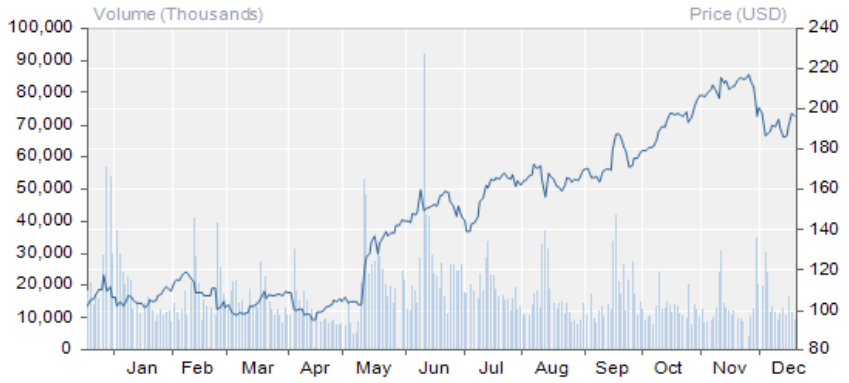
Information Technology

NVIDIA Corporation

Recommendation	NEUTRAL
Target (today's value)	$250.00
Current Price	$223.77
52 week range	$95.17-249.27

Share Data	
Ticker:	NVDA
Market Cap. (Billion):	$134.5
Inside Ownership	4.7%
Inst. Ownership	65.5%
Beta	1.36
Dividend Yield	0.3%
Payout Ratio	13.9%
Cons. Long-Term Growth Rate	12.0%



	'16	'17	'18E	'19E	'20E
Sales (billions)					
Year	$5.0	$6.9	$9.3	$11.5	$14.6
Gr %	7.0%	37.9%	34.8%	23.0%	27.8%
Cons	-	-	$9.4	$11.0	$12.8
EPS					
Year	$1.13	$3.08	$4.54	$6.02	$8.02
Gr %	-1.1%	172.3%	47.4%	32.6%	33.3%
Cons	-	-	$4.19	$4.69	$6.11

Summary: I recommend a neutral rating with a target of $250. NVDA has strong positioning within multiple strong growth verticals in the technology sector. I believe this positioning will lead to both top line growth as well as margin expansion going forward. My neutral rating is based on my belief that strong growth is already priced in the stock by the market. The stock is fairly valued based on my DCF analysis.

Ratio	'16	'17	'18E	'19E	'20E
ROE (%)	13.8%	32.6%	36.1%	36.7%	38%
Industry	14.1%	16.8%	25.4%	24.7%	23%
NPM (%)	12.3%	24.1%	26.4%	28.1%	29%
Industry	10.5%	18.2%	20.7%	18.9%	19%
A. T/O	0.69	0.80	0.87	0.91	0.96
ROA (%)	8.4%	19.4%	23.1%	25.7%	28%
Industry	4.9%	10.4%	13.7%	13.6%	14%
A/E	1.64	1.68	1.56	1.43	1.37

Key Drivers:

- Crypto-Currency Demand: Over 59% of NVDA's revenues currently come from its gaming segment. Leading growth within this segment over the past year has been the huge demand in hardware to mine crypto-currencies. This trend looks to continue over the next two years.
- Autonomous Driving: NVDA's segment with the highest potential growth over the next year is automotive. This growth is driven by NVDA's DrivePX Platform, the leading system in autonomous driving movements across the automotive industry.
- Strong Operating Leverage: NVDA's strategic R&D has led to a business model in which top-line growth significantly outpaces expense growth. This allows margins to expand, increasing free cash flow available to the company.
- Competitive Positioning: NVDA has allocated significant capital to building its CUDA platform. This platform allows the company to provide an exclusive database to customers increasing Artificial Intelligence capabilities and efficiency.

Valuation	'16	'17	'18E	'19E
P/E	27.1	42.5	52.9	47.4
Industry	14.8	15.7	30.3	24.4
P/S	3.1	8.5	14.2	12.3
P/B	3.7	12.0	19.8	15.0
P/CF	14.0	37.5	44.8	40.6
EV/EBITDA	10.8	25.4	38.6	32.2

Performance	Stock	Industry
1 Month	15.9%	11.1%
3 Month	22.5%	4.5%
YTD	14.7%	-15.8%
52-week	118.2%	-19.4%
3-year	1,021.8%	-28.6%

Valuation: Using a relative valuation approach, NVIDIA appears to be overvalued in comparison to the semiconductor industry. Due to greater precision of inputs, DCF analysis provides the best way to value the stock. A combination of DCF analysis and sensitivity analysis suggests that NVIDIA is slightly undervalued, as the stock's value is about $250 and the shares trade at $223.77.

Risks: Threats to the business include crypto-currency exposure, competition, and high variability in R&D capital needs.

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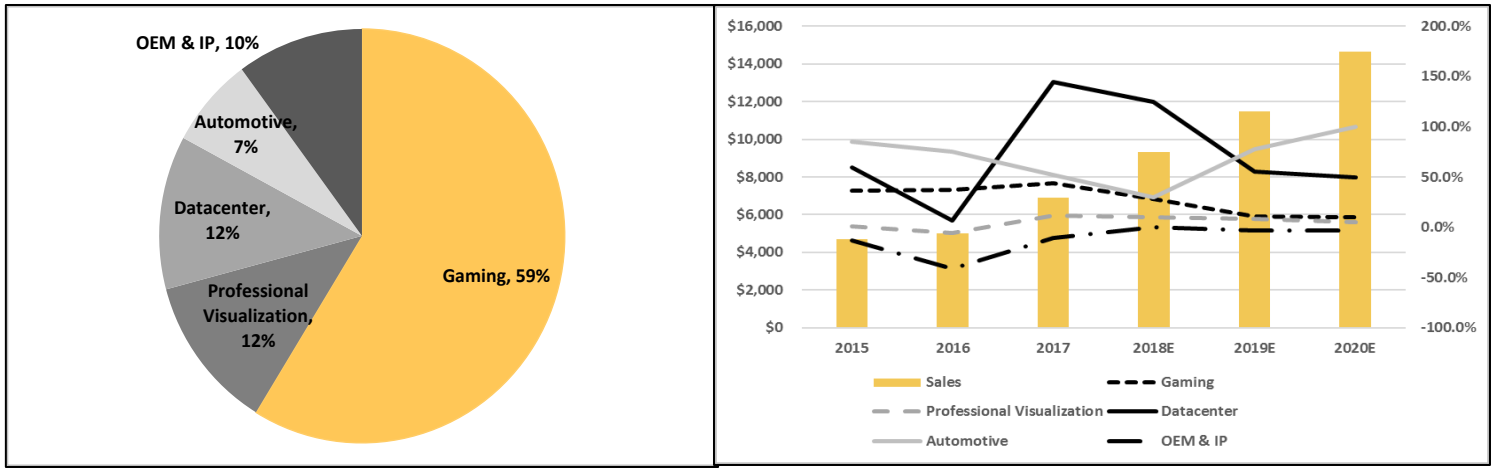
Company Overview

NVIDIA Corporation (NVDA) is a lead designer and manufacturer of computer graphic processors and chipsets. The company focuses on its two main products: Graphics Processing Unit (GPU) and Tegra Processor. NVDA sells its GPU products globally into the PC gaming, Cloud computing, and Artificial Intelligence (AI) industries, among others. The Tegra Processor platform is sold throughout the world and is an industry driver in both autonomous driving and electric cars. NVIDIA was founded in 1993 by Jensen Huang, Chris Malachowsky, and Curtis Priem and is headquartered in Santa Clara, California.

NVIDIA generates a majority of its revenue through the sale of its products with a small portion of revenue historically derived from licensing. NVDA divides its product sales into five business segments:

- Gaming: GPUs are used throughout the gaming industry including competitive online gaming, eSports, and virtual reality. It has experienced strong 2017 growth of 44%. Projected growth is 28% FY 2018, 11% FY 2019, and 10% FY 2020.
- Data Visualization: GPU computing enhances productivity and efficiency and is used in multiple industries including medical imaging, entertainment, and engineering. This division had moderate 2017 growth of 11%. Projected growth is 10% for FY 2018, 8% for FY 2019, and 5% for FY2020.
- Datacenter: GPUs are leading the movement into deep learning and AI and are used heavily in cloud computing. The firm generated high growth of 145% in 2017. Projected growth is 125% for FY 2018, 55% for FY 2019, and 50% for FY 2020.
- Automotive: Tesla GPUs are built into platforms that are used in multiple electric and autonomous driving cars throughout the industry. 2017 growth was 52%. Projected growth is 30% for FY 2018, 78% for FY 2019, and 100% for FY 2020.
- PC/Mobile OEM: This is a steadily declining segment consisting of GPUs used in OEM manufacturing of PCs and mobile phones. Revenue growth was -11% for 2017 and is projected to be 0%, -3%, and -3% for FY 2018, FY 2019, and FY 2020 respectively.

Figures 1 and 2: Revenue Sources for NVDA (2017) (left) and Revenue History with Segment Growth Since 2015



Source: NVIDIA Annual 10K

Business/Industry Drivers

Though several factors may contribute to NVIDIA's future success, the following are the most important near-term business drivers:

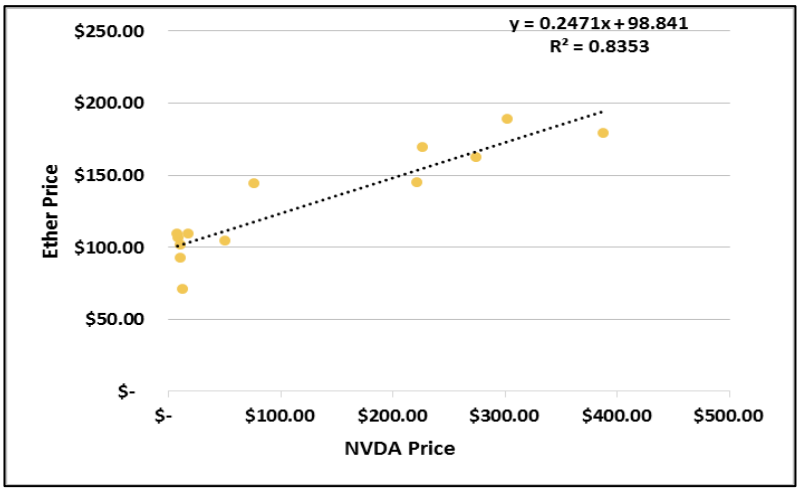
1) Crypto-Currency Demand
2) Automotive Partnerships
3) Strong Operating Leverage
4) Competitive Positioning

Crypto-currency Demand

Crypto-currency has experienced a huge increase in value and public interest in past year.

NVDA's gaming revenue segment appears be primarly driven in the short term by continued high demand in the non-Bitcoin, crypto-currency mining industry. These currencies include the extremely popular Ethereum, among others, and require computing power to mine which increases exponentially to the amount currently mined. The price of Ethereum has risen from $13.26 to $258.26 over the past year driving up demand for both mining and the blockchain technology backing the currency. Figure 3 shows the strong correlation of NVDA's price increase over the past year to the price of Ether. NVDA estimates a $7 billion target addressable market in the gaming segment by FY 2020 which represents a CAGR of 19.9%.

Figure 3: Correlation of NVDA Price and Ether Price from Oct. 1, 2016-Oct.1, 2017



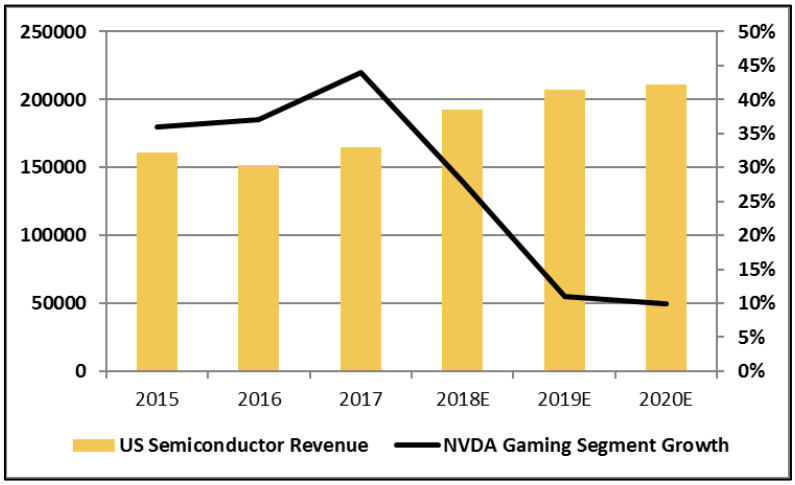
Source: Factset, CoinMarketCap

Many traditional financial service firms are looking to enter the crypto-currency and blockchain markets.

The NVIDIA GTX 1070 is currently considered by many as the best GPU on the market for crypto-currency mining. The current end-market price-point of the GTX 1070 is $534 per unit. This price-point as well as the sharp increase in demand driven by mining requirements was a significant factor in the growth of NVDA's gaming segment in 2017. Gaming revenues realized growth of 44% in 2017 and strongly contributed to the 39% growth of the overall GPU business of NVIDIA.

Traditional financial service firms have a rapidly growing interest in entering the crypto-currency and blockchain area which would cause demand to rise even more quickly. Sharp increases in demand for efficient GPUs that excel in crypto-currency mining have caused an overall industry supply tightening. NVDA's strong competitive position, and this along with continued high levels of demand in the mining market, should boost gaming revenues going forward.

Figures 4: US Semiconductor Revenue (left axis) and NVDA Gaming Revenue Growth (right axis)



Source: NVIDIA Annual 10K, Factset

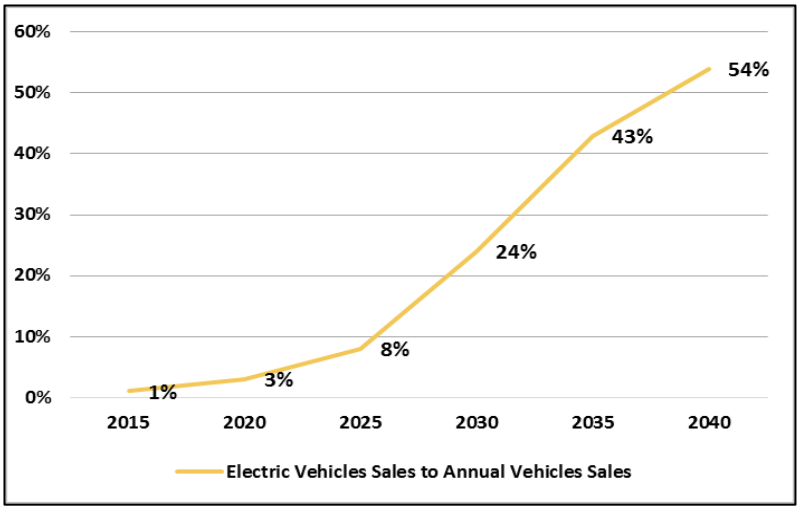
Traditionally, NVDA's gaming segment revenue accounted for 2.45% of the overall US semiconductor market revenues. The consensus estimates for the US semiconductor industry are for growth of 16.4% for 2017, 7.8% for 2018, and 2% in 2019. I believe demand for GPUs led by the continued need for increased computing power to mine crypto-currencies as well as supply shortages will contribute to an expansion from the 2.45% market share to 3.00% by FY 2020. This translates to gaming segment growth of 28% in FY 2018, 11% in FY 2019, and 10% in FY 2020 as shown in figure 4 above.

Automotive Partnerships

NVDA's Drive PX platform is the premier system for electric cars and autonomous driving.

NVIDIA has realized significant recent growth through its automotive business segment's implementation of its Drive PX platform. The Drive PX platform is the leading chip platform in electric vehicles as well as autonomous driving; both high growth opportunities for the automotive industry. The automotive business segment grew revenue 75% in FY 2016 and 52% in FY 2017. Tesla is the most significant automotive producer using the Drive PX platform, with every model sold operating on NVDA technology. NVIDIA projects a target addressable market $8 billion though 2025 in autonomous driving which represents a 36.5% CAGR from the $487 million in automotive revenue in 2016.

Figures 5: Projected Electric Vehicles as a Percentage of Total Vehicle Sales



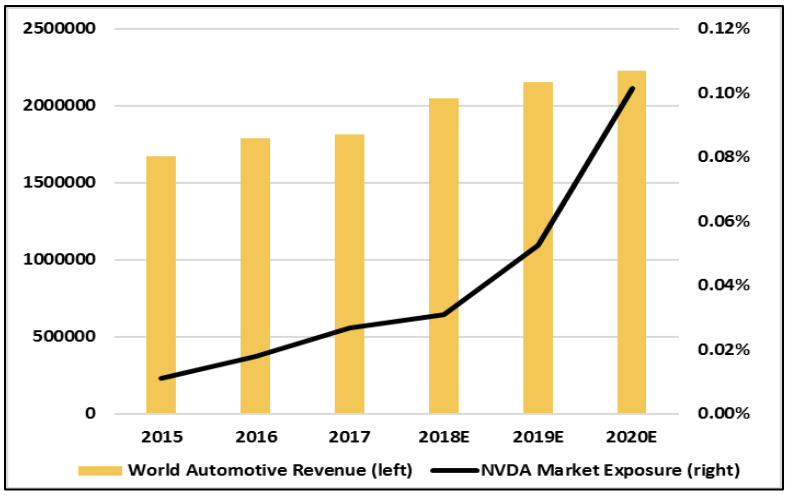
Source: Bloomberg New Energy Finance

Announcements of new partnerships with Toyota and others as well as manufacturer commitments to go fully electric are strong catalysts for NVDA growth.

In addition to Tesla, the NVDA Drive PX platform has been adopted and used in vehicles produced by Audi, Mercedes-Benz, and Volvo among others. Earlier in 2017, NVDA announced a new partnership with Toyota, the largest car manufacturer in the world, to introduce the Drive PX platform in Toyota's push into autonomous driving. Car manufacturers continue to align with NVDA to maximize efficiency in achieving autonomous driving instead of competitors such as AMD. This trend appears to project forward.

The move into autonomous driving is also connected to an industry-wide move to electric powered vehicles. Tesla has led this movement, but may have significant competition in the future. In the past year, multiple car manufacturers have announced near-term commitments to greatly transition to electric vehicles. Among these commitments is Volvo's announcement to fully electrify its entire vehicle line by the year 2019.

Figure 6: World Automotive Revenues (left) and NVDA Market Exposure (right)



Source: FactSet

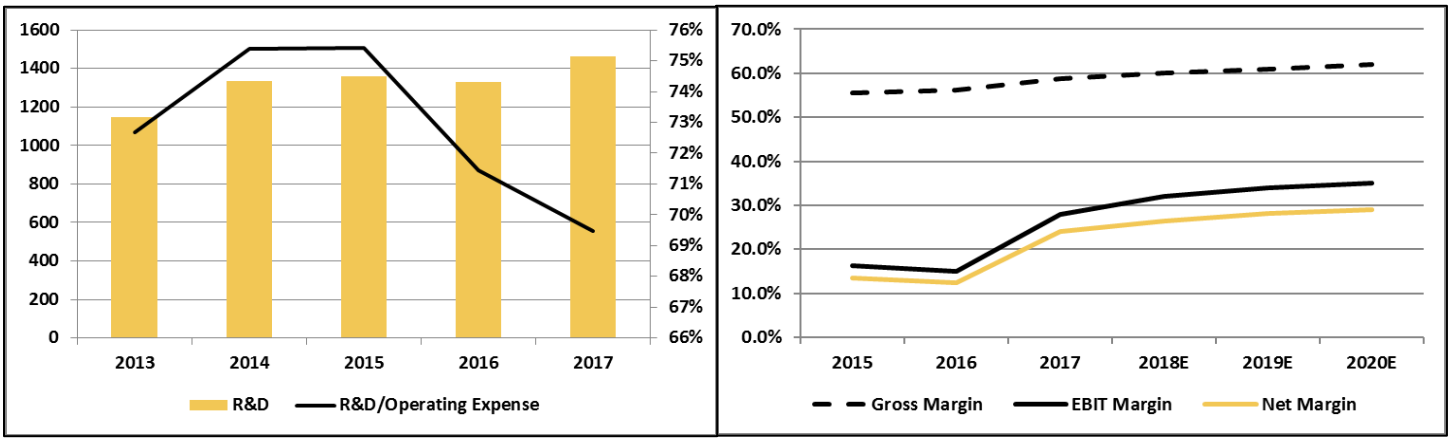
NVIDIA's market exposure to the world automotive market was 0.026% in FY2017. This market share realized growth of 63% in FY2016 and growth of 50% in FY2017. The consensus world motor vehicle revenue growth rates are 12.5% for 2017, 5% for 2018, and 3% for 2019. I believe that the industry transitions into electric-powered vehicles and autonomous driving will allow NVDA to grow exposure to the automotive market to 0.1% from the current 0.02% by FY 2020 as shown in Figure 6 above. This increased exposure coupled with world automotive revenue growth translates to NVDA automotive segment growing 30% in FY 2018, 78% in FY 2019, and 100% in FY 2020.

Strong Operating Leverage

NVDA completes the majority of R&D in-house, reducing the variability of expenses.

NVIDIA exhibits substantial operating leverage, which continues to grow as gross margin has risen with sales (figure 8). Gross margin expanded from 54.9% in FY2014 to 58.8% for FY2017. NVDA's ability to pass through cost increases, along with sales growth should push gross margin above 60% by 2020. Strong forecasted revenue growth coupled with high operating leverage will translate into significant bottom line margin expansion. This margin expansion will take place despite NVDA's continued commitment to research and development. Research and development expenses were $1.33 billion or 27% of sales in FY2016 and $1.46 billion or 21% of sales in FY2017.

Figure 7 and 8: NVDA R&D Expenses (left) and Margins (right)



Source: NVIDIA Annual 10K

High operating leverage will boost bottom-line growth.

I believe that strong top line growth will lead to gross margin of 60% in FY 2018 and continued expansion to 60.6% in FY2019. Given this continued gross margin expansion and fixed costs growing slower than sales, I believe high sales growth will translate to increases net margins of 26.4% in FY2018, 28% in FY2019, and 29% in FY 2020. Net margins were 12.3% and 24.1% for FY 2016 and FY 2017 respectively. Revenue estimates of $8.9 billion for FY 2018 and $11 billion for FY 2019 translate to earnings per share growth of 47.4% for FY 2018, 32% for FY 2019, and 33% for FY 2020 as shown in Figures 12-14 below.

Competitor Analysis

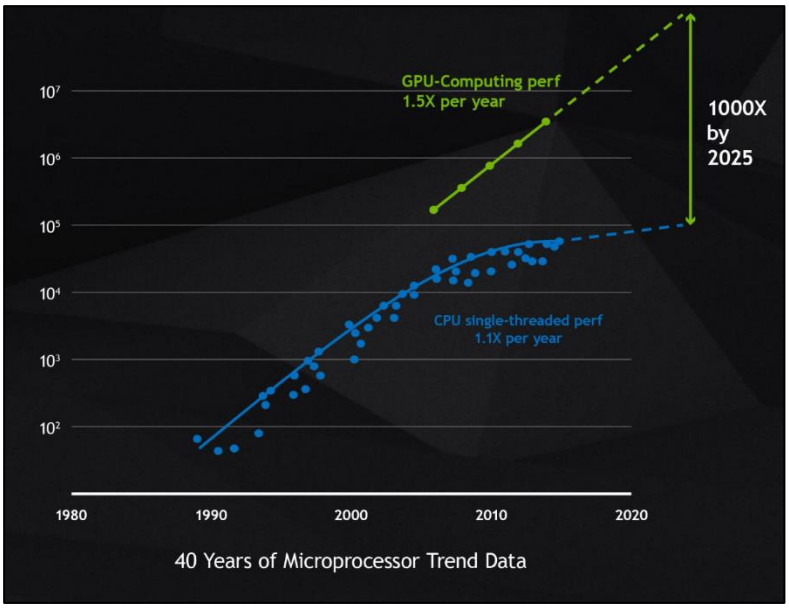
The semiconductor manufacturer industry is capital intensive and has high research and development requirements, both of which act as barriers of entry. Competition is between established players. Semiconductors are generally grouped into two categories based on the type of processing they use to complete computations. These include computer processing units (CPU), where Intel (INTC) is the largest, and graphic processing units (GPU), where NVIDIA is regarded as the industry leader. Although Intel is making movements into GPU manufacturing, Advanced Micro Devices (AMD) is generally regarded as NVDA's most direct competitor in the GPU space.

NVDA's CUDA platform is a highly defensible advantage against competitors.

The OEM PC/laptop industry has long relied on CPU-type chips for overall processing, a trend that looks to continue going forward. In contrast, all major emerging growth verticals within the technology sector are driven by the high-level computing capabilities produced through GPU processors. This has led to sharp increases in demand for high-powered and highly efficient GPU-type processors, and NVDA is the industry lead in both processing power and efficiency. The top 13 most efficient supercomputers in the world on the 2017 Green 500 list are powered by NVDA's Tesla GPU platform. Leading this list is NVIDIA's own DGX SATURNV supercomputer. NVDA's superior processing efficiency is helping it continue to expand its competitive position against competitors such as AMD as increased demand for computing power causes industry shortages.

NVIDIA's strongest barrier to competition is its CUDA platform. CUDA is a parallel computing platform as well as a programming model. It has been completely designed since 2006 and allows general computing to take place on GPUs. The CUDA platform is the first of its kind and is a substantial barrier to all competitors due to the time and capital necessary to build a suitable competitive platform. CUDA is the main driver in artificial intelligence and deep learning across multiple industries because of the higher levels of computing power by GPUs compared to traditional CPU chips as shown in figure 9.

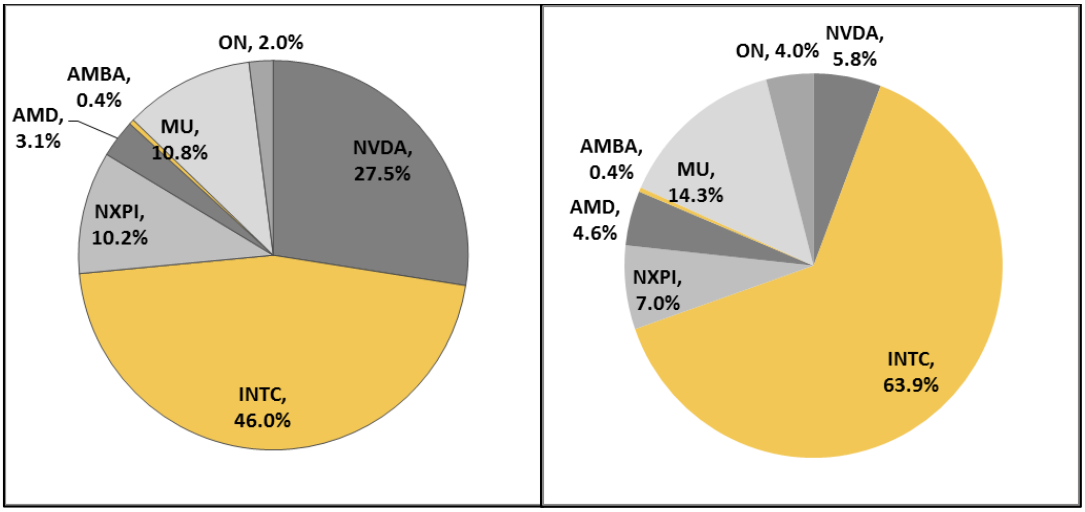
Figure 9: Data Representing GPU vs. CPU Processing Power



Source: About NVIDIA Brochure

The market is very optimistic about NVIDIA's growth opportunities as shown in figures 11 and 12 below. NVDA has 27.5% of the market capitalization even though it only generates 5.8% of total revenue.

Figures 10 and 11: Comparison of NVDA Comps by Market Cap (left) and Revenues (right)

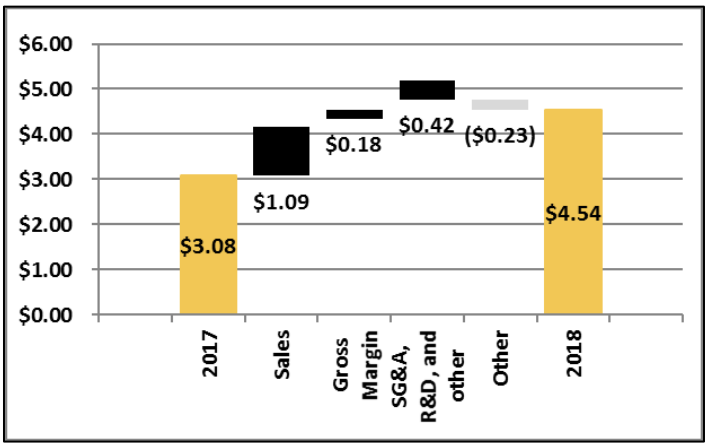


Source: FactSet, IMCP

Financial Analysis

I anticipate EPS to grow to $4.54 in FY 2018. Strong revenue growth should drive a large portion of earnings growth, providing a $1.09 increase in 2018 EPS. A modestly higher gross margin, courtesy of pricing increases due to high demand should add $0.18. I anticipate that SG&A will rise significantly slower than sales, adding $0.42 to earnings. I expect this earnings growth to be offset $0.23 by a return to traditional average effective tax rates of 16% from FY 2017's outlier tax rate of 12%.

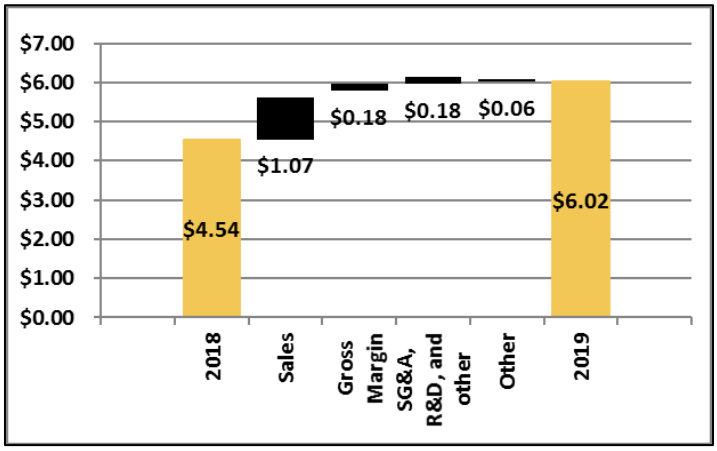
Figure 12: Quantification of 2018 EPS Drivers



Source: Company Reports, IMCP

I expect 2019 EPS to increase $1.48 to $6.02. NVIDIA will gain $1.07 of earnings from continued increased sales across datacenter and automotive segments among others. I anticipate a continued expansion in gross margin and operating margin will add to EPS by $0.18 each. Additionally, I project NVDA will use an increasing cash balance to execute $1 billion in share buybacks, adding $0.06 in FY 2019 EPS.

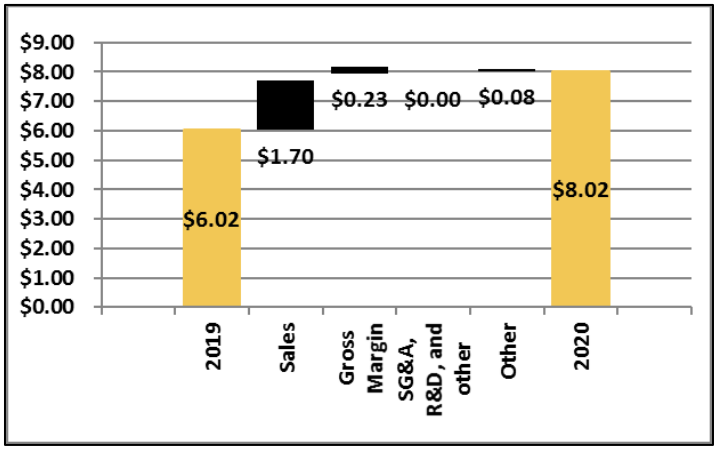
Figure 13: Quantification of 2019 EPS Drivers



Source: Company Reports, IMCP

I believe NVDA will see continued significant earnings growth in 2020 with EPS reaching $8.02. Strong automotive growth will lead increases in revenue adding $1.70 to earnings. Gross margin expansion will add to EPS by $0.23. Continued strong cash flows and increases in cash for NVDA lead me project continued stock buyback from 2019, adding an additional $0.08 to 2020 earnings.

Figure 14: Quantification of 2020 EPS Drivers



Source: Company Reports, IMCP

I am slightly more pessimistic than consensus estimates for 2018 revenues, but my EPS estimates are higher based on my optimistic view on NVDA's ability to continue to expand margins. Looking forward to 2019 and 2020, I am consistently more optimistic than consensus in estimates based on my belief that automotive growth with be significant in the next two years and NVDA's opportunity is currently underappreciated.

Figure 15: Revenue (M) and EPS YoY Estimates vs. Consensus

	FY 2018E	FY2019E	FY2020E
Revenue - Estimate	$ 9,314	$ 11,459	$ 14,639
YoY Growth	*35%*	*23%*	*28%*
Revenue - Consensus	$ 9,438	$ 10,914	$ 12,678
YoY Growth	*37%*	*16%*	*16%*
EPS - Estimate	$ 4.54	$ 6.02	$ 8.02
YoY Growth	*47%*	*33%*	*33%*
EPS - Consensus	$ 4.48	$ 5.26	$ 6.60
YoY Growth	*45%*	*17%*	*25%*

Source: Factset, IMCP

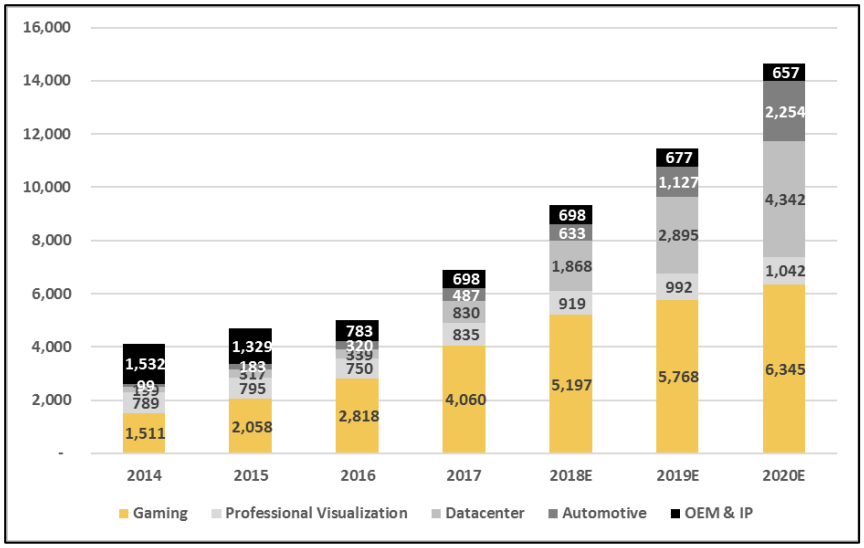
Revenues

NVIDIA's revenue has seen strong growth since falling 3.5% in 2014. While I forecast a stabilization of this growth over the next seven years, I believe strong sales growth will continue through 2020. The automotive and datacenter segments will primarily lead this growth. I anticipate that NVDA's automotive segment will see significant increasing growth of 30%, 78%, and 100% for 2018, 2019, 2020 respectively as autonomous driving becomes widely adopted throughout the automotive industry. Similarly, I see strong, although declining, growth of 125%, 55%, and 50% for 2018, 2019, and 2020 respectively for the datacenter segment as AI and cloud technologies see continued integration into society.

NVIDIA's traditional segments are forecasted to provide stable additional growth to the more explosive automotive and datacenter segments. The gaming segment is historically NVDA's largest, providing 59% of 2017 revenues. This segment has seen strong growth over the past three years, which I project will stabilize over the next two years as market saturation occurs. Similarly, I anticipate that the professional visualization will remain a stable growth segment as AI technologies continue to integrate into fields such as architecture and engineering. NVIDIA's lone struggling segment is OEM. I believe that this segment will continue to realize revenue declines as NVDA transitions to its new business model.

NVIDIA's strong vertical positioning in AI technology is leading a general transition in the business model for the company. Traditionally, NVDA has been recognized for its visualization technologies primarily within gaming-type applications. This trend is forecasted to change going forward with automotive and datacenter segment sales representing 45% of sales compared to 43% in the gaming segment in FY2020 as shown in figure 16 below.

Figure 16: Revenue (M) by Segment for NVDA 2014-2020E

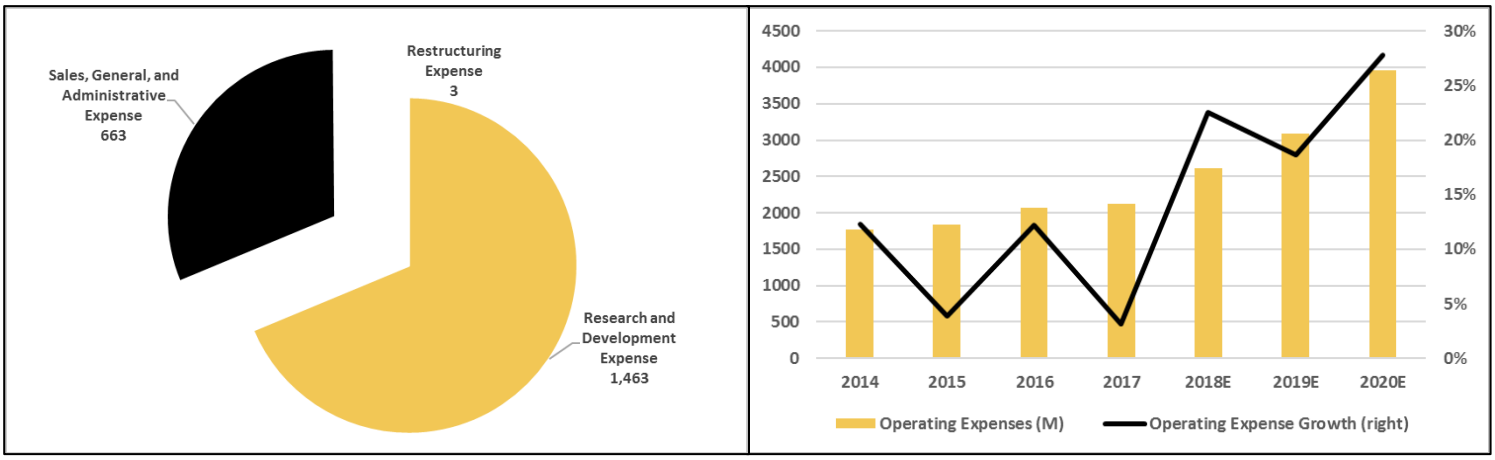


Source: NVIDIA Annual 10K, IMCP

Operating Income and Margins

Operating expenses are composed primarily of research and development expense and sales, general, and administrative expense. NVDA's high previous investment in research and development has allowed recent expenses to grow at a rate significantly lower than sales. R&D expenses for 2017 grew 10% over 2016 while sales growth was 38%. I anticipate that this trend will continue going forward with R&D growing at a stable rate. Similarly, NVIDIA has been able to maintain a stable low growth in SG&A expense; a trend I believe will continue.

Figures 17 & 18: Composition of 2017 Operating Expenses (left) and Operating Expenses vs YoY Operating Expense Growth



Source: NVIDIA Annual 10K, IMCP

Explosive revenue growth coupled with stable growth in operating expenses will allow for continued operating margin expansion going forward. Given the nature of the semiconductor industry, research and development is a consistent commitment for NVIDIA and provides a limiting factor on margin expansion capabilities. I anticipate operating margin to expand to 35% by 2020 from the current margin of 28% in 2017.

Operating margins are forecasted to expand to 35% by FY 2020.

Figure 19: NVDA Operating Margins, 2016 – 2020E

Numbers in M	2016	2017	2018E	2019E	2020E
Sales	5,010	6,910	9,314	11,459	14,639
Costs of Goods Sold	2,199	2,847	3,726	4,469	5,563
Gross Income	2,811	4,063	5,588	6,990	9,076
Gross Margin	*56.1%*	*58.8%*	*60.0%*	*61.0%*	*62.0%*
Operating Expenses					
R&D Expense	1,331	1,463	1,609	1,851	2,184
Growth	*-2%*	*10%*	*10%*	*15%*	*18%*
SG&A Expense	602	663	729	802	882
Growth	*25%*	*10%*	*10%*	*10%*	*10%*
Other Operating Expense	131	3	269	441	886
Operating Income	747	1,934	2,980	3,896	5,124
Operating Margin	*14.9%*	*28.0%*	*32.0%*	*34.0%*	*35.0%*

Source: NVIDIA Annual 10K, IMCP

Return on Equity

NVIDIA had a significant increase ROE during FY 2017, rising from 13.8% in 2016 to 32.6% in 2017. DuPont analysis for NVDA reveals that ROE is driven primarily by operating margins; although, asset turnover jumped in 2017 as well. Essentially, this shows that R&D of the past is paying off as growth in sales rose faster than costs and assets.

Figure 20: NVDA ROE Breakdown, 2015 – 2020E

5-Stage DuPont	2015	2016	2017	2018E	2019E	2020E
EBIT / sales	16.2%	14.9%	28.0%	32.0%	34.0%	35.0%
Sales / avg assets	0.65	0.69	0.80	0.87	0.91	0.96
EBT / EBIT	99.5%	99.5%	98.5%	98.1%	98.5%	98.9%
Net income /EBT	83.6%	82.6%	87.5%	84.0%	84.0%	84.0%
ROA	8.7%	8.4%	19.4%	23.1%	25.7%	27.9%
Avg assets / avg equity	1.63	1.64	1.68	1.56	1.43	1.37
ROE	14.2%	13.8%	32.6%	36.1%	36.7%	38.2%

Source: NVIDIA Annual 10K, IMCP

I expect ROE growth in the next two years to continue to rise due to continued increases in operating margin as discussed above. NVDA's ROE is forecasted to increase to 38% by FY 2020. This growth in ROE will be partially offset in 2019 and 2020 as the assets to equity ratio decreases.

Free Cash Flow

Figure 21: NVDA Free Cash Flow Breakdown, 2015 – 2020E

Free Cash Flow						
Numbers in M	2015	2016	2017	2018E	2019E	2020E
NOPAT	$ 634	$ 617	$ 1,691	$ 2,504	$ 3,273	$ 4,304
Growth	*48.2%*	*-2.7%*	*174.0%*	*48.0%*	*30.7%*	*31.5%*
NWC*	194	78	746	1,006	1,238	1,581
Net fixed assets	1,488	1,317	1,305	1,757	2,162	2,762
Total net operating capital*	1,682	1,395	2,051	2,763	3,400	4,343
Growth	*3.0%*	*-17.1%*	*47.0%*	*34.7%*	*23.0%*	*27.8%*
- Change in NWC*	187	(116)	668	260	232	343
- Change in NFA	(138)	(171)	(12)	452	405	600
FCFF*	$ 585	$ 904	$ 1,035	$ 1,791	$ 2,636	$ 3,360
Growth		*54.5%*	*14.5%*	*73.0%*	*47.2%*	*27.5%*
- After-tax interest expense	3	3	25	48	48	48
FCFE**	$ 582	$ 901	$ 1,010	$ 1,743	$ 2,588	$ 3,312
Growth		*54.8%*	*12.1%*	*72.6%*	*48.5%*	*28.0%*
FCFF per share	$ 1.06	$ 1.67	$ 1.91	$ 3.31	$ 4.92	$ 6.33
Growth		*57.1%*	*14.9%*	*73.0%*	*48.6%*	*28.7%*
FCFE per share	$ 1.05	$ 1.66	$ 1.87	$ 3.22	$ 4.83	$ 6.24
Growth		*57.4%*	*12.5%*	*72.6%*	*49.9%*	*29.3%*

Source: NVIDIA Annual 10K, IMCP

NVDA's free cash flow has been consistently growing over the last several years as sales and NOPAT have risen. I forecast that NOPAT will grow at a much faster pace than net operating capital over the next two years, and NVDA's strong cash balance of $2.3 billion gives it the ability to meet any funding shortfalls that may arise. The firm has repurchased 245 million shares in the past two years and has the option to repurchase $2 billion worth more; I fully expect them to do so in the next two years as the firm is generating about $2 billion or more in FCFE each year.

I expect both FCFF per share and FCFE per share to increase 49% and 50% respectively for FY 2019 and 29% for both in FY 2020 as NOPAT continues to grow.

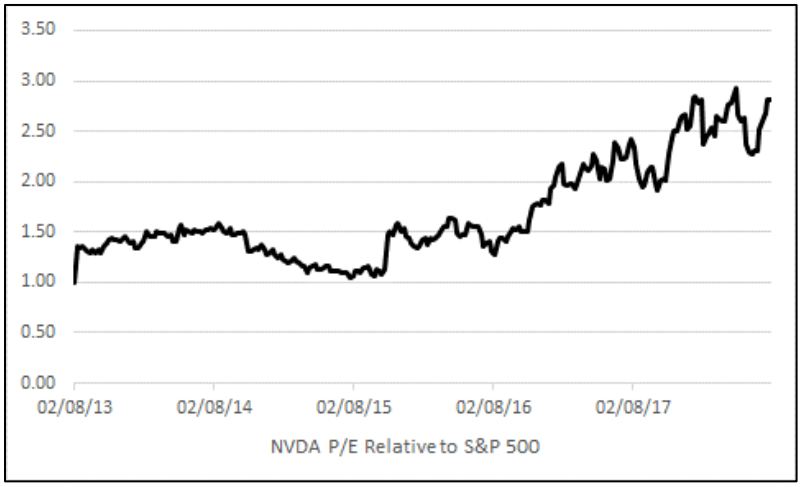
Valuation

NVDA was valued using multiples and a 3-stage discounting cash flow model. Based on earnings multiples, the stock is expensive relative to its peers; however, due to NVIDIA's strong vertical positioning and significant growth opportunities, this metric may be unreliable. Relative valuation shows NVDA to be overvalued based on its fundamentals versus its peers in the semiconductor industry. A price to book valuation based on a regression with ROE against peers yielded a price of $315.96. A detailed DCF analysis values NVDA slightly higher, at $233.09 using a terminal P/E of 35; I give this value a bit more weight because it incorporates assumptions that reflect NVDA's growth expectations. Finally, a scenario analysis of the terminal value of the DCF yields a price range of $198 - $270. As a result of these valuations, I value the stock at $250.00.

Trading History

NVDA is currently trading near its five-year high of 2.93 relative to the S&P 500. This is the result of high expectations by analysts believing that earnings will grow significantly in the future. NVDA's current NTM P/E is 50.2 compared to its five-year average of 24.8. While I expect some regression towards that number in the future, I do not believe that is likely to be the case in the near term.

Figure 22: NVDA NTM P/E Relative to S&P 500



Source: Factset

Assuming the firm maintains a 40 NTM P/E at the end of FY 2019, allowing some room for reversion, it should trade at $320.90 by the end of the year.

- Price = P/E x EPS = 40 x $8.02 = $320.90

Discounting $320.90 back to today at a 12.3% cost of equity (explained in Discounted Cash Flow section) yields a price of $285.75. Given NVDA's potential for earnings growth and continued profitability, this seems to be a fair valuation given its current price of $224 and an assumption of minimal P/E regression over the next year.

Relative Valuation

NVIDIA is currently trading at a P/E much higher than its peers, with a P/E NTM of 50.2 compared to an average of 25.7. Investors are willing to temporarily pay a premium for NVDA because it has the

potential for greater growth than many of the other companies in its market segment. Similarly, NVDA's P/B and P/S ratios are significantly higher than those of its peers – both are more than 2 times the average for the group. This reflects NVDA's relatively strong ROE compared to its competitors as well as its expanding net profit margin.

Figure 23: NVDA Comparable Companies

		Current	Market	Price Change						Earnings Growth								LT Debt/	S&P	LTM Dividend	
Ticker	Name	Price	Value	1 day	1 Mo	3 Mo	6 Mo	52 Wk	YTD	LTG	NTM	2015	2016	2017	2018	Pst 5yr	Beta	Equity	Rating	Yield	Payout
NVDA	NVIDIA CORP	$224.44	$136,011	(0.1)	13.4	13.6	35.2	118.0	16.0	12.0	11.0%	-3.6%	138.0%	62.3%	12.2%	21.8%	1.39	31.3%	B	0.29%	13.9%
INTC	INTEL CORP	$44.48	$208,166	0.2	(3.8)	10.5	28.8	21.0	(3.6)	8.4	12.8%	0.9%	16.7%	19.1%	0.3%	-2.5%	1.24	38.8%	B+	2.33%	37.2%
NXPI	NXP SEMICONDUCTORS NV	$120.00	$40,683	0.6	2.7	4.0	9.6	22.4	2.5	16.9	49.9%	17.6%	8.6%	7.4%	11.3%		0.73	45.3%		0.00%	
AMD	ADVANCED MICRO DEVICES	$12.47	$12,031	2.4	13.6	(11.4)	(7.5)	26.2	21.3	8.0	-440.1%	-60.0%	28.0%	87.0%	176.9%		2.96	260.8%	C	0.00%	
AMBA	AMBARELLA INC	$52.60	$1,752	(2.2)	(9.6)	(0.8)	2.8	6.4	(10.5)	14.8	41.0%	65.5%	-11.8%	-32.2%	-20.2%		0.92	0.0%		0.00%	
MU	MICRON TECHNOLOGY INC	$43.99	$50,867	(0.6)	0.6	5.6	37.9	97.1	7.0	12.5	52.6%	-97.8%	8166.7%	89.3%	-9.5%		2.04	34.0%	B-	0.00%	0.0%
ON	ON SEMICONDUCTOR CORP	$24.74	$10,494	3.4	18.7	25.5	61.2	86.6	18.1	20.2	75.5%	10.7%	8.4%	60.0%	15.3%	70.3%	2.33	121.3%	B-	0.00%	
Average			$65,715	0.5	5.1	6.7	24.0	54.0	7.3	13.3	-28.2%	-9.0%	1193.5%	41.8%	26.6%	29.9%	1.66	75.9%		0.38%	17.0%
Median			$40,683	0.2	2.7	5.6	28.8	26.2	7.0	12.5	41.0%	0.9%	16.7%	60.0%	11.3%	21.8%	1.39	38.8%		0.00%	13.9%
SPX	S&P 500 INDEX	$2,798		(0.2)	4.0	9.2	13.7	23.2	4.7			0.0%	0.5%	9.9%	11.0%						

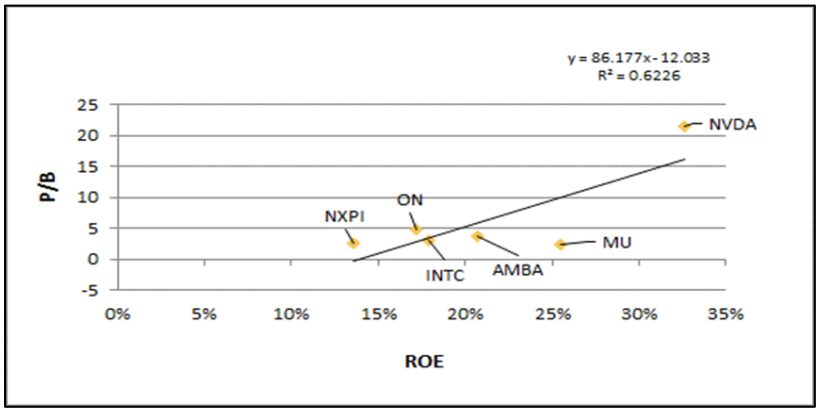
		2016		P/E						2016	2016		EV/	P/CF	P/CF	Sales Growth			Book
Ticker	Website	ROE	P/B	2014	2015	2016	TTM	NTM	2017	2018	NPM	P/S	OM	ROIC	EBIT	Current	5-yr	NTM	STM	Pst 5yr	Equity
NVDA	http://www.nvidia.com	32.6%	21.40	17.9	30.5	41.5	55.7	50.2	53.8	48.0	24.1%	19.68	32.0%	27.0%	34.8	42.6	17.7	17.7%	12.0%	11.6%	$14.51
INTC	http://www.intel.com	17.9%	2.93	15.7	14.8	13.3	15.6	13.8	13.7	13.7	21.4%	3.51	28.0%	12.2%	12.5	9.3	7.8	2.1%	3.8%	1.9%	$15.16
NXPI	http://www.nxp.com	13.6%	2.69	16.1	15.0	16.1	25.1	16.7	18.4	16.5	21.7%	4.28	5.5%	1.0%	-20791.3	15.0	15.7	-1.6%	4.9%	23.4%	$44.69
AMD	http://www.amd.com	-26.0%	23.14	44.5	-5.3	-81.0	-147.1	43.2	95.9	34.6	-3.2%	2.82	0.6%	-28.6%	-20.5	49.4	-35.1	16.4%	9.9%	-8.2%	$0.54
AMBA	http://www.ambarella.com	20.7%	3.73	25.4	16.8	18.5	50.6	35.9	26.6	33.3	31.4%	5.65	13.8%	14.4%	21.5	20.0	19.2	-7.0%	16.8%	26.1%	$14.09
MU	http://www.micron.com	25.5%	2.26	12.9	236.0	4.4	6.9	4.5	4.7	5.2	28.2%	2.50	37.2%	20.5%	7.4	4.1	5.4	21.3%	2.3%	19.8%	$19.45
ON	http://www.onsemi.com	17.2%	4.73	13.5	11.8	14.2	27.2	15.5	17.2	14.9	9.8%	2.69	11.1%	4.9%	27.0	9.2	7.9	1.7%	3.1%	2.6%	$5.23
Average		14.5%	8.70	20.8	45.7	3.9	4.9	25.7	32.9	23.7	19.1%	5.88	18.3%	7.3%	-2958.4	21.4	5.5	7.2%	7.6%	11.0%	
Median		17.9%	3.73	16.1	15.0	14.2	25.1	16.7	18.4	16.5	21.7%	3.51	13.8%	12.2%	12.5	15.0	7.9	2.1%	4.9%	11.6%	
SPX	S&P 500 INDEX			17.3	17.2	18.7			21.3	19.2											

Source: Factset, IMCP

A more thorough analysis of P/B and ROE is shown in figure 24. The calculated R-squared of the regression indicates that over 62% of a sampled firm's P/B is explained by its ROE. Note that that AMD is excluded from this regression, because they have a negative ROE. NVDA has the highest P/B and ROE of this grouping, and according to this measure is slightly overvalued. However, given NVDA's strong positioning and growth potential, I believe that ROE will continue to expand, justifying the valuation based on this regression.

- Estimated P/B = Estimated 2019 ROE (36.7%) x 86.177 – 12.033 = 19.594
- Target Price = Estimated P/B (19.594) x 2019E BVPS (18.11) = $354.83
- Discounted Target Price = $354.83 / (1 + 12.3%) = $315.96

Figure 24: P/B vs ROE



Source: Factset, IMCP

Discounted Cash Flow Analysis

A three stage discounted cash flow model was used to value NVIDIA.

For this analysis, the company's cost of equity was calculated to be 12.3% using the Capital Asset Pricing Model. The underlying assumptions used in calculating this rate are as follows:

- The risk-free rate, as represented by the ten-year Treasury bond yield, is 2.33%.
- A beta of 1.30 was utilized since the company has higher risk than the market.
- A long-term market rate of return of 10% was assumed, since historically, the market has generated an annual return of about 10%.

Given the above assumptions, the cost of equity is 12.3% = (2.33 + 1.30 (10.0 – 2.33)).

Stage One - The model's first stage simply discounts fiscal years 2019 and 2020 free cash flow to equity (FCFE). These per share cash flows are forecasted to be $4.83 and $6.24, respectively. Discounting these cash flows, using the cost of equity calculated above, results in a value of $9.25 per share. Thus, stage one of this discounted cash flow analysis contributes $9.25 to value.

Stage Two - Stage two of the model focuses on fiscal years 2021 to 2025. During this period, FCFE is calculated based on revenue growth, NOPAT margin and capital growth assumptions. The resulting cash flows are then discounted using the company's 12.3% cost of equity. I assume 15% sales growth in 2021, stabilizing to 5% through 2025. The ratio of NWC to sales will remain at 2019 levels of 9.26. Similarly, NFA to sales will remain at the 2019 5.3 ratio. NOPAT margin is expected to increase slightly to 30% in 2025 from 28.6% in 2019.

Figure 25: FCFE and Discounted FCFE, 2019 – 2025

	2019	2020	2021	2022	2023	2024	2025
FCFE	$4.83	$6.24	$8.04	$9.31	$10.29	$11.16	$11.99
Discounted FCFE	$4.30	$4.95	$5.68	$5.85	$5.76	$5.56	$5.32

Added together, these discounted cash flows total $28.18.

Stage Three – Net income for the years 2021 – 2025 is calculated based upon the same margin and growth assumptions used to determine FCFE in stage two. EPS is expected to grow from $6.02 in 2019 to $12.59 in 2025.

Figure 26: EPS estimates for 2019 – 2025

	2019	2020	2021	2022	2023	2024	2025
EPS	$6.02	$8.02	$9.27	$10.25	$11.11	$11.94	$12.59

Stage three of the model requires an assumption regarding the company's terminal price-to-earnings ratio. For this analysis, it is generally assumed that as a company grows larger and matures, its P/E ratio will converge near to the historical average of the company's industry. This method would assume a P/E ratio of 25 at the end of NVDA's terminal year. While this may be a fair multiple at the end of 2021, one must consider what the market will price in today. I believe that a multiple of 25 is extremely unlikely to become priced into NVDA's value within the next year and thus use a more reasonable P/E value of 35 in establishing my terminal value.

Given the assumed terminal earnings per share of $12.59 and a price to earnings ratio of 35, a terminal value of $440.70 per share is calculated. Using the 12.3% cost of equity, this number is discounted back to a present value of $195.66.

Total Present Value – given the above assumptions and utilizing a three stage discounted cash flow model, an intrinsic value of $233.09 is calculated (9.25 + 28.18 + 195.66). Given NVDA's current price of $224, this model indicates that the stock is slightly undervalued.

Scenario Analysis

NVIDIA is difficult to value with certainty due to the inherent risks the company has to future growth as well as the inability to predict with certainty the markets pricing in of growth going forward. Given the derived price equation of P/E x EPS, the sensitivity of the DCF model's terminal value to these two factors is high. Too better understand this variability, I conducted a sensitivity analysis determining the effect on the valuation of NVDA of change in terminal year P/E multiple as well as terminal year EPS.

Terminal Price to Earnings – As stated above, determining the expectations that the market will price into NVDA is difficult to do with accuracy. Given NVDA's current P/E of 49 and the peer average of 25, there is a significant range of values that could be reasonably argued for its terminal value providing a large amount of variability in the overall valuation. For this analysis, I used the P/E range of 20-50, representing both the peer average and the 50 P/E which NVDA has been valued around for most of the past year and a half. Also represented in this range is the 35 P/E value I used in my DCF analysis above.

Terminal Earnings Per Share – Given NVDA's valuation is heavily dependent on future growth, I used varying terminal EPS numbers to determine the sensitivity of growth. Due to the fact that this estimate is seven years out, minimizing greatly any accuracy of forecasting, I used a range $11.09-$14.09 for the terminal EPS. This range was based on a $1.50 variability up or down from my forecasted terminal EPS of $12.59 in my model.

Figure 27: NVDA Terminal Value Sensitivity Analysis

		Terminal Price to Earnings						
		20	25	30	35	40	45	50
Terminal EPS	11.09	135.90	160.25	185.14	209.76	234.37	258.99	283.61
	11.59	140.34	166.07	191.80	217.53	243.25	268.98	294.71
	12.09	144.78	171.62	198.46	225.29	252.13	278.97	305.81
	12.59	149.22	177.17	205.12	233.06	261.01	288.96	316.91
	13.09	153.66	182.72	211.78	240.83	269.89	298.95	328.01
	13.59	158.10	188.27	218.44	248.60	278.77	308.94	339.10
	14.09	162.54	193.82	225.10	256.37	287.65	318.93	350.20
	Valuation Range:				$198.46 - $269.89			

A valuation of NVDA stock was reached using the same discounted cash flow method outlined in the previous section. One can see from this analysis that NVDA is extremely sensitive to both growth and associated risks as well as market expectations. I believe that this analysis results in a reasonable target price range of $198 - $270. Although current market conditions and NVDA's high growth potential increases the possibility of the company's P/E remaining above 40 for the upcoming year, I believe that much of the company's growth has already been priced in by the market and this scenario is unlikely.

Business Risks

Although I have many reasons to be optimistic about NVIDIA, there are several significant risks to the investment thesis based on the firm's growth potential:

Crypto-Currency Exposure:

A portion of NVDA's growth opportunity is directly tied to the crypto-currency market. This market is yet not fully proven and seen by many as a possible financial bubble. A crash in this market space would directly affect NVDA's gaming revenue segment growth going forward.

Competitive marketplace:

Competition in the semiconductor industry is strong both at the same level in the supply chain as well as in end-market companies working on developing their own chips. Companies such as Google are investing significant capital in building their own chips to use in datacenter type applications. This poses a significant risk to NVDA's datacenter segment growth.

Automotive Integration:

Automotive integration of electric vehicles and autonomous driving forecasts to be significant over the next five years and is a primary growth opportunity for NVDA. Tesla, a main customer of NVIDIA, has experienced significant difficulty in high-level production of its main-market vehicle, the Model 3. If difficulties like this persist in the space it poses risk to NVDA's growth opportunity.

Research and Development Variability:

The semiconductor industry is very reliant on the newest levels of technology. This leads to high levels of variability in R&D expenses and the constant possibility of large investments to maintain in a competitive position. NVDA projects to have stable growth in R&D in the coming years but a spike in necessary R&D would have significant negative effects on projected margin expansion.

Poor Allocation of Assets:

NVIDIA's strong cash flows and building cash balance can be used going forward to return value to shareholders in the form of dividends, share buybacks, or non-speculative investments in new technologies. Use of this cash in bad investments, such as possible poor acquisition activity, could destroy this possible shareholder value.

Appendix 1: Porter's 5 Forces

Threat of New Entrants – Relatively Low

Barriers of entry in the semiconductor industry are high due to the significant level of research and development needed to reach the level of processing power being provided by industry leaders.

Threat of Substitutes - Medium

NVIDIA faces threat of substitution from its lower-cost, direct competitor, Advanced Micro Devices. This threat, however, is offset by NVDA's highly-evolved, proprietary CUDA platform.

Supplier Power - Low

Although material pricing is a factor that NVDA has little control over, they can mostly pass-through increases in costs to customers due to its power relative to end-market users.

Buyer Power – Low

Consumers and users of graphic processing units such as NVDA's chips only have two main suppliers to choose from, NVDA and AMD. This factor coupled with NVIDIA's CUDA platform add-on service with its chips severely minimize the buyer power customers have.

Intensity of Competition – High

Intensity of competition between NVDA, AMD, and other players in the semiconductor industry is very high. The industry is consistently racing to provide faster and more efficient processing. Adding to this competition is end-market companies, such as Google, investing in building comparable chips in-house.

Appendix 2: SWOT Analysis

Strengths	**Weaknesses**
CUDA Platform High Operating Margins	OEM Manufacturing Minimal Dividend
Opportunities	**Threats**
Emerging Market Expansion Industrial Shipping	End-Market Competition Lower-Priced Competition

Appendix 3: Income Statement

Income Statement							
Numbers in M	2014	2015	2016	2017	2018E	2019E	2020E
Sales	$ 4,130	$ 4,682	$ 5,010	$ 6,910	$ 9,314	$ 11,459	$ 14,639
Cost of Goods Sold	1,862	2,083	2,199	2,847	3,726	4,469	5,563
Gross Margin	2,268	2,599	2,811	4,063	5,588	6,990	9,076
SG&A, R&D, and other	1,772	1,840	2,064	2,129	2,608	3,094	3,953
EBIT	496	759	747	1,934	2,980	3,896	5,124
Interest	(14)	4	4	29	58	58	58
EBT	510	755	743	1,905	2,923	3,839	5,066
Taxes	70	124	129	239	468	614	811
Income	440	631	614	1,666	2,455	3,224	4,256
Other							
Net income	$ 440	$ 631	$ 614	$ 1,666	$ 2,455	$ 3,224	$ 4,256
Dividends							
Basic Shares	588.0	552.0	543.0	541.0	541.0	535.7	530.5
Earnings per Share	$ 0.75	$ 1.14	$ 1.13	$ 3.08	$ 4.54	$ 6.02	$ 8.02
Dividends per Share	$ 0.31	$ 0.34	$ 0.39	$ 0.48	$ 0.68	$ 0.69	$ 0.72

Appendix 4: Balance Sheets

Balance Sheet							
Numbers in M	2014	2015	2016	2017	2018E	2019E	2020E
Cash	1,152	497	596	1,766	2,312	3,530	5,462
Operating assets ex cash	952	1,090	1,016	1,738	2,347	2,888	3,689
Operating assets	2,104	1,587	1,612	3,504	4,659	6,418	9,151
Operating liabilities	945	896	938	992	1,341	1,650	2,108
NOWC	1,159	691	674	2,512	3,318	4,768	7,043
NOWC ex cash (NWC)	7	194	78	746	1,006	1,238	1,581
NFA	1,626	1,488	1,317	1,305	1,757	2,162	2,762
Invested capital	2,785	2,179	1,991	3,817	5,075	6,930	9,805
Marketable securities	3,520	4,126	4,441	5,032	5,032	5,032	5,032
Total assets	$ 7,250	$ 7,201	$ 7,370	$ 9,841	$ 11,448	$ 13,612	$ 16,945
Short-term and long-term debt	1,356	1,384	-	1,983	1,983	1,983	1,983
Other liabilities	493	503	463	277	277	277	277
Debt/equity-like securities	-	-	1,500	827	-	-	-
Equity	4,456	4,418	4,469	5,762	7,847	9,702	12,577
Total supplied capital	$ 6,305	$ 6,305	$ 6,432	$ 8,849	$ 10,107	$ 11,962	$ 14,837
Total liabilities and equity	$ 7,250	$ 7,201	$ 7,370	$ 9,841	$ 11,448	$ 13,612	$ 16,945
Balance	*0*	*0*	*0*	*0*	*0*	*0*	*0*

Appendix 5: Sales Forecast

Sales							
Numbers in M	2014	2015	2016	2017	2018E	2019E	2020E
Sales	$ 4,130	$ 4,682	$ 5,010	$ 6,910	$ 9,314	$ 11,459	$ 14,639
Growth		*13.4%*	*7.0%*	*37.9%*	*34.8%*	*23.0%*	*27.8%*
Gaming	1,511	2,058	2,818	4,060	5,197	5,768	6,345
Growth	*0.0%*	*36.2%*	*36.9%*	*44.1%*	*28.0%*	*11.0%*	*10.0%*
% of sales	*36.6%*	*44.0%*	*56.2%*	*58.8%*	*55.8%*	*50.3%*	*43.3%*
Professional Visualization	789	795	750	835	919	992	1,042
Growth	*0.0%*	*0.8%*	*-5.7%*	*11.3%*	*10.0%*	*8.0%*	*5.0%*
% of sales	*19.1%*	*17.0%*	*15.0%*	*12.1%*	*9.9%*	*2.0%*	*7.1%*
Datacenter	199	317	339	830	1,868	2,895	4,342
Growth	*0.0%*	*59.3%*	*6.9%*	*144.8%*	*125.0%*	*55.0%*	*50.0%*
% of sales	*4.8%*	*6.8%*	*6.8%*	*12.0%*	*20.1%*	*25.3%*	*29.7%*
Automotive	99	183	320	487	633	1,127	2,254
Growth	*0.0%*	*84.8%*	*74.9%*	*52.2%*	*30.0%*	*78.0%*	*100.0%*
% of sales	*2.4%*	*3.9%*	*6.4%*	*7.0%*	*6.8%*	*9.8%*	*15.4%*
OEM & IP	1,532	1,329	783	698	698	677	657
Growth	*0.0%*	*-13.3%*	*-41.1%*	*-10.9%*	*0.0%*	*-3.0%*	*-3.0%*
% of sales	*37.1%*	*28.4%*	*15.6%*	*10.1%*	*7.5%*	*5.9%*	*4.5%*

Appendix 6: Ratios

Ratios	2014	2015	2016	2017	2018E	2019E	2020E
Profitability							
Gross margin	54.9%	55.5%	56.1%	58.8%	60.0%	61.0%	62.0%
Operating (EBIT) margin	12.0%	16.2%	14.9%	28.0%	32.0%	34.0%	35.0%
Net profit margin	10.7%	13.5%	12.3%	24.1%	26.4%	28.1%	29.1%
Activity							
NFA (gross) turnover		3.01	3.57	5.27	6.08	5.85	5.95
Total asset turnover		0.65	0.69	0.80	0.87	0.91	0.96
Liquidity							
Op asset / op liab	2.23	1.77	1.72	3.53	3.47	3.89	4.34
NOWC Percent of sales		19.8%	13.6%	23.1%	31.3%	35.3%	40.3%
Solvency							
Debt to assets	18.7%	19.2%	0.0%	20.2%	17.3%	14.6%	11.7%
Debt to equity	30.4%	31.3%	0.0%	34.4%	25.3%	20.4%	15.8%
Other liab to assets	6.8%	7.0%	6.3%	2.8%	2.4%	2.0%	1.6%
Total debt to assets	25.5%	26.2%	6.3%	23.0%	19.7%	16.6%	13.3%
Total liabilities to assets	38.5%	38.6%	19.0%	33.0%	31.5%	28.7%	25.8%
Debt to EBIT	2.73	1.82	0.00	1.03	0.67	0.51	0.39
EBIT/interest	(35.43)	189.75	186.75	66.69	51.83	67.75	89.10
Debt to total net op capital	48.7%	63.5%	0.0%	52.0%	39.1%	28.6%	20.2%
ROIC							
NOPAT to sales	10.4%	13.5%	12.3%	24.5%	26.9%	28.6%	29.4%
Sales to EOY NOWC	3.56	6.78	7.43	2.75	2.81	2.40	2.08
Sales to EOY NFA	2.54	3.15	3.80	5.30	5.30	5.30	5.30
Sales to EOY IC	1.48	2.15	2.52	1.81	1.84	1.65	1.49
Total ROIC using EOY IC	15.4%	29.1%	31.0%	44.3%	49.3%	47.2%	43.9%
ROE							
5-stage							
EBIT / sales		16.2%	14.9%	28.0%	32.0%	34.0%	35.0%
Sales / avg assets		0.65	0.69	0.80	0.87	0.91	0.96
EBT / EBIT		99.5%	99.5%	98.5%	98.1%	98.5%	98.9%
Net income /EBT		83.6%	82.6%	87.5%	84.0%	84.0%	84.0%
ROA		8.7%	8.4%	19.4%	23.1%	25.7%	27.9%
Avg assets / avg equity		1.63	1.64	1.68	1.56	1.43	1.37
ROE		14.2%	13.8%	32.6%	36.1%	36.7%	38.2%
3-stage							
Net income / sales		13.5%	12.3%	24.1%	26.4%	28.1%	29.1%
Sales / avg assets		0.65	0.69	0.80	0.87	0.91	0.96
ROA		8.7%	8.4%	19.4%	23.1%	25.7%	27.9%
Avg assets / avg equity		1.63	1.64	1.68	1.56	1.43	1.37
ROE		14.2%	13.8%	32.6%	36.1%	36.7%	38.2%
Payout Ratio		29.8%	34.9%	15.7%	15.1%	11.5%	8.9%
Retention Ratio		70.2%	65.1%	84.3%	84.9%	88.5%	91.1%
Sustainable Growth Rate		10.0%	9.0%	27.4%	30.6%	32.5%	34.8%

Appendix 7: 3-stage DCF Model

3 Stage Discounted Cash Flow							
	Year						
	1	2	3	4	5	6	7
First Stage			**Second Stage**				
Cash flows	2019	2020	2021	2022	2023	2024	2025
Sales Growth	*23.0%*	*27.8%*	*15.0%*	*10.0%*	*8.0%*	*7.0%*	*5.0%*
NOPAT / S	*28.6%*	*29.4%*	*29.5%*	*29.6%*	*29.8%*	*29.9%*	*30.0%*
S / NWC	*9.26*	*9.26*	*9.26*	*9.26*	*9.26*	*9.26*	*9.26*
S / NFA (EOY)	*5.30*	*5.30*	*5.30*	*5.30*	*5.30*	*5.30*	*5.30*
S / IC (EOY)	*3.37*	*3.37*	*3.37*	*3.37*	*3.37*	*3.37*	*3.37*
ROIC (EOY)	*96.3%*	*99.1%*	*99.5%*	*99.9%*	*100.3%*	*100.7%*	*101.1%*
ROIC (BOY)		*126.6%*	*114.4%*	*109.9%*	*108.3%*	*107.8%*	*106.2%*
Share Growth		*-1.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Sales	$11,459	$14,639	$16,835	$18,519	$20,000	$21,400	$22,470
NOPAT	$3,273	$4,304	$4,970	$5,489	$5,952	$6,394	$6,741
Growth		*31.5%*	*15.5%*	*10.4%*	*8.4%*	*7.4%*	*5.4%*
- Change in NWC	232	343	237	182	160	151	116
NWC EOY	*1238*	*1581*	*1818*	*2000*	*2160*	*2311*	*2427*
Growth NWC		*27.8%*	*15.0%*	*10.0%*	*8.0%*	*7.0%*	*5.0%*
- Chg NFA	405	600	414	318	280	264	202
NFA EOY	*2,162*	*2,762*	*3,176*	*3,494*	*3,774*	*4,038*	*4,240*
Growth NFA		*27.8%*	*15.0%*	*10.0%*	*8.0%*	*7.0%*	*5.0%*
Total inv in op cap	636	944	651	499	440	415	317
Total net op cap	3400	4343	4995	5494	5934	6349	6666
FCFF	$2,636	$3,360	$4,318	$4,990	$5,513	$5,979	$6,424
% of sales	*23.0%*	*23.0%*	*25.7%*	*26.9%*	*27.6%*	*27.9%*	*28.6%*
Growth		*27.5%*	*28.5%*	*15.5%*	*10.5%*	*8.5%*	*7.4%*
- Interest (1-tax rate)	48	48	51	53	56	59	62
Growth		*0.0%*	*5.0%*	*5.0%*	*5.0%*	*5.0%*	*5.0%*
FCFE w/o debt	$2,588	$3,312	$4,268	$4,936	$5,457	$5,920	$6,362
% of sales	*22.6%*	*22.6%*	*25.3%*	*26.7%*	*27.3%*	*27.7%*	*28.3%*
Growth		*28.0%*	*28.8%*	*15.7%*	*10.5%*	*8.5%*	*7.5%*
/ No Shares	535.7	530.5	530.5	530.5	530.5	530.5	530.5
FCFE	$4.83	$6.24	$8.04	$9.31	$10.29	$11.16	$11.99
Growth		*29.3%*	*28.8%*	*15.7%*	*10.5%*	*8.5%*	*7.5%*
* Discount factor	0.89	0.79	0.71	0.63	0.56	0.50	0.44
Discounted FCFE	$4.30	$4.95	$5.68	$5.85	$5.76	$5.56	$5.32
Third Stage							
Terminal value P/E							
Net income	$3,224	$4,256	$4,919	$5,436	$5,896	$6,336	$6,679
% of sales	*28.1%*	*29.1%*	*29.2%*	*29.4%*	*29.5%*	*29.6%*	*29.7%*
EPS	$6.02	$8.02	$9.27	$10.25	$11.11	$11.94	$12.59
Growth		*33.3%*	*15.6%*	*10.5%*	*8.5%*	*7.5%*	*5.4%*
Terminal P/E							35.00
* Terminal EPS							$12.59
Terminal value							$440.70
* Discount factor							0.44
Discounted terminal value							$195.66
Summary							
First stage	$9.25	Present value of first 2 year cash flow					
Second stage	$28.18	Present value of year 3-7 cash flow					
Third stage	$195.66	Present value of terminal value P/E					
Value (P/E)	**$233.09**	= value at beg of fiscal yr	2019				