow and economic Profit models is our most accurate valuation of Google's intrinsic stock price. We believe it is the most accurate because Google does not have true direct comparable companies because of its vast size and operations in many different segments and industries. To calculate the DCF implied share price, we first forecasted the companies unlevered free cash flow to the firm (FCFF) through 2032 and discounted them using the weighted average cost of capital (WACC). FCFF is equal to net operating profit less adjusted taxes (NOPLAT) less the change in invested capital. To find our terminal value, we used a continuing value growth rate of NOPLAT of 4.0%. After discounting each year's FCFF to the present value, we had the value of operating assets. We then adjusted for the value of non-operating assets/liabilities to arrive at our equity value. Lastly, we divided this equity value by our shares outstanding to get an implied share price of \$115.32.

Our economic profit model gave us the same implied share price but was done a bit differently. We forecasted each year's economic profit then discounted it by the weighted average cost of capital. To calculate economic profit, we multiplied the beginning invested capital by the spread between return on invested capital (ROIC) and the weighted average cost of capital. We then made the same adjustments assumed in the DCF for non-operating assets/liabilities to derive the equity value. We then divided the equity value by shares outstanding to get an implied share price of \$115.32.

WACC

We calculated a 10.26% weighted average cost of capital for Alphabet. Their after-tax cost of debt was 3.4%, where we assumed a marginal tax rate of 22%. The value of debt was \$27.202 billion and accounted for 1.96% weight. The cost of equity was 10.40%. The market value of equity was \$1.361 trillion and carried a 98.04% weight. We used Google's 2022 ending balance of 12.849 billion shares outstanding, as reported from their 10-k. We also used its current share price of \$105.97 to calculate the current market value for equity for Google.

Cost of Equity

To calculate the cost of equity, we used the Capital Asset Pricing Model (CAPM). The components of this model are the risk-free rate, equity risk premium (ERP), and Alphabet's Beta. For the risk-free rate, we used the 10-year treasury rate of 3.98%. To calculate our beta of 1.15, we used the 5-year raw beta according to FactSet. Lastly, to get our ERP of 5.58%, we used the estimate from Damodaran's website. Using the CAPM equation and our numbers, our cost of equity was 10.26%.

Cost of Debt

To compute the cost of debt, we used the yield to maturity on a 20-year corporate bond issued by Alphabet maturing in 2033. We then used a marginal tax rate of 22% to get a 4.36% after-tax cost of debt.

Dividend Discount Model

Alphabet currently does not issue a dividend and has not announced any plans to do so in the future. Because Google does not issue a dividend, we believe that this valuation model is not as accurate as the DCF and EP models or the Relative PE model. In our continuing value year, we estimated a return on equity of 17.6%. We then multiplied this by our 2032 EPS estimate of \$14.64. This then gave us a future stock price of \$273.52. After discounting this future stock price to present value, we came to an intrinsic value of \$114.14. This value is just about average without DCF and EP forecasts, as well as our P/E valuation, but because Google does not issue a dividend we believe this number is not entirely accurate at representing Google's intrinsic value.

Relative Valuation Model

For our relative valuation model, we chose companies that operate in similar segments to Alphabet. The comparable companies we selected were Adobe, Apple, Baidu, Meta, Microsoft, Match, and Oracle.

We included all the comparable companies, as they have relevant EPS and P/E ratios for 2023E and 2024E. The average P/E for 2023 was 23.76 and for 2024 it was 20.12. Alphabet's P/E for 2023 was 22 and for 2024 it was 19.4, so slightly less than average for its comparable companies. We then calculated Alphabet's implied relative value to be \$114.50 for 2023 and \$109.90 for 2024.

We then also calculated the PEG ratio for Alphabet and its comparable companies. In this model we excluded Apple because its PEG for 2023 and 2024 was an outlier. After calculating the average PEG for the rest of the companies, we can get a value of 70.21 for 2023 and 60.18 for 2024. Alphabet's PEG for 2023 was 67.6 and for 2024 was 59.6. Multiplying the comparable companies average PEG by Alphabet's EPS, we can get the implied relative values of \$110.07 for 2023 and \$106.94 for 2024.

Sensitivity Analysis

Depreciation Rate vs. Risk-Free Rate

We wanted to test how our share price is sensitive to changes in Depreciation Rate and the Risk-Free Rate. We can see that as the Depreciation Rate increases our estimated share price decreases. This is because depreciation rate is tied to the depreciation expense on the income statement. Therefore, increases in depreciation expense will cause a lower valuation. The Risk-Free rate is

Important Disclaimer

This report was created by students enrolled in the Security Analysis (6F:112) class at the University of Iowa. The report was originally created to offer an internal investment recommendation for the University of Iowa Krause Fund and its advisory board. The report also provides potential employers and other interested parties an example of the students' skills, knowledge and abilities. Members of the Krause Fund are not registered investment advisors, brokers or officially licensed financial professionals. The investment advice contained in this report does not represent an offer or solicitation to buy or sell any of the securities mentioned. Unless otherwise noted, facts and figures included in this report are from publicly available sources. This report is not a complete compilation of data, and its accuracy is not guaranteed. From time to time, the University of Iowa, its faculty, staff, students, or the Krause Fund may hold a financial interest in the companies mentioned in this report.

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Alphabet Inc.

Revenue Decomposition

<i>Fiscal Years Ending Dec. 31</i>	2020	2021	2022	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
Google Search & other	104,062	148,951	162,450	173,822	189,465	208,412	229,253	252,178	277,396	305,136	335,650	369,215	406,136
<i>Growth Rate</i>	6.06%	43.14%	9.06%	7.00%	9.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
YouTube ads	19,772	28,845	29,243	30,267	34,262	38,818	43,865	49,348	55,517	62,456	70,263	79,046	88,927
<i>Growth Rate</i>	30.52%	45.89%	1.38%	3.50%	13.20%	13.30%	13.00%	12.50%	12.50%	12.50%	12.50%	12.50%	12.50%
Google Network	23,090	31,701	32,780	32,905	35,372	38,372	41,825	45,799	49,463	53,420	57,693	62,309	67,294
<i>Growth Rate</i>	7.16%	37.29%	3.40%	0.38%	7.50%	8.48%	9.00%	9.50%	8.00%	8.00%	8.00%	8.00%	8.00%
Google advertising	146,924	209,497	224,473	236,993	259,100	285,602	314,944	347,325	382,376	421,012	463,606	510,569	562,356
<i>Growth Rate</i>	8.99%	42.59%	7.15%	5.58%	9.33%	10.23%	10.27%	10.28%	10.09%	10.10%	10.12%	10.13%	10.14%
Google other	21,711	28,032	29,055	31,037	37,585	42,682	47,804	52,584	57,317	62,475	68,098	74,227	80,907
<i>Growth Rate</i>	27.61%	29.11%	3.65%	6.82%	21.10%	13.56%	12.00%	10.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Google Services total	168,635	237,529	253,528	268,029	296,685	328,284	362,747	399,909	439,692	483,487	531,704	584,796	643,263
<i>Growth Rate</i>	11.07%	40.85%	6.74%	5.72%	10.69%	10.65%	10.50%	10.24%	9.95%	9.96%	9.97%	9.99%	10.00%
Google Cloud	13,059	19,206	26,280	33,192	41,546	50,981	62,197	75,880	91,815	111,096	134,426	162,656	196,814
<i>Growth Rate</i>	46.43%	47.07%	36.83%	26.30%	25.17%	22.71%	22.00%	22.00%	21.00%	21.00%	21.00%	21.00%	21.00%
Other Bets	657	753	1,068	1,112	1,292	1,292	1,318	1,344	1,371	1,398	1,426	1,455	1,484
<i>Growth Rate</i>	-0.30%	14.61%	41.83%	4.12%	16.19%	-0.02%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Hedging gains (losses)	176	149	1960	0	0	0	0	0	0	0	0	0	0
<i>Growth Rate</i>	-61.32%	-15.34%	1215.44%										
Total Revenues	182,527	257,637	282,836	302,333	339,523	380,557	426,262	477,134	532,878	595,981	667,557	748,907	841,561
<i>Growth Rate</i>	12.77%	41.15%	9.78%	6.89%	12.30%	12.09%	12.01%	11.93%	11.68%	11.84%	12.01%	12.19%	12.37%

Alphabet Inc.

Income Statement

Fiscal Years Ending Dec. 31	2020	2021	2022	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
Revenues:	182,527	257,637	282,836	302,333	339,523	380,557	426,262	477,134	532,878	595,981	667,557	748,907	841,561
Cost and expenses:													
Cost of revenues	71,035	98,498	110,275	107,638	120,879	135,488	151,760	169,871	189,718	212,184	237,667	266,629	299,617
Depreciation & impairment of property & equipment	12,905	11,555	15,287	16,504	18,944	21,624	24,570	27,819	31,410	35,370	39,764	44,664	50,153
Amortization & impairment of intangible assets	792	886	641	463	444	314	235	152	236	240	0	0	0
Research & development expense	27,573	31,562	39,500	44,766	50,272	56,348	63,116	70,648	78,902	88,246	98,843	110,889	124,608
Sales & marketing expense	17,946	22,912	26,567	33,624	37,761	42,324	47,407	53,065	59,265	66,283	74,243	83,291	93,595
General & administrative expense	11,052	13,510	15,724	20,468	22,985	25,763	28,858	32,302	36,076	40,348	45,193	50,701	56,973
European Commission fine	0	0	0	0	0	0	0	0	0	0	0	0	0
Total costs & expenses:	141,303	178,923	207,994	223,463	251,285	281,861	315,946	353,858	395,606	442,670	495,710	556,173	624,946
Income from operation:	41,224	78,714	74,842	78,870	88,238	98,696	110,316	123,276	137,272	153,311	171,846	192,733	216,615
Other income	6,858	12,020	(3,514)	0	0	0	0	0	0	0	0	0	0
Income Before Income Taxes	48,082	90,734	71,328	78,870	88,238	98,696	110,316	123,276	137,272	153,311	171,846	192,733	216,615
Provision for income taxes	7,813	14,701	11,356	17,351	19,412	21,713	24,270	27,121	30,200	33,728	37,806	42,401	47,655
Net income (loss) from discontinued operations	0	0	0	0	0	0	0	0	0	0	0	0	0
Net income	40,269	76,033	59,972	61,518	68,826	76,983	86,047	96,155	107,072	119,583	134,040	150,332	168,959
Other Equity Information													
Basic Earnings per Share	2.96	5.69	4.59	4.82	5.46	6.19	7.00	7.91	8.91	10.06	11.39	12.90	14.64
Annual Dividends per Share	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Basic Total Shares Outstanding	13504	13242	12849	12681	12520	12368	12223	12085	11954	11829	11711	11598	11491
Basic Weighted Average Shares Outstanding	13616	13353	13063	12765	12600	12444	12295	12154	12020	11892	11770	11654	11544

Alphabet Inc.
Balance Sheet

Fiscal Years Ending Dec. 31	2020	2021	2022	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
Current Assets:													
Cash & cash equivalents	26,465	20,945	21,879	41,405	72,972	110,447	154,689	206,630	267,190	337,817	420,079	515,925	627,584
Marketable securities	110,229	118,704	91,883	96,349	101,033	105,944	111,094	116,494	122,157	128,095	134,322	140,851	147,698
Total cash, cash equivalents, & marketable securities	136,694	139,649	113,762	137,755	174,005	216,391	265,783	323,124	389,347	465,912	554,401	656,777	775,283
Accounts receivable, net	30,930	39,304	40,258	46,555	52,282	58,601	65,639	73,472	82,056	91,773	102,795	115,322	129,589
Receivable under reverse repurchase agreements	0	0	0	0	0	0	0	0	0	0	0	0	0
Deferred income taxes, net	0	0	0	0	0	0	0	0	0	0	0	0	0
Income taxes receivable, net	454	966	0	3,139	3,512	3,928	4,391	4,907	5,464	6,102	6,840	7,671	8,622
Inventory	728	1,170	2,670	1,484	1,666	1,868	2,092	2,342	2,615	2,925	3,276	3,676	4,130
Other current assets	5,490	7,054	8,105	8,499	8,912	9,345	9,800	10,276	10,775	11,299	11,849	12,425	13,028
Total Current Assets:	174,296	188,143	164,795	197,432	240,378	290,133	347,704	414,121	490,258	578,012	679,160	795,870	930,652
Non-marketable securities	20,703	29,549	30,492	31,974	33,528	35,158	36,867	38,659	40,539	42,509	44,576	46,742	49,015
Prepaid revenue share, expenses & other assets, non-current	0	0	0	4,393	4,933	5,529	6,193	6,933	7,742	8,659	9,699	10,881	12,228
Deferred income taxes	1,084	1,284	5,261	232	260	291	325	363	405	452	506	568	638
Property & equipment, net	84,749	97,599	112,668	129,322	147,615	167,730	189,910	214,420	241,454	271,449	304,900	342,373	384,518
Operating lease assets	12,211	12,959	14,381	16,507	18,842	21,409	24,240	27,369	30,819	34,648	38,918	43,701	49,080
Intangible assets, net	1,445	1,417	2,084	1,621	1,177	863	628	476	240	0	0	0	0
Goodwill	21,175	22,956	28,960	28,960	28,960	28,960	28,960	28,960	28,960	28,960	28,960	28,960	28,960
Other non-current assets	3,953	5,361	6,623	3,753	4,215	4,724	5,292	5,923	6,615	7,398	8,287	9,297	10,447
Total Non-Current Assets	145,320	171,125	200,469	216,762	239,531	264,664	292,415	323,103	356,774	394,076	435,846	482,522	534,886
Total Assets:	319,616	359,268	365,264	414,194	479,908	554,797	640,119	737,224	847,032	972,087	1,115,006	1,278,392	1,465,538
Current Liabilities:													
Accounts payable	5,589	6,037	5,128	8,531	9,581	10,739	12,028	13,464	15,037	16,818	18,837	21,133	23,748
Short-term debt	0	0	0	2,620	2,960	3,336	3,752	4,214	4,722	5,288	5,925	6,640	7,447
Accrued compensation & benefits	11,086	13,889	14,028	14,742	16,555	18,556	20,784	23,265	25,983	29,060	32,550	36,516	41,034
Accrued expenses & other current liabilities	28,631	31,236	37,866	31,196	35,033	39,267	43,983	49,232	54,984	61,495	68,881	77,275	86,835
Accrued revenue share	7,500	8,996	8,370	10,089	11,330	12,699	14,224	15,922	17,782	19,888	22,276	24,991	28,083
Securities lending payable	0	0	0	0	0	0	0	0	0	0	0	0	0
Deferred revenue	2,543	3,288	3,908	3,933	4,417	4,950	5,545	6,207	6,932	7,753	8,684	9,742	10,947
Income taxes payable, net	1,485	808	0	1,082	1,210	1,354	1,513	1,691	1,883	2,103	2,357	2,643	2,971
Total Current Liabilities:	56,834	64,254	69,300	72,192	81,085	90,900	101,830	113,994	127,322	142,404	159,509	178,941	201,065
Long-term debt	13,932	14,817	14,701	9,223	10,419	11,741	13,207	14,833	16,620	18,612	20,854	23,373	26,213
Deferred revenue, non-current	481	535	599	700	786	881	987	1,105	1,234	1,380	1,546	1,734	1,948
Income taxes payable, net, non-current	8,849	9,176	9,258	11,411	14,065	17,337	21,369	26,339	32,465	40,015	49,322	60,794	74,933
Deferred income taxes	3,561	5,257	514	543	573	605	639	675	713	753	795	840	887
Operating lease liabilities	11,146	11,389	12,501	14,833	16,931	19,239	21,783	24,594	27,695	31,135	34,972	39,270	44,104
Other long-term liabilities	2,269	2,205	2,247	5,480	6,155	6,898	7,727	8,649	9,660	10,803	12,101	13,576	15,255
Total Long Term Liabilities	40,238	43,379	39,820	42,191	48,929	56,701	65,712	76,195	88,386	102,699	119,590	139,586	163,341
Total Liabilities	97,072	107,633	109,120	114,383	130,015	147,602	167,542	190,190	215,708	245,102	279,099	318,526	364,406
Class A, Class B, & Class C stock & additional paid-in capital	58,510	61,774	68,184	68,184	68,184	68,184	68,184	68,184	68,184	68,184	68,184	68,184	68,184
Accumulated other comprehensive income (loss)	633	-1,623	-7,603	-7,603	-7,603	-7,603	-7,603	-7,603	-7,603	-7,603	-7,603	-7,603	-7,603
Retained earnings	163,401	191,484	195,563	239,230	289,312	346,614	411,996	486,454	570,743	666,404	775,326	899,284	1,040,551
Total Stockholders' Equity	222,544	251,635	256,144	299,811	349,893	407,195	472,577	547,035	631,324	726,985	835,907	959,865	1,101,132
Total Liabilities and Stockholders' Equity	319,616	359,268	365,264	414,194	479,908	554,797	640,119	737,224	847,032	972,087	1,115,006	1,278,392	1,465,538

Alphabet Inc.
Historical Cash Flow Statement

<i>Fiscal Years Ending Dec. 31</i>	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Net income	12,920	14,444	16,348	19,478	12,662	30,736	34,343	40,269	76,033	59,972
Depreciation & impairment of property & equipment	2,781	3,523	4,132	5,267	6,103	8,164	10,856	12,905	11,555	15,287
Amortization & impairment of intangible assets	1,158	1,456	931	877	812	871	925	792	886	641
Stock-based compensation expense	3,343	4,279	5,203	6,703	7,679	9,353	10,794	12,991	15,376	19,362
Excess tax benefits from stock-based award activities	(481)	(648)	(548)	0	0	0	0	0	0	0
Deferred income taxes	(437)	(104)	(179)	(38)	258	778	173	1,390	1,808	(8,081)
Loss (gain) on debt & equity securities, net	0	0	0	0	0	(6,650)	(2,798)	(6,317)	(12,270)	5,519
Loss (gain) on divestiture of business	(700)	(740)	0	0	0	0	0	0	0	0
Impairment of equity investments	0	0	0	0	0	0	0	0	0	0
Loss (gain) on equity interest	0	(126)	0	0	0	0	0	0	0	0
Loss (gain) on sale of non-marketable equity investments	0	(159)	0	0	0	0	0	0	0	0
Loss (gain) on marketable & non-marketable investments, net	0	0	334	275	194	-	-	-	-	-
Other adjustments	106	87	212	174	137	(189)	(592)	1,267	(213)	1,030
Accounts receivable, net	(1,307)	(1,641)	(2,094)	(2,578)	(3,768)	(2,169)	(4,340)	(6,524)	(9,095)	(2,317)
Income taxes, net	401	283	(179)	3,125	8,211	(2,251)	(3,128)	1,209	(625)	584
Inventories	(234)	0	0	0	0	0	0	0	0	0
Prepaid revenue share, expenses & other assets	(696)	459	(318)	312	0	0	0	0	0	0
Other assets	0	0	0	0	(2,164)	(1,207)	(621)	(1,330)	(1,846)	(5,046)
Accounts payable	605	436	203	110	731	1,067	428	694	283	707
Accrued expenses & other liabilities	713	757	1,597	1,515	4,891	8,614	7,170	5,504	7,304	3,915
Accrued revenue share	254	245	339	593	955	483	1,273	1,639	1,682	(445)
Deferred revenue	233	(175)	43	223	390	371	37	635	774	367
Net cash flows from operating activities	18,659	22,376	26,024	36,036	37,091	47,971	54,520	65,124	91,652	91,495
Purchases of property & equipment	(7,358)	(10,959)	(9,915)	(10,212)	(13,184)	(25,139)	(23,548)	(22,281)	(24,640)	(31,485)
Proceeds from disposals of property & equipment	0	0	0	240	99	98	0	0	0	0
Purchases of marketable securities	(45,444)	(56,310)	(74,368)	(84,509)	(92,195)	(50,158)	(100,315)	(136,576)	(135,196)	(78,874)
Maturities & sales of marketable securities	38,314	51,315	62,905	66,895	73,959	48,507	97,825	132,906	128,294	97,822
Purchases of non-marketable securities	(569)	(1,227)	(2,172)	(1,109)	(1,745)	(2,073)	(1,932)	(7,175)	(2,838)	(2,531)
Maturities & sales of non-marketable securities	0	0	0	494	533	1,752	405	1,023	934	150
Acquisitions, net of cash acquired, & purchases of intangible assets	0	0	0	0	0	0	0	0	0	(6,969)
Cash collateral related to (from) securities lending	(299)	1,403	(350)	(2,428)	0	0	0	0	0	0
Investments in reverse repurchase agreements	600	(775)	425	450	0	0	0	0	0	0
Proceeds from divestiture of business	2,525	386	0	0	0	0	0	0	0	0
Acquisitions, net of cash acquired & proceeds received from divesti	(1,448)	(4,888)	0	0	0	0	0	0	0	0
Acquisitions, net of cash acquired, & purchases of intangibles & oth	0	0	(236)	(986)	(287)	(1,491)	(2,515)	(738)	(2,618)	0
Proceeds from collection of notes receivable	0	0	0	0	1,419	0	0	0	0	0
Other investing activities	0	0	0	0	0	0	589	68	541	1,589
Net cash flows from investing activities	(13,679)	(21,055)	(23,711)	(31,165)	(31,401)	(28,504)	(29,491)	(32,773)	(35,523)	(20,298)
Net proceeds (payments) related to stock-based award activities	(781)	(2,069)	(2,375)	(3,304)	(4,166)	(4,993)	(4,765)	(5,720)	(10,162)	(9,300)
Excess tax benefits from stock-based award activities	481	648	548	0	0	0	0	0	0	0
Adjustment payment to class C capital stockholders	0	0	(47)	0	0	0	0	0	0	0
Repurchases of common & capital stock	0	0	(1,780)	(3,693)	(4,846)	(9,075)	(18,396)	(31,149)	(50,274)	(59,296)
Proceeds from issuance of debt, net of costs	10,768	11,625	13,705	8,729	4,291	6,766	317	11,761	20,199	52,872
Repayments of debt	(11,325)	(11,643)	(13,728)	(10,064)	(4,377)	(6,827)	(585)	(2,100)	(21,435)	(54,068)
Proceeds from sale of interest in consolidated entities, net	0	0	0	0	800	950	220	2,800	310	35
Net cash flows from financing activities	(857)	(1,439)	(3,677)	(8,332)	(8,298)	(13,179)	(23,209)	(24,408)	(61,362)	(69,757)
Effect of exchange rate changes on cash & cash equivalents	(3)	(433)	(434)	(170)	405	(302)	(23)	24	(287)	(506)
Net increase (decrease) in cash & cash equivalents	4,120	(551)	(1,798)	(3,631)	(2,203)	5,986	1,797	7,967	(5,520)	934
Cash & cash equivalents at beginning of period	14,778	18,898	18,347	16,549	12,918	10,715	16,701	18,498	26,465	20,945
Cash & cash equivalents at end of period	18,898	18,347	16,549	12,918	10,715	16,701	18,498	26,465	20,945	21,879

Alphabet Inc.

Forecasted Cash Flow Statement

Fiscal Years Ending Dec. 31	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
CASH FLOWS FROM OPERATING ACTIVITIES										
Net income	61,518	68,826	76,983	86,047	96,155	107,072	119,583	134,040	150,332	168,959
Depreciation & impairment of prop	16,504	18,944	21,624	24,570	27,819	31,410	35,370	39,764	44,664	50,153
Amortization & impairment of intan	463	444	314	235	152	236	240	0	0	0
Changes in working capital accounts										
Increase in receivables	(6,297)	(5,727)	(6,319)	(7,038)	(7,834)	(8,584)	(9,717)	(11,022)	(12,527)	(14,267)
Increase in inventories	1,186	(183)	(201)	(224)	(250)	(274)	(310)	(351)	(399)	(455)
Increase in prepaid expenses and ot	(4,393)	(540)	(596)	(664)	(739)	(810)	(917)	(1,040)	(1,182)	(1,346)
Increase in accounts payable	3,403	1,049	1,158	1,290	1,436	1,573	1,781	2,020	2,296	2,615
Increase in accrued compensation a	714	1,813	2,001	2,229	2,480	2,718	3,077	3,490	3,967	4,518
Increase in income taxes payable	1,082	128	143	159	178	192	220	254	286	328
Increase in deferred revenue	25	484	534	595	662	725	821	931	1,058	1,205
Increase (decrease) in deferred tax	5,057	3	1	(0)	(2)	(3)	(7)	(12)	(17)	(23)
Increase (decrease) in other non-cu	3,233	674	744	828	922	1,010	1,144	1,297	1,475	1,680
Increase (decrease) in Income Taxes	(3,139)	(373)	(416)	(463)	(516)	(557)	(638)	(738)	(831)	(951)
(Increase) decrease in operating lea	(2,126)	(2,335)	(2,567)	(2,831)	(3,129)	(3,451)	(3,829)	(4,270)	(4,783)	(5,379)
Increase (decrease) in operating lea	2,332	2,098	2,307	2,544	2,811	3,101	3,440	3,837	4,298	4,834
Increase (decrease) in income taxes	2,153	2,654	3,271	4,032	4,970	6,126	7,551	9,307	11,471	14,139
Increase (decrease) in deferred rev	101	86	95	106	118	129	146	166	188	215
Net cash provided by operating activiit	81,818	88,047	99,075	111,414	125,234	140,614	157,954	177,673	200,296	226,224
CASH FLOWS FROM INVESTING ACTIVITIES										
(Increase) decrease in short-term in	(4,466)	(4,684)	(4,911)	(5,150)	(5,400)	(5,663)	(5,938)	(6,227)	(6,529)	(6,847)
Capital expenditures	(33,159)	(37,237)	(41,738)	(46,751)	(52,330)	(58,444)	(65,365)	(73,215)	(82,137)	(92,299)
(Increase) decrease in other assets	2,476	(875)	(943)	(1,022)	(1,108)	(1,192)	(1,307)	(1,438)	(1,586)	(1,754)
(Increase) decrease in non-marketal	(1,482)	(1,554)	(1,630)	(1,709)	(1,792)	(1,879)	(1,971)	(2,066)	(2,167)	(2,272)
Net cash used for investing activities	(36,631)	(44,350)	(49,221)	(54,631)	(60,630)	(67,177)	(74,580)	(82,946)	(92,419)	(103,172)
CASH FLOWS FROM FINANCING ACTIVITIES										
Increase (decrease) in Payments of i	(5,478)	1,196	1,323	1,466	1,626	1,786	1,992	2,242	2,519	2,841
Repurchases of common stock	(17,851)	(18,743)	(19,681)	(20,665)	(21,698)	(22,783)	(23,922)	(25,118)	(26,374)	(27,693)
Increase (decrease) in short-term de	2,620	340	376	416	462	508	566	637	716	807
Increase (decrease) in accrued expe	(6,670)	3,837	4,234	4,716	5,249	5,752	6,511	7,385	8,394	9,560
Increase (decrease) in accrued revei	1,719	1,241	1,369	1,525	1,698	1,860	2,106	2,388	2,715	3,092
Increase (decrease) in securities len	0	0	0	0	0	0	0	0	0	0
Net cash provided by financing activiti	(25,660)	(12,130)	(12,379)	(12,541)	(12,663)	(12,877)	(12,747)	(12,465)	(12,031)	(11,393)
NET INCREASE (DECREASE) IN CASH										
NET INCREASE (DECREASE) IN CASH	19,526	31,567	37,475	44,242	51,941	60,560	70,627	82,262	95,846	111,659
Cash, beginning of year	21,879	41,405	72,972	110,447	154,689	206,630	267,190	337,817	420,079	515,925
Cash, end of year	41,405	72,972	110,447	154,689	206,630	267,190	337,817	420,079	515,925	627,584

Alphabet Inc.

Common Size Income Statement

Fiscal Years Ending Dec. 31	2020	2021	2022	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
Revenues:	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Cost of revenues	38.92%	38.23%	38.99%	35.60%	35.60%	35.60%	35.60%	35.60%	35.60%	35.60%	35.60%	35.60%	35.60%
Depreciation & impairment of property & equipment	7.07%	4.48%	5.40%	5.46%	5.58%	5.68%	5.76%	5.83%	5.89%	5.93%	5.96%	5.96%	5.96%
Amortization & impairment of intangible assets	0.43%	0.34%	0.23%	0.15%	0.13%	0.08%	0.06%	0.03%	0.04%	0.04%	0.00%	0.00%	0.00%
Research & development expense	15.11%	12.25%	13.97%	14.81%	14.81%	14.81%	14.81%	14.81%	14.81%	14.81%	14.81%	14.81%	14.81%
Sales & marketing expense	9.83%	8.89%	9.39%	11.12%	11.12%	11.12%	11.12%	11.12%	11.12%	11.12%	11.12%	11.12%	11.12%
General & administrative expense	6.05%	5.24%	5.56%	6.77%	6.77%	6.77%	6.77%	6.77%	6.77%	6.77%	6.77%	6.77%	6.77%
European Commission fine	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total costs & expenses:	77.41%	69.45%	73.54%	73.91%	74.01%	74.07%	74.12%	74.16%	74.24%	74.28%	74.26%	74.26%	74.26%
Income from operation:	22.59%	30.55%	26.46%	26.09%	25.99%	25.93%	25.88%	25.84%	25.76%	25.72%	25.74%	25.74%	25.74%
Other income	3.76%	4.67%	-1.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Income Before Income Taxes	26.34%	35.22%	25.22%	26.09%	25.99%	25.93%	25.88%	25.84%	25.76%	25.72%	25.74%	25.74%	25.74%
Provision for income taxes	4.28%	5.71%	4.02%	5.74%	5.72%	5.71%	5.69%	5.68%	5.67%	5.66%	5.66%	5.66%	5.66%
Net income (loss) from discontinued operations	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Net income	22.06%	29.51%	21.20%	20.35%	20.27%	20.23%	20.19%	20.15%	20.09%	20.06%	20.08%	20.07%	20.08%

Alphabet Inc.

Weighted Average Cost of Capital

(WACC) Estimation

Cost of Equity:

Risk-Free Rate	3.98%
Beta	1.15
Equity Risk Premium	5.58%
Cost of Equity	10.40%

ASSUMPTIONS:

10 Year Treasury Bond
 5-year raw beta from Factset
 Damodoran Estimate

Cost of Debt:

Risk-Free Rate	3.98%
Implied Default Premium	0.38%
Pre-Tax Cost of Debt	4.36%
Marginal Tax Rate	22%
After-Tax Cost of Debt	3.40%

10 Year Treasury Bond

YTM on Alphabet's 20 Year Corporate Bond

Market Value of Common Equity:

Total Shares Outstanding	12,849
Current Stock Price	\$105.97
MV of Equity	1,361,608.53

MV Weights

98.04%

Market Value of Debt:

Short-Term Debt	0
Current Portion of LTD	
Long-Term Debt	14701
PV of Operating Leases	12501
MV of Total Debt	27,202.00

1.96%

Market Value of the Firm**1,388,810.53**

100.00%

Estimated WACC**10.26%**

Alphabet Inc.*Discounted Cash Flow (DCF) and Economic Profit (EP) Valuation Models*

Key Inputs:

CV Growth of NOPLAT	4.00%
CV Year ROIC	49.28%
WACC	10.26%
Cost of Equity	10.40%

Fiscal Years Ending Dec. 31	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
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DCF Model:

Free Cash Flow (FCF)	44,278	50,755	57,302	64,662	72,933	82,203	92,692	104,632	118,406	134,251
Continuing Value (CV)										2,496,652
PV of FCF	40,158	41,749	42,748	43,750	44,754	45,749	46,786	47,898	49,160	1,036,567

Value of Operating Assets:	1,439,318
Non-Operating Adjustments	
Plus: Marketable Securities	96,349
Plus: Excess Cash	(1,508)
Less: Operating Lease ROU Asset	(49,080)
Less: Total Debt	(27,202)
Value of Equity	1,457,878
Shares Outstanding	12,849
Intrinsic Value of Last FYE	113.46
Implied Price as of Today	115.32

EP Model:

Economic Profit (EP)	54,501	54,483	60,801	67,861	75,791	84,341	94,314	106,025	119,316	134,684
Continuing Value (CV)										2,286,068
PV of EP	49,429	44,815	45,359	45,915	46,508	46,939	47,605	48,536	49,538	949,136

Total PV of EP	1,373,779
Invested Capital (last FYE)	65,539
Value of Operating Assets:	1,439,318
Non-Operating Adjustments	
Plus: Marketable Securities	96,349
Plus: Excess Cash	(1,508)
Less: Operating Lease ROU Asset	(49,080)
Less: Total Debt	(27,202)
Value of Equity	1,457,877
Shares Outstanding	12,849
Intrinsic Value of Last FYE	113.46
Implied Price as of Today	115.32

Alphabet Inc.

Relative Valuation Models

Ticker	Company	Price	EPS		P/E		Est. 5yr		
			2023E	2024E	23	24	EPS gr.	PEG 23	PEG 24
ADBE	Adobe	\$377.92	\$15.46	\$17.56	24.45	21.52	0.57	43.06	37.91
AAPL	Apple	\$165.23	\$5.56	\$6.60	29.72	25.03	0.17	178.47	150.34
BIDU	Baidu	\$131.54	\$7.22	\$8.00	18.22	16.44	0.53	34.24	30.90
META	Meta	\$218.86	\$8.52	\$12.43	25.69	17.61	0.37	68.86	47.20
MSFT	Microsoft	\$288.80	\$9.31	\$10.80	31.02	26.74	0.47	65.32	56.30
MTCH	Match	\$36.06	\$1.98	\$2.20	18.21	16.39	0.22	83.91	75.52
ORCL	Oracle	\$95.59	\$5.03	\$5.59	19.00	17.10	0.15	125.87	113.26
Average					23.76	20.12		70.21	60.18

GOOGL	Alphabet Inc.	\$105.97	\$4.82	\$5.46	22.0	19.4	32.53%	67.6	59.6
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Implied Relative Value:	
P/E (EPS23)	\$ 114.50
P/E (EPS24)	\$ 109.90
PEG (EPS23)	\$ 110.07
PEG (EPS24)	\$ 106.94

Alphabet Inc.

Present Value of Operating Lease Obligations

Fiscal Years Ending Dec. 31	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Year 1	466.0	499.0	598.0	646.0	828.0	1,160.0	1,303.0	1,757.0	2,198.0	2,539.0	2,955.0
Year 2	453.0	477.0	622.0	781.0	896.0	1,120.0	1,384.0	1,845.0	2,170.0	2,527.0	2,771.0
Year 3	417.0	438.0	634.0	792.0	905.0	1,062.0	1,327.0	1,680.0	1,995.0	2,226.0	2,377.0
Year 4	362.0	418.0	596.0	766.0	850.0	968.0	1,145.0	1,508.0	1,738.0	1,815.0	1,953.0
Year 5	326.0	370.0	576.0	716.0	765.0	828.0	977.0	1,301.0	1,389.0	1,401.0	1,502.0
Thereafter	1,595.0	1,836.0	3,157.0	3,705.0	3,693.0	3,615.0	3,911.0	5,763.0	5,601.0	4,948.0	5,882.0
Total Minimum Payments	3,619.0	4,038.0	6,183.0	7,406.0	7,937.0	8,753.0	10,047.0	13,854.0	15,091.0	15,456.0	17,440.0
Less: Cumulative Interest	682.8	776.8	1,287.4	1,520.1	1,551.0	1,585.7	1,762.7	2,523.7	2,581.0	2,450.4	2,829.7
PV of Minimum Payments	2,936.2	3,261.2	4,895.6	5,885.9	6,386.0	7,167.3	8,284.3	11,330.3	12,510.0	13,005.6	14,610.3
Implied Interest in Year 1 Payment		128.0	142.2	213.4	256.6	278.4	312.5	361.2	494.0	545.4	567.0
Pre-Tax Cost of Debt	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%
Years Implied by Year 6 Payment	4.9	5.0	5.5	5.2	4.8	4.4	4.0	4.4	4.0	3.5	3.9
Expected Obligation in Year 6 & Beyond	326.0	370.0	576.0	716.0	765.0	828.0	977.0	1,301.0	1,389.0	1,401.0	1,502.0
Present Value of Lease Payments											
PV of Year 1	446.5	478.2	573.0	619.0	793.4	1,111.5	1,248.6	1,683.6	2,106.2	2,432.9	2,831.5
PV of Year 2	415.9	438.0	571.1	717.1	822.7	1,028.4	1,270.8	1,694.1	1,992.5	2,320.3	2,544.3
PV of Year 3	366.9	385.4	557.8	696.8	796.2	934.4	1,167.5	1,478.1	1,755.3	1,958.5	2,091.4
PV of Year 4	305.2	352.4	502.5	645.8	716.6	816.1	965.3	1,271.3	1,465.3	1,530.2	1,646.5
PV of Year 5	263.4	298.9	465.3	578.4	618.0	668.9	789.3	1,051.0	1,122.1	1,131.8	1,213.4
PV of 6 & beyond	1,138.3	1,308.4	2,225.9	2,628.7	2,639.0	2,608.0	2,842.8	4,152.2	4,068.8	3,632.0	4,283.2
Capitalized PV of Payments	2,936.2	3,261.2	4,895.6	5,885.9	6,386.0	7,167.3	8,284.3	11,330.3	12,510.0	13,005.6	14,610.3

Alphabet Inc.*Key Management Ratios*

<i>Fiscal Years Ending Dec. 31</i>	2020	2021	2022	2023E	2024E	2025E	2026E	2027E	2028E	2029E	2030E	2031E	2032E
Liquidity Ratios:													
Quick Ratio	3.05	2.91	2.34	2.71	2.94	3.17	3.39	3.61	3.83	4.04	4.24	4.43	4.61
Absolute Liquidity Ratio	2.41	2.17	1.64	1.91	2.15	2.38	2.61	2.83	3.06	3.27	3.48	3.67	3.86
Current Ratio	3.07	2.93	2.38	2.73	2.96	3.19	3.41	3.63	3.85	4.06	4.26	4.45	4.63
Asset-Management Ratios:													
Accounts Payable Turnover Ratio	6.37	8.47	9.88	7.88	6.67	6.67	6.67	6.66	6.66	6.66	6.67	6.67	6.68
Asset Turnover Ratio	0.31	0.38	0.39	0.39	0.38	0.37	0.36	0.35	0.34	0.33	0.32	0.31	0.31
Fixed Asset Turnover Ratio	1.41	1.75	1.64	1.61	1.58	1.55	1.54	1.52	1.51	1.50	1.49	1.49	1.49
Financial Leverage Ratios:													
Debt/Equity	0.44	0.43	0.43	0.38	0.37	0.36	0.35	0.35	0.34	0.34	0.33	0.33	0.33
Debt to Capitalization Ratio	0.30	0.30	0.30	0.28	0.27	0.27	0.26	0.26	0.25	0.25	0.25	0.25	0.25
The Equity Multiplier	1.44	1.43	1.43	1.38	1.37	1.36	1.35	1.35	1.34	1.34	1.33	1.33	1.33
Profitability Ratios:													
Return on Equity (NI/Beg TSE)	19.99%	34.17%	23.83%	24.02%	22.96%	22.00%	21.13%	20.35%	19.57%	18.94%	18.44%	17.98%	17.60%
Earnings per share	\$ 2.96	\$ 5.69	\$ 4.59	\$ 4.82	\$ 5.46	\$ 6.19	\$ 7.00	\$ 7.91	\$ 8.91	\$ 10.06	\$ 11.39	\$ 12.90	\$ 14.64
Return on Assets	14.60%	23.79%	16.69%	16.84%	16.62%	16.04%	15.51%	15.02%	14.52%	14.12%	13.79%	13.48%	13.22%