



# Notre Dame Investment Club

---



---

January 16, 2020

# Alphabet

Lauren Weetman



# Alphabet Investment Thesis

*I rate Alphabet a **BUY** with a price target of **\$1,746** (current market price of ~\$1,440).*

1

Market misunderstands regulation risk

- > Market is pricing in a potential antitrust decisions in near term – analyst reports speak as if Cloud / other Google properties would be separated. Despite this, many analysts still place a higher price target on Alphabet than I do
- > This is not the case, per my primary research

2

Other Bets functions as option value

- > Extremely difficult to value these investments with limited public information, especially the pre-revenue companies
- > Strong belief in Google as operator / investor with deep technical knowledge and ability to scale nascent businesses at low cost

3

Current low trading multiple

- > Trades at discount to peers, especially when compared to ad segment peer Facebook
- > Especially apparent after adjusting EBITDA for Other Bets / hardware operating losses



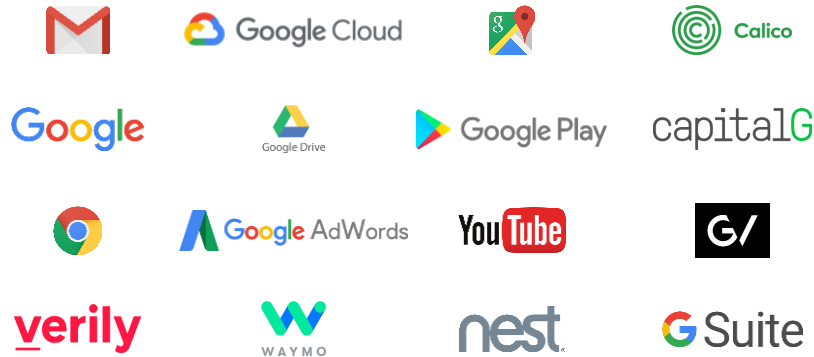
# Alphabet Overview

# Alphabet

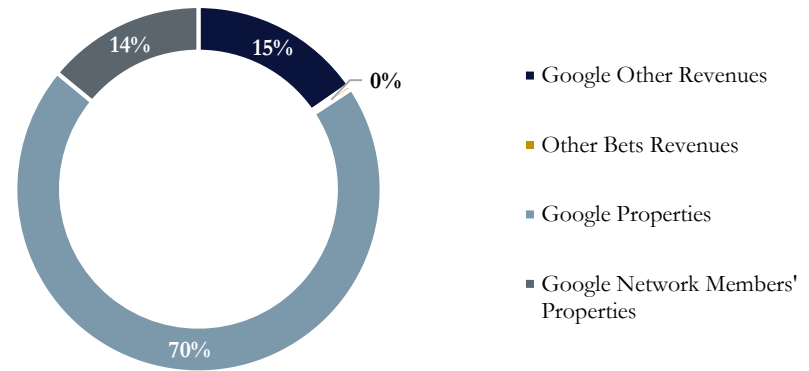
*Alphabet Inc. (Alphabet or the Company) is a U.S.-based multinational conglomerate providing internet related services and products. The Company primarily generates revenues through advertising.*

The Company operates in two main segments: Google and Other Bets. There are three subsegments within Alphabet's Google subsidiary

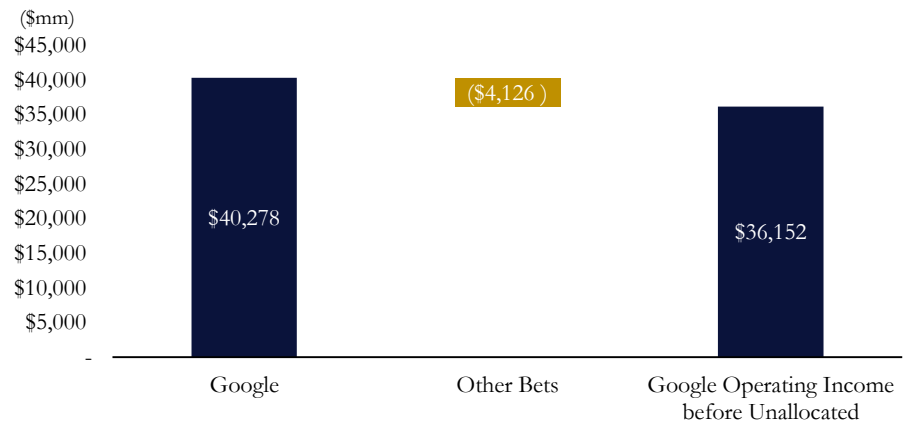
- > **Google Properties:** Advertising revenues related to traffic generated from search and other Google properties
- > **Network Members' Properties:** Revenues generated through AdMob, AdSense, Google Ad Manager
- > **Other Revenues:** Google cloud offerings, Google Play, hardware
- > **Other Bets:** "Moonshot" companies and internal growth / VC



## Alphabet Revenue Breakdown



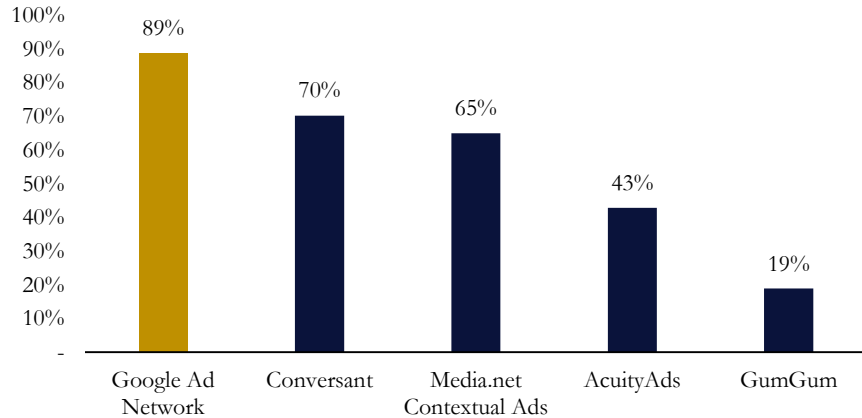
## Alphabet Operating Income before Unallocated (LTM Q3'19)



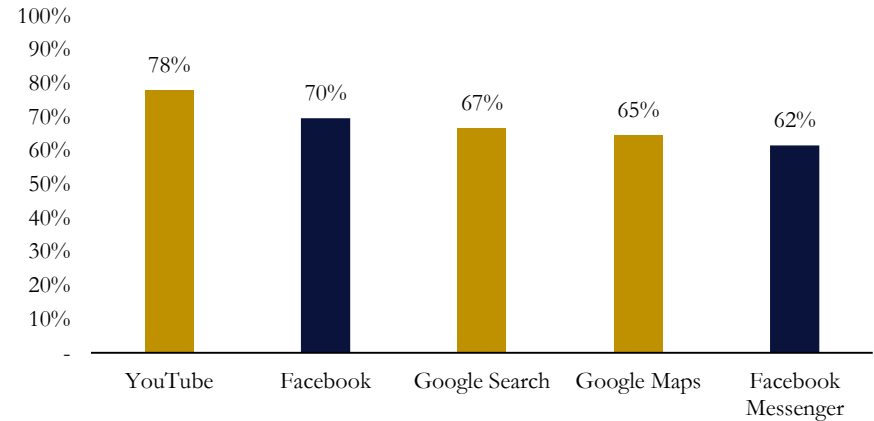


# Alphabet is a Market Leader...

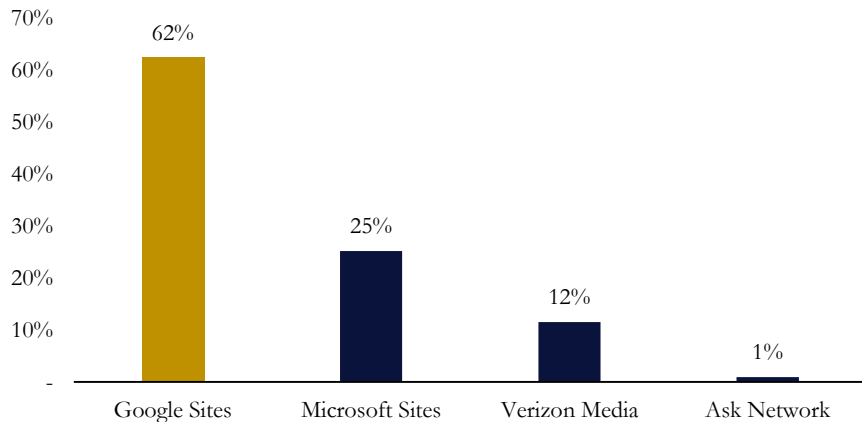
## Ad Network



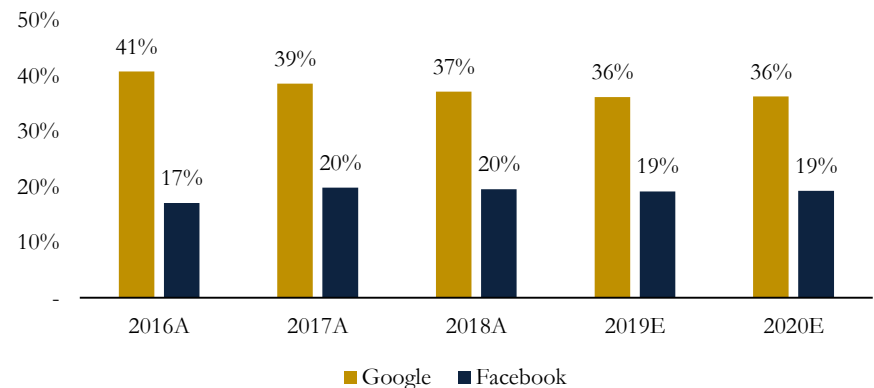
## Apps



## Search



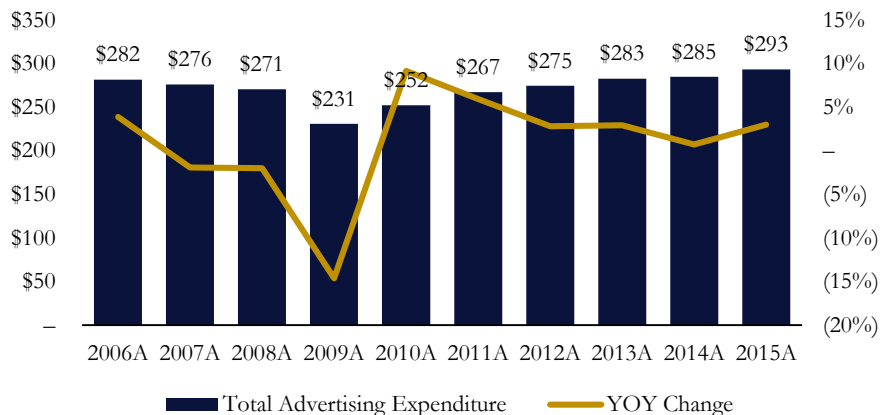
## Digital Advertising



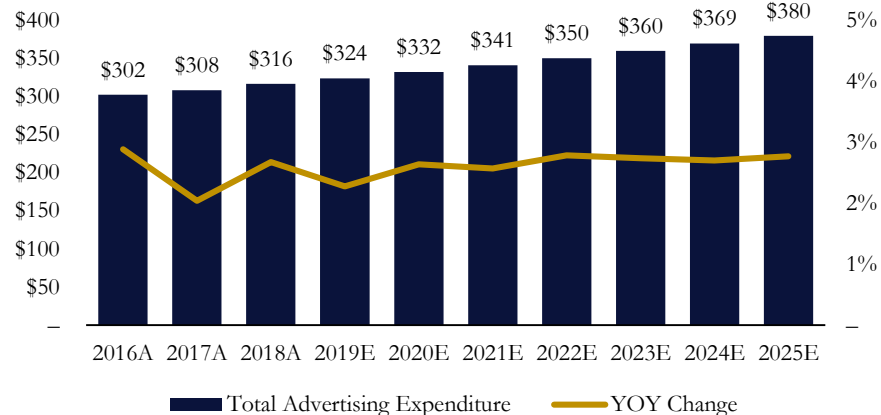


# ... in a Growing Market

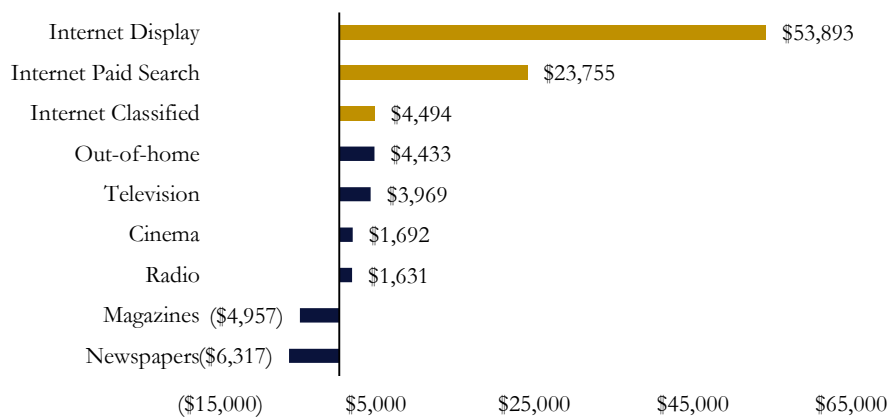
## Historical Ad Expenditure (\$bn)



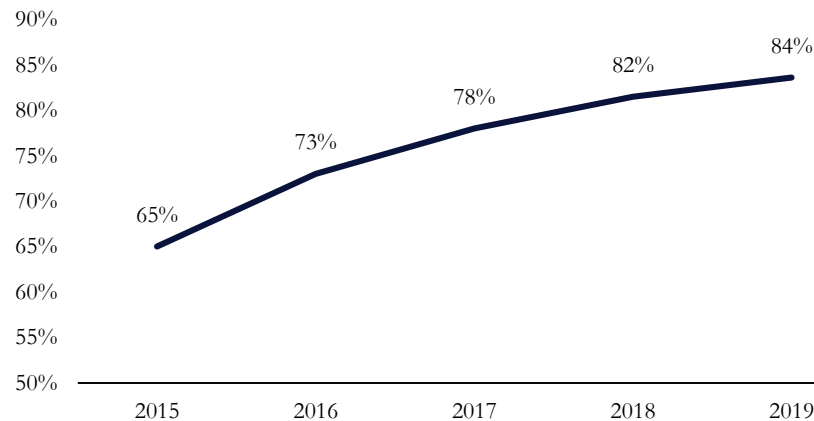
## Projected Ad Expenditure (\$bn)



## Global Growth Contribution by Channel (\$mm)



## Programmatic Ad Buying as a % of Digital Ads

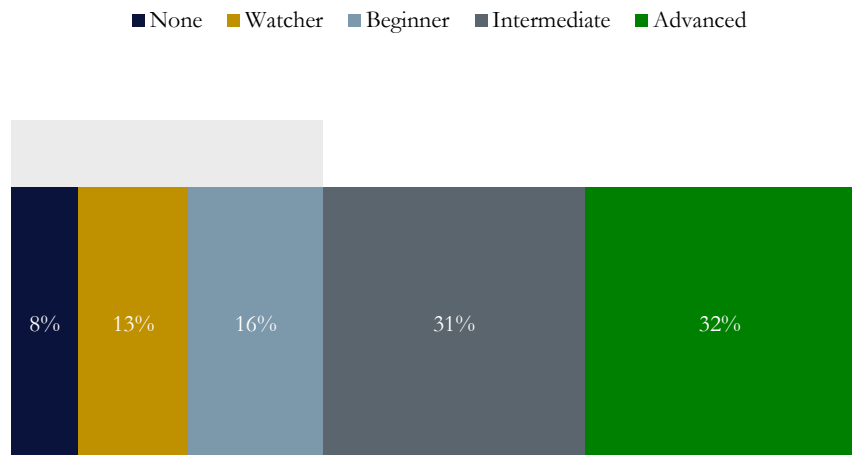




# Growth Story (Cont'd.)

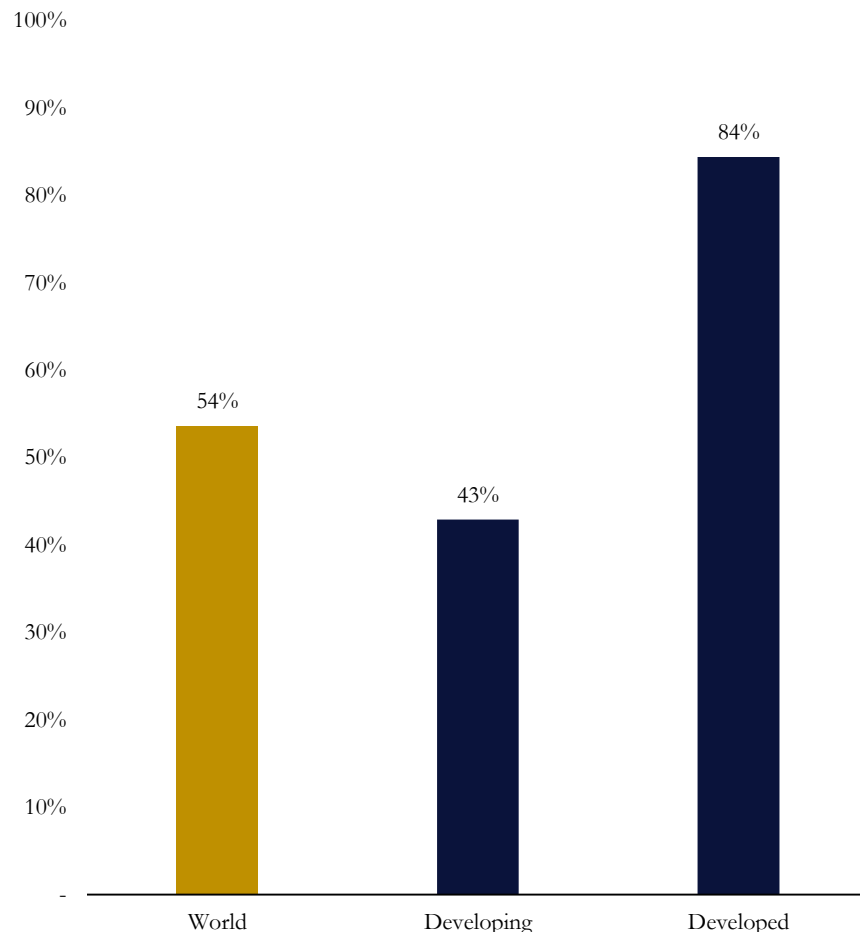
*There is a large TAM in Cloud offerings and worldwide platform services.*

## Enterprise Cloud



Google historical target audience, with potential to offer increased analytics to more developed users with Looker acquisition

## Worldwide Internet Access (2017)

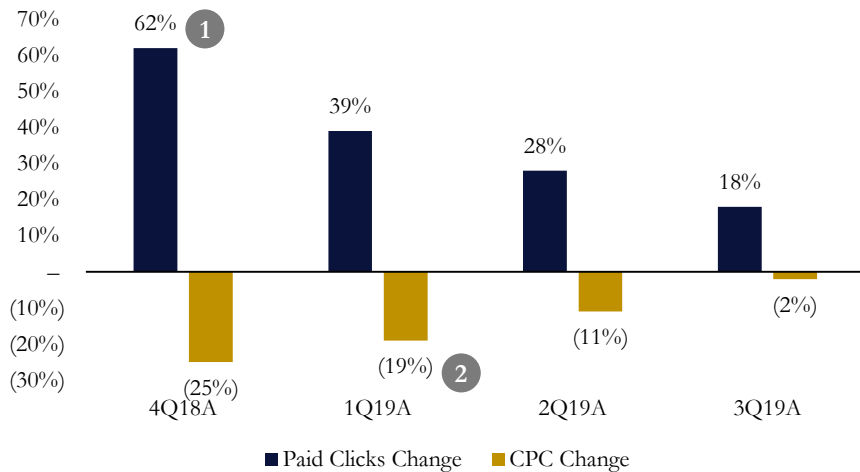




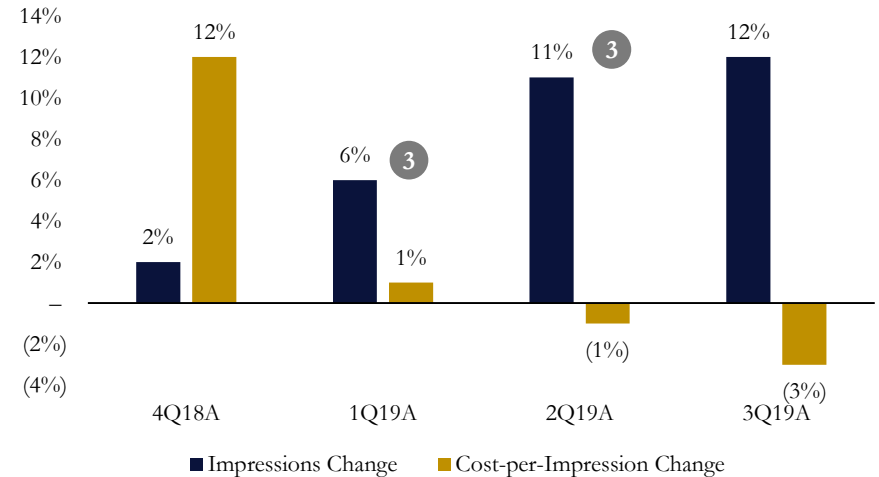
# Cost-per-Click and Paid Clicks Change

*Alphabet's key metrics of top line growth have somewhat stabilized in the past two quarters.*

## Q3'19 LTM Google Properties



## Q3'19 LTM Google Network Members' Properties



### Drivers

- 1 High Paid Clicks Change driven by increasing YouTube engagement and increases in mobile search queries. Conversely, these drivers of volume growth are also lower margin, driving down cost-per-click
- 2 Foreign exchange headwinds and increased YouTube engagement driving down margins
- 3 Significant increase in quarterly impressions driven by growth in programmatic advertising. This method allows advertisers to buy ads in real time, instead of manual negotiations and pre-set prices. As of 2019, programmatic advertising accounts for 84% of total digital ad spending

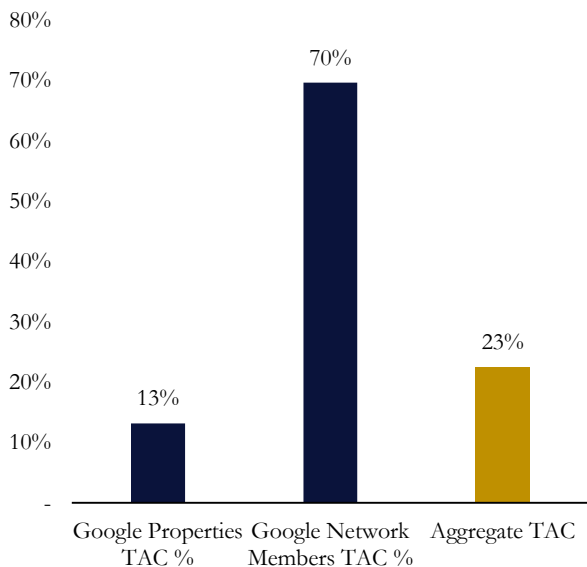


# Traffic Acquisition Cost Stabilized

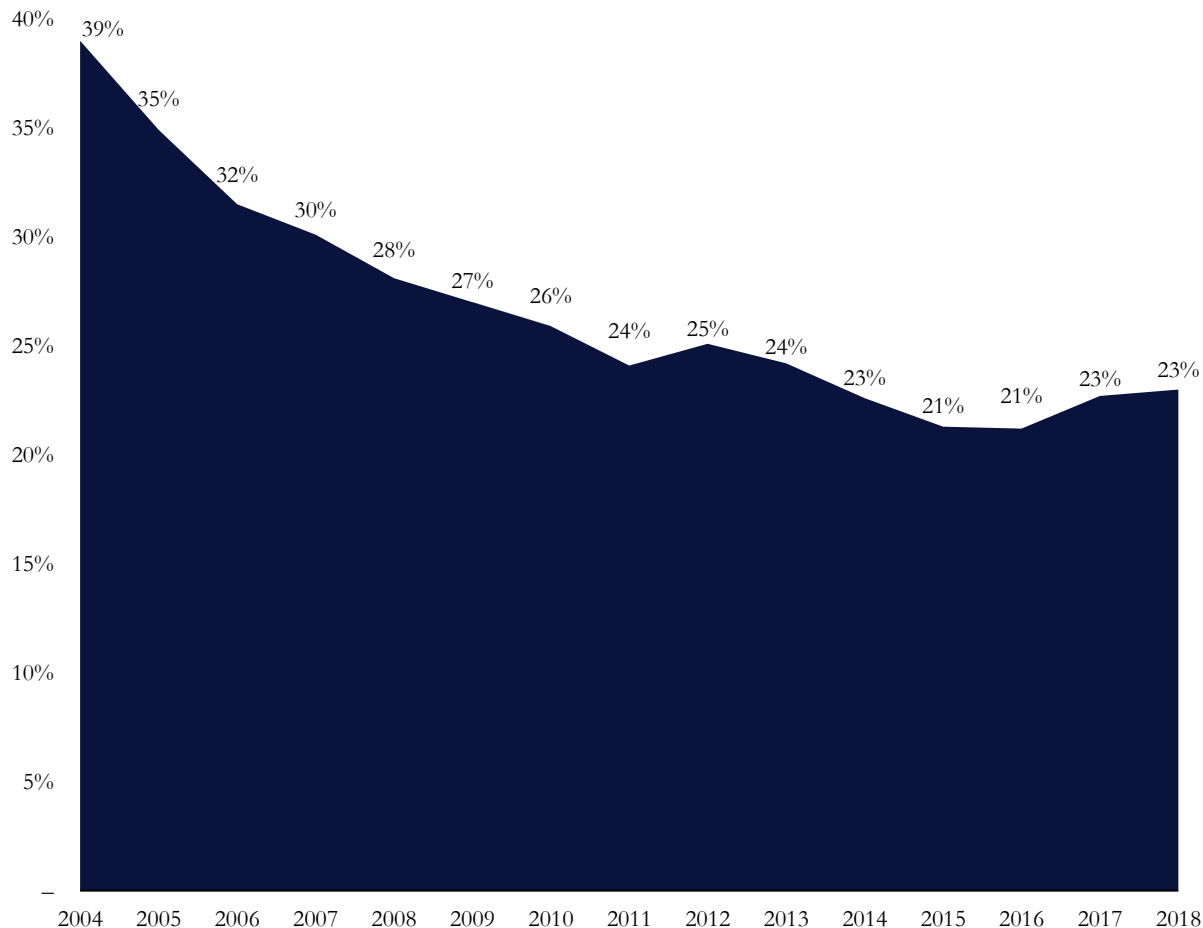
*Alphabet's scale allows the Company to maintain a low aggregate Traffic Acquisition Cost (TAC); however, this will likely increase with the shift to mobile.*

Traffic acquisition cost represents the costs incurred by Alphabet when gaining qualified traffic, i.e., paying Safari to be the default search engine, or sharing ad revenue with a website in exchange for its ad space

## LTM TAC



## Aggregate TAC (2004 – 2018)



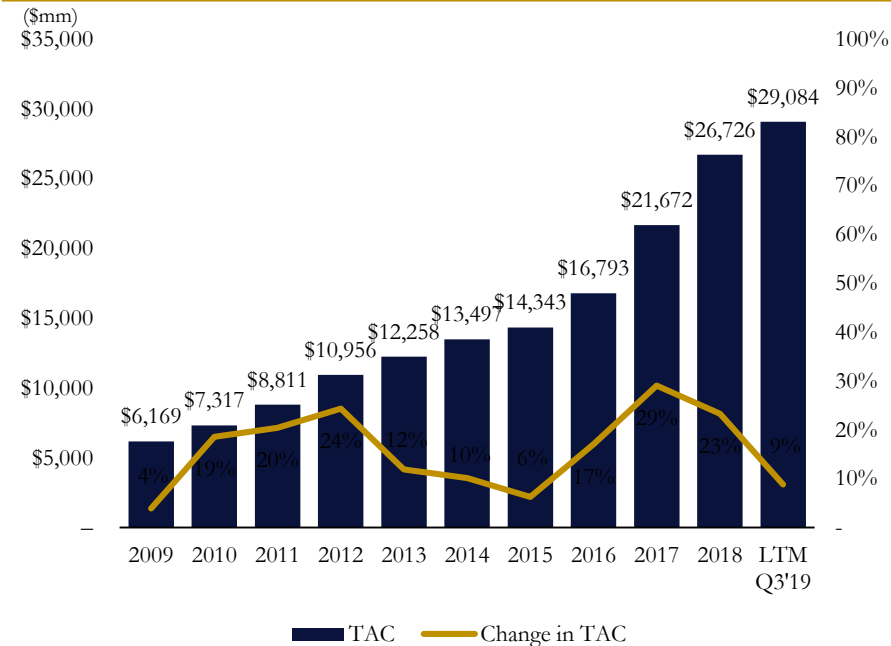




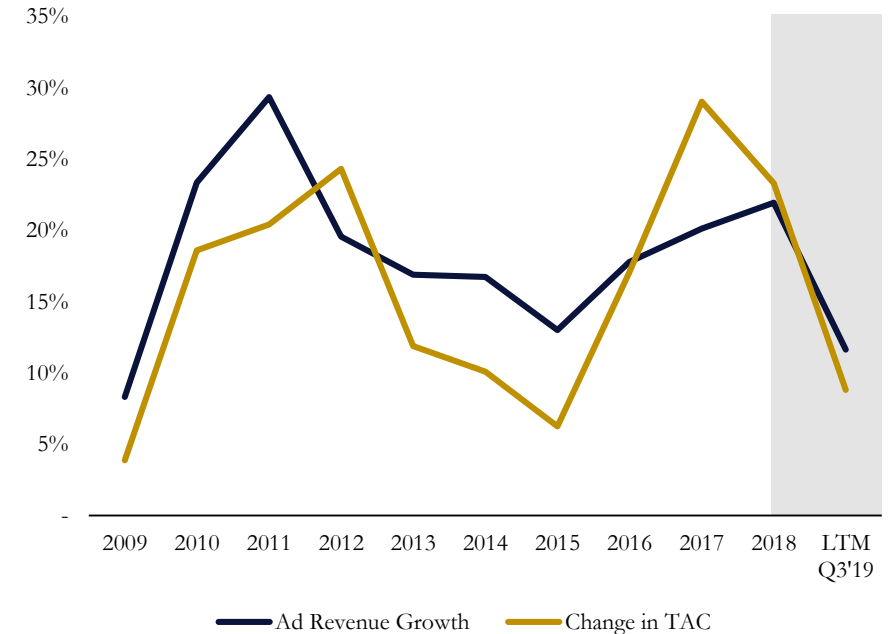
# Revenue Growth Outpacing TAC Growth

*Alphabet experiencing increased benefits to scale in growth in revenues without a proportionate increase in TAC.*

## TAC



## Change in TAC vs Revenue Growth



### Selected Commentary

- > TAC has increased at a 16% CAGR over the last ten years and represents ~40% of total cost of revenues
- > Revenue growth has largely mirrored TAC growth in past years. However, revenue growth has outpaced change in TAC in the last twelve months



# 1 Primary Discovery – Regulation Risk

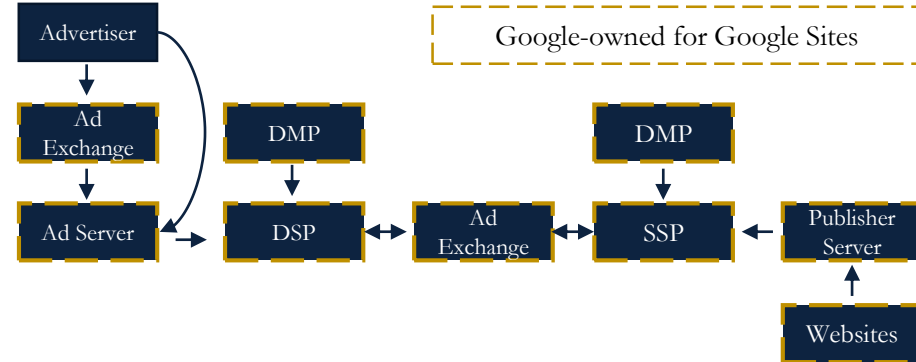
*The market fundamentally misunderstands and misprices Alphabet’s regulation risk.*

## Professor Roger Alford’s Background

- > Spent two years in the Antitrust Division of the U.S. Department of Justice
  - Managed Antitrust Division’s international work, including promoting the enforcement of antitrust laws around the world
- > Previously taught at Notre Dame and practiced law in D.C.



## Digital Advertising Supply Chain



## Major Findings

EU only provides injunctive relief

- > European commission only levies fines or provides injunctive relief (i.e., changing user preference defaults)
- > Have never broken up a firm before

Still a consumer-focused investigation

- > Believe that Google’s monopoly over the supply chain increases total advertising costs, which are passed on to consumer through product pricing
- > DOJ thesis is that digital advertising is cheap, but it could be cheaper with competition

DOJ takes issue with Google’s ad supply chain

- > DOJ’s issue is not with Google’s search / internet dominance
- > DOJ may work to create competition within ad supply chain

Should monitor GOOG acquisition activity

- > Alford stated that, historically, firms that genuinely fear antitrust regulation will cease acquisition activity
- > GOOG just closed Looker acquisition and is said to be considering Tik Tok rival acquisition



2

# Other Bets Valuation

Based on certain conservative assumptions, I estimated an incremental equity value of ~\$15bn.



### Assumptions

Estimated MoM	3.0x
Cost of Capital	30%
Investment	(1.0%)

Investment in Other Bets	\$34,457
(x) Estimated MoM	3.0x
Potential Payoff	103,371
(-) Investments	(34,457)
Value @ 2025	68,914
(x) Disc. Factor	0.182
Value @ 2020	\$12,522

### Assumptions

Estimated MoM	4.0x
Cost of Capital	30%
Investment	(3.0%)

Investment in Other Bets	\$67,847
(x) Estimated MoM	4.0x
Potential Payoff	271,390
(-) Investments	(67,847)
Value @ 2025	203,542
(x) Disc. Factor	0.182
Value @ 2020	\$36,985

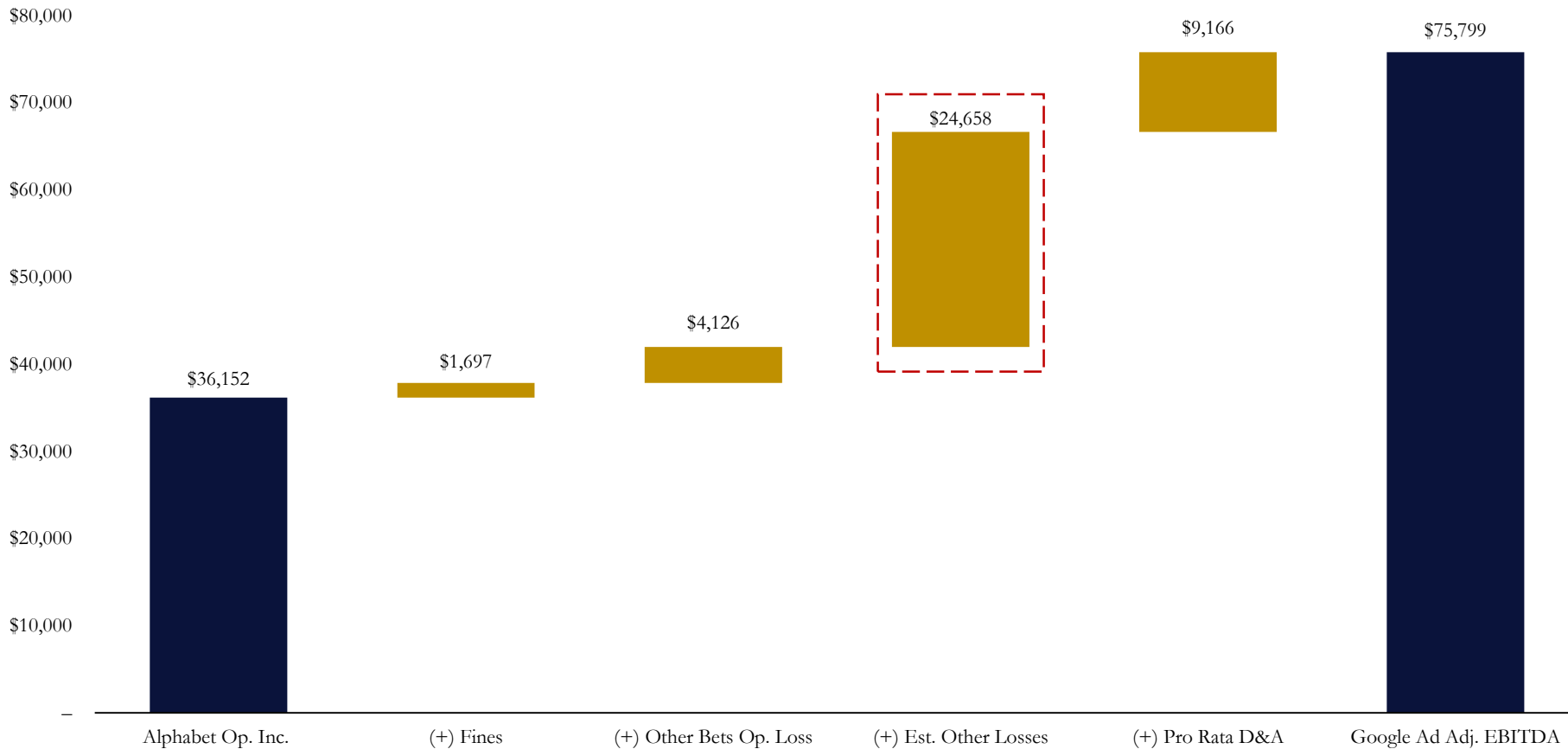
		MoM				
		0.0x	1.5x	3.0x	4.5x	6.0x
Investment	(2.0%)	1,597	1,597	1,597	1,597	1,597
	(1.5%)	1,597	1,597	1,597	1,597	1,597
	(1.0%)	1,597	1,597	\$1,597	1,597	1,597
	(0.5%)	1,597	1,597	1,597	1,597	1,597
	-	1,597	1,597	1,597	1,597	1,597



3

# Google Adjusted EBITDA Calc

*After adding back Alphabet's EBITDA-dilutive segments, the core ad business trades at a ~10x multiple.*



Key Assumptions	Alphabet Op. Inc.	(+) Fines	(+) Other Bets Op. Loss	(+) Est. Other Losses	(-) Pro Rata D&A	Google Ad Adj. EBITDA
	> Filings	> Recent EU Fines	> Filings	> Estimated using segment revenue, FB's op margin, and pro rata allocation of COGS	> SBC / D&A allocated by revenue share	> As compared to LTM Q3'19 EBITDA of \$50bn

Source: AIM / Weetman 2019, GOOG filings.



# Final Recommendation

# Alphabet

## Recommendation: Buy

Valuation Method	Weight	Implied Price	Contribution
Discounted Cash Flow (PGR)	70%	\$1,587	\$1,111
Discounted Cash Flow (Multiple)	10%	\$2,567	\$257
Comparable Companies (TEV / Sales)	--	\$1,405	--
Comparable Companies (TEV / EBITDA)	20%	\$1,891	\$378
Comparable Companies (P / E)	--	\$1,549	--
<b>Intrinsic Value per Share</b>			<b>\$1,746</b>
Current Price (as of January 15, 2020)			\$1,431
<i>Upside/(Downside) to Current</i>			<i>22%</i>

- ✓ Market fundamentally misunderstands regulation risk – regulation will not impact core Google properties, but the ad supply chain. Additionally, the timeline on potential regulation far exceeds potential investment horizon
- ✓ Other Bets segments represents a free option for potential upside, especially given Alphabet’s strong history as an operator
- ✓ Core Ad business demands a low multiple of ~10x and Alphabet as a whole trades significantly below peers
- ? Possibility for continued European Commission / DOJ fines, but risk mitigated by large cash balance / strong cash flow generation
- ✗ Tail risk of comprehensive antitrust regulation driven by 2020 election outcome



## Appendix



# Comps

## Selected Comparable Peers

Company	Ticker	Price	Equity Value	Net Debt	TEV	P/E		EV / EBITDA		EV / Sales	
						IQ_LTM	CY2020	IQ_LTM	FY2020	IQ_LTM	FY2020
<b>Search &amp; Information Services</b>											
Microsoft	NASDAQ:MSFT	165.0117	1,244,869	(51,039)	1,193,830	44.6x	29.4x	20.8x	18.4x	9.2x	8.1x
Facebook	NASDAQ:FB	220.9231	630,900	(43,137)	587,763	43.1x	24.1x	20.7x	13.4x	8.8x	6.8x
Booking	NASDAQ:BKNG	2053.26	87,041	1,672	88,713	28.0x	17.9x	15.3x	14.1x	5.9x	5.5x
Baidu	NASDAQ:BIDU	140.525	48,302 <span style="color: green;">▲</span>	(19,152)	29,150	30.2x	21.5x	14.9x	10.3x	1.9x	1.7x
eBay	NASDAQ:EBAY	35.81	28,742	5,326	34,068	26.7x	12.3x	10.9x	9.0x	3.1x	3.1x
Yandex	NASDAQ:YNDX	43.76	11,559 <span style="color: red;">▼</span>	(552)	11,007	31.7x	22.1x	18.0x	9.8x	4.1x	3.2x
Criteo	NASDAQ:CRTO	14.475	885	(220)	665	12.1x	6.1x	3.1x	2.3x	0.3x	0.7x
<b>Mean</b>						30.9x	19.1x	14.8x	11.0x	4.8x	4.1x
<b>25th</b>						27.4x	15.1x	12.9x <span style="color: green;">▲</span>	9.9x	2.5x	2.4x
<b>75th</b>						37.4x	23.1x	19.3x <span style="color: green;">▲</span>	13.9x	7.4x	6.2x
<b>Median</b>						30.2x	21.5x	15.3x	10.3x	4.1x	3.2x
<b>Tech</b>											
Microsoft	NASDAQ:MSFT	165.0117	1,244,869	(51,039)	1,193,830	44.6x	29.4x	20.8x	18.4x	9.2x	8.1x
Apple	NASDAQ:AAPL	313.342	1,364,923	7,490	1,372,413	35.4x	22.8x	17.9x	16.4x	5.3x	4.8x
Amazon	NASDAQ:AMZN	1869.3661	923,184	31,190	954,374	112.7x	68.4x	27.9x	19.1x	3.6x	2.9x
Facebook	NASDAQ:FB	220.9231	630,900	(43,137)	587,763	43.1x	24.1x	20.7x	13.4x	8.8x	6.8x
Alibaba	NYSE:BABA	223.18	603,774	(76,166)	527,608	5.1x	3.9x	4.2x	2.7x	1.2x	0.8x
Netflix	NASDAQ:NFLX	337.5695	153,213	9,104	162,317	120.0x	62.7x	66.0x	36.2x	8.6x	6.6x
<b>Mean</b>						60.2x	35.2x	26.2x <span style="color: green;">▲</span>	17.7x	6.1x	5.0x
<b>25th</b>						37.4x <span style="color: green;">▲</span>	23.1x	18.6x <span style="color: green;">▲</span>	13.4x	4.0x	4.3x
<b>75th</b>						95.7x <span style="color: green;">▲</span>	29.4x	26.1x <span style="color: green;">▲</span>	18.4x	8.8x	6.6x
<b>Median</b>						43.9x	26.8x	20.7x	17.4x	6.9x	5.7x
Alphabet	GOOG.L	1444.24	986,760	(107,258)	879,502	44.3x	24.8x	17.6x	13.6x	5.7x	4.7x



# Other Bets / Google Ad EBITDA Build

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Revenue	12	327	448	288	477	595	664						
Capex	(187)	(501)	(869)	(1,365)	(493)	(181)	(130)						
Op. Loss	(527)	(1,942)	(3,567)	(2,741)	(2,734)	(3,358)	(1,978)						
Net Investment	(702)	(2,116)	(3,988)	(3,818)	(2,750)	(2,944)	(1,444)	(1,878)	(2,180)	(2,525)	(2,914)	(3,353)	(3,844)
Run Rate		(2,818)	(6,806)	(10,624)	(13,374)	(16,318)	(17,762)	(19,640)	(21,821)	(24,345)	(27,260)	(30,613)	(34,457)

## MEMO

Total Revenue	55,519	66,001	74,989	90,272	110,855	136,819	160,770	187,818	218,044	252,457	291,431	335,318	384,444
as a % of rev.	(1.3%)	(3.2%)	(5.3%)	(4.2%)	(2.5%)	(2.2%)	(0.9%)	(1.0%)	(1.0%)	(1.0%)	(1.0%)	(1.0%)	(1.0%)

Alphabet Op. Inc	36,152	Ad Revenue	129,872
(+) Fines	1,697	(-) Cost of Revenues	(62,334)
(+) Other Bets Operating Loss	4,126	Gross Margin	67,538
(+) Est. Other Losses <b>a</b>	24,658	Margin	52%
(+) Pro Rata D&A	9,166	(-) Estimated Opex	(2,602)
Google AD Adj. EBITDA	75,799	Estimated Op Inc	64,936
Est. Margin	58%	Est. Margin	<b>50%</b>
Current Market TEV	888,703	Google Op Inc	40,278
Implied EBITDA Multiple	11.7x	Est. Other Loss <b>a</b>	(24,658)





# Revenue Build (Base)

	Q1 '19	Q2 '19	Q3 '19	2018	2019	2020	2021	2022	2023	2024	2025
Google Properties	25,682	27,335	28,647	96,336	112,265	130,267	150,504	173,132	198,297	226,128	256,734
% YOY Growth	16.7%	17.5%	16.0%		16.5%	16.0%	15.5%	15.0%	14.5%	14.0%	13.5%
Google Network Members	5,038	5,266	5,269	19,982	21,630	22,974	24,468	26,058	27,752	29,556	31,477
% YOY Growth	8.5%	9.1%	8.0%		8.2%	6.2%	6.5%	6.5%	6.5%	6.5%	6.5%
Google Other Revenues	5,449	6,181	6,428	19,906	26,280	33,982	42,478	52,672	64,787	79,040	95,638
% YOY Growth	25.1%	39.7%	20.0%		32.0%	29.3%	25.0%	24.0%	23.0%	22.0%	21.0%
Other Bets Revenues	170	162	155	595	595	595	595	595	595	595	595
% YOY Growth	13.3%	11.7%	-		-	-	-	-	-	-	-

## MEMO

Total Revenue	36,339	38,944	40,499	136,819	160,770	187,818	218,044	252,457	291,431	335,318	384,444
% YOY Growth	16.7%	19.3%	20.0%		17.5%	16.8%	16.1%	15.8%	15.4%	15.1%	14.7%
Est. Total Digital Ad Spend					333,250	384,960	435,830	479,200	517,510		
% GOOG Share					40%	40%	40%	42%	44%		



# Cost Build (Base)

	2017A	2018A	2019E	2020E	2021E	2022E	2023E	2024E	2025E
(-) TAC to distribution partners	(9,031)	(12,572)	(14,999)	(17,586)	(20,243)	(23,200)	(26,473)	(30,075)	(34,017)
(-) TAC to GNM	(12,641)	(14,154)	(14,776)	(15,255)	(16,344)	(17,511)	(18,760)	(20,098)	(21,530)
(-) Other cost of revenues	(23,911)	(32,823)	(41,863)	(49,260)	(56,691)	(65,639)	(75,772)	(87,183)	(99,956)
<b>(-) Cost of Revenues</b>	<b>(45,583)</b>	<b>(59,549)</b>	<b>(71,637)</b>	<b>(82,101)</b>	<b>(93,279)</b>	<b>(106,350)</b>	<b>(121,005)</b>	<b>(137,356)</b>	<b>(155,503)</b>
(-) R&D	(16,625)	(21,419)	(24,919)	(29,581)	(34,887)	(41,024)	(48,086)	(56,166)	(65,356)
(-) Sales & Marketing	(12,893)	(16,333)	(17,316)	(21,030)	(24,421)	(28,528)	(33,223)	(38,562)	(44,596)
(-) G&A	(6,872)	(6,923)	(8,492)	(9,473)	(10,902)	(12,623)	(14,572)	(16,766)	(19,222)
(-) Fines	-	-	-	-	-	-	-	-	-
<b>(-) Total Costs</b>	<b>(36,390)</b>	<b>(44,675)</b>	<b>(50,727)</b>	<b>(60,085)</b>	<b>(70,210)</b>	<b>(82,175)</b>	<b>(95,881)</b>	<b>(111,493)</b>	<b>(129,173)</b>
<b>MEMO</b>									
Total Revenue	110,855	136,819	162,425	189,461	218,044	252,457	291,431	335,318	384,444
Google Properties Revenue	77,788	96,336	112,265	130,267	150,504	173,132	198,297	226,128	256,734
GNM Revenue	17,587	19,982	21,630	22,974	24,468	26,058	27,752	29,556	31,477
<b>MARGINS</b>									
TAC to distribution partners	(11.6%)	(13.1%)	(13.4%)	(13.5%)	(13.5%)	(13.4%)	(13.4%)	(13.3%)	(13.3%)
TAC to GNM	(71.9%)	(70.8%)	(68.3%)	(66.4%)	(66.8%)	(67.2%)	(67.6%)	(68.0%)	(68.4%)
Other cost of revenues	(21.6%)	(24.0%)	(25.8%)	(26.0%)	(26.0%)	(26.0%)	(26.0%)	(26.0%)	(26.0%)
Research and development	(15.0%)	(15.7%)	(16.2%)	(17.5%)	(17.8%)	(18.0%)	(18.3%)	(18.5%)	(18.8%)
Sales and marketing	(11.6%)	(11.9%)	(10.7%)	(11.1%)	(11.2%)	(11.3%)	(11.4%)	(11.5%)	(11.6%)
General and administrative	(6.2%)	(5.1%)	(5.2%)	(5.0%)	(5.0%)	(5.0%)	(5.0%)	(5.0%)	(5.0%)
Fines	-	-	-	-	-	-	-	-	-



# NWC Build (Base)

	Historical			Projected						
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Accounts receivable, net of allowances	14,137	18,336	20,838	22,023	25,729	29,869	34,583	39,922	45,934	52,664
Income taxes receivable, net	95	369	355	350	350	350	350	350	350	350
Inventory	268	749	1,107	1,178	1,799	2,556	3,496	4,641	6,021	7,669
Other current assets	4,575	2,983	4,236	4,823	5,635	6,541	7,574	8,743	10,060	11,533
<b>Non-Cash Current Assets</b>	<b>\$19,075</b>	<b>\$22,437</b>	<b>\$26,536</b>	<b>\$28,374</b>	<b>\$33,513</b>	<b>\$39,316</b>	<b>\$46,003</b>	<b>\$53,656</b>	<b>\$62,365</b>	<b>\$72,216</b>
Accounts payable	2,041	3,137	4,378	4,907	5,736	6,645	7,721	8,951	10,349	11,929
Accrued compensation and benefits	3,976	4,581	6,839	6,369	7,105	8,177	9,467	10,929	12,574	14,417
Accrued expenses and other current liabilities	6,144	10,177	16,958	17,909	20,525	23,320	26,587	30,251	34,339	38,876
Accrued revenue share	2,942	3,975	4,592	5,627	6,574	7,632	8,836	10,200	11,736	13,456
Deferred revenue	1,099	1,432	1,784	2,090	2,442	2,835	3,282	3,789	4,359	4,998
Income taxes payable, net	554	881	69	—	—	—	—	—	—	—
<b>Non-Cash Current Liabilities</b>	<b>\$16,756</b>	<b>\$24,183</b>	<b>\$34,620</b>	<b>\$36,902</b>	<b>\$42,381</b>	<b>\$48,607</b>	<b>\$55,894</b>	<b>\$64,120</b>	<b>\$73,357</b>	<b>\$83,675</b>
Working capital	\$2,319	(\$1,746)	(\$8,084)	(\$8,528)	(\$8,869)	(\$9,291)	(\$9,890)	(\$10,463)	(\$10,993)	(\$11,459)
<b>Change in NWC</b>		<b>(\$4,065)</b>	<b>(\$6,338)</b>	<b>(\$444)</b>	<b>(\$341)</b>	<b>(\$422)</b>	<b>(\$599)</b>	<b>(\$573)</b>	<b>(\$529)</b>	<b>(\$466)</b>
<b>DRIVERS</b>										
DSO		53	52	50	50	50	50	50	50	50
Income taxes receivable				350	350	350	350	350	350	350
DIO		4	6	6	8	10	12	14	16	18
Other CA % of rev		2.7%	3.1%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
DPO		21	23	25	25.5	26	26.5	27	27.5	28
Comp as % of G&A		66.7%	84.2%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Accrued Expenses % of COGS		22.3%	28.5%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Accrued revenue as % of revenue		3.6%	3.4%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Deferred revenue as % of revenue		1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%
<b>MEMO</b>										
Revenue	90,272	110,855	136,819	160,770	187,818	218,044	252,457	291,431	335,318	384,444
Cost of revenue	35,138	45,583	59,549	71,637	82,101	93,279	106,350	121,005	137,356	155,503
G&A	6,985	6,872	8,126	8,492	9,473	10,902	12,623	14,572	16,766	19,222
Days	365	365	365	365	365	365	365	365	365	365

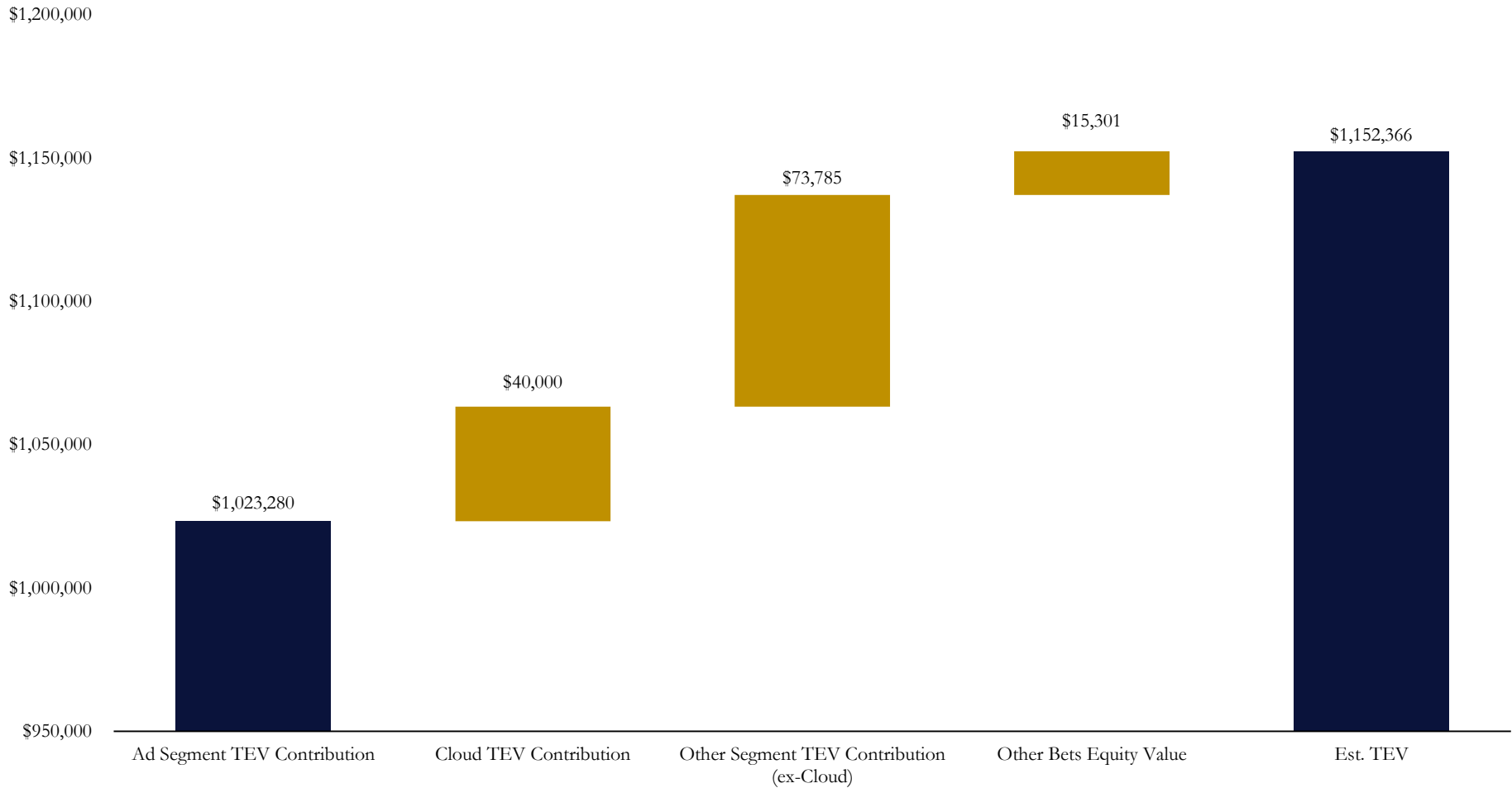


# PPE Build (Base)

	Historical			Projected						
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Beginning Net PPE	29,016	34,234	42,383	59,719	70,977	82,918	96,263	111,455	128,661	148,037
(+) Capex	10,212	13,184	25,139	22,508	26,295	30,526	35,344	40,800	46,945	53,822
(-) Depreciation	(6,144)	(6,915)	(9,035)	(11,250)	(14,353)	(17,182)	(20,151)	(23,594)	(27,569)	(32,134)
Ending Net PPE	34,234	42,383	59,719	70,977	82,918	96,263	111,455	128,661	148,037	169,725
<b>DRIVERS</b>										
Revenue	90,272	110,855	136,819	160,770	187,818	218,044	252,457	291,431	335,318	384,444
Net PPE % of Revenue	37.9%	38.2%	43.6%	44.1%	44.1%	44.1%	44.1%	44.1%	44.1%	44.1%
Capex % of Revenue	11.3%	11.9%	18.4%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%



# SOTP (Base)



Key Assumptions	Ad Segment TEV Contribution	Cloud TEV Contribution	Other Segment TEV Contribution (ex-Cloud)	Other Bets Equity Value	Est. TEV
	> Previous EBITDA build, 13.5x multiple (25% disc. to FB multiple)	> Run-Rate Cloud Revenue, 5x Revenue multiple	> Filings, 5x Rev	> Estimated using previously discussed build	> Debatable if conglomerate discount should be included



# WACC

## Selected Comparable Peers

Company	Ticker	Equity Value	Total Debt	Marginal Tax Rate	Debt / Equity	Levered Beta		Unlevered Beta		
						2 Year	5 Year	2 Year	5 Year	
<b>Search &amp; Information Services</b>										
Microsoft	NASDAQ:MSFT	1,244,869	85,570	10.0%	6.9%	1.067	1.228	1.005	1.157	
Facebook	NASDAQ:FB	630,900	9,132	16.5%	1.4%	1.183	1.042	1.168	1.030	
Booking	NASDAQ:BKNG	87,041	9,111	18.9%	10.5%	1.111	1.126	1.024	1.038	
Baidu	NASDAQ:BIDU	48,302	75,220	15.0%	155.7%	1.369	1.757	0.589	0.756	
eBay	NASDAQ:EBAY	28,742	8,412	20.9%	29.3%	0.934	1.277	0.758	1.037	
Yandex	NASDAQ:YNDX	29,481	8,098	15.8%	27.5%	0.813	2.002	0.660	1.626	
Criteo	NASDAQ:CRTO	885	189	30.0%	21.3%	0.668	0.734	0.581	0.639	
					<b>Mean</b>	36.1%	1.021	1.310	0.827	1.040
					<b>Median</b>	21.3%	1.067	1.228	0.758	1.037
<b>Tech</b>										
Microsoft	NASDAQ:MSFT	1,244,869	85,570	10.0%	6.9%	1.067	1.228	1.005	1.157	
Apple	NASDAQ:AAPL	1,364,923	108,047	15.7%	7.9%	1.090	1.234	1.022	1.157	
Amazon	NASDAQ:AMZN	923,184	74,591	-	8.1%	1.362	1.558	1.260	1.442	
Facebook	NASDAQ:FB	630,900	9,132	21.0%	1.4%	1.183	1.042	1.169	1.030	
Alibaba	NYSE:BABA	603,774	164,844	15.0%	27.3%	1.436	2.280	1.165	1.851	
Netflix	NASDAQ:NFLX	153,213	13,539	21.0%	8.8%	1.692	1.229	1.582	1.149	
					<b>Mean</b>	10.1%	1.305	1.429	1.201	1.298
					<b>Median</b>	8.0%	1.272	1.232	1.167	1.157
<b>Alphabet</b>		<b>995,961</b>	<b>13,338</b>	<b>18.1%</b>	<b>1.3%</b>	<b>1.141</b>	<b>0.982</b>	<b>1.129</b>	<b>0.972</b>	

## Implied Alphabet Beta

	Historical		Peers (2 Year)		Peers (5 Year)	
	2-Year	5-Year	Mean	Median	Mean	Median
Search & Information Services Unlevered Beta			0.827	0.758	1.040	1.037
(x) Weight			85%	85%	85%	85%
Tech Unlevered Beta			1.201	1.167	1.298	1.157
(x) Weight			15%	15%	15%	15%
<b>Unlevered Beta</b>	<b>1.129</b>	<b>0.972</b>	<b>0.883</b>	<b>0.820</b>	<b>1.079</b>	<b>1.055</b>
Cash Beta Weight	39%	39%	39%	39%	39%	39%
Implied Operating Asset Weight	61%	61%	61%	61%	61%	61%
Cash Beta	1.000	1.000	1.000	1.000	1.000	1.000
Operating Asset Beta	1.211	0.954	0.807	0.704	1.130	1.091
Target Debt / Equity	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%
Marginal Tax Rate	18.1%	18.1%	18.1%	18.1%	18.1%	18.1%
(x) Levering Factor	1.02	1.02	1.02	1.02	1.02	1.02
<b>Levered Beta</b>	<b>1.230</b>	<b>0.969</b>	<b>0.820</b>	<b>0.715</b>	<b>1.147</b>	<b>1.108</b>

## WACC

	Historical			Peer		
	Choice	Low	High	Choice	Low	High
Levered beta	1.230	1.205	1.255	0.715	0.690	0.740
(x) Equity risk premium	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
(+) Risk free rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Cost of Equity	9.15%	9.03%	9.28%	6.58%	6.45%	6.70%
Pre-tax cost of debt	2.2%	2.1%	2.3%	2.2%	2.3%	2.1%
(x) Tax Shield	82%	82%	82%	82%	82%	82%
After-tax cost of debt	2%	2%	2%	2%	2%	2%
Cost of equity	9.2%	9.0%	9.3%	6.6%	6.5%	6.7%
(x) Target equity / total capital	98.1%	98.1%	98.1%	98.1%	98.1%	98.1%
Cost of debt	1.8%	1.7%	1.9%	1.8%	1.9%	1.7%
(x) Target debt / total capital	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%
<b>WACC</b>	<b>9.0%</b>	<b>8.9%</b>	<b>9.1%</b>	<b>6.5%</b>	<b>6.4%</b>	<b>6.6%</b>
Weight to WACCs	50.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Contribution	4.5%	0.9%	0.9%	0.6%	0.6%	0.7%
<b>Final WACC</b>	<b>8.3%</b>					

## Forward WACC Assumptions

Beta Choice	<b>2 Year</b>
Cash Weight	<b>39%</b>
Estimated Cash Beta	<b>1.000</b>
LT Marginal Tax Rate	<b>18%</b>
Weight to Search Beta	<b>85%</b>
Risk free – US 10Y	<b>3.0%</b>
Equity risk premium	<b>5.0%</b>
Pre-tax cost of debt	<b>2.2%</b>
Beta sensitivity step	<b>0.025</b>
Pre-tax cost of debt step	<b>0.10%</b>

## Target Capital Structure

LTM EBITDA	48,090
(x) Target Debt / EBITDA	<b>0.4x</b>
Target Debt	19,236
Implied Diff. in Debt	5,898
Current debt incl. op leases	13,338
(+) Implied Incr. (Decr.) in Debt	5,898
Target total debt	19,236
(+) Current diluted equity value	995,961
Target total capital	1,015,197
Target Debt / Equity	1.9%
Target Debt / Total Capital	1.9%



# DCF Outputs (Base)

## Terminal Value – PGR

2034 Unlevered FCF	78,424
Perpetual Growth Rate	2.5%
Implied 2035 Unlevered FCF	80,385
WACC	8.3%
Terminal Value @ 2034	1,397,156
Discount Factor	0.3
Discounted Terminal Value	408,693

## Terminal Value – EV / EBITDA

2025 EBITDA	157,727
EV / EBITDA	14.0x
Implied 2025 TEV	2,208,173
Discount Factor	0.60
Discounted Terminal Value	1,318,747

Enterprise & Equity Value	PGR	EV/EBITDA
Sum of Disc. CFs	464,699	205,296
Disc. Terminal Value	408,693	1,318,747
Enterprise Value	873,393	1,524,043
(-) Debt	(4,074)	(4,074)
(-) Capitalized Op. Leases	(9,713)	(9,713)
(+) Excess Cash	121,056	121,056
(+) Other net non. Op assets	11,583	11,583
Equity Value (GOOG)	992,245	1,642,895
(+) Other Bets Equity Val	12,522	12,522
<b>Alphabet</b>	<b>1,004,767</b>	<b>1,655,417</b>
Diluted Shares Out ('000)	655	655
Estimated Share Price (ex-Bets)	\$1,515	\$2,508
Estimated Share Price (incl. Bets)	\$1,534	\$2,527
Current Share Price	\$1,444	\$1,444
Upside / (Downside) ex-Bets	4.9%	73.7%
Upside / (Downside) incl. Bets	6.2%	75.0%

## Sensitivity Analysis – Base Case

		Perpetual Growth				
		1.5%	2.0%	2.5%	3.0%	3.5%
WACC	7.3%	1,509	1,571	1,646	1,739	1,857
	7.8%	1,459	1,512	1,574	1,650	1,743
	8.3%	1,417	1,462	<b>\$1,515</b>	1,578	1,653
	8.8%	1,381	1,420	1,465	1,518	1,581
	9.3%	1,349	1,383	1,422	1,468	1,521

		EV / EBITDA				
		12.0x	13.0x	14.0x	15.0x	16.0x
WACC	7.3%	2,339	2,492	2,645	2,798	2,950
	7.8%	2,279	2,427	2,575	2,724	2,872
	8.3%	2,221	2,364	<b>\$2,508</b>	2,652	2,796
	8.8%	2,164	2,304	2,443	2,583	2,722
	9.3%	2,109	2,245	2,380	2,516	2,651

		MoM				
		0.0x	1.5x	3.0x	4.5x	6.0x
Investment	(2.0%)	1,501	1,522	1,543	1,564	1,586
	(1.5%)	1,503	1,521	1,539	1,556	1,574
	(1.0%)	1,505	1,520	<b>\$1,534</b>	1,548	1,563
	(0.5%)	1,508	1,518	1,529	1,540	1,551
	–	1,510	1,517	1,525	1,532	1,539



# Scenario Analysis – PGR

Scenario Analysis				
PGR				
	Base	Upside	Downside	Regulation
PV Future Cash Flows	464,699	594,951	384,393	380,313
PV Terminal Value	408,693	594,547	304,063	254,677
Enterprise Value	\$873,393	\$1,189,498	\$688,456	\$634,989
Probability	–	80%	10%	5%
Weighted Enterprise Value				\$883,836
(-) Debt				(4,074)
(-) Capitalized Op. Leases				(9,713)
(+) Excess Cash				121,056
(+) Other net non. Op assets				11,583
Google Equity Value				\$1,002,688
(+) Other Bets Equity Value				12,522
Alphabet Equity Value				\$1,015,210
Diluted Shares Outstanding				655
Estimated Share Price (ex-Bets)				\$1,531
Estimated Share Price (incl. Bets)				\$1,550
Current Share Price				1,444
Upside / (Downside) ex-Bets				6.0%
Upside / (Downside) incl. Bets				7.3%





# Scenario Analysis – EV / EBITDA

EV/EBITDA					
	Base	Upside	Downside	Regulation	
PV Future Cash Flows	205,296	251,362	192,017	201,278	
PV Terminal Value	1,318,747	1,552,950	1,050,793	1,072,859	
Enterprise Value	\$1,524,043	\$1,804,312	\$1,242,810	\$1,274,138	
Probability	–	80%	10%	5%	5%
Weighted Enterprise Value					\$1,525,513
(-) Debt					(4,074)
(-) Capitalized Op. Leases					(9,713)
(+) Excess Cash					121,056
(+) Other net non. Op assets					11,583
Google Equity Value					\$1,644,365
(+) Other Bets Equity Value					12,522
Alphabet Equity Value					\$1,656,887
Diluted Shares Outstanding					655
Estimated Share Price (ex-Bets)					\$2,510
Estimated Share Price (incl. Bets)					\$2,529
Current Share Price					1,444
<i>Upside / (Downside) ex-Bets</i>					73.9%
<i>Upside / (Downside) incl. Bets</i>					75.2%



# Valuation Summary

## Incl. Other Bets

Method	Weight	Valuation	Contr.
Discounted Cash Flow (PGR)	70%	\$1,550	\$1,085
Discounted Cash Flow (Multiple)	10%	\$2,529	\$253
Implied Forward P/E	–	\$1,405	–
Implied Forward EV/EBITDA	20%	\$1,891	\$378
Implied Forward EV/Sales	–	\$1,549	–
Implied Intrinsic Value			\$1,716
Market Price (as of 1/14/2019)			\$1,431
<b>Implied Upside / (Downside)</b>			<b>20%</b>

## Excl. Other Bets

Method	Weight	Valuation	Contr.
Discounted Cash Flow (PGR)	70%	\$1,515	\$1,060
Discounted Cash Flow (Multiple)	10%	\$2,510	\$251
Implied Forward P/E	–	\$1,405	–
Implied Forward EV/EBITDA	20%	\$1,891	\$378
Implied Forward EV/Sales	–	\$1,549	–
Implied Intrinsic Value			\$1,690
Market Price (as of 1/14/2019)			\$1,431
<b>Implied Upside / (Downside)</b>			<b>18%</b>