



Technology

Alphabet Inc. (NYSE: GOOG)

Recommendation: BUY

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Analysts

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Current Price: \$1,066.15
Target Price: \$1,180-\$1,230

Alphabet Shows Potential Strength

Company Overview

Alphabet is a leader in the technology sector of the market. Alphabet is one of the “Big Five” companies that also includes Apple, Amazon, and Facebook. Alphabet generates a majority of their revenue from Google’s advertising. Alphabet also generates revenue from a segment called Other Bets, this segment is dedicated to innovation and the creation of new technology. Alphabet is one of the largest companies in the world in terms of market cap. Alphabet is an extremely established company that holds a large market share in numerous markets in which they compete.

Stock Performance Highlights

52 week High	\$980.64
52 week Low	\$1273.89
Beta Value	1.44
Average Daily Volume	1.68 Million

Share Highlights

Market Capitalization	\$725.498 Billion
Shares Outstanding	694.783 M
EPS (2018 Q3)	\$23.16
P/E Ratio	44.86
Dividend Payout Ratio	0%

Company Performance Highlights

ROA	6.94%
ROE	8.69%
Sales	\$110,885 M

Financial Ratios

Current Ratio	5.14
Debt to Equity	1.78%

- **Industry:** Alphabet is in a sector of the market that is known for performing very well in the past and we believe that this will continue into the future.
- **Demand for Technology:** With a constant demand for new technology from consumers, we believe Alphabet is poised to deliver new and innovative technology. Alphabet is a leader in innovation which is shown by dedicating a whole segment of the business, Other Bets, strictly to research and development. We believe the demand for new technology will allow Google to continue to grow at a fast past.
- **Diversification of Revenue:** Google is constantly finding new ways to generate sources of revenue. We believe that as Google continues to diversify their products and services they will see a continued increase in overall revenue. By not being too dependent on only a few sources of revenue in the future, Google will be seen as a less risky company as they will rely on more and more sources of revenue.
- **Challenges:** A major challenge that Google faces is the threat of stricter government regulation. With increased government regulation companies will be forced to disclose more information, leaving Alphabet vulnerable to replication from competitors. This will in turn lead to Google losing a portion of its competitive advantage.

One Year Stock Performance vs the S&P 500



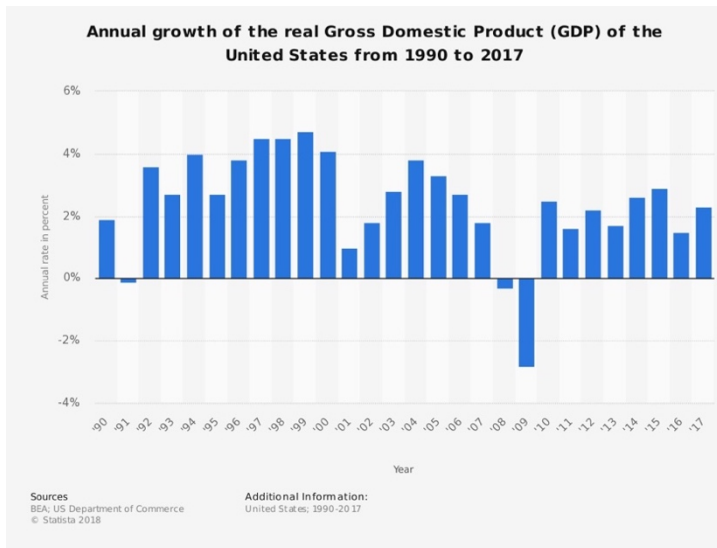
Source: Yahoo Finance

Economic Analysis

U.S. Gross Domestic Product

Gross domestic product (GDP) is the monetary value of all the finished goods and services produced within a country's borders in a specific time period.³ GDP is looked at by investors and economists as an indicator of how the economy as a whole is doing. When GDP increases, it typically means consumers are spending more money on goods and services.

As a result of consumers spending more money companies will be more inclined to spend on advertising in order to entice consumers to buy their products. Google receives a majority of their revenues from other companies paying to place their advertisements on Google's website. Google will see an increase in revenues as a result of companies spending more on advertising.



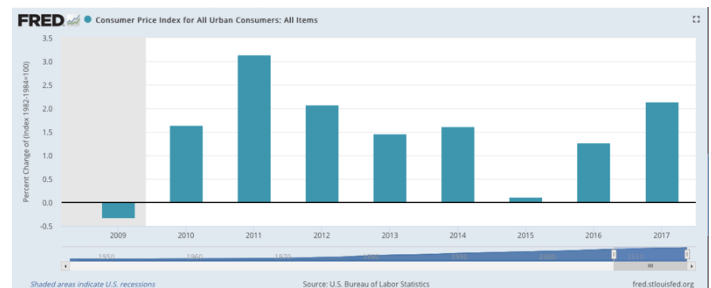
♥Statista 2018

The above graph demonstrates yearly historical GDP growth data from 1990 through 2017. It is important to notice that GDP growth has only been negative three times during that time period. Yearly GDP growth rate has grown by 2.6%, 2.9% 1.5%, and 2.3% in 2014, 2015, 2016, and 2017 respectively.¹ We believe that GDP will grow by 2.5% next year before reaching its steady-state of growth of 2.0%. We believe a decline in the GDP growth will be a result of the FED's projected interest rate increase over the several next quarters.

Inflation

Inflation is the rate at which the overall level of prices for goods and services is increasing. As the prices of goods and services increase due to inflation, we also see the purchasing power of consumers decreasing. The Consumer Price Index (CPI) is the main indicator of inflation, the CPI measures inflation by tracking a basket of fundamental goods and services. Currently the CPI rate sits at 2.9%.²

However, the FED also measures their own inflation rate. The FED typically has a more conservative method over measuring GDP, this is seen with the FED's most recent reporting of 2.1% for inflation.



Source: FED St. Louis

The above graph illustrates the annual CPI change dating back to 2009. Since 2009 the CPI has only been negative once and has had a high of just over 3%. Due to unemployment being at an all-time low and the rising cost of raw materials, we believe that the inflation rate will hover around 2.5-3% in the coming 6 months. However, with the mentioned interest rate hikes the Fed has planned in the future we believe that the inflation rate will decrease and over around the FED's target of 2%.

In our current economy we are seeing high manufacturing costs, which cuts into the profit of companies. We believe in the long run with the decrease in inflation manufacturing costs will decrease allowing companies' profits to increase. The technology sector as a whole will benefit from these lower manufacturing costs which will help increase their bottom line.

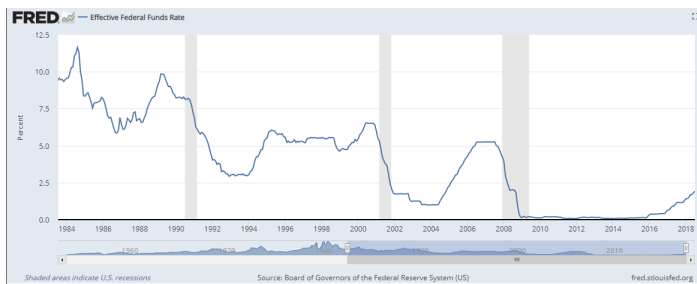
Interest Rates

As previously mentioned, the FED has enacted interest hikes and plans to continue the interest hikes in the foreseeable future. However, we do

not believe these interest hikes will have a large impact on established companies such as Google, Apple, and Facebook.

Large companies such as the ones mentioned above have been established for a large time in the economy and have established cash flow. For example, Apple has \$12.9 billion of cash and cash equivalents according to the company's 10-k. While investors may begin to turn towards the bond market instead of the stock market we do not see this having a large impact on established companies in the economy.

However, we believe these interest hikes will have a large impact on startup or relatively young companies. These young companies will still need a source of financing that established companies do not need. The cost of borrowing money will increase both in the short-term and the long-term as a result of interest hikes.



Source: FED St. Louis

The above graph represents the historical effective FED Fund Rate encompassing 1984 to the beginning of 2018. Interest rates are at a historical low during this time period, which leads us to believe we will continue to see an increase in the interest rate. The draw back to increasing interest rates is that consumer spending will decrease.

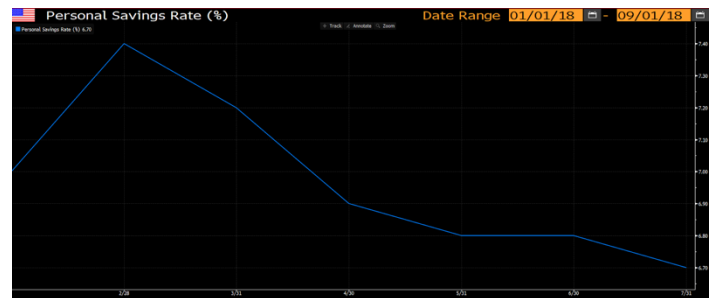
We believe that with an increase of interest rates, the economy will begin to slow to more of an organic growth rather than the strong Bull market we have been in over the last several years. We believe it is important that these interest hikes do not increase too quickly as it can shock the economy and cause a recession.

Consumer Confidence Index

The Consumer Confidence Index (CCI) measures a consumer's feeling about current and future economic conditions.

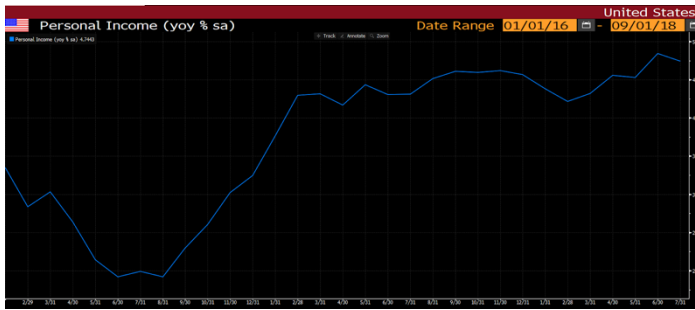
This is used as an indicator of the overall economy. In August of 2018, the CCI reached its highest point since 2000. The CCI was 133.4 in August of 2018, meaning that consumers were very optimistic of the current economy.² The economic development is looking to be strong for the rest of 2018 and carry into 2019. We imagine that the CCI has the possibility of dropping in the short-term due to trade war threats. However, in the long-run we believe that the CCI will bounce back and show an increase due to stabilizing trade agreements, general economic environments, and new technologies.

Additionally, we looked at the personal savings rate as well as personal savings and how they were affected by a strong CCI. The graph below represents the personal savings rate, it is clear that since the beginning of the year the personal savings rate has decreased. We think this trend will continue into the future as the CCI continues to report strong numbers. An increase in the CCI demonstrates a strong economy people will feel more comfortable spending money and we will see a decrease in the personal savings rate.



Source: Bloomberg

However, as we have seen a decrease with the personal savings rate we have also seen an increase in personal income. The following graph represents the increase of personal income from 2016 to 2018.



Source: Bloomberg

An increase in personal income and a decrease in the personal savings rate in a good indicator that the economy is strong. We know this shows a strong economy because people are more willing to spend their money on goods or services or invest that money. This will benefit the economy in the future as we believe personal saving will continue to decrease as the personal income will continue to increase.

Market Outlook

Now is the perfect time to invest into the market but more importantly, the perfect time to invest in the technology sector of the market. Consumers are constantly demanding new and better technology. Due to this demand tech companies are investing heavily in to research and development, with large R&D accounts the hope is that tech companies will have breakthroughs into new technologies. The tech sector as a whole will benefit from the demand for new technology because firms are so intertwined in the industry. Several tech companies are suppliers to other firms within the tech sector. For example, AMD recently acquired Amazon providing computer chips to run Amazon's processors. We also believe that the tech sector is a strong investment because it plays such a large role in the overall economy. The tech sector alone accounted for \$1.8 trillion in value added to the economy.

Industry Analysis

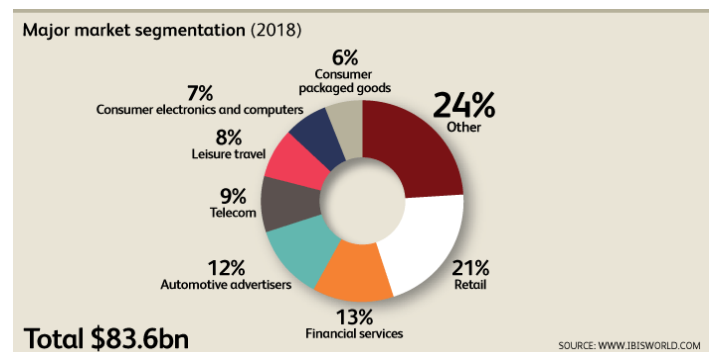
Industry Overview

Alphabet is predominantly a part of the online advertising industry, with their niche being the search engine industry. The main applications of this industry are to provide internet search capabilities,

web-based applications such as e-mail and maps, as well as online text or banner advertisements. The former functions are used to attract users, while the latter is used to drive revenue. For example, Google provides its search services for free and earns income from their cost-per-click pricing model. Every time a user clicks on an advertisement link, the advertisers are charged by Google.

Market Segments

The search engine industry is driven by advertising, so an effective way to breakdown this industry's market is to look at all the different advertisers who place ads on search engines. The way it works is that advertisers will bid on certain keywords or phrases that they can use to more effectively target their consumers. The more ads that one particular sector places, the more their sought after keywords or phrases will cost, which in turn generates more revenue from that sector. The graph below depicts the different market segments, with the retail sector in the lead followed by financial services and so on.



Source: IBISWORLD

Products and Services

The principal services offered by this industry is the wide array of search capabilities and applications offered to internet users. The product offered by the search engine industry that generates actual revenue is its ad space. Search engine ad space can be categorized as either paid placement or paid inclusion.

Paid placement ads are used by advertisers who seek to improve their advertisements location on a search engines page. The underlying goal of paid placement ads is to either drive traffic, increase brand awareness, generate leads or sell products online. As Google's paid placement platform Google AdWords continues

to grow, paid placement is expected to remain the most significant style of search engine advertising.

Search engines create their result listing by indexing websites across the internet and reviewing them for relevancy. Paid inclusions guarantee companies that they will be immediately submitted for review and inclusion in the results listing. Until recently, Google has opposed this type of advertising and therefore paid inclusion has accounted for only a minimal amount of industry revenue. Google has begun to offer paid inclusion ad space for searches regarding hotels, flights and financial products. We expect the revenue share of paid inclusion to increase as Google broadens their paid inclusion platform.

Industry Trends

Mobile Searching

Over the last five years we have seen the internet become gradually detached from the typical computer system and we expect this trend to steadily increase over the next several years. In the mobile market, there is a large focus on targeting consumers who are close to making a decision. For example, consumers searching where to go eat or which store to pick up a product from. According to the research company BIA/Kelsey, as mobile local searching continues to outpace computer local searches, search engines will be able to boost profitability in this segment by charging premiums for mobile search ads.

Porter's 5 Forces

Threat of Competitors: High

Companies in the search engine industry compete internally and at very high levels. They compete for users as well as advertisers. To compete for users search engines work to offer the most relevant and efficient search capabilities possible. They are constantly testing changes to their algorithms in the hopes to improve their search results and consumer experience. They also try to increase and retain their user base by offering a large suite of services, such as email, maps, news, storage space and more.

Search engines compete for advertisers tirelessly, although they often struggle when facing the industry leader Google. Search engines work to attract

advertisers through the size of their user base and cost-per-click rate. Google's domination of the industry allows it to charge higher rates, leaving space for the less popular search engines to compete in terms of pricing.

Threat of New Entrants: Low

The barriers to the search engine industry are high. It takes extremely skilled software programmers, engineers and IT professionals to build a search engine. It also takes complex algorithms to create a search engine capable of effectively handling indexing and relevancy submissions. Unless the start-up is able to license technology from an existing competitor, they will need to develop their own. Google's overwhelming market share and brand recognition also make it extremely challenging for new entrants to gain a foothold.

Threat of Substitutes: Low to Moderate

Between search engines exclusively, we feel that the threat of substitutes is relatively low. Google has been an industry leader for quite some time now and has developed a strong brand recognition and sense of familiarity which leads to loyalty from its consumers. However, we are moderately concerned about other companies such as Facebook, potentially becoming more attractive to companies seeking online advertising as social media's influence on the average consumer continues to climb. The concern is only moderate for now since we do recognize that Google and Facebook compete indirectly, as one draws people in through providing information and the other through social media.

Bargaining Power of Buyers: Low

The bargaining power of buyers for online advertising in the search engine industry is low. As Google continues to dominate the industry taking up the majority of market share worldwide, it is clear how powerful the industry leader is. The term "Google it" has even become synonymous with "search it". If companies want the best ad exposure possible they know that their best bet is google.

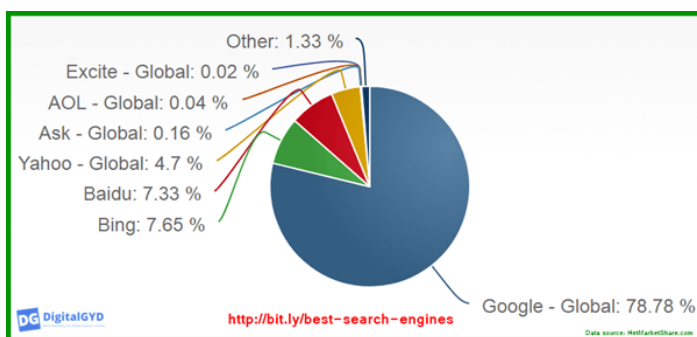
Bargaining Power of Suppliers: Low

Considering search engines don't provide physical products but rather free searching capabilities and various internet applications, the bargaining power of suppliers is low. Search engines are primarily ran off of exclusive algorithms that are developed by the companies own software programmers and engineers. Therefore, their primary service is independent of suppliers.

Competitor Comparisons

Google dominates the market share in the search engine industry globally by 78.78% an overwhelming amount. The other predominant competitors are Bing at 7.65%, and Yahoo at 4.7%. None of Google's competitors have managed to take from its profits or market share over the last several years. Keeping this in mind and the strong brand loyalty that Google has established, we see Google remaining the leading player in the search engine industry.

Although we recognize that while Google dominates globally there are certain geographic regions that have their own leaders. For example, in China Baidu is the leading search engine holding onto 80% of the market share. Baidu does not yet compete globally but could be a potential competitor for Google to watch out for.

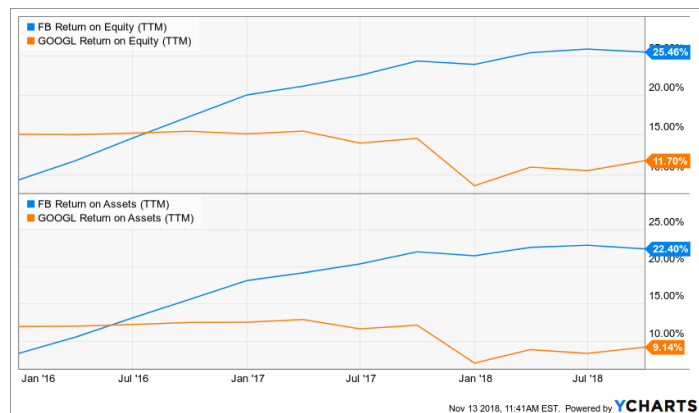


Source: DigitalDYG

Comparing Google to other companies in the search engine industry is a challenge because most of its direct competitors are not comparable in terms of size or market share. Many times search engines only play a minor role in the company. For instance, Microsoft owns Bing but only generates a small portion of their revenue from that segment. Therefore, we will focus on comparing metrics between Facebook and Google. Although these two companies do not compete

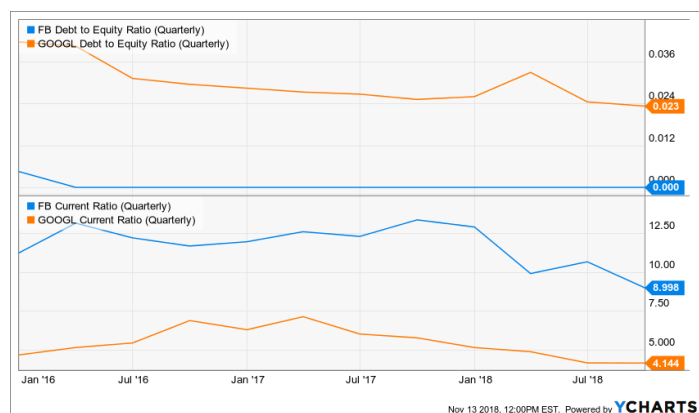
directly, they are similar in size and both generate the majority of their revenues through online advertising.

The chart below compares the profitability ratios of Facebook and Google. Facebook ROE sits at 25.46% while Google's is at 11.47%. Their ROA is 22.4% and 9.14% respectively. Although Facebook's profitability ratios surpass Google's it is important to remember that they are indirect competitors. Google's ROE of 11.47% surpasses the search engine industry average ROE of 10.32% for the last 12 months, which is impressive.



Source: YCharts

This next chart will compare Facebook and Google's Debt to Equity Ratios as well as their Current Assets ratios.



Source: YCharts

As you can see Facebook currently carries no debt and Google is not far behind. These numbers are not surprising since massive risk is accompanied by the borrowing of debt in the technology world. The technology sector is consistently rapidly developing therefore companies tend to stay away from the debt market. Facebook and Google both have solid current

ratios which means they will have no problem covering any current liabilities.

Catalysts for Growth or Change

The Search Engines Industry is currently in the growth stage of its economic life cycle. An important metric to look at when determining this is the industry's IVA. Industry Value Added is a measurement of the industry's contribution to the overall economy. The IVA is expected to increase at an annualized rate of 10.7% until 2023. In comparison US GDP is forecasted to grow in the same time frame at an annualized rate of 2.2%.

There are many elements influencing this growth. One element would be the rapidly increasing use of mobile searching. According to eMarketer, as the internet becomes increasingly removed from the traditional computer, mobile advertising revenue is projected to increase to nearly 50% of all ad spending in the next five years. This will continue to drive Alphas profits as they have already secured a dominant market share in the mobile phone search market.

Social Integration is another factor driving growth in the search engine industry. Social networking sites are also in the business of using consumer's information to deliver targeted advertisements. Because these sites can often gather more specific data they are able to typically charge higher rates for their advertisements. While this may be viewed as a threat the search engine industry actually benefits from the increasing number of users and the aggregation of data. We predict that pending stricter government regulation of consumer information, social networking sites and search engines will continue to cooperate in the coming years due to these aligning interests.

Key Positives & Negatives

Positives

Consumer Spending is a major external driver for the search engine industry. Typically, a decrease in consumer spending would result in businesses reducing their spending on advertisements. However, consumer spending is projected to grow steadily in 2018, leading to more advertisements which will generate more revenue for search engines.

This industry's revenue is directly linked to total US advertising expenditure. Advertisers are aware that advertising done through search engines are far superior in terms of cost and effectiveness when compared to traditional media outlets. This means that when or if there is a decline in total advertising expenditure, search engine revenue will be significantly less impacted than other media sources.

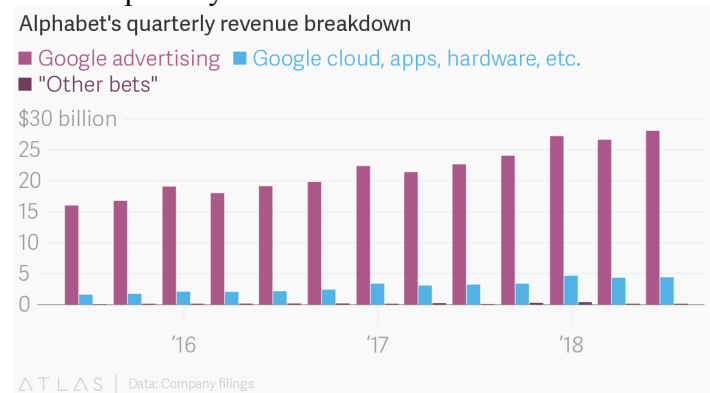
Negatives

Mobile Internet connectivity is a major driver of growth in the search engine industry. This is because it expands the reach of search engines by allowing them to be accessed from devices outside of the traditional computer. As this market approaches saturation it is forecasted that this could cause a deceleration in growth.

Company Analysis

Company Overview

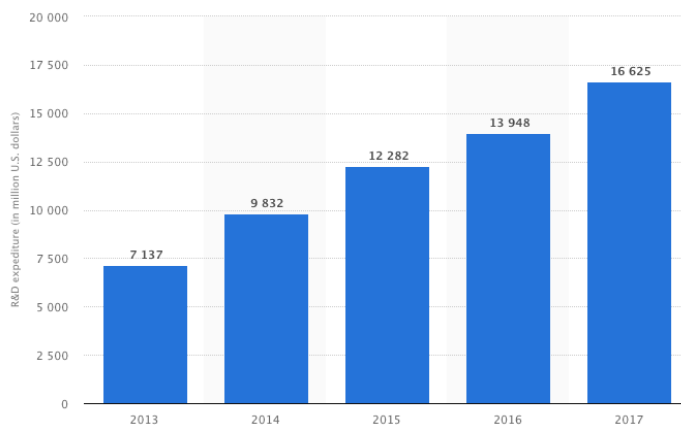
Alphabet Inc. is a larger American company in the technology sector of the market. Alphabet is the parent company to several other companies; however, the two main segments of Alphabet are Google and Other Bets. Google was founded by Larry Page and Sergey Brin in 1998 and was originally a privately held company. This later changed in 2004 when the company decided to have an initial public offering. After 11 years of being public the company once again decide to change their route, the company restructured creating Alphabet Inc. as the parent company. The following graph depicts the revenue breakdown over the past 3 years.



Source: Quartz

Many people are familiar with Google, but they may not be aware of how Google makes their money. Alphabet makes around 99% of their revenue from Google. 90% of Google's revenue comes from advertising.⁹ Companies pay Google every time someone clicks on their ad. Companies can also pay Google to put their websites on top of Google's search engine. Other Bets makes up about 1% of Alphabet's revenue.⁹ While Other Bets accounts for a very small amount of Alphabet's revenue it is a vital portion of the company.

Other Bets is a company that hosts other companies inside them that are the edge of innovation. Other Bets accounts for a large portion of Alphabet's R&D budget. In order to maintain their status as an industry leader Alphabet must consistently be innovating new products and opportunities for expansion. According to FactSet, Alphabet spent 16.6 Billion dollars in 2017 on research and development expenses, coming in second only to Amazon. Below is a graph depicting the steady incline of Alphabet's R&D budget over the last 4 years that we believe to continue into the future with increased demand for new and improved materials.



Source: Statista 2018

Products

Alphabet offers over 62 different products and services to its customers. The most known service Alphabet offers is Google's search engine which holds a majority of the U.S market share in the search engine industry. Google also has several other products associated with its search engine including Google translate and Google Chrome. Another very well-known service that Alphabet

owns is YouTube. Google has recently been developing a cloud services segments and saw sales in that segment by 37% in Q2 2018.

Google also has physical products that make such as Chromecast. Chromecast is a streaming device that plugs into TV and allows the user to stream numerous different forms of entertainment. Google Home is another device that Google makes and allows users to quickly search the internet by asking the device questions. Google also has a footprint in the telephone industry as they create Android OS which is the software run on all Android phones.

Alphabet also has several unique devices under their Other bets segment. One of the most notable devices under Other bets is Nest.⁷ Nest is a device made to make "smart-homes" and will be seen in even more house in the future. Nest allows users to change the temperature, turn on and off lights, lock and unlock doors and so much more. Google is so devoted to the growth of the technology sector that they have a segment dedicated entirely supporting the financing of startup companies in the technology industry. That company is GV which is essentially a venture capital firm under Alphabet.

Competition

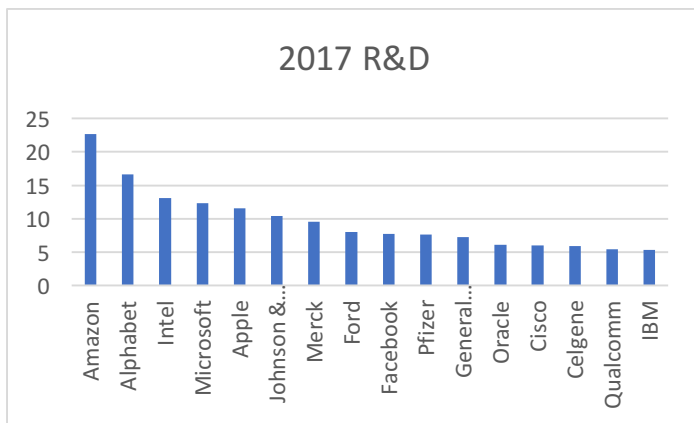
While many may not think Google has very many competitors they do have several competitors depending on how competitor is being defined. We focused on two main areas of competition. First, we looked at competition from an advertising perspective. We then decided it would be logical to look at competitors in the search engine industry as that is what Google is best known for.

When it comes to the advertising competitors we focused heavily on Facebook as Google's main competitor. We decided to use these two companies because they are similar in size. Facebook targets what customers search for in order to have those searched items show up in the users newsfeed. Facebook is also similar to Alphabet as their revenue for advertising makes up a large portion of their revenue. These were also good companies to compare to one another

because they both use cost per click in order to generate revenue.

When it comes to the search engine industry we compared Alphabet to companies such as we compared Google to Bing. Google holds roughly 64% of the U.S market share in the search engine industry. Bing accounts for roughly 34% of the U.S market share. While Bing is a competitor in the U.S it struggles to compete on the international level. Google is the largest search engine in nearly every country besides China (Baidu), Russia (Yandex), Korea (Naver), and the Czech Republic (Seznam).

We also decided to compare Amazon to Alphabet, we thought this was a good comparison because both companies are devoted to creating new and innovating technology that can have a large impact on the world. This is evident by how much money these companies spend on R&D. Amazon spent \$22.6 billion on R&D followed closely by Alphabet who spent \$16.6 billion.⁸



Source: Factset

The above graph depicts the spending these companies spent on R&D, showing that they put an importance on generating groundbreaking technology. A place where Amazon and Google compete directly are between Alexa and Google Home.

Catalysts for Growth/Change

Alphabet has designated an entire division of their company “Other Bets” specifically for growth and to be a place where they can invest in the future. Several major players that create revenue for Alphabet in this division are Nest, Verily and Google Fiber. The growth in Alphabet could be significant should they be able to capitalize upon any of the opportunities that

these companies and this division may present in the future.

We believe that Alphabet’s biggest opportunity for growth relies on a continued push for improved and groundbreaking technologies. As we mentioned before, we believe the R&D expense will increase in the future allowing for an increase in innovation. However, we believe that these increase in R&D expenses will pay off as Google has the possibility to get into new markets as well as growing the market presence they already have in markets.

Key Positives and Negatives

Even with a positive outlook for Alphabet and a “buy” rating we do realize that there is still negatives associated with the company. We also realize that there is some risk associated with the company as a lot of their future depends on innovation and getting new products and services to the market before competitors.

A key advantage to investing in Alphabet is their strategy of expansion through company and product acquisitions. Since 2001, Alphabet has acquired nearly 200 businesses. While not all these ventures have been homeruns, the strategy has proven to be successful. This is seen in several examples such as the acquisition of YouTube, SkyBox, DoubleClick and Android. This commitment to diversification has allowed Alphabet to enter new markets whilst improving existing market shares.

The benefit of Alphabet acquiring so many business is their ability to diversify the way they earn revenue. While a majority of Alphabet’s revenue still does come from Google’s advertising revenue, they are seeking other ways in which they can create revenue. This allows Alphabet to have another source of revenue to keep running the business if their advertising revenue from Google were to decline for some reason.

We see government regulations as a possible negative of investing in Google. If governments begin to set more regulations on search engines companies may be forced to disclose their proprietary algorithms, leaving their systems vulnerable to replication. This would cause a threat to Google as new competitors can come into the market and try to replicate

Google's success. Regulations on the search engine industry would standardize the industry and taking away one of Google's competitive advantages. Without this competitive advantages Google's bottom line could see a large decrease as companies may be able to advertise their products on a different search engine at a cheaper price.

Valuation Analysis

Revenue Decomposition

Alphabet has three sources of income, Google Advertising Revenue, Google Other Revenue, and Other bets. As we have mentioned a majority of the Revenue comes from advertising, leaving the other two segments to account for a majority of the revenue Alphabet generates.

Google Advertising Revenue

Advertising contributed to roughly 86% of Alphabet's overall revenue in 2017. That is down from roughly 88% in 2016. Over the past several years we have seen a decline in the percentage of advertising revenue compared to overall revenue. We believe that this trend will continue to occur in the future, by 2023 we believe advertising revenue will decrease to roughly 81% of Alphabet's overall revenue. We believe that this trend will continue to occur because moving forward we see Alphabet diversifying the ways the bring revenue to the company. However, even with a decreasing percentage of overall sales advertising will continue to be the driving force behind Alphabet's revenue.

Google Other Revenues

Google's other revenues makes up a small proportion of Alphabet's overall revenue; to be exact, Google's other revenue accounted for 12.8% of overall revenue in 2017. We see this as a segment where Google has opportunity to grow because of all the smart technology that they have under this segment. We believe that by 2023 this segments contribution will be up by almost 6% and be contributing to about 18% of overall revenue.

Other Bets

This is Alphabets lowest contributing segment to overall revenue. Other Bets was the hardest segment to predict growth, since the segment consists of many projects that are in development stages and are not generating much if any revenue for Alphabet. In 2017 Other Bets accounted for only 1.08% of revenue. We do not believe there will be a huge growth in this segment of the business due to the high R&D costs associated with this segment. We see a slight increase occurring, by 2023 we predict Other Bets will make up 1.21% of overall revenue. However, Other Bets could have a large impact on overall revenue if some of their projects in development lead to new technologies that only Alphabet can offer.

Operating Expenses

Cost of Goods Sold

Alphabet records their cost of revenue with depreciation and amortization included. We decided to separate depreciation and amortization out of cost of revenue in order to get a more accurate representation of Alphabet's true cost of revenue. Cost of revenue not including depreciation and amortization in 2017 was 34.9% of total revenue. We believe Alphabet's cost of revenue will increase slightly and be 36% of total revenue in the future. We believe that the cost of inputs will increase in the future due to the threat of trade wars and other economic factors, we believe this will have a minimal impact on Alphabet's cost of revenue.

Research and Devolvement Expense

Consumers are constantly demanding new and improved technology from the leaders in the technology sector. As an industry leader Alphabet is forced to spend highly on R&D in order to maintain their market dominance as well as their competitive advantage. Alphabet's R&D has actually seen a decrease in the past several years as a portion of revenue because revenue has been growing faster than R&D expense have been growing. In 2017, R&D expenses was 15% of overall revenue. We see Google holding their R&D expense constant at 15% of overall revenue.

Selling and Marketing Expenses

Selling and Marketing expenses encompass the expense that Google incurs from marketing their own products. For example, Google has marketed their Google Home heavily over the past year to compete with Amazon's Alexa. We believe that selling and marketing costs will stay rather constant in the future, because of that we forecasted selling and marketing expense as a percentage of revenue. Based off historical data we believe selling and marketing expense will remain constant at roughly 12% of revenue.

General and Administrative Expense

General and Administrative expense includes some labor costs and other miscellaneous costs that go along with running a business. Alphabet currently has 6.2% cost of revenue compared to the revenue it generates. We believe general and administrative will have a steady increase as a percentage of revenue, by 2023 we see general and administrative being almost 8% of revenue. We forecasted an increase in general and administrative expense to adjust for an increase in inflation. We also believe that the increase in personal income we mentioned earlier will have an increase on labor costs that are a part of Alphabet's general and administrative expenses.

WACC

While calculating WACC for Alphabet we took into account the equity that Google has and the debt it has. It was relatively easy to compute WACC due to the low debt the Alphabet carries on its balance sheet. Alphabet has such a large cash reserve that they are easily able to pay down their debt.

Cost of Equity

In order to calculate the cost of equity we used the largely accepted method of CAPM. We used the 10-year treasury as our risk-free rate because we felt a 10-year treasury fit our forecast horizon better than a 30-year treasury. When we were deciding on our equity risk premium we decided to use Damodaran of 5.30%. We decided to use this as our equity risk premium because we think that it has historically

been a good proxy of the market. Our cost of equity was 10.82% which was calculated by multiplying our beta of 1.44 times the market risk premium and then adding the risk free rate.

Cost of Debt

In order to calculate cost of debt we multiplied our pre-tax cost of debt times (1-marginal tax rate). To calculate our pre-tax cost of debt we decided to look at a 30-year bond issued by Apple, which was 3.05%, due to the fact that Alphabet did not have any bonds of that length. We then added .026% which is the default rate for a 30-year AA+ rated bond. When we multiplied that by (1-.22), we came to an after tax cost of debt of 2.61%.

Weights

To calculate the weight of our equity we first took the total shares outstanding multiplied by the current stock price to obtain a total value of equity of 740,742.90. After obtaining our value of equity we then needed to find our value of debt which was found by adding long term debt with the present value of operating leases to get 8,730.11. We then added those together to obtain our total value of capital of 749,466.01. To obtain the weight of equity and weight of debt we divided them by the total value of capital to obtain a 98.84% and 1.16% weight of equity and weight of debt respectively.

Dividend Discount Model

Although we did compute a target price using the dividend discount model (DDM) we decided that it was not a realistic way to measure the intrinsic value of Alphabet. Alphabet does not offer a dividend to their stock holders, so we believe that this is not an effective way to measure the value of the company. This model gave us a price of \$1,187.78 which was not too far off our intrinsic value based off the discounted cash flow model. We still see this as a lower end valuation of the company.

DCF and EP Model

We believe that DCF and EP are the most effective way to measure the intrinsic value based off the drawbacks discussed about the DDM. After accounting for a partial year adjustment we calculated

an intrinsic value of \$1,205.30. We believe that this is an accurate representation of what Alphabet is worth. We believe this is the most effective way to measure Alphabet based on the fact that we are not comparing it to other companies via relative valuation, as one outlier can vastly affect the intrinsic value calculated.

Sensitivity Analysis

Beta and Equity Risk Premium

The beta and equity risk premium are important values to analyze since they are crucial to the calculation of the cost of equity. Alphabet carries little debt and therefore their WACC weight is heavily influenced by equity. Holding the beta constant, our sensitivity analysis of these variables yielded a stock price between \$1190.62 and \$1220.29.

WACC and CV Growth of NOPLAT

Our WACC is an important component when calculating our Intrinsic value because it determines the rate at which our free cash flows are discounted back at. However, we don't see Alphabet's WACC drastically changing as we don't see them taking on a different capital structure with more debt. Holding the WACC constant, our sensitivity analysis of these variables yielded a stock price between \$1136.95 and \$1292.37.

Beta and Risk-Free-Rate

These variables both had similar effects on our intrinsic value, that when they both increased our stock price decreased. It is important to analyze these variables with the expected increase in treasury yields and market volatility. Holding beta constant, our sensitivity analysis of these variables yielded a stock price between \$1178.50 and \$1233.12.

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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.

Alphabet Inc.

Key Assumptions of Valuation Model

Ticker Symbol	GOOG	
Current Share Price	\$1,066.15	
Current Model Date	11/9/2018	
FY End (month/day)	Dec. 31	
Pre-Tax Cost of Debt	3.31%	
Beta	1.44	1.44
Risk-Free Rate	3%	3.19%
Equity Risk Premium	5.30%	4.80%
CV Growth of NOPLAT	5.50%	4.50%
Current Dividend Yield	0%	
Marginal Tax Rate	21%	21.00%
Effective Tax Rate		
WACC	10.73%	10.73%
Intrinsic Value	1205.30	\$ 1,205.30
ROIC	78.11%	78.11%

		WACC							
		\$ 1,205.30	9.45%	9.65%	9.85%	10.73%	10.25%	10.45%	10.65%
CV Growth	3.75%		1277.66	1251.65	1227.35	1136.95	1183.22	1163.14	1144.21
	4.00%		1310.16	1281.85	1255.47	1158.04	1207.78	1186.16	1165.83
	4.25%		1345.79	1314.84	1286.11	1180.76	1234.39	1211.04	1189.14
	4.50%		1385.01	1351.04	1319.61	1205.30	1263.32	1238.01	1214.34
	4.75%		1428.41	1390.93	1356.40	1231.90	1294.87	1267.34	1241.68
	5.00%		1476.68	1435.11	1396.98	1260.81	1329.43	1299.37	1271.44
	5.25%		1530.70	1484.32	1441.97	1292.37	1367.44	1334.47	1303.95

		Marginal Tax Rate							
		\$ 1,205.30	15%	17%	19%	21%	23%	25%	27%
Risk Free Rate	2.89%		1272.17	1253.30	1234.47	1215.68	1196.93	1178.22	1159.55
	2.99%		1268.48	1249.68	1230.92	1212.20	1193.52	1174.88	1156.28
	3.09%		1264.81	1246.08	1227.39	1208.75	1190.14	1171.56	1153.03
	3.19%		1261.16	1242.50	1223.88	1205.30	1186.76	1168.26	1149.80
	3.29%		1257.52	1238.94	1220.39	1201.88	1183.41	1164.97	1146.58
	3.39%		1253.91	1235.39	1216.91	1198.47	1180.06	1161.70	1143.38
	3.49%		1250.31	1231.86	1213.44	1195.07	1176.74	1158.45	1140.19

		Beta							
		\$ 1,205.30	1.29	1.34	1.39	1.44	1.49	1.54	1.59
Risk Free Rate	2.89%		1243.89	1234.37	1224.97	1215.68	1206.51	1197.45	1188.50
	2.99%		1240.29	1230.81	1221.45	1212.20	1203.07	1194.06	1185.15
	3.09%		1236.70	1227.26	1217.95	1208.75	1199.66	1190.68	1181.82
	3.19%		1233.12	1223.73	1214.46	1205.30	1196.26	1187.33	1178.50
	3.29%		1229.56	1220.22	1210.99	1201.88	1192.88	1183.98	1175.20
	3.39%		1226.02	1216.72	1207.54	1198.47	1189.51	1180.66	1171.92
	3.49%		1222.50	1213.24	1204.10	1195.07	1186.16	1177.35	1168.65

		ROIC CV							
		\$ 1,205.30	63.11%	68.11%	73.11%	78.11%	83.11%	88.11%	93.11%
NOPLAT Growth	3.75%		1129.44	1132.31	1134.79	1136.95	1138.85	1140.54	1142.04
	4.00%		1149.73	1152.91	1155.65	1158.04	1160.14	1162.01	1163.67
	4.25%		1171.59	1175.10	1178.12	1180.76	1183.08	1185.14	1186.98
	4.50%		1195.21	1199.07	1202.40	1205.30	1207.86	1210.12	1212.15
	4.75%		1220.79	1225.04	1228.70	1231.90	1234.71	1237.20	1239.42
	5.00%		1248.61	1253.28	1257.30	1260.81	1263.90	1266.64	1269.08
	5.25%		1278.97	1284.09	1288.51	1292.37	1295.76	1298.76	1301.44

		Beta							
		\$ 1,205.30	1.29	1.34	1.39	1.44	1.49	1.54	1.59
Equit Risk Premium	5.00%		1247.05	1238.02	1229.10	1220.29	1211.58	1202.97	1194.46
	5.10%		1242.38	1233.23	1224.19	1215.26	1206.44	1197.72	1189.10
	5.20%		1237.73	1228.47	1219.31	1210.26	1201.33	1192.50	1183.78
	5.30%		1233.12	1223.73	1214.46	1205.30	1196.26	1187.33	1178.50
	5.40%		1228.54	1219.03	1209.64	1200.37	1191.22	1182.19	1173.26
	5.50%		1223.98	1214.36	1204.86	1195.48	1186.22	1177.08	1168.06
	5.60%		1219.45	1209.71	1200.10	1190.62	1181.26	1172.02	1162.90

Alphabet Inc.

Revenue Decomposition

<i>Fiscal Years Ending Dec. 31</i>	2015	2016	2017	2018E	2019E	2020E	2021E	2022E	2023E
Google Segment									
Google Websites	52357.00	63785.00	77788.00	89456.20	100190.94	110210.04	120128.94	129739.26	138821.01
YOY %	16.13%	21.83%	21.95%	15.00%	12.00%	10.00%	9.00%	8.00%	7.00%
Google Network Members' websites	15033.00	15598.00	17587.00	18993.96	20323.54	21542.95	22620.10	23524.90	24230.65
YOY %	3.40%	3.76%	12.75%	8.00%	7.00%	6.00%	5.00%	4.00%	3.00%
Google Advertising Revenue	67390.00	79383.00	95375.00	108450.31	120514.60	131753.09	142749.13	153264.24	163051.72
YOY %	13.02%	17.80%	20.15%	13.71%	11.12%	9.33%	8.35%	7.37%	6.39%
Google Other Revenues	7151.00	10080.00	14277.00	17417.94	20901.53	24663.80	28363.37	32050.61	35896.69
YOY %	18.20%	40.96%	41.64%	22.00%	20.00%	18.00%	15.00%	13.00%	12.00%
Google Segment Revenue	74541.00	89463.00	109652.00	125868.25	141416.13	156416.89	171112.50	185314.85	198948.41
YOY %	13.50%	20.02%	22.57%	14.79%	12.35%	10.61%	9.40%	8.30%	7.36%
Other Bets									
Other Bets Revenue	448.00	809.00	1203.00	1419.54	1646.67	1877.20	2083.69	2271.22	2452.92
YOY %	37.00%	80.58%	48.70%	18.00%	16.00%	14.00%	11.00%	9.00%	8.00%
Consolidated Revenues	74989.00	90272.00	110885.00	127287.79	143062.80	158294.09	173196.19	187586.07	201401.33
YOY %	13.62%	20.38%	22.83%	14.79%	11.03%	9.62%	8.60%	7.67%	6.86%

Alphabet Inc.

Income Statement

<i>Fiscal Years Ending Dec. 31</i>	2015	2016	2017	2018E	2019E	2020E	2021E	2022E	2023E
Revenue	74989.00	90272.00	110855.00	127287.79	143062.80	158294.09	173196.19	187586.07	201401.33
Costs and Expenses									
Cost of Revenue	23101.00	35138.00	38668.00	45823.60	51502.61	56985.87	62350.63	67530.99	72504.48
Deprciation	4132.00	5267.00	6103.00	5509.79	6336.26	7286.70	8379.70	9636.66	11082.16
Amoritzation	931.00	877.00	812.00	756.99	552.28	379.34	240.71	111.64	52.02
Research and Development	12282.00	13948.00	16625.00	19093.17	21459.42	23744.11	25979.43	28137.91	30210.20
Sales and Marketing	9047.00	10485.00	12893.00	15159.98	17038.78	18852.83	20627.67	22341.50	23986.90
General and Administrative	6136.00	6985.00	6872.00	7902.80	9088.22	10451.45	12019.17	13822.05	15895.35
European Commissions fine	0.00	0.00	2736.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Expenses	55629.00	66556.00	84709.00	94246.33	105977.56	117700.30	129597.31	141580.74	153731.11
Income from Operations	19360.00	23716.00	26146.00	33041.46	37085.24	40593.79	43598.89	46005.33	47670.22
Interest Income	999.00	1220.00	1312.00	2933.88	3750.50	4571.63	5510.67	6454.35	7607.64
Interest Expesne	-104.00	-124.00	-109.00	-115.54	-122.47	-129.82	-137.61	-145.87	-154.62
Foreign currenecy exchanges losses. Net	-422.00	-475.00	-121.00	-105.60	-92.15	-80.42	-70.18	-61.25	-53.45
Gain (Loss) on Marketable securities. Net	-208.00	-210.00	-80.00	-19.99	-4.99	-1.25	-0.31	-0.08	-0.02
Gain (Loss) on non-marketable investments, net	-126.00	-65.00	-114.00	-66.05	-38.27	-22.17	-12.84	-7.44	-4.31
Other	152.00	88.00	159.00	205.11	264.58	341.31	440.28	567.95	732.65
Other Income (expenses), net	291.00	434.00	1047.00	2831.82	3757.20	4679.28	5730.00	6807.67	8127.88
Income before income taxes	19651.00	24150.00	27193.00	35873.28	40842.43	45273.07	49328.89	52813.00	55798.11
Provision for income taxes	3303.00	4672.00	14531.00	7533.39	8576.91	9507.34	10359.07	11090.73	11717.60
Net Income	16348.00	19478.00	12662.00	28339.89	32265.52	35765.72	38969.82	41722.27	44080.50
Net income (loss) from discontinued operations	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net income available to allstockholders	16348.00	19478.00	12662.00	28339.89	32265.52	35765.72	38969.82	41722.27	44080.50
Basic EPS	23.78	28.18	18.22	40.30	45.35	50.03	54.51	58.37	61.66
Shares outstanding	687.348	691.293	694.783	703.146	711.509	714.853	714.850	714.848	714.847

Alphabet Inc.
Balance Sheet

<i>Fiscal Years Ending Dec. 31</i>	2015	2016	2017	2018E	2019E	2020E	2021E	2022E	2023E
Assets									
Current Assets:									
Cash & cash equivalents	16549.00	12918.00	10715.00	27219.36	45430.26	68971.20	94395.48	129251.74	170294.16
Marketable securities	56517.00	73415.00	91156.00	103006.28	113306.91	122371.46	129713.75	134902.30	138949.37
Total cash, cash equivalents, & marketable securities	73066.00	86333.00	101871.00	130225.64	158737.17	191342.66	224109.22	264154.03	309243.53
Accounts receivable, gross	11852.00	14604.00	19010.00	20264.22	22775.60	25200.42	27572.83	29863.70	32063.09
Allowance	296.00	467.00	674.00	551.29	526.87	592.17	579.61	579.03	627.14
Accounts receivable, net	11556.00	14137.00	18336.00	19712.93	22248.73	24608.25	26993.22	29284.67	31435.95
Receivable under reverse repurchase agreements	450.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Deferred income taxes, net	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Income taxes receivable, net	1903.00	95.00	369.00	191.30	205.85	213.92	233.08	232.91	234.35
Inventories	0.00	268.00	749.00	623.71	701.01	775.64	848.66	919.17	986.87
Other current assets	3139.00	4575.00	2983.00	3069.51	3158.52	3250.12	3344.37	3441.36	3541.16
Total current assets	90114.00	105408.00	124308.00	153823.08	185051.28	220190.59	255528.56	298032.15	345441.86
Non-marketable investments	5183.00	5878.00	7813.00	8058.33	8311.36	8572.34	8841.51	9119.13	9405.47
Prepaid revenue share, expenses & other assets, non-current	3181.00	1819.00	-	0.00	0.00	0.00	0.00	0.00	0.00
Deferred income taxes	251.00	383.00	680.00	662.73	645.89	629.49	613.50	597.92	582.73
Property & Equipment Gross	40146.00	47527.00	59647.00	70437.14	81707.09	94780.22	108997.25	122076.92	136726.15
Less: Accumulated Depreciation & Amortization	11130.00	13293.00	17264.00	22773.79	29110.05	36396.75	44776.45	54413.10	65495.26
Property & equipment, net	29016.00	34234.00	42383.00	47663.35	52597.04	58383.47	64220.80	67663.82	71230.89
Intangible assets, net	3847.00	3307.00	2692.00	1964.00	1349.00	856.00	397.00	185.00	0.00
Goodwill	15869.00	16468.00	16747.00	16747.00	16747.00	16747.00	16747.00	16747.00	16747.00
Other non-current assets	0.00	0.00	2672.00	2672.00	2672.00	2672.00	2672.00	2672.00	2672.00
Total assets	147461.00	167497.00	197295.00	231590.49	267373.57	308050.89	349020.37	395017.01	446079.96
Liabilities and Stockholder's Equity									
Current Liabilities:									
Accounts payable	1931.00	2041.00	3137.00	3271.30	3676.71	4068.16	4451.14	4820.96	4944.86
Short-term debt	3225.00	0.00	0.00	0.00	0.00	0.00	1000.00	0.00	0.00
Accrued compensation & benefits	3539.00	3976.00	4581.00	4617.61	4816.76	5016.70	5769.20	5805.26	7837.10
Accrued expenses & other current liabilities	4768.00	6144.00	10177.00	11703.26	11360.28	12541.74	13822.05	15895.35	17484.89
Accrued revenue share	2329.00	2942.00	3975.00	4216.12	4155.68	3943.27	3890.26	3830.04	3574.08
Securities lending payable	2428.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Deferred revenue	788.00	1099.00	1432.00	1489.27	1673.83	1852.04	2026.40	2194.76	2220.44
Income taxes payable, net	302.00	554.00	881.00	559.73	600.38	608.47	621.54	609.99	585.88
Total current liabilities	19310.00	16756.00	24183.00	25857.27	26283.64	28030.38	31580.59	33156.36	36647.25
Long-term debt	1995.00	3935.00	3969.00	4132.92	4303.61	4481.35	4666.43	4859.15	5059.83
Deferred revenue, non-current	151.00	202.00	340.00	279.68	251.08	185.20	162.11	131.69	133.23
Income taxes payable, net, non-current	3663.00	4677.00	12812.00	16799.46	19126.51	21201.38	18128.37	18854.24	19919.92
Deferred income taxes	189.00	226.00	430.00	339.50	351.65	361.28	362.57	388.18	363.25
Other long-term liabilities	1822.00	2665.00	3059.00	3157.19	3258.54	3363.14	3471.10	3582.52	3697.52
Total liabilities	27130.00	28461.00	44793.00	50566.03	53575.03	57622.73	58371.16	60972.13	65820.99
Stockholder's Equity									
Class A & class B common stock, & class C capital stock & additior	32982.00	36307.00	40247.00	43869.23	47817.46	52121.03	56811.93	61925.00	67498.25
Accumulated other comprehensive income (loss)	-1874.00	-2402.00	-992.00	-992.00	-992.00	-992.00	-992.00	-992.00	-992.00
Retained earnings	89223.00	105131.00	113247.00	138147.22	166973.07	199299.13	234829.28	273111.88	313752.72
Total stockholders' equity	120331.00	139036.00	152502.00	181024.45	213798.54	250428.16	290649.21	334044.88	380258.96
Total Liabilities and Stockholders' Equity	147461.00	167497.00	197295.00	231590.49	267373.57	308050.90	349020.37	395017.01	446079.96

Alphabet Inc.*Cash Flow Statement*

<i>Fiscal Years Ending Dec. 31</i>	2015	2016	2017
Net income	16348.00	19478.00	12662.00
Adjustments:			
Depreciation & amortization of property & equipment	0.00	0.00	0.00
Depreciation & impairment of property & equipment	4132.00	5267.00	6103.00
Amortization of intangibles & other assets	0.00	0.00	0.00
Amortization & impairment of intangible assets	931.00	877.00	812.00
Stock-based compensation expense	5203.00	6703.00	7679.00
Excess tax benefits from stock-based compensation	-548.00	-	-
Deferred income taxes	-179.00	-38.00	258.00
Loss (gain) on divestiture of business	0.00	0.00	0.00
Impairment of equity investments	0.00	0.00	0.00
Loss (gain) on equity interest	0.00	0.00	0.00
Loss (gain) on sale of non-marketable equity investments	0.00	0.00	0.00
Loss (gain) on marketable & non-marketable investments, net	334.00	275.00	194.00
Other adjustments	212.00	174.00	137.00
Changes in assets and liabilities:			
Accounts receivable	-2094.00	-2578.00	-3768.00
Income taxes, net	-179.00	3125.00	8211.00
Inventories	0.00	0.00	0.00
Prepaid revenue share, expenses & other assets	-318.00	312.00	0.00
Other assets	0.00	0.00	-2164.00
Accounts payable	203.00	110.00	731.00
Accrued expenses & other liabilities	1597.00	1515.00	4891.00
Accrued revenue share	339.00	593.00	955.00
Deferred revenue	43.00	223.00	390.00
Net cash flows from operating activities	26024.00	36036.00	37091.00
Investing Activities			
Purchases of property & equipment	-9915.00	-10212.00	-13184.00
Proceeds from disposals of property & equipment	0.00	240.00	99.00
Purchases of marketable securities	-74368.00	-84509.00	-92195.00
Maturities & sales of marketable securities	62905.00	66895.00	73959.00
Purchases of non-marketable investments	-2172.00	-1109.00	-1745.00
Maturities & sales of non-marketable investments	0.00	494.00	533.00
Cash collateral related to (from) securities	-350.00	-2428.00	0.00
Investments in reverse repurchase agreements	425.00	450.00	0.00
Proceeds from divestiture of businesses	0.00	0.00	0.00
Acquisitions, net of cash acquired & purchase of intangibles & other assets	0.00	0.00	0.00
Acquisitions, net of cash acquired, & purchases of intangibles & other assets	-236.00	-986.00	-287.00
Proceeds from collection of notes receivable	0.00	0.00	1419.00
Net cash flows from investing activities	-23711.00	-31165.00	-31401.00
Financing Activities			
Net proceeds (payments) related to securities	-2375.00	-3304.00	-4166.00
Adjustment payment to class C capital	-47.00	0.00	0.00
Repurchases of capital stock	-1780.00	-3693.00	-4846.00
Proceeds from issuance of debt, net of discounts	13705.00	8729.00	4291.00
Repayments of debt	-13728.00	-10064.00	-4377.00
Proceeds from sale of subsidiary shares	0.00	0.00	800.00
Net cash flows from financing activities	-4225.00	-8332.00	-8298.00
Effect of exchange rate changes on cash & cash equivalents	-434.00	-170.00	405.00
Net increase (decrease) in cash & cash equivalents	-1798.00	-3631.00	-2203.00
Cash & cash equivalents at beginning of period	18347.00	16549.00	12918.00
Cash & cash equivalents at end of period	16549.00	12918.00	10715.00

Alphabet Inc.*Cash Flow Statement*

	2018E	2019E	2020E	2021E	2022E	2023E
Operating Activities						
<i>Net income</i>	28339.89	32265.52	35765.72	38969.82	41722.27	44080.50
Depreciation	5509.79	6336.26	7286.70	8379.70	9636.66	11082.16
Amortization	756.99	552.28	379.34	240.71	111.64	52.02
Changes in Assets and Liabilities						
Accounts receivable	-1376.93	-2535.80	-2359.53	-2384.97	-2291.45	-2151.28
Income Tax Receivable	-177.70	14.54	8.07	19.16	-0.17	1.45
Inventories	-125.29	77.30	74.63	73.02	70.51	67.69
Other Current Assets	-86.51	-89.02	-91.60	-94.25	-96.99	-99.80
Accrued revenue share Liability	241.12	-60.44	-212.41	-53.01	-60.23	-255.96
Accounts payable	134.30	405.42	391.44	382.98	369.82	123.90
Accrued expenses & other liabilities	1526.26	-342.98	1181.47	1280.30	2073.31	1589.54
Accrued Compensation	36.61	199.15	199.94	752.50	36.06	2031.84
Other Long Term Liabilities	98.19	101.35	104.60	107.96	111.42	115.00
Deferred Revenue	57.27	184.57	178.21	174.35	168.36	25.68
Deferred Taxes	-90.50	12.15	9.63	1.29	25.61	-24.93
Income Taxes Payable, Non Current	3987.46	2327.05	2074.87	-3073.01	725.87	1065.68
Income Taxes Payable	-321.27	40.65	8.09	13.07	-11.55	-24.11
Deferred Revenue, Non Current	-60.32	-28.61	-65.87	-23.09	-30.43	1.54
Net cash flows from operating activities	38449.37	39459.39	44933.30	44766.54	52560.71	57680.92
Purchases of property & equipment	-10790.14	-11269.94	-13073.13	-14217.03	-13079.67	-14649.23
Purchases of Non Marketable Investments	-245.33	-253.03	-260.98	-269.17	-277.62	-286.34
Purchases of marketable securities	-11850.28	-10300.63	-9064.55	-7342.29	-5188.55	-4047.07
Net cash flows from investing activities	-22885.75	-21823.60	-22398.66	-21828.49	-18545.84	-18982.64
Short Term Debt	0.00	0.00	0.00	1000.00	-1000.00	0.00
Long Term Debt	163.92	170.69	177.74	185.08	192.72	200.68
Proceeds from Issuance of Common Stock	3622.23	3948.23	4303.57	4690.89	5113.07	5573.25
Repurchase of Common Stock	-3439.67	-3439.67	-3439.67	-3439.67	-3439.67	-3439.67
Net cash flows from financing activities	940.74	575.12	1006.30	2486.23	841.39	2344.14
Net increase (decrease) in cash & cash equivalents	16504.36	18210.91	23540.94	25424.28	34856.25	41042.43
Cash & cash equivalents at beginning of period	10715.00	27219.36	45430.26	68971.20	94395.49	129251.74
Cash & cash equivalents at end of period	27219.36	45430.26	68971.20	94395.49	129251.74	170294.16

Alphabet Inc.*Common Size Income Statement*

<i>Fiscal Years Ending Dec. 31</i>	2015	2016	2017	2018E	2019E	2020E	2021E	2022E	2023E
Revenue	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Costs and Expenses									
Cost of Revenue	37.56%	38.92%	41.12%	36.00%	36.00%	36.00%	36.00%	36.00%	36.00%
Research and Development	16.38%	15.45%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%	15.00%
Sales and Marketing	12.06%	11.61%	11.63%	11.91%	11.91%	11.91%	11.91%	11.91%	11.91%
General and Administrative	8.18%	7.74%	6.20%	6.21%	6.35%	6.60%	6.94%	7.37%	7.89%
European Commissions fine	0.00%	0.00%	2.47%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total Expenses	74.18%	73.73%	76.41%	74.04%	74.08%	74.36%	74.83%	75.48%	76.33%
Income from Operations	25.82%	26.27%	23.59%	25.96%	25.92%	25.64%	25.17%	24.52%	23.67%
Other Income (expenses), net	0.39%	0.48%	0.94%	2.22%	2.63%	2.96%	3.31%	3.63%	4.04%
Income before income taxes	26.21%	26.75%	24.53%	28.18%	28.55%	28.60%	28.48%	28.15%	27.70%
Provision for income taxes	4.40%	5.18%	13.11%	5.92%	6.00%	6.01%	5.98%	5.91%	5.82%
Net Income	21.80%	21.58%	11.42%	22.26%	22.55%	22.59%	22.50%	22.24%	21.89%
Net income (loss) from discontinued operations	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Less: Adjustment Payment to Class C capital stockholders	0.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Net income available to all stockholders	21.10%	21.58%	11.42%	22.26%	22.55%	22.59%	22.50%	22.24%	21.89%

Alphabet Inc.
Common Size Balance Sheet

<i>Fiscal Years Ending Dec. 31</i>	2015	2016	2017	2018E	2019E	2020E	2021E	2022E	2023E
Assets									
Current Assets:									
Cash & cash equivalents	25.20%	20.93%	17.05%	21.38%	31.76%	43.57%	54.50%	68.90%	84.55%
Marketable securities	75.37%	81.33%	82.23%	80.92%	79.20%	77.31%	74.89%	71.91%	68.99%
Total cash, cash equivalents, & marketable securities	97.44%	95.64%	91.90%	102.31%	110.96%	120.88%	129.40%	140.82%	153.55%
Accounts receivable, gross	15.80%	16.18%	17.15%	15.92%	15.92%	15.92%	15.92%	15.92%	15.92%
Allowance	0.39%	0.52%	0.61%	0.43%	0.37%	0.37%	0.33%	0.31%	0.31%
Accounts receivable, net	15.41%	15.66%	16.54%	15.49%	15.55%	15.55%	15.59%	15.61%	15.61%
Receivable under reverse repurc	0.60%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Deferred income taxes, net	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Income taxes receivable, net	2.54%	0.11%	0.33%	0.15%	0.14%	0.14%	0.13%	0.12%	0.12%
Raw materials & work in process	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Finished goods	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Inventories	0.00%	0.30%	0.68%	0.49%	0.49%	0.49%	0.49%	0.49%	0.49%
Prepaid revenue share, expenses	4.19%	5.07%	0.00%	2.41%	2.21%	2.05%	1.93%	1.83%	1.76%
Other current assets	0.00%	0.00%	2.69%	2.41%	2.21%	2.05%	1.93%	1.83%	1.76%
Total current assets	120.17%	116.77%	112.14%	120.85%	129.35%	139.10%	147.54%	158.88%	171.52%
Non-marketable investments	6.91%	6.51%	7.05%	6.33%	5.81%	5.42%	5.10%	4.86%	4.67%
Prepaid revenue share, expenses	4.24%	2.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Deferred income taxes	0.33%	0.42%	0.61%	0.52%	0.45%	0.40%	0.35%	0.32%	0.29%
Property & equipment, net	38.69%	37.92%	38.23%	37.45%	36.76%	36.88%	37.08%	36.07%	35.37%
Intangible assets, net	5.13%	3.66%	2.43%	1.54%	0.94%	0.54%	0.23%	0.10%	0.00%
Goodwill	21.16%	18.24%	15.11%	13.16%	11.71%	10.58%	9.67%	8.93%	8.32%
Other non-current assets	0.00%	0.00%	2.41%	2.10%	1.87%	1.69%	1.54%	1.42%	1.33%
Total assets	196.64%	185.55%	177.98%	181.94%	186.89%	194.61%	201.52%	210.58%	221.49%
Liabilities and Stockholder's Equity									
Current Liabilities:									
Accounts payable	2.58%	2.26%	2.83%	2.57%	2.57%	2.57%	2.57%	2.57%	2.46%
Short-term debt	4.30%	0.00%	0.00%	0.00%	0.00%	0.00%	0.58%	0.00%	0.00%
Accrued compensation & benefit	4.72%	4.40%	4.13%	3.63%	3.37%	3.17%	3.33%	3.09%	3.89%
Accrued expenses & other curren	6.36%	6.81%	9.18%	9.19%	7.94%	7.92%	7.98%	8.47%	8.68%
Accrued revenue share	3.11%	3.26%	3.59%	3.31%	2.90%	2.49%	2.25%	2.04%	1.77%
Securities lending payable	3.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Deferred revenue	1.05%	1.22%	1.29%	1.17%	1.17%	1.17%	1.17%	1.17%	1.10%
Income taxes payable, net	0.40%	0.61%	0.79%	0.44%	0.42%	0.38%	0.36%	0.33%	0.29%
Total current liabilities	25.75%	18.56%	21.81%	20.31%	18.37%	17.71%	18.23%	17.68%	18.20%
Long-term debt	2.66%	4.36%	3.58%	3.25%	3.01%	2.83%	2.69%	2.59%	2.51%
Deferred revenue, non-current	0.20%	0.22%	0.31%	0.22%	0.18%	0.12%	0.09%	0.07%	0.07%
Income taxes payable, net, non-current	4.88%	5.18%	11.56%	13.20%	13.37%	13.39%	10.47%	10.05%	9.89%
Deferred income taxes	0.25%	0.25%	0.39%	0.27%	0.25%	0.23%	0.21%	0.21%	0.18%
Other long-term liabilities	2.43%	2.95%	2.76%	2.48%	2.28%	2.12%	2.00%	1.91%	1.84%
Total liabilities	36.18%	31.53%	40.41%	39.73%	37.45%	36.40%	33.70%	32.50%	32.68%
Stockholder's Equity									
Class A & class B common stock &	43.98%	40.22%	36.31%	34.46%	33.42%	32.93%	32.80%	33.01%	33.51%
Accumulated other comprehensi	-2.50%	-2.66%	-0.89%	-0.78%	-0.69%	-0.63%	-0.57%	-0.53%	-0.49%
Retained earnings	118.98%	116.46%	102.16%	108.53%	116.71%	125.90%	135.59%	145.59%	155.78%
Total stockholders' equity	160.46%	154.02%	137.57%	142.22%	149.44%	158.20%	167.82%	178.08%	188.81%
Total Liabilities and Stockholders' Equity	196.64%	185.55%	177.98%	181.94%	186.89%	194.61%	201.52%	210.58%	221.49%

Alphabet Inc.
Value Driver Estimation

Fiscal Years Ending Dec. 31	2015	2016	2017	2018E	2019E	2020E	2021E	2022E	2023E
NOPLAT									
EBITA									
Revenue	74989.00	90272.00	110855.00	127287.79	143062.80	158294.09	173196.19	187586.07	201401.33
Cost of Revenue	23101.00	35138.00	38668.00	45823.60	51502.61	56985.87	62350.63	67530.99	72504.48
Research and Development	12282.00	13948.00	16625.00	19093.17	21459.42	23744.11	25979.43	28137.91	30210.20
Sales and Marketing Expense	9047.00	10485.00	12893.00	15159.98	17038.78	18852.83	20627.67	22341.50	23986.90
General and Administrative Expenses	6136.00	6985.00	6872.00	7902.80	9088.22	10451.45	12019.17	13822.05	15895.35
Interest on PV of Operating Leases	207.02	30.12	156.70	1133.00	1073.00	975.00	831.00	0.00	0.00
EBITA	24215.98	23685.88	35640.30	38175.24	42900.77	47284.83	51388.30	55753.63	58804.40
Adjusted Taxes									
Provision for Income Tax	3303.00	4672.00	14531.00	7533.39	8576.91	9507.34	10359.07	11090.73	11717.60
Tax on Interest Income	-349.65	-427.00	-459.20	-1026.86	-1312.67	-1600.07	-1928.73	-2259.02	-2662.67
Interest Tax Shield	-36.40	-43.40	-38.15	40.44	42.87	45.44	48.16	51.05	54.12
Amortization	-931.00	-877.00	-812.00	812.00	812.00	812.00	812.00	812.00	812.00
European Commission Fine	0.00	0.00	957.60	0.00	0.00	0.00	0.00	0.00	0.00
Less Adjusted Taxes	2916.95	4201.60	14991.25	7358.97	8119.10	8764.71	9290.50	9694.76	9921.05
Change in Deferred Taxes									
End DTL - End DTA	-62.00	-157.00	-250.00	-323.22	-294.24	-268.21	-250.93	-209.74	-219.48
Beg. DTL - Beg. DTA	649.00	189.00	226.00	-244.00	-211.79	-175.22	-230.89	-217.04	-190.85
Plus Change in Deferred Taxes	-711.00	-346.00	-476.00	-79.22	-82.46	-92.99	-20.05	7.30	-28.63
NOPLAT	21273.03	19458.28	20623.05	30737.05	34699.21	38427.12	42077.75	46066.17	48854.72
Invested Capital									
Net Operating Working Capital:									
Normal Cash (5% of sales)	3749.45	4513.60	5542.75	6364.39	7153.14	7914.70	8659.81	9379.30	10070.07
Accounts Receivable	11556.00	14137.00	18336.00	19712.93	22248.73	24608.25	26993.22	29284.67	31435.95
Inventory	-	268.00	749.00	623.71	701.01	775.64	848.66	919.17	986.87
Income taxes receivable, net	1903.00	95.00	369.00	191.30	205.85	213.92	233.08	232.91	234.35
Prepaid Expenses	3139.00	4575.00	2983.00	3069.51	3158.52	3250.12	3344.37	3441.36	3541.16
Operating Current Assets	20347.45	23588.60	27979.75	29961.84	33467.24	36762.63	40079.15	43257.41	46268.40
Accounts Payable	1931.00	2041.00	3137.00	3271.30	3676.71	4068.16	4451.14	4820.96	4944.86
Accrued Expenses	4768.00	6144.00	10177.00	11703.26	11360.28	12541.74	13822.05	15895.35	17484.89
Accrued compensation	3539.00	3976.00	4581.00	4617.61	4816.76	5016.70	5769.20	5805.26	7837.10
Accrued revenue share	2329.00	2942.00	3975.00	4216.12	4155.68	3943.27	3890.26	3830.04	3574.08
Deferred Revenue	788.00	1099.00	1432.00	1489.27	1673.83	1852.04	2026.40	2194.76	2220.44
Income Taxes Payable	302.00	554.00	881.00	559.73	600.38	608.47	621.54	609.99	585.88
Non Interest Bearing Current Liabilities	13657.00	16756.00	24183.00	25857.27	26283.64	28030.38	30580.59	33156.36	36647.25
Total Net Operating Working Capital	6690.45	6832.60	3796.75	4104.56	7183.60	8732.25	9498.55	10101.06	9621.15
Other LT Operating Assets:									
Net PPE	29016.00	34234.00	42383.00	47663.35	52597.04	58383.47	64220.80	67663.82	71230.89
Prepaid Revenue	3181.00	1819.00	-	0.00	0.00	0.00	0.00	0.00	0.00
Intangible assets, net	3847.00	3307.00	2692.00	1964.00	1349.00	856.00	397.00	185.00	0.00
PV of Operating Leases	6254.47	909.98	4734.11	5047.55	5570.03	6182.81	6800.98	7165.60	7543.35
Total Other LT Operating Assets	42298.47	40269.98	49809.11	54674.90	59516.06	65422.28	71418.79	75014.42	78774.24
Other LT Operating Liabilities:									
Deferred revenue, non-current	151.00	202.00	340.00	279.68	251.08	185.20	162.11	131.69	133.23
Income taxes payable, net, non-current	3663.00	4677.00	12812.00	16799.46	19126.51	21201.38	18128.37	18854.24	19919.92
Other long-term liabilities	1822.00	2665.00	3059.00	3157.19	3258.54	3363.14	3471.10	3582.52	3697.52
Total Other LT Operating Liabilities	5636.00	7544.00	16211.00	20236.34	22636.13	24749.72	21761.57	22568.44	23750.67
Invested Capital	43352.92	39558.58	37394.86	38543.13	44063.54	49404.81	59155.77	62547.03	64644.73
Economic Profit									
NOPLAT	21273.03	19458.28	20623.05	30737.05	34699.21	38427.12	42077.75	46066.17	48854.72
Less: Change in IC	9926.89	-3794.34	-2163.72	1148.27	5520.41	5341.28	9750.96	3391.26	2097.70
FCF	11346.14	23252.62	22786.78	29588.78	29178.80	33085.85	32326.80	42674.91	46757.02
NOPLAT	21273.03	19458.28	20623.05	30737.05	34699.21	38427.12	42077.75	46066.17	48854.72
Beginning IC	33426.03	43352.92	39558.58	37394.86	38543.13	44063.54	49404.81	59155.77	62547.03
ROIC	63.64%	44.88%	52.13%	82.20%	90.03%	87.21%	85.17%	77.87%	78.11%
IC	43352.92	39558.58	37394.86	38543.13	44063.54	49404.81	59155.77	62547.03	64644.73
ROIC-WACC	52.91%	34.15%	41.40%	71.47%	79.30%	76.48%	74.44%	67.14%	67.38%
EP	22938.94	13510.61	15482.57	27545.20	34941.05	37784.03	44035.17	41995.74	43556.83

Alphabet Inc.*Weighted Average Cost of Capital (WACC) Estimation*

Cost of Capital	
Risk Free rate	3.19%
Equity Risk Premium	5.30%
Beta	1.44
Cost of Equity	10.82%

Pre Tax Cost of Debt	3.31%
Marginal Tax Rate	21.00%
After Tax Cost of Debt	2.61%

Weight of Capital	
Total Shares outstanding	694.78
Share Price	\$1,066.15
Value of Equity	740,742.90

Long Term Debt	3,969.00
PV of Operating Leases	4,734.11
Value of Debt	8,703.11

Total Value of Capital 749,446.01

Weight of Equity 98.84%
Weight of Debt 1.16%

Weighted Cost of Equity 10.70%
Weighted Cost of Debt 0.03%

Weighted Average Cost of Capi 10.73%

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

Key Inputs:

CV Growth	4.50%
CV ROIC	78.11%
WACC	10.73%
Cost of Equity	10.82%

<i>Fiscal Years Ending Dec. 31</i>	2018E	2019E	2020E	2021E	2022E	2023E
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DCF Model

NOPLAT	30,737.05	34,699.21	38,427.12	42,077.75	46,066.17	48,854.72
Less CapEX	1,148.27	5,520.41	5,341.28	9,750.96	3,391.26	2,097.70
FCF	29,588.78	29,178.80	33,085.85	32,326.80	42,674.91	46,757.02
Continuing Value						908,802.24
Discount Factor	1.11	1.23	1.36	1.51	1.67	1.67
Present Value of FCF	26,699.38	23,758.31	24,308.84	21,431.81	25,529.52	543,675.13
Total PV						

665,402.99**Plus Value of Non Operating Assets**

Excess Cash	11086
Non-Marketable Securities	7813
Marketable Securities	91156
Value of Non-Operating Assets	110055

Less: Value of Non-Operating Liabilities

Long Term Debt	3969
PV of Operating Leases	4734
Value of Non Operating Liabilities	8703

Value of Equity 766,754.38

Shares Outstanding 695

Intrinsic Value \$ 1,103.59

Partial Year Adjustment

1205.30**EP Model**

	2018E	2019E	2020E	2021E	2022	2023
Economic Profit	27545.20	34941.05	37784.03	44035.17	41995.74	43556.83
Continuing Value						823466.55
Discount Factor	1.11	1.23	1.36	1.51	1.67	1.67
PV	24,855.35	28,450.11	27,760.69	29,194.14	25,123.22	492625

Total PV 628,008.06**Beginning IC 37,394.86**

Value of Operating Assets 665,402.92

Plus Value of Non Operating Assets

Excess Cash	\$ 11,085.50
Non-Marketable Investments	7,813.00
Marketable Securities	91,156.00
Value of Non-Operating Assets	\$ 110,054.50

Value of Non-Operating Liabilities

Long-Term Debt	3,969.00
PV Operating Leases	4,734.11
Value of Non-Operating Liabilities	8,703.11

Value of Equity \$ 766,754.31

Shares outstanding 694.78

Intrinsic Value 1103.59

Partial Year Adjustment Value 1205.30

Alphabet Inc.*Dividend Discount Model (DDM) or Fundamental P/E Valuation Model*

<i>Fiscal Years Ending</i>	2018E	2019E	2020E	2021E	2022E	2023E
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EPS	\$ 40.30	\$ 45.35	\$ 50.03	\$ 54.51	\$ 58.37	\$ 61.66
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Key Assumptions

CV growth	4.50%
CV ROE	11.59%
Cost of Equity	10.82%

Future Cash Flows

P/E Multiple (CV Year)					\$ 26.60	
EPS (CV Year)					\$ 61.66	
Future Stock Price					\$1,640.40	
Dividends Per Share	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Future Cash Flows	\$0.00	\$0.00	\$0.00	\$0.00	\$1,640.40	

Discounted Cash Flows					1087.544075	
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Intrinsic Value	\$ 1,087.54
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Parital Year Adjustment	\$ 1,187.78
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Alphabet Inc.*Relative Valuation Models*

Ticker	Company	Price	EPS		P/E 18	P/E 19	Est. 5yr		
			2018E	2019E			EPS gr.	PEG 18	PEG 19
AAPL	Apple	\$216.30	\$11.77	\$13.53	18.38	15.99	9.67	1.90	1.65
MSFT	Microsoft	\$106.96	\$3.31	\$4.36	32.31	24.53	12.32	2.62	1.99
FB	Facebook	\$145.37	\$7.06	\$7.99	20.59	18.19	22.91	0.90	0.79
			Average		23.76	19.57	Average	1.81	1.48

GOOG	Alphabet Inc.	\$1,066.15	\$40.30	\$45.35	26.5	23.5	24.6	1.1	1.0
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Implied Relative Value:

P/E (EPS18)	\$	957.66
P/E (EPS19)	\$	887.50
PEG (EPS18)	\$	1,791.99
PEG (EPS19)	\$	1,650.52

