Krause Fund Research
Fall 2020

Communications

Alphabet Inc. (NASDAQ: GOOGL)

Recommendation: HOLD **November 17, 2020**

Current Price:	**$1,774**
Target Price:	**$1,875 - $1,975**
DCF / EP Target Price:	**$1,932**
Relative P/E:	**$1,948**

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Company Overview

Alphabet Inc. provides online advertising around the world through performance and brand advertising. The firm operates through Google and Other Bets segments. Google offers products such as Ads, Search, Google Cloud, Maps, Hardware, and YouTube. The Other Bets segment operates businesses like Waymo, Verily, Calico, and Nest. The company was founded in 1998 by Larry Page and Sergey Brin and is currently headquartered in Mountain View, CA.

Stock Performance Highlights

52 week High	$1,816.89
52 week Low	$1,008.87
Beta (5yr Weekly)	0.96
Average Volume (3 months)	1.86 M

Share Highlights

Market Capitalization	$1.202 T
Shares Outstanding	688.34 M
EPS (FY19)	$49.16
P/E Ratio (TTM)	34.28
Dividend Yield	0%

Company Performance Highlights

ROA	13.5%
ROE	18.1%
Sales	$161.9 b

Financial Ratios

Current Ratio	3.4
Debt to Equity	7.9%

Source: FactSet

Alphabet Continues to Grow

Investment Thesis

- Alphabet continues to be one of the best growth stories of the last 20 years. Their acquisitions and new product lines will drive their growth over the next decade.

- Google.com absolutely dominates the world of internet search. More money is flooding to digital advertising as they offer a better ROI for advertisers and Google's network is larger than almost any in the world.

- We see YouTube as a key growth driver over the next few years. With the advent of 5G and adoption of video advertising, YouTube is positioned to grow upwards of 25% each year through 2024 and maintain doubt digit growth thereafter.

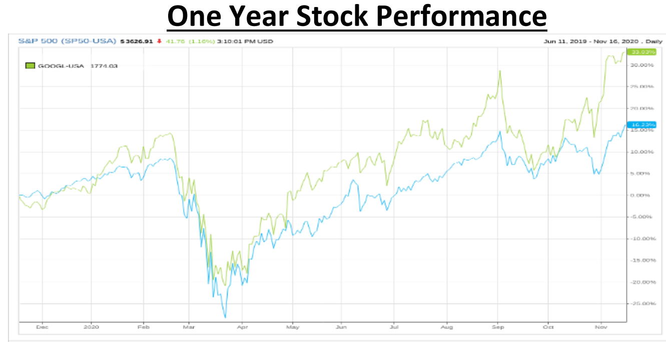
- The adjustments required by businesses in the age of COVID-19 have accelerated adoption of Cloud services. With Google's brand awareness and massive infrastructure, they should capitalize on this secular trend over the next decade.

Risks to Thesis

- Regulatory threats loom large across the digital ad industry but particularly for Alphabet because of their dominance on desktop and mobile devices.

- Increased competition from other mega cap technology companies could eat at their market share and profitability.

One Year Stock Performance



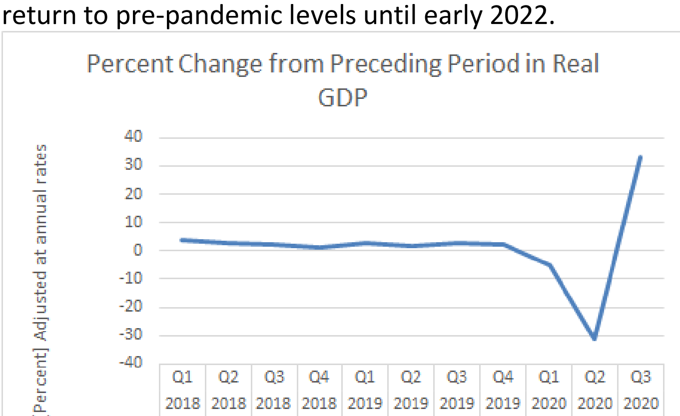
Source: FactSet

Macroeconomic Outlook

U.S. Real Gross Domestic Product (GDP)

Real GDP represents the market value of goods and services produced within a given year on an inflation adjusted basis. Therefore, steady gains in real GDP are a positive indicator of the overall strength of the economy and suggests increased consumer spending and personal consumption expenditures (PCE). This correlation is since the advertising industry contributed $3.4 trillion to the U.S. GDP (2014), around 19% of the country's economic output[1]. As real GDP declined in the first and second quarters of 2020 due to the COVID-19 shutdowns, third quarter real GDP increased by 33.1% from the preceding quarter. The rebound in the latest quarter is attributable to second quarter's decrease of 31.4% being the largest quarterly contraction of real GDP in 75 years.

The increase in third quarter real GDP reflects the continued attempts to reopen businesses that have been restricted due to the coronavirus pandemic. Alphabet has benefitted from stay-at-home orders; however, an extended shutdown will greatly hurt consumer spending on home entertainment. We anticipate uncertainty of coronavirus related news to continue to elongate the recovery of GDP. As cases have seen a resurgence in the recent weeks and restrictions have been reinstated, a slow recovery is imminent. We forecast that GDP will not return to pre-pandemic levels until early 2022.



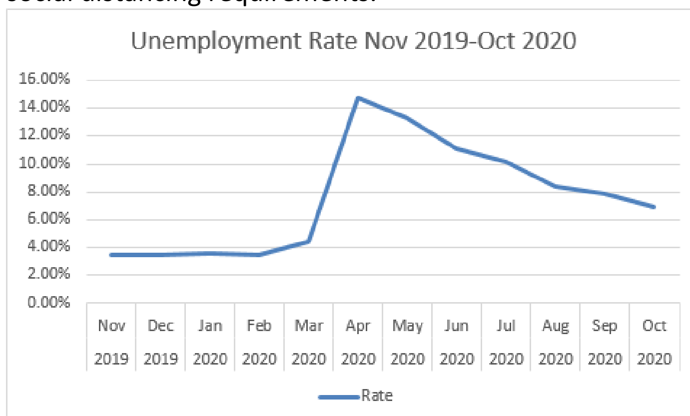
	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020
% Change	3.8	2.7	2.1	1.3	2.9	1.5	2.6	2.4	-5	-31.4	33.1

Source: Bureau of Economic Analysis

Current Employment Statistics

Unemployment rates are still heightened above usual levels as a direct result of the COVID-19 pandemic. The most recent unemployment statistics released by the Bureau of Labor Statistics for October indicated that nonfarm payroll employment rose by 638,000. The unemployment rate in October fell to 6.9%[2] but is still nearly double what the unemployment rate had been pre-pandemic. Due to the way unemployment is calculated, many employees that are still employed but working reduced hours are not factored into this calculation regardless of their underutilization. As a result of the pandemic, businesses nationwide have reduced their hours of operation affecting many employees. Due to this we believe the true unemployment rate to 7.3%, 0.4% points above the Bureau of Labor Statistics most recently reported figure.

The unemployment rate has continued to steadily decline from April's all-time record unemployment rate of 14.7% as millions of Americans were laid off as businesses were forced to close. However, with recent news regarding positive test results of a COVID-19 vaccine, we expect this rate to decline slightly into the end of the year and drop to roughly 5.5% in 1H 2021 as an effective vaccine becomes widely available for distribution and jobs in the hardest hit industries such as hospitality are able loosen social distancing requirements.

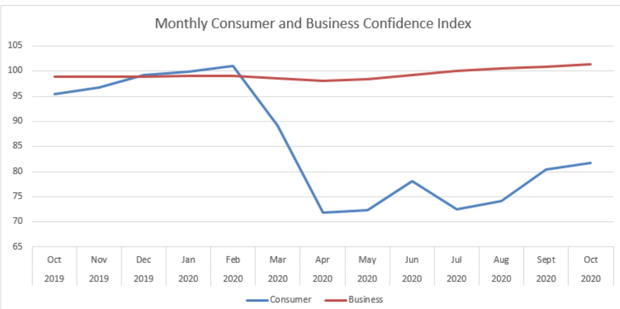


Source: Bureau of Labor Statistics

Consumer & Business Confidence Index

The Consumer Confidence Index is the leading indicator in predicting consumer consumption and gives detail on how consumers view the overall economy and their individual financial situations. Additionally, the Business Confidence Index is a helpful indicator confidence regarding future business performance by monitoring output growth and anticipating the turning points of economic activity. Historically, it is shown that during economic downturns, the level of advertising spending decreases alongside declining economic activity.[3] The University of Michigan puts out a monthly report detailing the index reading and is one of the leading economic indicators in predicting the performance of the American economy as it accounts for roughly 68% of GDP. The most recent report in October gave us a reading of 81.8, a 14.3% YoY decline from 95.5 and much lower than the pre-pandemic reading of 101 in February of this year.

These results indicate that consumers are less likely to consume as much as they had prior to this pandemic and feel more sensitive in their financial situation. However, due to the release of positive vaccine results, we believe that this does not accurately the true confidence of consumers in the economy. As positive vaccine results indicate a return to normalcy in the near term, we believe many consumers negatively affected financially by the COVID-19 pandemic will look more favorably upon the economy in the near term and their financial situations going forward. As a result of this, we estimate that the true Consumer Confidence Index to be 89 and expecting to return to pre-COVID levels during 2022. We also estimate the same time of return for the Business Confidence Index, with a return to true value of 100.



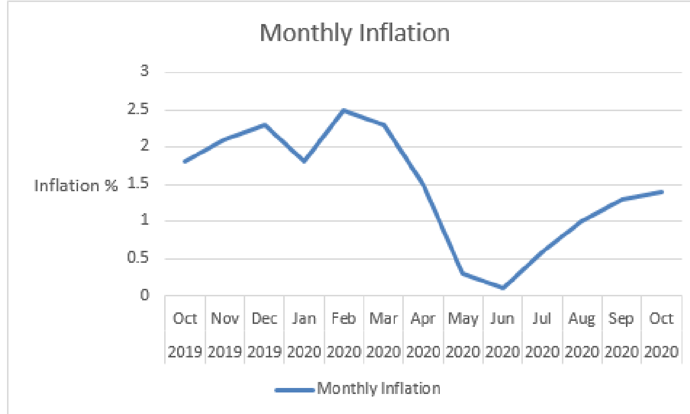
Source: Organization for Economic Cooperation and Development

Inflation

The Consumer Price Index is a measure of the average change over time that consumers pay for a basket of market goods and services and is the most widely used index to measure price inflation. As a result of the COVID-19 pandemic, trillions of dollars have been pushed into the system to help support capital markets and to help consumers support themselves as many find themselves still unemployed. An influx of cash like this has never been seen before, not even during the financial crisis of 2008.

This influx in cash has caused the price of common goods across the board to raise YoY by 1.4%. Without factoring energy costs into the CPI, which has seen cost decreases as global consumption of oil has decreased, consumer goods such as food has seen YoY price increases of 3.9%. Certain food items such as meat and poultry have seen larger price increases of roughly 6.3%, used car prices have risen 10.3%, and the cost to eat out has roughly increased 3.8%.

Due to the deflationary effects that energy costs have on the overall CPI, we believe the true CPI has been much higher than reported throughout the pandemic. Disregarding the deflationary effects that oil prices have had on the overall CPI basket of consumer goods, we believe the true CPI to be closer to 3.1%. Higher inflation rates harm consumers as their purchasing power is negatively affected as consumer goods prices rise.



Source: Bureau of Labor Statistics

Industry Analysis

Industry Overview

Alphabet falls under the Interactive Media & Services industry within the Communications sector of the S&P 500. To gather more relevant comparisons, we will consider them as members of the

Digital Advertising Industry. Digital advertising uses the web to share marketing materials with consumers. Search advertisements, promoted social media content, margin advertising banners, and sponsored content promoted before a viral video are used to reach the public.[4]

Industry Trends

The US and global advertising markets are shifting away from TV and Print media to more digital platforms. Mass marketing has taken a hit as digital ad curators have offered firms a better ROI with the advent of data collection and targeted advertising. More time is being spent in front of computers and smart phone screens than ever before. We believe that Alphabet will be able to capitalize on this trend. Four of the top five most popular smartphone apps are owned by Alphabet.[5] As our dependence on Smartphones escalates, they are well-positioned for location-based advertising.

The secular trends away from traditional media are only going to be accelerated by the rollout and adoption of 5G. CFRA reports that US Internet ad revenues are expected to grow in the high teens through 2024, contingent on 5G. This new wireless revolution will give broader and faster internet access to consumers of all ages. It is not only to the public's advantage, however. Technology platforms will benefit from faster data exchanges and increase their ad targeting capabilities

Video advertising is expected to be a top gainer with the 5G advent. Current connections give marketers the ability to share data rich ads. But 5G will be 100x faster than today's technology.[6] With faster streaming and more impactful ads, we think that video content will grow much faster than search in the coming years. This positions Alphabet's Youtube squarely in the middle two massive consumer trends.

Regulation

One of the biggest challenges facing not only Alphabet, but the whole tech industry, are the government regulations. The two biggest issues that are presented to Google are anti-trust and data privacy, which stems from its dominance in Google Search. Search processes around 90% of all online searches in the US. [7]

There is an ongoing anti-trust case being built against Google. The main case revolves around the idea that the company utilizes its search engine to maintain a dominant position over its peers by giving them less exposure to users.

Last year, the EU fined Google €50 million for the violation of privacy laws. This was part of the new General Data Protection Regulation that was imposed in May 2018. The main argument against Google was that the company did not get proper consent from its users to use their data for personalized advertising.

Currently, there is high uncertainty regarding how the biggest tech companies will be regulated. If governments decide to further regulate this industry, it is almost certain the Alphabet will be targeted. The most common approach in doing so is to break up Alphabet, forcing it to sell one of its divisions.

Recently, the US Department of Justice announced (October 20th) that it was filing a suit against Google for illegal practices in the search market. There has been talk that US prosecutors may force Google to sell its Chrome browser. If this is the case, it would be a huge hit towards Google. Google Chrome as a browser has the largest market share in the U.S. and is a strong force in tunneling revenue for Google.

Historically, this has almost happened in the past. In a lawsuit that began in 1998, the Department of Justice accused Microsoft of engaging in the same behavior (illegal anti-competitive behaviors). It was ruled that they were guilty and ordered to be broken up into two separate entities. However, Microsoft won its appeal and the idea was later abandoned. If the same situation were to happen to Google, it would be uncertain if the same outcome would occur.

Another factor that could affect the company's outlook are the Net Neutrality regulations, which will be contingent on the upcoming election results. Net Neutrality will determine if internet service companies must charge their services equally. Depending on the outcome of these regulations, Alphabets earnings will increase as they would be allowed to charge prices on their products and services.

Competition of Big Tech

In order to understand Alphabet's position, it helps to know how the largest US firms all operate and how tech has come to dominate. Alphabet is clearly the king of search advertising and has a growing video ad segment through YouTube. They have also been investing heavily in Google Cloud and seen substantial growth over the last few years.

Facebook dominates the world of social media advertising through facebook.com, Instagram, and Whatsapp. With nearly 2.5 billion monthly active users worldwide[8], they are connecting the globe and offering a cost-effective way for small businesses to engage in targeted advertising.

Amazon is the world's largest internet retailer. They also operate Amazon Web Services, a cloud-based service for business and data optimization. Their share of the digital ad market has increased recently through sponsored products on their retail site. Ad revenue recently topped $10 billion, up drastically from just a few years ago.[9]

We view Microsoft as another competitor because of their exposure to digital advertising and success with their cloud segment, Azure. They offer advertising through Linkedin and Bing. This is a small revenue segment for MSFT but Bing does represent competition in search for those who are partial to Microsoft systems. Azure on the other hand is a dominant player in the cloud computing industry. If Alphabet wants to become a big player, they will have to eat into Microsoft's market share.

Twitter is the last formidable player we foresee in the digital ad space. They have done better at monetizing their platform in recent years. However, TWTR have not achieve consistently high growth rates like other firms in the industry. With a smaller network of 350 million monthly active users, they have a high hill to climb to achieve the same scale as other sites.

Overall, we believe that Alphabet ranks among the top firms in terms of their ability to adapt and invest in a fast-changing landscape. Their liquidity and low debt level allow them to invest quicker into new projects than other firms in the space. Facebook closely rivals the strength of GOOGL's balance sheet and profitability, but they are tied much more to ad revenue as that is 99% of their total sales in FY19. Alphabet already has some infrastructure in place to pursue other ventures and is seeing profound growth.

Most Recent FYE Data	Current Ratio	Total D/E
GOOGL	3.4 x	7.9 %
FB	4.4 x	11.0 %
AMZN	1.1 x	124.9 %
MSFT	2.5 x	69.4 %
TWTR	9.2 x	37.8 %

Source: FactSet

FYE 2019 Data	Gross Margins (%)	EBIT Margins (%)	EBIT Growth (% YoY)
GOOGL	55.5	22.0	16.5
FB	81.9	41.0	16.3
AMZN	41.0	5.3	15.9
BIDU	41.5	5.9	(61.1)
MSFT	67.8	37.0	24.3
TWTR	67.1	10.6	(18.4)

Source: FactSet

Porter's Five Forces

Existing Competition: High and increasing – The largest US tech companies that dominate the S&P 500 are all competing for the ad dollars of businesses big and small. Alphabet, Facebook, Amazon, Microsoft, and Twitter have enough capital to drive their growth initiatives into the coming years. All the firms in this industry are investing heavily in infrastructure and technology that allow them to provide the best ROI to virtual advertisers. Each company mentioned above has their own core competency but must fend of the others from encroaching on their niche slice of the internet. For example, Amazon and Facebook are beginning to cross paths more as Amazon extends banner advertising opportunities on their home site. Facebook has begun to rollout Facebook Shops for small businesses to begin selling direct to consumer.

Threat of Entry: Low – The initial cost of creating a website is very cheap and we do not see that changing in the future. However, that is not the most important factor when considering new threats. It is all about eyeballs. The network effects of Big Tech are what make them so incredibly hard to take on. There will certainly be competition that arises over the next decade, but without any significant anti-trust legislation, they are not likely to steal a large share of industry revenue.

Threat of Substitutes: Moderate and decreasing – With end users, substitutions are made many times a day[10]. More and more time is being spent in front of computers and smartphones, meaning that they engage with many platforms with sponsored content. Advertisers know the statistics about active users, shoppers, and search queries. Big Tech has dominated each quarter of each year over the last half decade. Going forward, we believe that the biggest substitutes for targeted advertising are already present in the digital ad market.

Power of Suppliers: Low and decreasing – Competitors in this industry have a lot of influence over their suppliers. This is a unique industry in that they have two types of suppliers. First, they have the manufacturers of servers, storage systems, and network equipment. These businesses are subject to the demand of Big Tech. Companies like Google, Facebook, and Amazon can buy the components they need then build much of the hardware themselves to best suit their needs.

The other group of suppliers for this industry is us, the consumer. We are what make their platforms so valuable. More advertising recipients on their sites make the advertising companies more willing to pay for impressions. With their vast swaths of data and complex algorithms, they have consumers engaging on their sites more and more each day. It is hard to escape the online networks that Google, Microsoft, Facebook, and Twitter have developed.

Power of Buyers: Moderate and decreasing – The same algorithms that keep us using their sites help to increase the ROI on ad dollars spent, so they are viewed as better than traditional media. However, ad buyers have enough options across big tech platforms to make companies compete on pricing. Thankfully, the entire internet is not a monopoly. But it is quickly becoming an oligopoly where smaller companies must decide between dominant digital ad platforms to reach the end consumer.

Industry Catalysts for Growth
We believe that the biggest change coming for the industry is the adoption of 5G. It presents opportunities for increased connectivity in an already mobile world. A report from Cisco in 2020 projected 8% CAGR in the number of mobile devices from 2018 to 2023. This would mean that 8.7 billion mobile devices would be connected to high-speed networks.[11] This number paired with blazing wireless speeds across the US present a massive moment for digital platforms. Those that can position themselves at the forefront of this new revolution should see accelerated growth in the coming years. In the same report from Cisco, they anticipated that 79% of mobile data traffic will be for video content. This can come in the form of short videos on social media, podcast streaming, or viral clips on Youtube. Regardless, video advertising will be a key growth driver as 5G becomes more mainstream.

Company Specific Analysis

Alphabet is the parent company of one of the world's biggest tech giants, Google. Starting off as a search engine, Google has now diversified to hundreds of products and services from phones to cloud services in its efforts organize all the world's data and make it accessible for all its users. It is most of the most dominant providers of its services, with 86.9%% of desktop searches being handled by Google.[12]

Alphabet Breakdown
Google's multiple segments include the commonly known internet offerings such as Search, Youtube, Google Network Members' Properties, Google Cloud, Google Other, and Other Bets. Alphabet's other offerings are known as the Other Bets. These include a wide range of products from Nest (connected home) to Calico (Biotech) The Other Bets pursue initiatives with similar goals of Google. This is a company that is continually looking to invest towards the future and avoid becoming complacent. Examples could be seen when they acquired YouTube or had launch their own browser (Chrome) to compete with Microsoft Explorer.

Revenue Drivers
With billions of users, the main revenue driver for this company is advertisement revenue, which made up of around 89% of total revenue. Google primarily advertises in two ways:
Performance Advertising – Delivering relevant ads that will result in direct engagement, typically prices are charged only when users engage in their ads. Data is used to custom tailor set populations for ads to be presented to for the most engagement. They have experienced a strong growth in total paid clicks for these ads. At the same time, the cost per click has decreased at a lower rate – driving revenue and profitability.
Brand Advertising – Rather than focusing on engagement, brand advertising focuses on creating more awareness of a specific brand via exposure.

Youtube has been a phenomenal growth story since they began reporting their sales separate from Google Search. From 2017 to FYE 2019, its ad revenue has grown at an average annual rate of 36.3%. In the 3Q20 conference call, Alphabet's CFO noted 32% YoY growth in YouTube ads.[13]

Another young segment with promising growth is Google Cloud. They've seen an average annual growth rate of 48.4% since they began reporting in 2017. Management were quick to point out this segment performance as well in the most recent quarter. Ruth Porat noted that they saw 45% YoY growth driven both by increased demand and cost per user.[14]

Catalysts for Growth
Google Search advertising still represents an opportunity for mid-single digit growth going forward. In their Q3 earnings report, Alphabet experienced 6.5% YoY growth in their search segment. Management indicated that the growth was driven by user adoption but stifled in part due to the uncertainty in ad spending due to COVID-19.[15] We expect to see moderately higher growth going forward as the economy recovers.

Youtube advertising is gaining strength due to new ad formatting and delivery, which was met with increased advertising spend. In Q3, they saw over 32% growth. Management highlighted the uptake by advertisers thanks to direct response marketing products, which were improved by the new platform layout. We believe that Youtube is in the early innings of their growth story.

We see this site as a great opportunity to expand Alphabet's reach into social media. Youtube also recently released "Shorts", a feature for the Youtube app available in India only. This new feature will be modeled after TikTok, allowing users to release short 15 second videos with licensed music attached, this comes after India banned TikTok in July. According to NPR, 1/3 of Tik Toks estimated daily users were believed to be from India prior to the ban, representing a market that will likely be receptive of the new product.[16] A successful release in India could lead to the creation of a stand-alone app and widespread release into other markets.

The last key growth driver we see for Google is in the Cloud. COVID-19 has transformed the way that large and small businesses are doing business. Even prior to the pandemic, Alphabet had seen its highest growth rates in the Cloud segment. This business segment averaged 48% annual growth since the end of 2017 and we believe that it will continue at this level as the world relies more on software services. Google cloud has become a larger portion of overall revenue at Alphabet.

In the first three quarters of FY20 Cloud represented 7.4% of total revenue, up from 5.5% in 2019. The initial costs for cloud infrastructure and data centers have driven revenue costs up a bit higher recently. But the exact margins figures have yet to be reported by management. Regardless, we see this as a segment that can stabilize overall gross margins as the digital ad industry matures in the coming years.

SWOT Analysis

Strengths:

Google is synonymous with internet search and has been since the early 2000s. Their reach into nearly every household in the United States makes them a top choice for advertisers in an increasingly digital world. As of July 2020, google accounted for 86.86% of global internet search on desktops.[17] The next closest competitor was Bing, who made up 6.43%. In the United States, Google made up 96% and 92% of mobile and overall search visits, respectively.

Their brand recognition ranks among the top of all tech companies in the US. A survey conducted by Statista in 2018 revealed that 93% of respondents knew about Google, at least by name. That is higher than Cisco, Apple, and Microsoft.[18]

Weaknesses:

Significant dependence on advertising revenue exposes them to risks that more diversified firms in the communications sector may not experience. Over 83% of 2019 revenue was attributable to online ads. The advertising budgets of their customers are susceptible to macroeconomic effects and any significant blow to them, could affect Google as well.

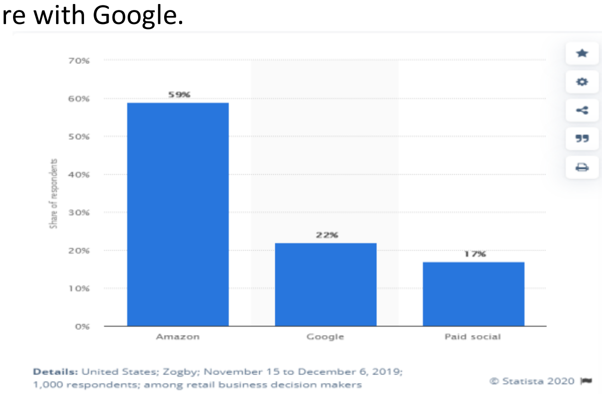
Opportunities:

The world was already running toward cloud networks and storage and the COVID-19 pandemic has caused the entire world to sprint to it. Google cloud presents an even larger opening for them to expand their reach. The cloud business accounted for 5.5% of their revenue in 2019. This is a growing business segment for Alphabet, and they are experiencing accelerated revenue growth over the last two years. We believe that the change in small business and corporate work settings lead to a continuation of this trend going forward.

Google recently pledged to invest $10 billion in India over the next five to seven years. Of the 1.3 billion people, only about half have access to the internet. Google's CEO said that the investment would help gain reach in four areas: they want to provide access in the Indian language, new rollouts targeted at Indians, digital support for businesses, and the promotion of key social issues. Google has been developing hardware and apps that are more conducive to the economic and structural realities in India. Namely, the development of voice software in their phones for people who are not familiar with English or American keyboards[19]. They have also been creating apps that are specifically designed to use less data since the infrastructure in India rarely supports high-speed video streaming.

Threats:

The competitive environment of internet advertising could be quite problematic for Google. The rollout of Facebook Shops and the increasing user base make them a formidable opponent to the king of search. Social media ad spending has more than doubled over the last five years[20] and Facebook is one of the top choices for small businesses who have a hard time competing on Google's platform. The other behemoth that Google must fend off is Amazon. They have the same massive data warehouses about consumers. There's may even be more useful data since many people go to their website with the sole intention of making a purchase or at least checking competitive prices. A recent survey of US retail brands selling on Amazon revealed that 59% saw Amazon ads generating the highest return on ad spending while Google only represented 22% of sellers.[21] This indicates that those who have made the switch to advertising on Amazon are seeing more seeing more success than they were with Google.



Source: Statista

These two giants could eat into Google's market share if they continue to attract eyeballs at the blistering growth rates, we've seen in recent years. They are certainly making a run at the leader in internet search by offering attractive propositions to advertisers looking to sell online.

Last, if Alphabet remains a dominant player in the industry, there will always be regulatory concerns for the company. The company has faced numerous fines in the past for its monopolistic practices and is currently undergoing a lawsuit in which the U.S. government is looking to potentially break up the company. Nevertheless, regulation is a common threat among all tech companies (Microsoft in '98) and will remain that way as the emerging improvements with tech will continually bring unchartered territory that will need to be regulated.

Valuation Analysis

Revenue Decomposition

Google Search Ad revenue is the biggest contributor to the company's revenue and has remained that way considering that the search browser has been the reason why the company has grown to the size it is today. In 2019, advertisements from Google Search & Other generated around 60% of the company's total revenue with about almost $100 billion. This is also not considering the amount of revenue that Alphabet brings in from the advertisements it does with Youtube and Google Network Members (which consists of another ~22%).

As mentioned, YouTube will be a key growth segment for Alphabet as 5G networks develop and consumers adopt it in the coming years. They have achieved excellent growth recently and we project that this will continue as advertisers look to make more meaningful impressions on consumers. With this in mind, we see a 25% to 35% revenue growth over the next four years and continued double digit growth beyond that.

While Alphabet has consistently generated and grown its Google Search ad revenue for the entirety of the company's lifespan, we are projecting that this growth will slowly decrease and make up for less of Google's revenue in the future. The revenue growth of Google Search has been very high the past decade and it will be very hard to sustain these numbers, especially considering the changes in product mix, advertising preferences and the online advertising market.

Another main reason being is that Alphabet is continuously diversifying its revenue streams, in tandem with the rapid growth of technology. One key figure to look at is Google Cloud, in which Alphabet is heavily investing towards as the needs and demands of cloud services is expected to tremendously increase. As of 2019, Google Cloud only made up around 5% of total revenue, but we are expecting this to increase to around 25% by 2029.

Expenses

The biggest expense for Google is Cost of Revenue. A big reason is that Cost of Revenue include traffic-acquisition costs (TAC), which is the cost that Google pays for partners to run its ads and services. As noted above, since advertisements are crucial to Google's income, we have projected this expense to increase as the industry matures.

As with many tech companies, R&D is very important in ensuring that Google can continue to diversify its offerings all the while staying on top of the continually emerging competition. R&D is the second largest expense, and we expect that it will continue to stay this way as Google is constantly expanding via its offerings and Other Bets. We are projecting R&D expense at 16.5% of total sales, which is very similar to the historical average.

Weighted Average Cost of Capital (WACC)

For our valuation, we calculated and used a WACC of 5.83%. We calculated a cost of equity by using a risk-free rate of 0.8% (10-year treasury bond). Our beta value was taken from Bloomberg with a value of 0.96. The equity risk premium was taken from Aswath Damodaran's forward looking projection for November 2020. With these values, we got to a cost of equity of 5.94%.

For our cost of debt, we used the same risk-free rate with an implied default premium of 1.78% (2030 corporate bond rate). We used a pre-tax cost of debt of 2.58% and marginal tax rate of 16% (Bloomberg) to derive our post-tax cost of Debt at 2.16%

Our final calculated WACC value weighed equity tremendously more than debt considering that the company has very low borrowing rates as Alphabet is a highly credit rated company, and considerably high value on equity.

Discounted Cash Flow / Economic Profit (DCF / EP)

Two of the four valuation methods that were used were the DCF and EP model. The DCF model required us to forecast Alphabet's free cash flows to 2029 in the Drivers tab of our model. These values came from the assumptions about revenue and expenses as mentioned above. We then discounted these projected cash flows and a large 2029 continuing value cashflow back to the current date.

The EP model was created similarly, but rather than free cash flow, we projected the beginning invested capital of each fiscal year. Then our growth was forecasted by the multiplying each year's beginning invested capital * (ROIC – WACC). Our continuing value ROIC was 34.3% and the WACC remained 5.83% to calculate discounted CV in 2029. Both models arrived at an intrinsic value of $1,932 We believe that these models indicate the best intrinsic value of Alphabet. They are the most comprehensive assessment of the firm's growth prospects, capital structure, and cost mechanisms.

Dividend Discount Model (DDM)

Another valuation model that was used is the DDM. We believe this method of valuing Alphabet would be less accurate, considering that Alphabet does not currently pay a dividend. This means that the valuation consisted of theoretical dividends that they can afford to pay given our EPS, CV growth, and CV ROE projections. Our DDM value for Alphabet was $1030.91, which is considerably lower than the valuations from the other methods. We do not feel that this accurately reflects the intrinsic value of the firm.

Relative Comparable Companies

The last method that we used to value Alphabet is through looking at numerous ratios of other relative companies. While Alphabet is a unique company, we were able to value them relative to other Big Tech firms with significant exposure to digital advertising and the cloud. We place less emphasis on this valuation because it deals much less with company fundamentals. However, it served as a good check that our DCF and EP models were not outlandish. The implied relative value using a P/E ratio gives us a valuation of $1,948, which is very similar to the valuation we derived from the DCF & EP models.

Sensitivity Analysis

Beta vs Equity risk premium

Neither the beta nor equity risk premium have a drastic impact on our stock price when we adjust them in either direction. There is only a $4 change in our valuation if the forward-looking ERP were to increase by 30 basis points from current levels. If we were to increase Alphabet's beta from 0.96 to 1.16, the implied price only increases $16 or less than 1%.

Equity Risk Premium \ Beta							
1,932.04	0.81	0.86	0.91	0.96	1.01	1.06	1.16
5.10%	1,917.01	1,920.83	1,924.64	1,928.46	1,932.27	1,936.08	1,943.70
5.15%	1,917.61	1,921.47	1,925.32	1,929.17	1,933.02	1,936.87	1,944.56
5.25%	1,918.83	1,922.76	1,926.68	1,930.61	1,934.53	1,938.46	1,946.29
5.35%	1,920.04	1,924.04	1,928.04	1,932.04	1,936.04	1,940.04	1,948.03
5.45%	1,921.25	1,925.33	1,929.41	1,933.48	1,937.55	1,941.62	1,949.76
5.55%	1,922.46	1,926.62	1,930.77	1,934.91	1,939.06	1,943.20	1,951.49
5.65%	1,923.68	1,927.90	1,932.13	1,936.35	1,940.57	1,944.79	1,953.22

CV EPS ROIC vs CV NOPLAT Growth

When comparing the "steady state" ROIC and CV NOPLAT growth, we see that the continuing growth is far more impactful on the implied stock price. An increase from 3.0% to 3.3% in perpetuity increases our valuation from $1,932 up to $2,089. The CV ROIC is less impactful as the horizontal yellow strip indicates. The impact of growth cannot be understated for Alphabet and it is why so many investors were excited to hear about Youtube and Cloud success in the most recent quarter.

CV NOPLAT Growth \ CV EPS ROIC							
1932.04	31.3%	32.3%	33.3%	34.3%	35.3%	36.3%	37.3%
2.7%	1,793.92	1,797.78	1,801.41	1,804.82	1,808.05	1,811.10	1,813.98
2.8%	1,832.75	1,836.88	1,840.77	1,844.43	1,847.89	1,851.15	1,854.24
2.9%	1,874.23	1,878.66	1,882.82	1,886.74	1,890.44	1,893.94	1,897.25
3.0%	1,918.64	1,923.38	1,927.84	1,932.04	1,936.01	1,939.75	1,943.29
3.1%	1,966.30	1,971.39	1,976.17	1,980.66	1,984.91	1,988.92	1,992.71
3.2%	2,017.59	2,023.04	2,028.16	2,032.98	2,037.53	2,041.83	2,045.89
3.3%	2,072.94	2,078.78	2,084.27	2,089.43	2,094.31	2,098.92	2,103.28

WACC vs CV ROIC

As mentioned above, a 1 percentage point change in ROIC has less impact on the implied value than other variables. We do not anticipate a CV ROIC outside the data table we've created. Meaning, the WACC is far more important to GOOGL's valuation. The value is very sensitive to the rate at which we discount their cash flows. If Alphabet's WACC were to drop only 30 basis points, it would imply an increase of more than $200 per share.

CV ROIC \ WACC							
1,932.04	5.53%	5.63%	5.73%	5.83%	5.93%	6.03%	6.13%
31.30%	2,136.58	2,058.39	1,985.94	1,918.64	1,855.95	1,797.41	1,742.63
32.30%	2,142.02	2,063.58	1,990.90	1,923.38	1,860.49	1,801.77	1,746.81
33.30%	2,147.14	2,068.46	1,995.57	1,927.84	1,864.76	1,805.86	1,750.75
34.30%	2,151.96	2,073.06	1,999.96	1,932.04	1,868.79	1,809.72	1,754.45
35.30%	2,156.51	2,077.40	2,004.10	1,936.01	1,872.58	1,813.36	1,757.94
36.30%	2,160.80	2,081.49	2,008.02	1,939.75	1,876.17	1,816.80	1,761.24
37.30%	2,164.87	2,085.37	2,011.72	1,943.29	1,879.56	1,820.05	1,764.36

Risk Free Rate vs WACC

We know that the WACC of any firm is vitally important to its overall valuation. Alphabet is no different, but where they do differ is in their capital structure. Alphabet carries very little debt and so interest rate risk is of little concern for their valuation. Changes in US treasuries are not likely to impact our valuation nearly at all. As you can see, a 30-basis point swing in the risk free rate only changes our valuation by $5. Firms with higher leverage would be far more susceptible to changes in the bond market.

WACC \ Risk Free Rate							
1932.04	0.65%	0.70%	0.75%	0.80%	0.85%	0.90%	0.95%
5.53%	2,149.46	2,150.30	2,151.13	2,151.96	2,152.79	2,153.63	2,154.46
5.63%	2,070.65	2,071.46	2,072.26	2,073.06	2,073.86	2,074.66	2,075.47
5.73%	1,997.64	1,998.41	1,999.18	1,999.96	2,000.73	2,001.51	2,002.28
5.83%	1,929.80	1,930.55	1,931.30	1,932.04	1,932.79	1,933.54	1,934.29
5.93%	1,866.62	1,867.34	1,868.06	1,868.79	1,869.51	1,870.23	1,870.95
6.03%	1,807.62	1,808.32	1,809.02	1,809.72	1,810.42	1,811.12	1,811.82
6.13%	1,752.41	1,753.09	1,753.77	1,754.45	1,755.13	1,755.80	1,756.48

Marginal Tax Rate vs CV COGS (as % of sales)

Alphabet has benefitted from the corporate tax cuts that have been in place since FY18. Their marginal tax rate is now just above 16% and should remain stable going forward. If things were to change and they experience unfavorable changes upwards of 18%, our valuation remains mostly the same. However, the cost of sales for Alphabet is very susceptible to change between now and FY29. An increase in assumed costs can drastically cut the firms value. The same is true with lower costs, the firm could achieve much higher valuation levels if they manage to keep their COGS low into perpetuity.

Marginal Tax Rate \ CV COGS (%sales)							
1,932.04	44.00%	45.00%	46.00%	47.00%	48.00%	49.00%	50.00%
13.10%	2,355.51	2,212.99	2,070.48	1,927.96	1,785.44	1,642.93	1,500.41
14.10%	2,356.87	2,214.35	2,071.84	1,929.32	1,786.81	1,644.29	1,501.77
15.10%	2,358.23	2,215.71	2,073.20	1,930.68	1,788.17	1,645.65	1,503.14
16.10%	2,359.59	2,217.08	2,074.56	1,932.04	1,789.53	1,647.01	1,504.50
17.10%	2,360.95	2,218.44	2,075.92	1,933.41	1,790.89	1,648.37	1,505.86
18.10%	2,362.31	2,219.80	2,077.28	1,934.77	1,792.25	1,649.74	1,507.22
19.10%	2,363.68	2,221.16	2,078.64	1,936.13	1,793.61	1,651.10	1,508.58

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Alphabet

Revenue Decomposition

in millions

Fiscal Years Ending Dec. 31	2017	2018	2019	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
Google Search & other	**69,811**	**85,296**	**98,115**	**106,945**	**116,570**	**127,062**	**138,497**	**149,577**	**160,048**	**169,650**	**179,829**	**188,821**	**194,485**
growth%	9.4%	22.2%	15.0%	9.0%	9.0%	9.0%	9.0%	8.0%	7.0%	6.0%	6.0%	5.0%	3.0%
% of Total sales	62.98%	62.34%	60.62%	57.99%	54.74%	51.49%	48.34%	45.05%	41.75%	38.99%	37.04%	36.64%	36.64%
Youtube ads	**8,150**	**11,155**	**15,149**	**20,451**	**26,586**	**34,562**	**43,203**	**54,004**	**64,805**	**74,525**	**81,978**	**86,077**	**88,659**
growth%		36.9%	35.8%	35.0%	30.0%	30.0%	25.0%	25.0%	20.0%	15.0%	10.0%	5.0%	3.0%
% of Total sales	7.4%	8.2%	9.4%	11.1%	12.5%	14.0%	15.1%	16.3%	16.9%	17.1%	16.9%	16.7%	16.7%
Google Network Members' Properties	**17,616**	**20,010**	**21,547**	**22,624**	**24,887**	**27,375**	**30,113**	**33,124**	**36,437**	**40,080**	**44,088**	**46,293**	**47,682**
growth%	12.9%	13.6%	7.7%	5.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	5.0%	3.0%
% of Total sales	15.9%	14.6%	13.3%	12.3%	11.7%	11.1%	10.5%	10.0%	9.5%	9.2%	9.1%	9.0%	9.0%
Google Cloud	**4,056**	**5,838**	**8,918**	**13,199**	**19,534**	**27,348**	**38,287**	**51,687**	**69,777**	**90,711**	**113,388**	**124,727**	**128,469**
growth%		43.93%	52.76%	48.00%	48.00%	40.00%	40.00%	35.00%	35.00%	30.00%	25.00%	10.00%	3.00%
% of Total sales	3.7%	4.3%	5.5%	7.2%	9.2%	11.1%	13.4%	15.6%	18.2%	20.8%	23.4%	24.2%	24.2%
Google Other	**10,914**	**14,063**	**17,014**	**20,417**	**24,500**	**29,400**	**35,280**	**42,336**	**50,804**	**58,424**	**64,266**	**67,480**	**69,504**
growth%	8.3%	28.9%	21.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	15.0%	10.0%	5.0%	3.0%
% of Total sales	9.8%	10.3%	10.5%	11.1%	11.5%	11.9%	12.3%	12.8%	13.3%	13.4%	13.2%	13.1%	13.1%
Other Bets	**477**	**595**	**659**	**725**	**834**	**959**	**1,102**	**1,268**	**1,458**	**1,677**	**1,844**	**1,937**	**1,995**
growth%	-41.0%	24.7%	10.8%	10.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	10.0%	5.0%	3.0%
% of Total sales	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Hedging Gains (losses)	**(169)**	**(138)**	**455**	49	49	49	49	49	49	49	49	49	49
growth%		-18.3%	-429.7%	-89.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% of Total sales	-0.2%	-0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Revenues	**110,855**	**136,819**	**161,857**	**184,411**	**212,961**	**246,755**	**286,532**	**332,046**	**383,377**	**435,117**	**485,444**	**515,383**	**530,843**
growth%	22.8%	23.4%	18.3%	13.9%	15.5%	15.9%	16.1%	15.9%	15.5%	13.5%	11.6%	6.2%	3.0%

Alphabet

Income Statement

In Millions (shares outstanding in thousands)

Fiscal Years Ending Dec. 31	2017	2018	2019	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
Revenues:													
Revenues	**$110,855**	**$136,819**	**$161,857**	**$ 184,411**	**$ 212,961**	**$ 246,755**	**$ 286,532**	**$ 332,046**	**$ 383,377**	**$ 435,117**	**$ 485,444**	**$ 515,383**	**$ 530,843**
Costs and expenses:													
Costs of revenues	38,668	50,514	60,115	70,076	83,055	98,702	117,478	139,459	164,852	191,451	218,450	237,076	249,496
Research and development	16,625	21,419	26,018	30,428	35,139	40,715	47,278	54,788	63,257	71,794	80,098	85,038	87,589
Sales and marketing	12,893	16,333	18,464	22,129	25,555	32,078	37,249	43,166	49,839	56,565	63,108	67,000	69,010
General and administrative	6,872	6,923	9,551	11,065	12,778	14,805	17,192	19,923	23,003	26,107	29,127	30,923	31,851
Depreciation and Amortization	6,915	9,035	11,781	16,473	18,862	21,243	23,597	25,876	28,071	30,255	32,399	34,511	36,599
EU Commission and US DOJ fines	2,736	5,071	1,697										
Total costs and expenses	**84,709**	**110,498**	**127,626**	**150,170**	**175,389**	**207,543**	**242,794**	**283,211**	**329,022**	**376,173**	**423,182**	**454,549**	**474,545**
Income from operations	26,146	26,321	34,231	34,240	37,572	39,212	43,738	48,835	54,355	58,944	62,262	60,835	56,299
Interest and other income, net	1,047	8,592	5,394	1,197	1,348	1,612	1,893	2,227	2,615	3,070	3,564	4,090	4,589
Income from continuing operations before taxes	27,193	34,913	39,625	35,437	38,921	40,824	45,631	51,062	56,970	62,014	65,826	64,924	60,887
Provision for income taxes	14,531	4,177	5,282	4,607	5,060	5,307	5,932	6,638	7,406	8,062	8,557	8,440	7,915
Net income from continuing operations	12,662	$31,736	$34,343	30,830	33,861	35,517	39,699	44,424	49,564	53,952	57,269	56,484	52,972
Net income	**$12,662**	**$30,736**	**$34,343**	**$ 30,830**	**$ 33,861**	**$ 35,517**	**$ 39,699**	**$ 44,424**	**$ 49,564**	**$ 53,952**	**$ 57,269**	**$ 56,484**	**$ 52,972**
GAAP EPS	**$ 18.00**	**$ 43.70**	**$ 49.16**	**$ 44.80**	**$ 49.21**	**$ 51.62**	**$ 57.71**	**$ 64.59**	**$ 72.07**	**$ 78.46**	**$ 83.29**	**$ 82.16**	**$ 77.06**
Total Shares outstanding	694,783	695,556	688,335	688,218	688,108	688,004	687,906	687,813	687,726	687,643	687,565	687,491	687,422

Alphabet
Balance Sheet
in millions

Fiscal Years Ending Dec. 31	2017	2018	2019	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
Current assets:													
Cash and cash equivalents	10,715	16,701	18,498	32,647	57,993	85,017	117,447	155,192	199,629	247,875	299,408	348,223	394,060
Marketable securities	91,156	92,439	101,177	102,189	103,211	104,243	105,285	106,338	107,401	108,475	109,560	110,656	111,762
Total cash, cash equivalents, and marketable securities	101,871	109,140	119,675	134,835	161,203	189,260	222,733	261,530	307,031	356,350	408,968	458,879	505,822
Accounts receivable, net of allowance	18,336	20,838	25,326	29,148	33,661	39,002	45,289	52,483	60,597	68,775	76,729	81,461	83,905
Income taxes receivable, net	369	355	2,166	982	1,134	1,314	1,526	1,768	2,042	2,317	2,585	2,744	2,827
Inventory	749	1,107	999	1,292	1,492	1,729	2,008	2,326	2,686	3,049	3,401	3,611	3,719
Other current assets	2,983	4,236	4,412	4,535	5,046	5,771	6,540	7,414	8,389	9,487	10,649	11,860	12,966
Total current assets	**124,308**	**135,676**	**152,578**	**170,792**	**202,536**	**237,076**	**278,095**	**325,522**	**380,744**	**439,978**	**502,333**	**558,556**	**609,240**
Non-marketable investments	7,813	13,859	13,078	13,209	13,341	13,474	13,609	13,745	13,883	14,021	14,162	14,303	14,446
Deferred income taxes	680	737	721	737	810	849	949	1,062	1,185	1,290	1,369	1,350	1,266
Property and equipment, net	42,383	59,719	73,646	85,173	96,311	107,068	117,471	127,595	137,524	147,269	156,870	166,358	173,760
Operating lease assets			10,941	12,654	14,308	15,906	17,452	18,956	20,431	21,879	23,305	24,715	25,814
Intangible assets, net	2,692	2,220	1,979	1,230	565	248	191	146	-	-	-	-	-
Goodwill	16,747	17,888	20,624	20,825	20,825	20,825	20,825	20,825	20,825	20,825	20,825	20,825	20,825
Other non-current assets	2,672	2,693	2,342	2,387	2,434	2,481	2,529	2,578	2,628	2,680	2,732	2,785	2,839
Total Non-current Assets	72,987	97,116	123,331	136,215	148,593	160,852	173,026	184,908	196,476	207,963	219,262	230,336	238,950
Total assets	**197,295**	**232,792**	**275,909**	**307,007**	**351,129**	**397,928**	**451,121**	**510,430**	**577,220**	**647,941**	**721,595**	**788,892**	**848,190**
Current liabilities:													
Accounts payable	3,137	4,378	5,561	5,818	6,719	7,785	9,040	10,477	12,096	13,729	15,316	16,261	16,749
Accrued compensation and benefits	4,581	6,839	8,495	5,534	6,512	7,844	9,294	10,733	13,127	15,244	17,665	20,396	23,148
Accrued expenses and other current liabilities	10,177	16,958	23,067	24,895	28,750	33,312	38,682	44,826	51,756	58,741	65,535	69,577	71,664
Accrued revenue share	3,975	4,592	5,916	6,514	7,523	8,716	10,121	11,729	13,542	15,370	17,148	18,205	18,751
Deferred revenue	1,432	1,784	1,908	2,320	2,679	3,105	3,605	4,178	4,824	5,475	6,108	6,484	6,679
Income taxes payable, net	881	69	274	198	218	228	255	285	319	347	368	363	340
Total current liabilities	**24,183**	**34,620**	**45,221**	**45,280**	**52,400**	**60,991**	**70,998**	**82,228**	**95,664**	**108,904**	**122,140**	**131,286**	**137,332**
Long-term debt	3,969	4,012	4,554	4,834	5,332	5,859	6,412	6,988	7,586	8,187	8,777	9,265	9,612
Deferred revenue, non-current	340	396	358	502	580	672	781	905	1,044	1,185	1,323	1,404	1,446
Income taxes payable, non-current	12,812	11,327	9,885	8,384	9,209	9,659	10,796	12,081	13,479	14,672	15,574	15,361	14,406
Deferred income taxes	430	1,264	1,701	1,428	1,568	1,645	1,839	2,058	2,296	2,499	2,653	2,616	2,454
Operating lease liabilities			10,214	11,768	13,307	14,793	16,230	17,629	19,001	20,347	21,674	22,985	24,007
Other long-term liabilities	3,059	3,545	2,534	2,724	2,972	3,217	3,461	3,698	3,930	4,159	4,385	4,607	4,779
Total liabilities	**44,793**	**55,164**	**74,467**	**74,921**	**85,368**	**96,836**	**110,517**	**125,587**	**142,999**	**159,954**	**176,525**	**187,524**	**194,036**
Stockholders' equity:													
Common stock	40,247	45,049	50,552	50,552	50,552	50,552	50,552	50,552	50,552	50,552	50,552	50,552	50,552
Accumulated other comprehensive income/loss	(992)	(2,306)	(1,232)	(1,232)	(1,232)	(1,232)	(1,232)	(1,232)	(1,232)	(1,232)	(1,232)	(1,232)	(1,232)
Retained earnings	113,247	134,885	152,122	182,952	216,813	252,330	292,029	336,453	386,017	439,969	497,237	553,722	606,694
Share Repurchases				(186)	(372)	(558)	(744)	(930)	(1,116)	(1,302)	(1,488)	(1,674)	(1,860)
Total stockholders' equity	**152,502**	**177,628**	**201,442**	**232,086**	**265,761**	**301,092**	**340,605**	**384,843**	**434,221**	**487,987**	**545,069**	**601,368**	**654,154**
Total liabilities and stockholders' equity	**197,295**	**232,792**	**275,909**	**307,007**	**351,129**	**397,928**	**451,121**	**510,430**	**577,220**	**647,941**	**721,595**	**788,892**	**848,190**

Alphabet

Historical Cash Flow Statement

in millions

Fiscal Years Ending Dec. 31	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Operating activities											
Net income	$6,520	$8,505	$9,737	$10,737	$12,920	$14,444	$16,348	$19,478	$12,662	$30,736	$34,343
Adjustments:											
Depreciation and impairment of property and equipment	1,240	1,067	1,396	1,988	2,781	3,523	4,132	5,267	6,103	8,164	10,856
Amortization and impairment of intangible assets	284	329	455	974	1,158	1,456	931	877	812	871	925
Stock-based compensation expense	1,164	1,376	1,974	2,692	3,343	4,279	5,203	6,703	7,679	9,353	10,794
Excess tax benefits from stock-based award activities	(90)	(94)	(86)	(188)	(481)	(648)	(548)				
Deferred income taxes	(268)	9	343	(266)	(437)	(104)	(179)	(38)	258	778	173
Gain on divestiture of business	-	-	-	(188)	(700)	(740)	-	-	-	-	-
Gain on equity interest	-	-	-	-	-	(126)	-	-	-	-	-
(Gain) loss on marketable and non-marketable investments, net	-	-	110	-	-	(159)	334	275	37	(6,650)	(2,798)
Other	(20)	(12)	6	-	-	87	212	174	294	(189)	(592)
Changes in assets and liabilities, net of effects of acquisitions:											
Accounts receivable	(504)	(1,129)	(1,156)	(787)	(1,307)	(1,641)	(2,094)	(2,578)	(3,768)	(2,169)	(4,340)
Income taxes, net	217	102	731	1,492	401	283	(179)	3,125	8,211	(2,251)	(3,128)
Prepaid revenue share, expenses and other assets	262	(414)	(262)	(532)	(930)	459	(318)	312	(2,164)	(1,207)	(621)
Accounts payable	34	272	101	(499)	605	436	203	110	731	1,067	428
Accrued expenses and other liabilities	243	745	795	762	713	757	1,597	1,515	4,891	8,614	7,170
Accrued revenue share	158	214	259	299	254	245	339	593	955	483	1,273
Deferred revenue	76	111	162	163	233	(175)	43	223	390	371	37
Net cash provided by operating activities	**9,316**	**11,081**	**14,565**	**16,619**	**18,659**	**22,376**	**26,024**	**36,036**	**37,091**	**47,971**	**54,520**
Investing activities											
Purchases of property and equipment	(810)	(4,018)	(3,438)	(3,273)	(7,358)	(10,959)	(9,915)	(10,212)	(13,184)	(25,139)	(23,548)
Proceeds from disposals of property and equipment	-	-	-	-	-	-	-	240	-	98	-
Purchases of marketable securities	(29,139)	(43,985)	(61,672)	(33,410)	(45,444)	(56,310)	(74,368)	(84,509)	(92,195)	(50,158)	(100,315)
Maturities and sales of marketable securities	22,103	37,099	48,746	35,180	38,314	51,315	62,905	66,895	73,959	48,507	97,825
Purchases of non-marketable investments	(65)	(320)	(428)	(696)	(569)	(1,227)	(2,172)	(1,109)	(1,745)	(2,073)	(1,932)
Maturities and sales of non-marketable investments	-	-	-	-	-	-	-	494	533	1,752	405
Cash collateral related to securities lending	-	2,361	(354)	(334)	(299)	1,403	(350)	(2,428)	-	-	-
Investments in reverse repurchase agreements	-	(750)	5	45	600	(775)	425	450	-	-	-
Proceeds from divestiture of business	-	-	-	-	2,525	386	-	-	-	-	-
Acquisitions, net of cash acquired, and purchases of intangibles and other assets	(108)	(1,067)	(1,900)	(10,568)	(1,448)	(4,888)	(236)	(986)	(287)	(1,491)	-
Proceeds from collection of notes receivable	-	-	-	-	-	-	-	-	1,419	-	-
other investing activities	-	-	-	-	-	-	-	-	-	-	589
Net cash used in investing activities	**(8,019)**	**(10,680)**	**(19,041)**	**(13,056)**	**(13,679)**	**(21,055)**	**(23,711)**	**(31,165)**	**(31,401)**	**(28,504)**	**(29,491)**
Financing activities											
Net payments related to stock-based award activities	143	294	(5)	(287)	(781)	(2,069)	(2,375)	(3,304)	(4,166)	(4,993)	(4,765)
Excess tax benefits from stock-based award activities	90	94	86	188	481	648	548	-	-	-	-
Adjustment Payment to Class C capital stockholders	-	-	-	-	-	-	(47)	-	-	-	-
Repurchases of capital stock	-	(801)	-	-	-	-	(1,780)	(3,693)	(4,846)	(9,075)	(18,396)
Proceeds from issuance of debt, net of costs	-	5,246	10,905	16,109	10,768	11,625	13,705	9,729	4,291	6,766	317
Repayments of debt	-	(1,783)	(10,179)	(14,781)	(11,325)	(11,643)	(13,728)	(10,064)	(4,377)	(6,827)	(585)
Proceeds from sale of subsidiary shares	-	-	-	-	-	-	-	-	800	950	220
Net cash used in financing activities	**233**	**3,050**	**807**	**1,229**	**(857)**	**(1,439)**	**(3,677)**	**(8,332)**	**(8,298)**	**(13,179)**	**(23,209)**
Effect of exchange rate changes on cash and cash equivalents	11	(19)	22	3	(3)	(433)	(434)	(170)	405	(302)	(23)
Net increase (decrease) in cash and cash equivalents	1,541	3,432	(3,647)	4,795	4,120	(551)	(1,798)	(3,631)	(2,203)	5,986	1,797
Cash and cash equivalents at beginning of period	8,657	10,198	13,630	9,983	14,778	18,898	18,347	16,549	12,918	10,715	16,701
Cash and cash equivalents at end of period	**10,198**	**13,630**	**9,983**	**14,778**	**18,898**	**18,347**	**16,549**	**12,918**	**10,715**	**16,701**	**18,498**
FCFF	**8,506**	**7,063**	**11,127**	**13,346**	**11,301**	**11,417**	**16,109**	**25,824**	**23,907**	**22,832**	**30,972**

Alphabet

Forecasted Cash Flow Statement

in millions

Fiscal Years Ending Dec. 31	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
Operating activities										
Net income	30,830	33,861	35,517	39,699	44,424	49,564	53,952	57,269	56,484	52,972
Adjustments:										
Depreciation amortization (Combined with line 10)	16,473	18,862	21,243	23,597	25,876	28,071	30,255	32,399	34,511	36,599
Change in Deferred income taxes	(289)	68	37	94	106	115	98	74	(18)	(79)
Changes in assets and liabilities, net of effects of acquisitions:										
Accounts receivable	(3,822)	(4,513)	(5,342)	(6,287)	(7,194)	(8,113)	(8,178)	(7,955)	(4,732)	(2,444)
Income tax receivable, net	1,184	(152)	(180)	(212)	(242)	(273)	(276)	(268)	(159)	(82)
Inventory	(293)	(200)	(237)	(279)	(319)	(360)	(363)	(353)	(210)	(108)
other current assets	(123)	(511)	(725)	(769)	(874)	(975)	(1,098)	(1,162)	(1,211)	(1,106)
Accounts payable	257	901	1,066	1,255	1,436	1,620	1,632	1,588	945	488
Accrued compensation and Benefits	(2,961)	977	1,333	1,450	1,439	2,394	2,116	2,421	2,731	2,753
Accrued expenses and other liabilities	1,828	3,854	4,562	5,370	6,144	6,930	6,985	6,794	4,042	2,087
Accrued revenue share	598	1,009	1,194	1,405	1,608	1,813	1,828	1,778	1,058	546
income taxes payable, net	(76)	19	11	27	30	33	28	21	(5)	(23)
Deferred revenue	412	359	425	500	573	646	651	633	377	195
change in long-term deferred revenue	144	78	92	108	124	140	141	137	82	42
change in long-term tax payable	(1,501)	824	450	1,137	1,285	1,398	1,193	902	(213)	(955)
change in operating lease liabilities	1,554	1,539	1,486	1,437	1,399	1,372	1,346	1,326	1,311	1,023
change in long term other liabilities	190	248	245	243	238	231	230	226	221	172
Net cash provided by operating activities	**44,407**	**57,224**	**61,178**	**68,776**	**76,051**	**84,606**	**90,543**	**95,832**	**95,213**	**92,079**
Investing activities										
CapEx	(28,000)	(30,000)	(32,000)	(34,000)	(36,000)	(38,000)	(40,000)	(42,000)	(44,000)	(44,000)
Change in Marketable Securities	(1,012)	(1,022)	(1,032)	(1,042)	(1,053)	(1,063)	(1,074)	(1,085)	(1,096)	(1,107)
Change in Non-marketable securities	(131)	(132)	(133)	(135)	(136)	(137)	(139)	(140)	(142)	(143)
change in intangible assets	749	665	317	57	45	146	-	-	-	-
change in other noncurrent assets	(45)	(46)	(47)	(48)	(49)	(50)	(51)	(52)	(53)	(54)
change in operating lease assets	(1,713)	(1,655)	(1,598)	(1,545)	(1,504)	(1,475)	(1,448)	(1,426)	(1,410)	(1,100)
change in goodwill	(201)	-	-	-	-	-	-	-	-	-
Net cash used in investing activities	**(30,353)**	**(32,190)**	**(34,494)**	**(36,714)**	**(38,697)**	**(40,580)**	**(42,712)**	**(44,703)**	**(46,700)**	**(46,403)**
Financing activities										
Repurchases of capital stock (note 11 on 10k)	(186)	(186)	(186)	(186)	(186)	(186)	(186)	(186)	(186)	(186)
Repayments of debt	280	498	526	554	576	598	601	591	488	347
Net cash used in financing activities	**94**	**312**	**340**	**368**	**390**	**412**	**415**	**405**	**302**	**161**
Net increase (decrease) in cash and cash equivalents	14,149	25,346	27,024	32,430	37,744	44,438	48,246	51,533	48,815	45,837
Cash and cash equivalents at beginning of period	18,498	32,647	57,993	85,017	117,447	155,192	199,629	247,875	299,408	348,223
Cash and cash equivalents at end of period	**32,647**	**57,993**	**85,017**	**117,447**	**155,192**	**199,629**	**247,875**	**299,408**	**348,223**	**394,060**

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Common Size Income Statement

% of sales

Fiscal Year Ending Dec. 31	**2016**	**2017**	**2018**	**2019**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**	**2029E**
Revenues:														
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%**	**100.00%**
Costs and expenses:														
Costs of revenues	32.12%	34.88%	36.92%	37.14%	38.00%	39.00%	40.00%	41.00%	42.00%	43.00%	44.00%	45.00%	46.00%	47.00%
Research and development	15.45%	15.00%	15.65%	16.07%	16.50%	16.50%	16.50%	16.50%	16.50%	16.50%	16.50%	16.50%	16.50%	16.50%
Sales and marketing	11.61%	11.63%	11.94%	11.41%	12.00%	12.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%
General and administrative	7.74%	6.20%	5.06%	5.90%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%	6.00%
Depreciation and Amortization	6.81%	6.24%	6.60%	7.28%	8.93%	8.86%	8.61%	8.24%	7.79%	7.32%	6.95%	6.67%	6.70%	6.89%
European Commission fines	-	2.47%	3.71%	1.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total costs and expenses	**73.73%**	**76.41%**	**80.76%**	**78.85%**	**81.43%**	**82.36%**	**84.11%**	**84.74%**	**85.29%**	**85.82%**	**86.45%**	**87.17%**	**88.20%**	**89.39%**
Income from operations	26.27%	23.59%	19.24%	21.15%	18.57%	17.64%	15.89%	15.26%	14.71%	14.18%	13.55%	12.83%	11.80%	10.61%
Interest and other income, net	0.48%	0.94%	6.28%	3.33%	0.65%	0.63%	0.65%	0.66%	0.67%	0.68%	0.71%	0.73%	0.79%	0.86%
Income from continuing operations before income taxes	26.75%	24.53%	25.52%	24.48%	19.22%	18.28%	16.54%	15.93%	15.38%	14.86%	14.25%	13.56%	12.60%	11.47%
Provision for income taxes	5.18%	13.11%	3.05%	3.26%	2.50%	2.38%	2.15%	2.07%	2.00%	1.93%	1.85%	1.76%	1.64%	1.49%
Net income from continuing operations	21.58%	11.42%	23.20%	21.22%	16.72%	15.90%	14.39%	13.85%	13.38%	12.93%	12.40%	11.80%	10.96%	9.98%
Net income	**21.58%**	**11.42%**	**22.46%**	**21.22%**	**16.72%**	**15.90%**	**14.39%**	**13.85%**	**13.38%**	**12.93%**	**12.40%**	**11.80%**	**10.96%**	**9.98%**

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Common Size Balance Sheet

% of Assets

Fiscal Years Ending Dec. 31	2017	2018	2019	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
Current assets:													
Cash and cash equivalents	5.43%	7.17%	6.70%	10.63%	16.52%	21.36%	26.03%	30.40%	34.58%	38.26%	41.49%	44.14%	46.46%
Marketable securities	46.20%	39.71%	36.67%	33.29%	29.39%	26.20%	23.34%	20.83%	18.61%	16.74%	15.18%	14.03%	13.18%
Total cash, cash equivalents, and	**51.63%**	**46.88%**	**43.37%**	**43.92%**	**45.91%**	**47.56%**	**49.37%**	**51.24%**	**53.19%**	**55.00%**	**56.68%**	**58.17%**	**59.64%**
Accounts receivable, net of allowanc	9.29%	8.95%	9.18%	9.49%	9.59%	9.80%	10.04%	10.28%	10.50%	10.61%	10.63%	10.33%	9.89%
Income taxes receivable, net	0.19%	0.15%	0.79%	0.32%	0.32%	0.33%	0.34%	0.35%	0.35%	0.36%	0.36%	0.35%	0.33%
Inventory	0.38%	0.48%	0.36%	0.42%	0.42%	0.43%	0.45%	0.46%	0.47%	0.47%	0.47%	0.46%	0.44%
Other current assets	1.51%	1.82%	1.60%	1.48%	1.44%	1.45%	1.45%	1.45%	1.45%	1.46%	1.48%	1.50%	1.53%
Total current assets	**63.01%**	**58.28%**	**55.30%**	**55.63%**	**57.68%**	**59.58%**	**61.65%**	**63.77%**	**65.96%**	**67.90%**	**69.61%**	**70.80%**	**71.83%**
Non-marketable investments	3.96%	5.95%	4.74%	4.30%	3.80%	3.39%	3.02%	2.69%	2.41%	2.16%	1.96%	1.81%	1.70%
Deferred income taxes	0.34%	0.32%	0.26%	0.24%	0.23%	0.21%	0.21%	0.21%	0.21%	0.20%	0.19%	0.17%	0.15%
Property and equipment, net	21.48%	25.65%	26.69%	27.74%	27.43%	26.91%	26.04%	25.00%	23.83%	22.73%	21.74%	21.09%	20.49%
Operating lease assets	0.00%	0.00%	3.97%	4.12%	4.07%	4.00%	3.87%	3.71%	3.54%	3.38%	3.23%	3.13%	3.04%
Intangible assets, net	1.36%	0.95%	0.72%	0.40%	0.16%	0.06%	0.04%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%
Goodwill	8.49%	7.68%	7.47%	6.78%	5.93%	5.23%	4.62%	4.08%	3.61%	3.21%	2.89%	2.64%	2.46%
Other non-current assets	1.35%	1.16%	0.85%	0.78%	0.69%	0.62%	0.56%	0.51%	0.46%	0.41%	0.38%	0.35%	0.33%
Total assets	**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%**
Current liabilities:													
Accounts payable	1.59%	1.88%	2.02%	1.90%	1.91%	1.96%	2.00%	2.05%	2.10%	2.12%	2.12%	2.06%	1.97%
Accrued compensation and benefits	2.32%	2.94%	3.08%	1.80%	1.85%	1.97%	2.06%	2.10%	2.27%	2.35%	2.45%	2.59%	2.73%
Accrued expenses and other current	5.16%	7.28%	8.36%	8.11%	8.19%	8.37%	8.57%	8.78%	8.97%	9.07%	9.08%	8.82%	8.45%
Accrued revenue share	2.01%	1.97%	2.14%	2.12%	2.14%	2.19%	2.24%	2.30%	2.35%	2.37%	2.38%	2.31%	2.21%
Deferred revenue	0.73%	0.77%	0.69%	0.76%	0.76%	0.78%	0.80%	0.82%	0.84%	0.84%	0.85%	0.82%	0.79%
Income taxes payable, net	0.45%	0.03%	0.10%	0.06%	0.06%	0.06%	0.06%	0.06%	0.06%	0.05%	0.05%	0.05%	0.04%
Total current liabilities	**12.26%**	**14.87%**	**16.39%**	**14.75%**	**14.92%**	**15.33%**	**15.74%**	**16.11%**	**16.57%**	**16.81%**	**16.93%**	**16.64%**	**16.19%**
Long-term debt	2.01%	1.72%	1.65%	1.57%	1.52%	1.47%	1.42%	1.37%	1.31%	1.26%	1.22%	1.17%	1.13%
Deferred revenue, non-current	0.17%	0.17%	0.13%	0.16%	0.17%	0.17%	0.17%	0.18%	0.18%	0.18%	0.18%	0.18%	0.17%
Income taxes payable, non-current	6.49%	4.87%	3.58%	2.73%	2.62%	2.43%	2.39%	2.37%	2.34%	2.26%	2.16%	1.95%	1.70%
Deferred income taxes	0.22%	0.54%	0.62%	0.47%	0.45%	0.41%	0.41%	0.40%	0.40%	0.39%	0.37%	0.33%	0.29%
Operating lease liabilities	-	-	3.70%	3.83%	3.79%	3.72%	3.60%	3.45%	3.29%	3.14%	3.00%	2.91%	2.83%
Other long-term liabilities	1.55%	1.52%	0.92%	0.89%	0.85%	0.81%	0.77%	0.72%	0.68%	0.64%	0.61%	0.58%	0.56%
Total liabilities	**22.70%**	**23.70%**	**26.99%**	**24.40%**	**24.31%**	**24.33%**	**24.50%**	**24.60%**	**24.77%**	**24.69%**	**24.46%**	**23.77%**	**22.88%**
Stockholders' equity:													
Class A, Class B, Class C common s	20.40%	19.35%	18.32%	16.47%	14.40%	12.70%	11.21%	9.90%	8.76%	7.80%	7.01%	6.41%	5.96%
Accumulated other comprehensive i	-0.50%	-0.99%	-0.45%	-0.40%	-0.35%	-0.31%	-0.27%	-0.24%	-0.21%	-0.19%	-0.17%	-0.16%	-0.15%
Retained earnings	57.40%	57.94%	55.13%	59.59%	61.75%	63.41%	64.73%	65.92%	66.88%	67.90%	68.91%	70.19%	71.53%
Total stockholders' equity	**77.30%**	**76.30%**	**73.01%**	**75.60%**	**75.69%**	**75.67%**	**75.50%**	**75.40%**	**75.23%**	**75.31%**	**75.54%**	**76.23%**	**77.12%**
Total liabilities and stockholders'	**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%**

Common Size Balance Sheet

% of Sales

Fiscal Years Ending	2017	2018	2019	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
Current assets:													
Cash and cash equivalents	9.67%	12.21%	11.43%	17.70%	27.23%	34.45%	40.99%	46.74%	52.07%	56.97%	61.68%	67.57%	74.23%
Marketable securities	82.23%	67.56%	62.51%	55.41%	48.46%	42.25%	36.74%	32.03%	28.01%	24.93%	22.57%	21.47%	21.05%
Total cash, cash equivalents, and	**91.90%**	**79.77%**	**73.94%**	**73.12%**	**75.70%**	**76.70%**	**77.73%**	**78.76%**	**80.09%**	**81.90%**	**84.25%**	**89.04%**	**95.29%**
Accounts receivable, net of allowanc	16.54%	15.23%	15.65%	15.81%	15.81%	15.81%	15.81%	15.81%	15.81%	15.81%	15.81%	15.81%	15.81%
Receivable under reverse repurchas	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%
Income taxes receivable, net	0.33%	0.26%	1.34%	0.53%	0.53%	0.53%	0.53%	0.53%	0.53%	0.53%	0.53%	0.53%	0.53%
Inventory	0.68%	0.81%	0.62%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%
Other current assets	2.69%	3.10%	2.73%	2.46%	2.37%	2.34%	2.28%	2.23%	2.19%	2.18%	2.19%	2.30%	2.44%
Total current assets	**112.14%**	**99.16%**	**94.27%**	**92.62%**	**95.10%**	**96.08%**	**97.06%**	**98.04%**	**99.31%**	**101.12%**	**103.48%**	**108.38%**	**114.77%**
Non-marketable investments	7.05%	10.13%	8.08%	7.16%	6.26%	5.46%	4.75%	4.14%	3.62%	3.22%	2.92%	2.78%	2.72%
Deferred income taxes	0.61%	0.54%	0.45%	0.40%	0.38%	0.34%	0.33%	0.32%	0.31%	0.30%	0.28%	0.26%	0.24%
Property and equipment, net	38.23%	43.65%	45.50%	46.19%	45.22%	43.39%	41.00%	38.43%	35.87%	33.85%	32.31%	32.28%	32.73%
Operating lease assets	-	-	6.76%	6.86%	6.72%	6.45%	6.09%	5.71%	5.33%	5.03%	4.80%	4.80%	4.86%
Intangible assets, net	2.43%	1.62%	1.22%	0.67%	0.27%	0.10%	0.07%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%
Goodwill	15.11%	13.07%	12.74%	11.29%	9.78%	8.44%	7.27%	6.27%	5.43%	4.79%	4.29%	4.04%	3.92%
Other non-current assets	2.41%	1.97%	1.45%	1.29%	1.14%	1.01%	0.88%	0.78%	0.69%	0.62%	0.56%	0.54%	0.53%
Total assets	**177.98%**	**170.15%**	**170.46%**	**166.48%**	**164.88%**	**161.26%**	**157.44%**	**153.72%**	**150.56%**	**148.91%**	**148.65%**	**153.07%**	**159.78%**
Current liabilities:													
Accounts payable	2.83%	3.20%	3.44%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%	3.16%
Accrued compensation and benefits	4.13%	5.00%	5.25%	3.00%	3.06%	3.18%	3.24%	3.23%	3.42%	3.50%	3.64%	3.96%	4.36%
Accrued expenses and other current	9.18%	12.39%	14.25%	13.50%	13.50%	13.50%	13.50%	13.50%	13.50%	13.50%	13.50%	13.50%	13.50%
Accrued revenue share	3.59%	3.36%	3.66%	3.53%	3.53%	3.53%	3.53%	3.53%	3.53%	3.53%	3.53%	3.53%	3.53%
Deferred revenue	1.29%	1.30%	1.18%	1.26%	1.26%	1.26%	1.26%	1.26%	1.26%	1.26%	1.26%	1.26%	1.26%
Income taxes payable, net	0.79%	0.05%	0.17%	0.11%	0.10%	0.09%	0.09%	0.09%	0.08%	0.08%	0.08%	0.07%	0.06%
Total current liabilities	21.81%	25.30%	27.94%	24.55%	24.61%	24.72%	24.78%	24.76%	24.95%	25.03%	25.16%	25.47%	25.87%
	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%
Long-term debt	3.58%	2.93%	2.81%	2.62%	2.50%	2.37%	2.24%	2.10%	1.98%	1.88%	1.81%	1.80%	1.81%
Deferred revenue, non-current	0.31%	0.29%	0.22%	0.27%	0.27%	0.27%	0.27%	0.27%	0.27%	0.27%	0.27%	0.27%	0.27%
Income taxes payable, non-current	11.56%	8.28%	6.11%	4.55%	4.32%	3.91%	3.77%	3.64%	3.52%	3.37%	3.21%	2.98%	2.71%
Deferred income taxes	0.39%	0.92%	1.05%	0.77%	0.74%	0.67%	0.64%	0.62%	0.60%	0.57%	0.55%	0.51%	0.46%
Operating lease liabilities	-	-	6.31%	6.38%	6.25%	5.99%	5.66%	5.31%	4.96%	4.68%	4.46%	4.46%	4.52%
Other long-term liabilities	2.76%	2.59%	1.57%	1.48%	1.40%	1.30%	1.21%	1.11%	1.02%	0.96%	0.90%	0.89%	0.90%
Total liabilities	**40.41%**	**40.32%**	**46.01%**	**40.63%**	**40.09%**	**39.24%**	**38.57%**	**37.82%**	**37.30%**	**36.76%**	**36.36%**	**36.39%**	**36.55%**
Stockholders' equity:													
Class A, Class B, Class C common s	36.31%	32.93%	31.23%	27.41%	23.74%	20.49%	17.64%	15.22%	13.19%	11.62%	10.41%	9.81%	9.52%
Accumulated other comprehensive i	-0.89%	-1.69%	-0.76%	-0.67%	-0.58%	-0.50%	-0.43%	-0.37%	-0.32%	-0.28%	-0.25%	-0.24%	-0.23%
Retained earnings	102.16%	98.59%	93.99%	99.21%	101.81%	102.26%	101.92%	101.33%	100.69%	101.12%	102.43%	107.44%	114.29%
Total stockholders' equity	**137.57%**	**129.83%**	**124.46%**	**125.85%**	**124.79%**	**122.02%**	**118.87%**	**115.90%**	**113.26%**	**112.15%**	**112.28%**	**116.68%**	**123.23%**
Total liabilities and stockholders'	**177.98%**	**170.15%**	**170.46%**	**166.48%**	**164.88%**	**161.26%**	**157.44%**	**153.72%**	**150.56%**	**148.91%**	**148.65%**	**153.07%**	**159.78%**

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Value Driver Estimation

Numbers denoted in millions

Fiscal Years Ending Dec. 31	2017	2018	2019	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
NOPLAT:													
operating revenues	110,855	136,819	161,857	184,411	212,961	246,755	286,532	332,046	383,377	435,117	485,444	515,383	530,843
COGS	38,668	50,514	60,115	70,076	83,055	98,702	117,478	139,459	164,852	191,451	218,450	237,076	249,496
SG&A	19,765	23,256	28,015	33,194	38,333	46,884	54,441	63,089	72,842	82,672	92,234	97,923	100,860
Depreciation (combined starting 2020)	6,103	8,164	10,856	16,473	18,862	21,243	23,597	25,876	28,071	30,255	32,399	34,511	36,599
Amortization of Non-Goodwill Intangibles	812	871	925	-	-	-	-	-	-	-	-	-	-
R&D expenses	16,625	21,419	26,018	30,428	35,139	40,715	47,278	54,788	63,257	71,794	80,098	85,038	87,589
Implied interest on operating leases	180	201	232	304	343	382	419	455	490	525	559	593	619
EBITA	29,062	32,796	36,160	34,544	37,916	39,594	44,157	49,289	54,845	59,469	62,822	61,428	56,918
Income Tax Provision	14,531	4,177	5,282	4,607	5,060	5,307	5,932	6,638	7,406	8,062	8,557	8,440	7,915
"+ tax shield on oper. least int."	36	32	38	49	55	61	67	73	79	85	90	95	100
"-tax shield on interest income"	210	1,349	890	193	217	260	305	359	421	494	574	658	739
"+ Tax shield effect on Gov't Fines"	550	796	280	-	-	-	-	-	-	-	-	-	-
Total Adjusted Taxes	14,907	3,656	4,710	4,463	4,898	5,109	5,695	6,353	7,064	7,652	8,074	7,877	7,276
Change in Deferred taxes	258	778	173	(273)	140	77	194	219	238	203	154	(36)	(163)
NOPLAT:	14,414	29,919	31,623	29,808	33,158	34,561	38,656	43,156	48,019	52,020	54,902	53,514	49,479
Invested Capital (IC):													
Operating Current Assets													
Cash and cash equivalents	1,189	1,854	2,053	3,624	6,437	9,437	13,037	17,226	22,159	27,514	33,234	38,653	43,741
Accounts receivable, net of allowance	18,336	20,838	25,326	29,148	33,661	39,002	45,289	52,483	60,597	68,775	76,729	81,461	83,905
Receivable under reverse repurchase agreements	-	-	-	-	-	-	-	-	-	-	-	-	-
Income taxes receivable, net	369	355	2,166	982	1,134	1,314	1,526	1,768	2,042	2,317	2,585	2,744	2,827
Inventory	749	1,107	999	1,292	1,492	1,729	2,008	2,326	2,686	3,049	3,401	3,611	3,719
Other current assets	2,983	4,236	4,412	4,535	5,046	5,771	6,540	7,414	8,389	9,487	10,649	11,860	12,966
Total Operating Current Assets	23,626	28,390	34,956	39,581	47,770	57,253	68,400	81,219	95,872	111,141	126,599	138,330	147,158
Non Interest-Bearing CL:													
Accounts payable	3,137	4,378	5,561	5,818	6,719	7,785	9,040	10,477	12,096	13,729	15,316	16,261	16,749
Accrued compensation and benefits	4,581	6,839	8,495	5,534	6,512	7,844	9,294	10,733	13,127	15,244	17,665	20,396	23,148
Accrued expenses and other current liabilities	10,177	16,958	23,067	24,895	28,750	33,312	38,682	44,826	51,756	58,741	65,535	69,577	71,664
Accrued revenue share	3,975	4,592	5,916	6,514	7,523	8,716	10,121	11,729	13,542	15,370	17,148	18,205	18,751
Deferred revenue	1,432	1,784	1,908	2,320	2,679	3,105	3,605	4,178	4,824	5,475	6,108	6,484	6,679
Income taxes payable, net	881	69	274	198	218	228	255	285	319	347	368	363	340
Total Non Interest-Bearing CL	24,183	34,620	45,221	45,280	52,400	60,991	70,998	82,228	95,664	108,904	122,140	131,286	137,332
Net Operating Working Capital	(557)	(6,230)	(10,265)	(5,700)	(4,630)	(3,738)	(2,599)	(1,010)	209	2,237	4,460	7,044	9,826
Plus: PPE (net)	42,383	59,719	73,646	85,173	96,311	107,068	117,471	127,595	137,524	147,269	156,870	166,358	173,760
Plus: Intangible Assets (net)	2,692	2,220	1,979	1,230	565	248	191	146	-	-	-	-	-
Plus: PV of operating leases	7,804	8,993	10,941	12,654	14,308	15,906	17,452	18,956	20,431	21,879	23,305	24,715	25,814
Less: Deferred revenue (non-current)	340	396	358	502	580	672	781	905	1,044	1,185	1,323	1,404	1,446
Invested Capital (IC):	51,982	64,305	75,943	92,855	105,973	118,812	131,734	144,783	157,119	170,199	183,312	196,712	207,954
Free Cash Flow (FCF):													
NOPLAT	14,414	29,919	31,623	29,808	33,158	34,561	38,656	43,156	48,019	52,020	54,902	53,514	49,479
Change in IC	3,900	12,323	11,638	16,911	13,119	12,839	12,922	13,048	12,336	13,080	13,112	13,401	11,241
FCF	10,514	17,595	19,985	12,897	20,039	21,723	25,733	30,107	35,683	38,940	41,789	40,113	38,238
Return on Invested Capital (ROIC):													
NOPLAT	14,414	29,919	31,623	29,808	33,158	34,561	38,656	43,156	48,019	52,020	54,902	53,514	49,479
Beg. IC	48,082	51,982	64,305	75,943	92,855	105,973	118,812	131,734	144,783	157,119	170,199	183,312	196,712
ROIC	29.98%	57.56%	49.18%	39.25%	35.71%	32.61%	32.54%	32.76%	33.17%	33.11%	32.26%	29.19%	25.15%
Economic Profit (EP):													
Beg. IC	48,082	51,982	64,305	75,943	92,855	105,973	118,812	131,734	144,783	157,119	170,199	183,312	196,712
x (ROIC - WACC)	24.15%	51.73%	43.35%	33.42%	29.88%	26.78%	26.71%	26.93%	27.34%	27.28%	26.43%	23.36%	19.32%
EP	11,610	26,888	27,874	25,380	27,745	28,383	31,729	35,475	39,579	42,860	44,979	42,827	38,011

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Weighted Average Cost of Capital (WACC) Estimation

Actual values as they appear

Cost of Equity:		*ASSUMPTIONS:*
Risk-Free Rate	0.80%	*10-year treasury bond*
Beta	0.96	5yr weekly raw beta from damodaran link and Bloomberg
Equity Risk Premium	5.35%	Damodaran's forward looking projections for October 202
Cost of Equity	**5.94%**	
Cost of Debt:		
Risk-Free Rate	0.80%	*10 yr US treasury*
Implied Default Premium	1.78%	*2030 yr corporate bond - risk-free rate*
Pre-Tax Cost of Debt	2.58%	*YTM on 2060 Corporate bond from Bloomberg*
Marginal Tax Rate	16%	
After-Tax Cost of Debt	**2.16%**	

Market Value of Common Equity:		**MV Weights**
Total Shares Outstanding	688,335,000	
Current Stock Price	$1,593.01	
MV of Equity	**1,096,524,538,350**	98.67%
Market Value of Debt:		
Long-Term Debt	4,554,000,000	
PV of Operating Leases	10,214,000,000	
MV of Total Debt	**14,768,000,000**	1.33%
Market Value of the Firm	**1,111,292,538,350**	100.00%

Estimated WACC	**5.89%**

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Discounted Cash Flow (DCF) and Economic Profit (EP) Valuation Models

All values in millions

Key Inputs:

CV Growth of NOPLAT	3.00%
CV Year ROIC	34.30%
WACC	5.83%
Cost of Equity	5.94%

Fiscal Years Ending Dec. 31	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**	**2029E**
DCF Model:										
Free Cash Flow (FCF)	12,897	20,039	21,723	25,733	30,107	35,683	38,940	41,789	40,113	
Continuing Value (CV)										1,595,459
PV of FCF	12,186	17,892	18,327	20,515	22,679	25,398	26,190	26,558	24,088	958,090

Value of Operating Assets:		1,151,924
Excess Cash		16,445
Marketable Securities		101,177
+ non-marketable securites'		14,446
(Debt)		(4,554)
PV operating leases		(10,941)
Value of Equity		1,268,497
Shares Outstanding		688
Intrinsic Value of Last FYE	$	1,842.85
Implied Price as of Today	$	1,932.04

EP Model:										
Economic Profit (EP)	25,380	27,745	28,383	31,729	35,475	39,579	42,860	44,979	42,827	38,011
Continuing Value (CV)										1,398,747
PV of EP	23,982	24,772	23,946	25,294	26,723	28,171	28,826	28,585	25,718	839,963

Total PV of EP		1,075,981
Invested Capital (last FYE)		75,943
Value of Operating Assets:		1,151,924
Excess Cash		16,445
Marketable Securities		101,177
(Debt)		(4,554)
PV of operating leases		(10,941)
+ non-marketable securites'		14446
Value of Equity		1,268,497
Shares Outstanding		688
Intrinsic Value of Last FYE	$	1,842.85
Implied Price as of Today	$	1,932.04

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Dividend Discount Model (DDM) or Fundamental P/E Valuation Model

Fiscal Years Ending Dec. 31	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**	**2029E**
EPS	$ 44.80	$ 49.21	$ 51.62	$ 57.71	$ 64.59	$ 72.07	$ 78.46	$ 83.29	$ 82.16	$ 77.06
Key Assumptions										
CV growth of EPS	3.00%									
CV Year ROE	8.10%									
Cost of Equity	5.94%									
Future Cash Flows										
P/E Multiple (CV Year)										21.4
EPS (CV Year)										$ 77.06
Future Stock Price										$ 1,652.28
theoretical Dividends Per Share										-
Discounted Cash Flows	-	-	-	-	-	-	-	-	-	$ 983.31
Intrinsic Value as of Last FYE	$ 983.31									
Implied Price as of Today	$ 1,030.91									

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Relative Valuation Models

Ticker	Company	Price	EPS 2020E	EPS 2021E	P/E 20	P/E 21
FB	Facebook	$267.67	$8.09	$10.26	33.09	26.09
BIDU	Baidu	$130.70	$4.75	$6.64	27.52	19.68
TCTZF	Tencent	$76.64	$1.88	$2.27	40.77	33.76
MSFT	Microsoft	$202.68	$6.69	$7.36	30.30	27.54
APPL	Apple	$111.20	$3.24	$3.91	34.32	28.44
AMZN	Amazon.com	$3,311.37	$34.87	$45.48	94.96	72.81
				Average	43.49	34.72
L	Alphabet	$1,593.01	$ 44.80	$ 49.21	35.6	32.4

Implied Relative Value:

P/E (EPS20)	**$ 1,948.29**
P/E (EPS21)	**$ 1,708.54**

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Key Management Ratios

Fiscal Years Ending Dec. 31	**2017**	**2018**	**2019**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**	**2029E**
Liquidity Ratios:													
Quick ratio	5.1	3.9	3.4	3.7	3.8	3.9	3.9	3.9	4.0	4.0	4.1	4.2	4.4
Current Ratio	5.1	3.9	3.4	3.8	3.9	3.9	3.9	4.0	4.0	4.0	4.1	4.3	4.4
Cash Ratio	4.2	3.2	2.6	3.0	3.1	3.1	3.1	3.2	3.2	3.3	3.3	3.5	3.7
Asset-Management Ratios:													
Total Asset Turnover (Sales / avg Total assets)	0.97	1.05	1.12	1.14	1.14	1.12	1.11	1.10	1.09	1.06	1.03	0.97	0.91
Fixed Asset Turnover (sales / avg PPE)	2.89	2.68	2.43	2.32	2.35	2.43	2.55	2.71	2.89	3.06	3.19	3.19	3.12
Financial Leverage Ratios:													
debt-equity ratio (Total Liab./SE)	29.37%	31.06%	36.97%	32.28%	32.12%	32.16%	32.45%	32.63%	32.93%	32.78%	32.39%	31.18%	29.66%
L-T Debt ratio (Long-Term debt / total assets)	2.01%	1.72%	1.65%	1.57%	1.52%	1.47%	1.42%	1.37%	1.31%	1.26%	1.22%	1.17%	1.13%
Profitability Ratios:													
return on assets (net income / total assets)	6.42%	13.20%	12.45%	10.04%	9.64%	8.93%	8.80%	8.70%	8.59%	8.33%	7.94%	7.16%	6.25%
net profit margin (net income / revenue)	11.42%	22.46%	21.22%	16.72%	15.90%	14.39%	13.85%	13.38%	12.93%	12.40%	11.80%	10.96%	9.98%
return on equity (net income / shareholders' equity)	8.30%	17.30%	17.05%	13.28%	12.74%	11.80%	11.66%	11.54%	11.41%	11.06%	10.51%	9.39%	8.10%
Payout Policy Ratios:													
Dividend Payout Ratio (Dividend/EPS)	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 Payout Ratio ((Divs. + Repurchases)/NI)	38.27%	29.53%	53.57%	0.60%	0.55%	0.52%	0.47%	0.42%	0.38%	0.34%	0.32%	0.33%	0.35%

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Effects of ESOP Exercise and Share Repurchases on Common Stock Account and Number of Shares Outstanding

All units in dollars or shares they appear

Fiscal Years Ending Dec. 31	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E	2029E
Change in Treasury Stock	186,000,000	186,000,000	186,000,000	186,000,000	186,000,000	186,000,000	186,000,000	186,000,000	186,000,000	186,000,000
Expected Price of Repurchased Shares:	$ 1,593.01	$ 1,687.57	$ 1,787.75	$ 1,893.87	$ 2,006.29	$ 2,125.38	$ 2,251.54	$ 2,385.19	$ 2,526.78	$ 2,676.77
Number of Shares Repurchased:	**116,760**	**110,218**	**104,042**	**98,212**	**92,709**	**87,514**	**82,610**	**77,981**	**73,612**	**69,487**
Shares Outstanding (beginning of the year)	688,335,000	688,218,240	688,108,022	688,003,981	687,905,769	687,813,060	687,725,546	687,642,936	687,564,955	687,491,344
Less: Shares Repurchased in Treasury	116,760	110,218	104,042	98,212	92,709	87,514	82,610	77,981	73,612	69,487
Shares Outstanding (end of the year)	**688,218,240**	**688,108,022**	**688,003,981**	**687,905,769**	**687,813,060**	**687,725,546**	**687,642,936**	**687,564,955**	**687,491,344**	**687,421,857**
Dollar value of shares repurchased	186,000,000	186,000,000	186,000,000	186,000,000	186,000,000	186,000,000	186,000,000	186,000,000	186,000,000	186,000,000

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Sensitivity Tables

Beta

Equity Risk Premium	1,932.04	0.81	0.86	0.91	0.96	1.01	1.06	1.16
	5.10%	1,917.01	1,920.83	1,924.64	1,928.46	1,932.27	1,936.08	1,943.70
	5.15%	1,917.61	1,921.47	1,925.32	1,929.17	1,933.02	1,936.87	1,944.56
	5.25%	1,918.83	1,922.76	1,926.68	1,930.61	1,934.53	1,938.46	1,946.29
	5.35%	1,920.04	1,924.04	1,928.04	1,932.04	1,936.04	1,940.04	1,948.03
	5.45%	1,921.25	1,925.33	1,929.41	1,933.48	1,937.55	1,941.62	1,949.76
	5.55%	1,922.46	1,926.62	1,930.77	1,934.91	1,939.06	1,943.20	1,951.49
	5.65%	1,923.68	1,927.90	1,932.13	1,936.35	1,940.57	1,944.79	1,953.22

Risk Free Rate

WACC	1932.04	0.65%	0.70%	0.75%	0.80%	0.85%	0.90%	0.95%
	5.53%	2,149.46	2,150.30	2,151.13	2,151.96	2,152.79	2,153.63	2,154.46
	5.63%	2,070.65	2,071.46	2,072.26	2,073.06	2,073.86	2,074.66	2,075.47
	5.73%	1,997.64	1,998.41	1,999.18	1,999.96	2,000.73	2,001.51	2,002.28
	5.83%	1,929.80	1,930.55	1,931.30	1,932.04	1,932.79	1,933.54	1,934.29
	5.93%	1,866.62	1,867.34	1,868.06	1,868.79	1,869.51	1,870.23	1,870.95
	6.03%	1,807.62	1,808.32	1,809.02	1,809.72	1,810.42	1,811.12	1,811.82
	6.13%	1,752.41	1,753.09	1,753.77	1,754.45	1,755.13	1,755.80	1,756.48

CV EPS ROIC

CV NOPLAT Growth	1932.04	31.3%	32.3%	33.3%	34.3%	35.3%	36.3%	37.3%
	2.7%	1,793.92	1,797.78	1,801.41	1,804.82	1,808.05	1,811.10	1,813.98
	2.8%	1,832.75	1,836.88	1,840.77	1,844.43	1,847.89	1,851.15	1,854.24
	2.9%	1,874.23	1,878.66	1,882.82	1,886.74	1,890.44	1,893.94	1,897.25
	3.0%	1,918.64	1,923.38	1,927.84	1,932.04	1,936.01	1,939.75	1,943.29
	3.1%	1,966.30	1,971.39	1,976.17	1,980.66	1,984.91	1,988.92	1,992.71
	3.2%	2,017.59	2,023.04	2,028.16	2,032.98	2,037.53	2,041.83	2,045.89
	3.3%	2,072.94	2,078.78	2,084.27	2,089.43	2,094.31	2,098.92	2,103.28

CV COGS (%sales)

Marginal Tax Rate	1,932.04	44.00%	45.00%	46.00%	47.00%	48.00%	49.00%	50.00%
	13.10%	2,355.51	2,212.99	2,070.48	1,927.96	1,785.44	1,642.93	1,500.41
	14.10%	2,356.87	2,214.35	2,071.84	1,929.32	1,786.81	1,644.29	1,501.77
	15.10%	2,358.23	2,215.71	2,073.20	1,930.68	1,788.17	1,645.65	1,503.14
	16.10%	2,359.59	2,217.08	2,074.56	1,932.04	1,789.53	1,647.01	1,504.50
	17.10%	2,360.95	2,218.44	2,075.92	1,933.41	1,790.89	1,648.37	1,505.86
	18.10%	2,362.31	2,219.80	2,077.28	1,934.77	1,792.25	1,649.74	1,507.22
	19.10%	2,363.68	2,221.16	2,078.64	1,936.13	1,793.61	1,651.10	1,508.58

WACC

CV ROIC	1,932.04	5.53%	5.63%	5.73%	5.83%	5.93%	6.03%	6.13%
	31.30%	2,136.58	2,058.39	1,985.94	1,918.64	1,855.95	1,797.41	1,742.63
	32.30%	2,142.02	2,063.58	1,990.90	1,923.38	1,860.49	1,801.77	1,746.81
	33.30%	2,147.14	2,068.46	1,995.57	1,927.84	1,864.76	1,805.86	1,750.75
	34.30%	2,151.96	2,073.06	1,999.96	1,932.04	1,868.79	1,809.72	1,754.45
	35.30%	2,156.51	2,077.40	2,004.10	1,936.01	1,872.58	1,813.36	1,757.94
	36.30%	2,160.80	2,081.49	2,008.02	1,939.75	1,876.17	1,816.80	1,761.24
	37.30%	2,164.87	2,085.37	2,011.72	1,943.29	1,879.56	1,820.05	1,764.36

Cost of Equity

CV EPS Growth	$ 1,030.91	5.636%	5.736%	5.836%	5.936%	6.036%	6.136%	6.236%
	2.85%	1144.64	1096.46	1051.57	1009.66	970.44	933.68	899.15
	2.90%	1154.46	1105.16	1059.29	1016.51	976.52	939.07	903.93
	2.95%	1164.64	1114.17	1067.27	1023.59	982.80	944.63	908.85
	3.00%	1175.20	1123.51	1075.54	1030.91	989.28	950.37	913.93
	3.05%	1186.17	1133.20	1084.10	1038.48	995.98	956.30	919.17
	3.10%	1197.58	1143.26	1092.98	1046.32	1002.91	962.42	924.58
	3.15%	1209.44	1153.70	1102.19	1054.44	1010.08	968.75	930.16