



The Boeing Co. Equity Report

May 2019

By Susanna Domosi

Content

	Page
Company Profile, Valuation Methodology and Financial Analysis Summary.	2
Boing Co. and Competitor Stock Performance	3
Financial Analysis FY 2017 vs. FY 2018.	4
Ratio Analysis.	6
Projection Analysis Assumptions	7
Projection Analysis	8
Valuation Analysis	9
Valuation Analysis Discussion	10
Technical Analysis	11
Appendix	12



Boeing Co (BA)

Susanna Domosi
Pr. Droussiatis
FIN 4710
Spring 2019

Company Profile

Headquarters: Chicago, Illinois

Founded: 1916

CEO: Dennis A. Muilenburg

Industry: Aerospace & Defense

Sector: Industrial Goods

The Boeing Company is the world's largest aerospace company. As a multinational industry leader, Boeing designs, manufactures, and sells jetliners, defense, space and security systems, and services of aftermarket support. Boeing is America's biggest manufacturing exporter by dollar value and its customers include airlines, the U.S. government and over 150 allied governments.

Products and tailored services of Boeing include commercial and military aircraft, satellites, weapons, electronic and defense systems, launch systems, advanced information and communication systems, and performance-based logistics and training

Boeing was founded by William Boeing on July 15, 1916, in Seattle, Washington.

Boeing employs ~153,000 employees and is organized into five primary divisions and one exploratory division:

1. Boeing Capital
2. Boeing Commercial Airplanes
3. Boeing Defense, Space & Security
4. Engineering, Test & Technology
5. Boeing Shared Services Group
6. Boeing NeXt- explores urban air mobility

Operations exist in over 65 countries with more than 20,000 diverse suppliers and partners. Over 70% of Boeing's backlog is represented by customers outside the U.S. A global leader of innovation, Boeing holds 15k+ patents worldwide, has 11 research and development centers around the world, and had been named a top global innovator among aerospace and defense companies for 6 consecutive years.

As of 2018, Boeing is second on the list of Top 100 US Federal Contractors, ranked 24th on the *Fortune* magazine "Fortune 500" list, ranked 64th on the "Fortune Global 500" list, and ranked 19th on the "World's Most Admired Companies.

\$352.71
SELL

Valuation Methodology

Method #1
Stock Price

• \$352.71

Method #4
Trading Comparable

• \$283.51

Method #6
DCF Analysis

• \$292.62

Average of Methods

• \$309.61

Financial Summary (12/31/2018):

Revenues:	\$ 101.13 B
EBITDA:	\$ 13.92 B
Net Income:	\$ 10.45 B

Market Data

Market Cap (intraday)	\$ 200.99 B
Enterprise Value (May 7, 2019)	\$ 219.99B
Enterprise Value/EBITDA (ttm)	15.8x





Financial Analysis

Solvency Ratios

LTD/Total Capitalization:	9.09%
Interest Coverage:	29.38x
LTD/EBITDA:	0.76x

Profitability Ratios

Gross Margin:	19.42
EBITDA Margin:	13.80%
EBIT Margin:	11.70%
ROA:	6.05%
Gross Return on Assets:	20.20%
ROE(ttm):	1344.44%

Boeing's Top Competitors



Lockheed Martin is a primary competitor of Boeing with a market cap of \$94.42B. The company has a global presence employing ~105,000 employees with headquarters in Maryland, and was founded in 1995. Their profit margin for fiscal year 2018 was 9.91% with a return on equity of 463.96% and an return of assets of 10.37%. Operating cash flows were \$4.17B.



Northrop Grumman is another direct competitor of Boeing with a market cap of \$49.34B.

Approximately 85,000 employees work at Northrop Grumman with headquarters in Virginia, though the company has multicontinental operations and was founded in 1994. Profit margins were 10.31% for 2018, with an ROE of 39.61% and an ROA of 7.11%

Financial Analysis FY 17 vs FY 18

Operations:

- Revenues increased from FY 17 to FY 18 by \$7,122 or by 8% due to an increase in revenues throughout several divisions of Boeing: Commercial Airplanes (BCA), Defense Space & Security (BDS), and Global Services (BGS). BCA revenues increased due to higher 737 and 787 deliveries offsetting the decreased 777 and 747 deliveries.
- BDS revenues increased due to non-US contract awards for fighters, higher weapons revenues, and higher satellite revenues. Revenues from BGS increased due to Boeing's growing service portfolio. This growth is generated by higher parts revenues, as well as the acquisition of KLX.
- Cost of sales increased by 6% or \$4,878 million from FY 17 to FY 18 due to increased sales. Research and development costs increased by 3% or \$90 million due to heightened capital outlays for product development.
- Interest and debt expenses increased by \$115 million in FY 18 due to higher debt balances.
- Earnings from operations in 2018 increased by \$1,643 million from 2017 due to higher BCA and BGS revenues, which was sufficient to offset the decline in BDS earnings from operations
- Gross margins increased from 18.5% in FY 2017 to 19.4% in FY 2018, and EBITDA Margin increased by 0.9%.
- As a result, net income increased to \$320.89 million in 2018 from \$287.79 million in 2017 due to the increased revenues and improved operating margins. The more favorable margins can be attributed to higher 787 margins, improved cost performance, and a more favorable delivery mix.

The Boing Company (BA)

Income Statement

All numbers in millions

PERIOD ENDING	30-Dec-16	29-Dec-17	31-Dec-18
Total Revenue	93,496	94,005	101,127
Cost of Revenue	79,026	76,612	81,490
Gross Profit	14,470	17,393	19,637
Operating Expenses			
Research Development	4,626	3,179	3,269
Selling General and Administrative	4,091	4,101	4,525
Non Recurring - One time	-	-	-
Others	-	-	-
Total Operating Expenses	7,482	7,280	7,794
Operating Income or Loss	6,988	10,113	11,843
One time	(1,205)	(6)	(146)
Earnings Before Interest And Taxes	6,988	10,113	11,843
Interest Expense	306	360	475
Income Before Tax	5,783	10,107	11,604
Income Tax Expense	749	1,649	1,144
Minority Interest	60	57	71
Net Income From Continuing Ops	5,034	8,458	10,460
Non-recurring Events			
Discontinued Operations	-	-	-
Extraordinary Items	-	-	-
Effect Of Accounting Changes	-	-	-
Other Items	-	-	-
Net Income	5,034	8,458	10,460
Preferred Stock And Other Adjustments	-	-	-
Net Income Applicable To Common	5,034	8,458	10,460
End of Period Stock Price Close	\$ 147.80	\$ 287.79	\$ 320.89
% Change		94.7%	11.5%



The Boing Company (BA)

Cash Flow Statement

PERIOD ENDING	31-Dec-16	31-Dec-17	31-Dec-18
Net Income	5,034	8,458	10,460
Depreciation	1,889	2,047	2,114
Adjustments To Net Income	651	589	464
Changes In Accounts Receivables	(1,118)	(2,440)	(2,621)
Changes In Liabilities	(740)	(4,830)	(2,638)
Changes In Inventories	4,004	(1,403)	568
Changes In Other Operating Activities	(726)	609	1,879
Total Cash Flow From Operating Activities	10,496	13,346	15,322
Investing Activities, Cash Flows Provided By or Used In			
Capital Expenditures	(2,613)	(1,739)	(1,722)
Investments	(513)	38	291
Other Cashflows from Investing Activities	7	6	(11)
Total Cash Flows From Investing Activities	(3,378)	(2,058)	(4,621)
Financing Activities, Cash Flows Provided By or Used In			
Dividends Paid	(2,756)	(3,417)	(3,946)
Sale Purchase of Stock	-	-	-
Net Borrowings	(34)	1,124	1,365
Other Cash Flows from Financing Activities	(24)	35	35
Total Cash Flows From Financing Activities	(9,587)	(11,350)	(11,722)
Effect Of Exchange Rate Changes	(33)	80	(53)
Change In Cash and Cash Equivalents	(2,502)	18	(1,074)

Leverage:

- Total debt increased to \$13.8 billion at year end of 2018 as opposed to \$11.1 billion in 2017, of which \$3.2 billion and \$1.3 billion was short term.
- 26.1 million shares valued at a total of \$9.0 billion were repurchased through Boeing's open market repurchase program.
- Interest coverage decreased from 33.78x in FY 2017 to 29.38x in FY 2018.
- TD/EBITDA increased from 0.71x in FY17 to 0.99x in FY18, and TD/Total Cap increased from 83.8% to 97.6%.



Cash Flows:

- Cash flows from operating activities increased to \$15.3 billion in 2018 which is a \$2 billion increase from 2017. This OCF growth is due to higher earnings and lower spending on inventory.
- Cash used by investing activities increased in 2018 to \$4.6 billion from \$2.1 billion in 2017 due to acquisitions throughout the second half of 2018.
- CapEx was flat throughout 2017 and 2018 at \$1.7 billion.
- Financing activity cash use increased by \$0.4 billion in FY 2018 to \$11.7 billion due to higher dividends offset by higher net borrowing of \$1.4 billion as opposed to \$1.1 billion in 2017.

The Boing Company (BA)

Balance Sheet

PERIOD ENDING	30-Dec-16	29-Dec-17	31-Dec-18
Assets			
Current Assets			
Cash And Cash Equivalents	8,801	8,813	7,637
Short Term Investments	1,228	1,179	927
Net Receivables	8,832	11,088	13,904
Inventory	43,199	61,388	62,567
Other Current Assets	-	2,417	2,335
Total Current Assets	62,488	85,194	87,830
Long Term Investments	1,317	1,260	1,087
Property Plant and Equipment	12,807	12,672	12,645
Goodwill	5,324	5,559	7,840
Intangible Assets	2,540	2,573	3,429
Accumulated Amortization	-	-	-
Other Assets	1,748	2,348	2,110
Deferred Long Term Asset Charges	332	321	284
Total Assets	89,997	112,362	117,359
Liabilities			
Current Liabilities			
Accounts Payable	11,190	12,202	12,916
Short/Current Long Term Debt	284	435	3,190
Other Current Liabilities	27,623	51,260	50,676
Total Current Liabilities	50,134	74,648	81,590
Long Term Debt	6,804	8,159	10,657
Other Liabilities	29,418	26,219	24,702
Deferred Long Term Liability Charges	-	-	-
Minority Interest	60	57	71
Negative Goodwill	-	-	-
Total Liabilities	89,120	110,649	116,949
Stockholders' Equity			
Redeemable Preferred Stock	-	-	-
Preferred Stock	-	-	-
Common Stock	5,061	5,061	5,061
Retained Earnings	40,714	49,618	55,941
Treasury Stock	(49,720)	(59,827)	(67,431)
Capital Surplus	4,762	6,804	6,768
Other Stockholder Equity	(13,623)	(16,373)	(15,083)
Total Stockholder Equity	817	1,656	339
Total Liabilities & Equity	89,937	112,305	117,288

Ratio Analysis



Boeing Co (BA)

Ratio Analysis

PERIOD ENDING	3 Year Average	31-Dec-16	31-Dec-17	31-Dec-18
EBITDA (Operating Income + Depreciation+Non Re)	8,877	12,160	13,957	
Liquidity Ratios				
Current Ratio	1.15x	1.25x	1.14x	1.08x
Accounts Receivable Turnover	8.78x	10.59x	8.48x	7.27x
Solvency Ratios				
TD / Total Capitalization	90.4%	89.7%	83.8%	97.6%
EBITDA / Interest (Interest Coverage)	30.72x	29.01x	33.78x	29.38x
TD / EBITDA	0.83x	0.80x	0.71x	0.99x
Profitability Ratios				
Gross Margin	17.8%	15.5%	18.5%	19.4%
EBITDA Margin	12.1%	9.5%	12.9%	13.8%
EBIT Margin	10.0%	7.5%	10.8%	11.7%
Return on Assets (ROA)	7.1%	5.0%	7.4%	8.9%
Gross Return on Assets	12.0%	6.9%	8.8%	20.2%
Return on Equity (ROE)	604.0%	79.4%	684.0%	1048.6%
Trend Analysis Ratios				
Revenue Growth	4.06%		0.54%	7.58%
Operating Expense as % of Revenues	7.8%	8.0%	7.7%	7.7%
Tax as % of EBT	13.0%	13.0%	16.3%	9.9%
Depreciation	2.1%	2.0%	2.2%	2.1%
Capex	2.1%	2.8%	1.8%	1.7%
This year's interest Expense/ Previous Year's Outstanding =				5.5%



Projection Analysis Assumptions



Revenues:

- Revenue growth ranged from 0.54% to 7.58% throughout 2016-2018 with an average of 4.06%. Considering the tragic accident and negative publicity Boeing has experienced in the beginning of 2019, projected growth for 2019 is on the low side around 1%, but not negative since Boeing's backlog and other business lines will still bring in revenues.
- The negative events will also be offset by acquisition activity, incrementally repairing revenue growth numbers for 2020 to about 3% and increasing to the three-year trailing average of 4% by 2021.
- As Boeing is a leader in drone technology innovation and is actively exploring urban air mobility, it can be expected drone solution that is widely used by the population will be produced giving their revenues a large 3% boost by 2022. Legislation has already approved the use of drone technology for air deliveries in suburban areas, therefore approvals in urban areas are soon to follow.

Operating Expense:

- The historic range of operating expenses are between 7-8%. This expense can be expected to stay in the 7% range and level off at 8% long term.

EBITDA:

- Historically, EBITDA has been between 9-14% of revenues. With operating expense management improving at Boeing, operating expense percentages of revenues will gradually decrease from the historic 7% to 6% by 2024. This in turn effects the EBITDA margin to improve from 13% to 14% by 2024. Gross margin is projected to remain flat at 18% which is slightly above the 17.8% historic average.

Other Assumptions:

- **Depreciation & CapEx:** Depreciation is expected to remain at the historic average of 2% while CapEx is expected to increase in the year prior to the roll out of the new drone technology.
- **Interest Payment:** Interest expense is expected to decrease as long term debt is paid off.
- **Total Debt to EBITDA:** Expected to decrease from 1.04x in 2019 to 0.55x in 2024.

Projection Analysis

The Boing Company (BA)

Income Statement

PERIOD ENDING	3-year Average	Operating Assumpt. Input	Projections					
			30-Dec-19	29-Dec-20	29-Dec-21	29-Dec-22	30-Dec-23	29-Dec-24
Total Revenue			102,138	105,202	109,411	117,069	125,264	134,033
Cost of Revenue			83,753	86,266	89,717	95,997	102,717	109,907
Gross Profit			18,385	18,936	19,694	21,072	22,548	24,126
Total Operating Expenses			7,150	7,364	8,753	9,366	10,021	10,723
EBIT			11,235	11,572	10,941	11,707	12,526	13,403
Interest Expense			765	765	727	689	651	612
EBT			10,470	10,807	10,214	11,018	11,876	12,791
Income Tax Expense			1,361	1,405	1,328	1,432	1,544	1,663
Net Income			9,109	9,402	8,886	9,586	10,332	11,128
Income Statement Assumptions								
Revenue Growth	4.06%	4.00%	1.00%	3.00%	4.00%	7.00%	7.00%	7.00%
Gross Margin	17.80%	18.00%	18.00%	18.00%	18.00%	18.00%	18.00%	18.00%
Operating Exp as % of Revenue	7.82%	7.00%	7.00%	7.00%	8.00%	8.00%	8.00%	8.00%
Tax as % of EBT	13.04%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%	13.00%
Other Assumptions % of Revenue								
Depreciation			2,043	2,104	2,188	2,341	2,505	2,681
Capex			2,043	2,104	5,471	3,512	2,505	2,681
Depreciation	2.10%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Capital Expenditures	2.12%	2.00%	2.00%	2.00%	5.00%	3.00%	2.00%	2.00%
Debt Schedule								
Short Term Debt			13,847	13,155	12,462	11,770	11,078	10,385
Long Term Debt			(692.35)	(692)	(692)	(692)	(692)	(692)
Total Debt Outstanding			765	765	727	689	651	612
Increase/Decrease								
Interest Payment								
Ratio Analysis - Assumptions								
EBITDA			30-Dec-19	29-Dec-20	29-Dec-21	29-Dec-22	29-Dec-23	28-Dec-24
			13,278	13,676	13,129	14,048	15,032	16,084
Trend Analysis								
Revenue Growth			4.00%	3.00%	4.00%	7.00%	7.00%	7.00%
Solvency Ratios (Leverage Management)								
Total Debt / EBITDA (Incl. CPLTD)			1.04x	0.96x	0.95x	0.84x	0.74x	0.65x
EBITDA / Interest Coverage Ratio			17.35x	17.87x	18.06x	20.40x	23.11x	26.27x
EBIT / Interest Coverage Ratio			14.68x	15.12x	15.05x	17.00x	19.26x	21.89x
Profitability Ratios								
Gross Margin %			18.00%	18.00%	18.00%	18.00%	18.00%	18.00%
EBITDA Margin %			13.00%	13.00%	12.00%	12.00%	12.00%	12.00%
EBIT Margin %			11.00%	11.00%	10.00%	10.00%	10.00%	10.00%



Valuations Analysis

METHOD #1 - Market Value / Using the Stock Price

	SP	SO	SP * SO = EQ	D	C	EQ + D - C = EV
--	----	----	--------------	---	---	-----------------

Company	Symbol	Stock Price (as of 12/31/2018)	Stocks Outstanding (\$000)	Equity Value (\$000)	Debt (ST<) 12/31/2018 (\$000)	Cash 12/31/2018 (\$000)	Enterprise Value (\$000)
Boeing Co.	BA	\$ 322.50	564,480	182,044,800	13,850,000	7,637,000	188,257,800

Boeing Co.'s Enterprise Value **188,257,800**

METHOD #4 -Average EBITDA Industry Trading Multiples

	SP	SO	SP * SO = EQ	D	C	EQ + D - C = EV	E	EV / E
--	----	----	--------------	---	---	-----------------	---	--------

Company	Symbol	Stock Price (as of 12/31/2018)	Stocks Outstanding (\$000)	Equity Value (\$000)	Debt (ST<) (\$000)	Cash (\$000)	Enterprise Value (\$000)	EBITDA (\$mm)	EBITDA Multiple	Beta
Lockheed Martin	LMT	\$ 261.84	282,810	74,050,970	14,100,000	772,000	87,378,970	8,600,000	10.16x	1.42x
General Dynamics Corp.	GD	\$ 157.21	288,770	45,397,532	12,417,000	963,000	56,851,532	5,220,000	10.89x	1.46x
General Electric Co.	GE	\$ 7.28	8,710,000	63,408,800	95,234,000	20,069,000	138,573,800	19,730,000	7.02x	0.19x
Honeywell International Inc.	HON	\$ 132.12	728,370	96,232,244	12,628,000	9,287,000	99,573,244	8,910,000	11.18x	1.24x
Northrop Grumman Corp.	NOC	\$ 244.90	169,960	41,623,204	14,400,000	1,579,000	54,444,204	4,580,000	11.89x	1.07x
Textron Inc.	TXT	\$ 45.99	233,850	10,754,762	2,808,000	987,000	12,575,762	1,520,000	8.27x	1.79x
United Technologies Corp.	UTX	\$ 105.85	862,330	91,277,631	44,068,000	6,152,000	129,193,631	9,500,000	13.60x	1.31x
Raytheon Co.	RTN	\$ 153.35	282,240	43,281,504	4,755,000	3,608,000	44,428,504	5,110,000	8.69x	1.29x
Boeing Co.	BA	\$ 322.50	564,480	182,044,800	13,850,000	7,637,000	188,257,800	13,920,000	13.52x	1.20x

EBITDA * Average Multiple	13,920,000	10.18x	Average Outliers	10.21x	1.22x
---------------------------	------------	--------	------------------	--------	-------

Boeing Co.'s **141,710,758**

METHOD #6 - Discount Cash Flow Valuation Analysis

The Boing Company (BA)

Discount Cash Flow Valuation Analysis

Projected (yr1-yr6) Assumptions	Input Actual		EXIT YEAR				
	31-Dec-18	30-Dec-19	29-Dec-20	29-Dec-21	29-Dec-22	30-Dec-23	29-Dec-24
Revenues	101,127	102,138	105,202	109,411	117,069	125,264	135,671
Revenue Growth Assumptions		1.0%	3.0%	4.0%	7.0%	7.0%	8.3%
Cost of Revenues (CoGS)	82.0%	(81,490)	(83,753)	(86,266)	(89,717)	(95,997)	(102,717)
Operating Expenses	7.0%	(7,794)	(7,150)	(7,364)	(7,659)	(8,195)	(8,768)
EBIT	11,843	11,235	11,572	12,035	12,878	13,779	14,924
Less Taxes / % of EBIT	13.0%	(1,540)	(1,461)	(1,504)	(1,565)	(1,674)	(1,791)
Plus Depreciation	2.0%	2,114	2,043	2,104	2,188	2,341	2,505
Less Capex	3.0%	(1,722)	(3,064)	(3,156)	(3,282)	(3,512)	(4,070)
Cash Flow	10,695	8,753	9,016	9,376	10,033	10,735	11,627

EBITDA **13,920** 13,278 13,676 14,223 15,219 16,284 17,637

Terminal Value	Assumptions	(EBITDA x Market EBITDA Multiple)	Next Yr Cash Flow / (WACC - Next Yr Rev Growth)
EBITDA Multiple Method	10.18x	165,775	
Perpetuity Method	11.87%	326,555	
Average		246,165	
Less Debt Outstanding (at Exit)		(10,385)	← (75% of orginal Debt)
Plus Cash (at Exit)		-	
Equity Value at Terminal		235,779	

Equity Cash Flows	PV Table or $(1 / [(1 + i)^n]$	8,753	9,016	9,376	10,033	246,515
		0.88963	0.79145	0.70410	0.62639	0.55726
		7,787	7,136	6,602	6,284	137,372

Total Present Value of Equity	165,181	Calculating WACC	Amount	% Cap	Return/Inter	After Tax	WACC
+ PV of Debt =	13,847		181,890	92.9%	12.41%	12.41%	11.53%
- Less Cash =	(7,637)		13,850	7.1%	5.53%	4.81%	0.34%
Boeing Co.'s Enterprise Value	171,390,795		195,740	100.0%			11.87%
6-year Treasury Note =			1.65% (given)				
Historical Market Premium =			9.00% (given)				
Company Beta =			1.20x				
Historical Tax Rate =			13.00%				

Valuations Analysis Discussion

Valuation Analysis Discussion:

- Out of the three valuation methods utilized, the highest valuation of Boeing Co. was Method #1: the market value/stock price method. At \$322.50, the highest resulting valuation is still well below the current trading price of Boeing, which is currently in the #350-\$360 range.
- Comparing Boeing's Enterprise Value EBITDA multiple of 13.52x to the industry average of 10.18x, it can be concluded that Boeing is overvalued. Trading at \$322.5 on 12/31/2018 and currently trading in the \$350-\$360 range, Boeing's stock price exceeds all of its competitors'.
- Using a DCF analysis to include more detail into valuation resulted in a stock price of \$292.62, a figure significantly lower than Boeing's current trading price. This valuation included higher than historic growth rates and a positive view on growth past 2020 due to the expected establishment of Boeing NeXt, an exploratory division of Boeing exploring urban air mobility. Even with such a positive outlook, the DCF valuation still results in the conclusion that Boeing is overvalued.

Results:

- Based on all three methods, the conclusion can be drawn that Boeing's stock is overvalued. Boeing is currently trading at \$359.57, which is 26% above \$286.05, the average of the three methods. Therefore, selling Boeing stock is recommended.

ENTERPRISE VALUATION ANALYSIS

	EV	Debt	Cash	Eq Value	Shares Outs	Stock Price
METHOD #1 - Market Value / Using the Stock Price	188,257,800	13,850,000	7,637,000	182,044,800	564,480	\$ 322.50
METHOD #4 -Average EBITDA Industry Trading Multiples	141,710,758	13,850,000	7,637,000	135,497,758	564,480	\$ 240.04
METHOD #6 - Discount Cash Flow Valuation Analysis	171,390,795	13,850,000	7,637,000	165,177,795	564,480	\$ 292.62
Average of other methods	167,119,784	13,850,000	7,637,000	160,906,784	564,480	\$ 285.05



Technical Analysis



BOEING STOCK

10 Year Average Stock (Adj)	120.2196
10 Year High	368.3401
10 Year Low	23.96298
10 year Median	108.2406

10 Year Monthly Average Change	2.19%
Standard Deviation	7.3%
Skew	-0.349

Return / Standard Deviation	0.300977
-----------------------------	----------

S&P INDEX

10 Year Average	160.7797
10 Year High	286.4679
10 Year Low	60.01623
10 year Median	161.493

10 Year Monthly Average Change	1.08%
Standard Deviation	4.0%
Skew	-0.293

Return / Standard Deviation	0.272683
-----------------------------	----------

10 Year Beta Coefficient	1.195164
---------------------------------	-----------------



Appendix

Boeing Co.

Date	Open	High	Low	Close	Avg Vol	Adj Close* Change
11/1/2008	51.9	54.65	36.17	42.63	177147000	32.249416
12/1/2008	41.64	43.69	36.28	42.67	158466000	32.522282 0.85%
1/1/2009	42.8	47	39.51	42.31	139705400	32.247988 -0.84%
2/1/2009	41.73	43.67	31.4	31.44	152449700	23.962982 -25.69%
3/1/2009	30.96	38.68	29.05	35.58	227580100	27.39175 14.31%
4/1/2009	34.52	41.74	34.21	40.05	158407900	30.833048 12.56%
5/1/2009	40.31	45.84	40.09	44.85	119288100	34.528378 11.98%
6/1/2009	45.54	53.39	41.09	42.5	203961900	33.040806 -4.31%
7/1/2009	42.63	44.5	38.92	42.91	157987100	33.359558 0.96%
8/1/2009	43.18	52.53	42.51	49.67	150311700	38.614979 15.75%
9/1/2009	49.21	55.48	47.76	54.15	109453100	42.502113 10.07%
10/1/2009	53.85	53.9	47.18	47.8	126937300	37.518021 -11.73%
11/1/2009	47.82	53	47.33	52.41	83821900	41.136379 9.64%
12/1/2009	52.75	56.56	52.75	54.13	103468100	48.860661 4.19%
1/1/2010	55.72	63.4	54.8	60.6	130667600	47.983663 11.95%
2/1/2010	60.74	64.47	57.14	63.16	108739500	50.010693 4.22%
3/1/2010	63.05	74.53	63	72.61	163859800	57.885803 15.75%
4/1/2010	73.24	76	68.98	72.43	117851900	57.742298 -0.25%
5/1/2010	72.62	74.7	60.61	64.18	152590100	51.165272 -11.39%
6/1/2010	64.27	69.34	58.94	62.75	149194900	50.31559 1.66%
7/1/2010	62.48	69.75	60.65	68.14	110005400	54.637508 8.59%
8/1/2010	69.01	70	59.48	61.13	99202500	49.01659 -10.29%
9/1/2010	61.79	67.97	61.66	66.54	97619100	53.678764 9.51%
10/1/2010	67.54	72.49	65.86	70.64	97535100	56.986286 6.16%
11/1/2010	70.71	71.89	61.84	63.77	150042600	51.441464 -9.73%
12/1/2010	64.66	67.39	62.82	65.26	103910300	52.964977 2.96%
1/1/2011	66.15	72.99	66	69.48	128661800	58.389904 6.47%
2/1/2011	70	74.29	69.6	72.01	91690200	58.443275 3.64%
3/1/2011	71.93	74.47	67.34	73.93	119791900	60.350121 3.26%
4/1/2011	74.29	80.34	70.88	79.78	95129600	65.125565 7.91%
5/1/2011	80.35	86.05	75.13	78.03	87491500	63.697025 -2.19%
6/1/2011	77.95	78.1	70.29	73.93	103740100	66.688383 -4.75%
7/1/2011	73.81	76.2	69.07	70.47	106421300	57.824975 -4.68%
8/1/2011	71.61	71.63	56.01	66.86	194916400	54.867031 -5.12%
9/1/2011	66.96	73.7	57.53	60.51	124749900	49.992663 -8.88%
10/1/2011	60.18	68.76	56.9	65.79	127425600	54.35516 8.73%
11/1/2011	64.23	68.97	62.12	68.69	114604000	56.751114 4.41%
12/1/2011	68.7	74.74	68.51	73.35	116561100	60.987591 7.47%
1/1/2012	74.7	76.7	72.74	74.18	103787200	61.677666 1.13%
2/1/2012	74.96	76.74	74.3	74.95	84337600	62.317894 1.04%
3/1/2012	74.96	75.81	72.3	74.37	89633300	62.199593 -0.19%
4/1/2012	74	77.57	70.59	76.8	85289300	64.231934 3.27%
5/1/2012	76.59	77.83	68.93	69.61	88091800	58.218544 -9.36%
6/1/2012	68.67	73.47	66.82	74.3	88430100	62.50581 7.36%
7/1/2012	74.21	75.96	70.85	73.91	86964700	62.177746 -0.52%
8/1/2012	74.32	74.69	70.02	71.4	85793400	60.061363 -3.40%
9/1/2012	71.5	73.27	69.03	69.6	103075800	50.903008 -1.94%
10/1/2012	69.86	75	69.2	70.44	92093600	59.613907 1.21%
11/1/2012	70.59	74.86	69.3	74.28	101603600	62.863728 5.45%
12/1/2012	74.41	76.56	72.93	75.36	90048100	64.169777 2.08%
1/1/2013	76.55	78.02	72.68	73.87	191804200	62.901031 -1.98%
2/1/2013	74.49	77.93	74.23	76.9	101429400	65.48111 4.10%
3/1/2013	76.7	86.84	76.17	85.85	105359030	73.571663 12.36%
4/1/2013	85.6	93.38	83.8	91.41	106380800	78.336494 6.48%
5/1/2013	91.08	101.5	90.72	99.02	116622200	84.858101 8.33%
6/1/2013	99.36	104.2	96.31	102.4	99711500	88.240463 3.99%
7/1/2013	102.93	109.5	98.99	105.1	152799000	90.531761 2.60%
8/1/2013	105.99	107.9	101.8	103.9	79814700	89.513212 -1.12%
9/1/2013	105.13	120.4	104.6	117.5	89293700	101.67362 13.58%
10/1/2013	117.97	131.9	113.3	130.5	102075200	112.92262 11.06%
11/1/2013	130.9	142	130.6	134.3	88250600	116.16751 2.87%
12/1/2013	134.99	138.9	130.6	136.5	76860000	118.5362 2.04%
1/1/2014	136.01	144.6	131.2	125.3	113971400	108.7834 -8.23%
2/1/2014	124.24	130.9	118.8	128.9	119968600	111.96198 2.92%
3/1/2014	127.18	131	124.4	125.5	97798400	109.59783 -2.11%
4/1/2014	126.24	131.5	121.9	129	779966900	112.680797 2.81%
5/1/2014	127.84	135.4	128.3	135.3	61514500	118.1213 4.83%
6/1/2014	135.5	138.4	126.2	127.2	78754100	111.74097 -5.40%
7/1/2014	127.66	130.6	120.4	120.5	111816600	105.8127 -5.31%
8/1/2014	120.45	129.1	117.9	126.8	79247500	111.36333 5.25%
9/1/2014	125.62	129.9	121.4	127.4	75364300	112.55022 1.07%
10/1/2014	127.37	128	116.3	124.9	107425800	110.36778 -0.89%
11/1/2014	125.35	135.8	124.3	134.4	70426500	124.84266 -0.65%
12/1/2014	134.31	134.4	120.6	130	96842100	115.51766 -2.70%
1/1/2015	130.7	143.8	126.2	145.4	108953000	129.19527 11.84%
2/1/2015	143.72	158.8	143.1	150.9	92501800	134.06554 3.77%
3/1/2015	150.85	156.9	146	150.1	81417100	134.20619 0.10%
4/1/2015	149.97	155.5	142.8	143.3	84494200	128.17905 -4.49%
5/1/2015	144.41	148.3	140.3	140.5	79281400	125.65732 -1.97%
6/1/2015	141.45	146.5	134.3	138.7	70426500	124.84266 -0.65%
7/1/2015	140.48	149.2	139	144.2	70138100	129.74744 3.93%
8/1/2015	144.46	146.8	115.1	130.7	92706100	117.60696 -9.36%
9/1/2015	128.16	139.9	126.9	130.9	81148500	118.60185 0.85%
10/1/2015	131.32	139.6	126.8	148.1	92056900	134.1075 13.07%
11/1/2015	148.38	150.6	141.6	145.4	52868200	131.73454 -1.77%
12/1/2015	146.54	154.9	138.9	144.6	79585600	131.76534 0.02%
1/1/2016	141.38	141.7	115	120.1	13504800	109.47485 -16.92%
2/1/2016	119.64	124.9	102.1	118.2	153106200	107.69782 -1.62%
3/1/2016	136.8	138.6	113.8	126.9	10718100	116.75131 8.41%
4/1/2016	126.23	137.9	125.1	134.8	96152000	123.99524 6.19%
5/1/2016	134.38	135.2	126.2	126.2	82219600	116.02472 -6.42%
6/1/2016	126	134.6	123.2	129.9	102652400	120.42045 3.79%
7/1/2016	129.54	139.4	124	133.7	7609900	123.93468 2.92%
8/1/2016	133.21	136.4	129.1	129.4	61444000	120.031 -3.15%
9/1/2016	130.03	133.1	126.3	131.7	71550300	123.16668 2.61%
10/1/2016	131.28	146.2	130.7	142.4	80920900	133.161 8.11%
11/1/2016	142.95	153.1	138.8	150.6	73628200	140.76192 5.71%
12/1/2016	150.74	160.1	150	155.7	62860400	147.79933 5.00%
1/1/2017	156.3	170	155.2	163.4	7335200	155.174754 4.97%
2/1/2017	164.25	181.9	160.8	180.2	76731900	171.10658 10.29%
3/1/2017	181.85	185.7	173.8	176.9	71329400	169.3915 -1.03%
4/1/2017	177.08	184.9	175.5	184.8	52167800	176.98315 4.51%
5/1/2017	184.23	188.3	175.5	187.6	66022900	179.66425 1.51%
6/1/2017	187.41	204.4	184.5	197.8	64597400	190.80425 6.20%
7/1/2017	198.07	246.5	197.8	242.5	75175600	233.94386 22.61%
8/1/2017	243.38	244	230.9	239.7	48415800	231.24222 -1.15%
9/1/2017	239.66	259.3	234.3	254.2	76743100	246.744941 6.70%
10/1/2017	254.65	267.2	253.5	258	68772900	250.40338 1.48%
11/1/2017	258.29	277	256.2	276.8	52749700	268.67065 7.30%
12/1/2017	277.51	299.3	270.6	294.9	71520900	287.78757 7.12%
1/1/2018	295.75	361	295.4	354.4	125857300	345.81155 20.16%
2/1/2018	352.95	371.6	317.4	362.2	116097000	353.46219 2.21%
3/1/2018	362.33	362.7	311.2	327.9	138587800	321.54074 -9.03%
4/1/2018	325.2	347.7	311.9	336.3	103765100	327.1109 1.73%
5/1/2018	332.5	365	319.1	352.2	85673400	345.35129 5.58%
6/1/2018	355.79	374.5	327.3	335.5	84319800	330.66455 -4.25%
7/1/2018	330.69	364.5	329.1	356.3	60241500	351.15424 6.20%
8/1/2018	354.09	357.9	328	342.8	62969600	337.83393 -3.79%
9/1/2018	341.6	374.2	337.3	371.9	64530500	368.3409 9.03%
10/1/2018	375.16	394.3	328.6	354.9	100261700	351.46317 -4.58%
11/1/2018	357.47	373.7	296.6	346.8	85447700	343.44074 -2.28%
12/1/2018	364.31	369	295.2	322.5	91168000	320.88794 -6.57%

Date	Open	High	Low	Close	Avg Vol	Adj Close* Change

<tbl_r cells

BA	S&P	S (Y-AvgY)	M (X-AvgX)	S x M	M^2
0.85%	0.17%	-1.34%	-0.91%	0.000123	8.37005E-05
-0.84%	-7.47%	-3.03%	-8.55%	0.002593	0.007306291
-25.69%	-10.74%	-27.88%	-11.83%	0.032973	0.013986107
14.31%	7.56%	12.12%	6.48%	0.007853	0.004198788
12.56%	10.72%	10.37%	9.64%	0.01	0.009293099
11.98%	5.85%	9.80%	4.76%	0.004666	0.002269536
-4.31%	-0.63%	-6.50%	-1.71%	0.00111	0.000291792
0.96%	8.07%	-1.23%	6.99%	-0.00086	0.004880639
15.75%	3.69%	13.56%	2.61%	0.003544	0.000682552
10.07%	3.05%	7.88%	1.97%	0.001554	0.000389455
-11.73%	-1.46%	-13.92%	-2.54%	0.00353	0.000643514
9.64%	6.16%	7.45%	5.08%	0.003786	0.00257997
4.19%	1.36%	2.00%	0.28%	5.66E-05	8.00633E-06
11.95%	-3.12%	9.76%	-4.20%	-0.0041	0.001761329
4.22%	3.12%	2.03%	2.04%	0.000415	0.000415384
15.75%	5.65%	13.56%	4.57%	0.006198	0.002089816
-0.25%	1.97%	-2.44%	0.88%	-0.00022	7.81139E-29
-11.39%	-7.95%	-13.58%	-9.03%	0.012289	0.008148429
-1.66%	-5.62%	-3.85%	-6.70%	0.002582	0.004495019
8.59%	7.34%	6.40%	6.26%	0.004004	0.00391494
-10.29%	4.50%	-12.48%	-5.58%	0.006962	0.003113035
9.51%	8.38%	7.32%	7.29%	0.005534	0.005320097
6.16%	4.38%	3.97%	3.29%	0.001309	0.001085439
-9.73%	0.00%	-11.92%	-1.08%	0.001288	0.00011694
2.96%	6.13%	0.77%	5.05%	0.000387	0.002545939
6.47%	2.87%	4.28%	1.79%	0.000764	0.000319262
3.64%	3.47%	1.45%	2.39%	0.000347	0.000572332
3.26%	-0.42%	1.07%	-1.50%	-0.00016	0.00022559
7.91%	3.34%	5.72%	2.26%	0.001294	0.000511565
-2.19%	-1.12%	-4.38%	-2.20%	0.000966	0.000485262
-4.75%	-2.17%	-6.94%	-3.25%	0.002259	0.001058429
-4.68%	-1.51%	-6.87%	-2.60%	0.001783	0.000673932
-5.12%	-5.50%	-7.31%	-6.58%	0.004811	0.004328251
-8.88%	-7.42%	-11.07%	-8.50%	0.009415	0.007229141
8.73%	11.49%	6.54%	10.41%	0.006802	0.010830931
4.41%	-0.41%	2.22%	-1.49%	-0.00033	0.00022134
7.47%	0.41%	5.28%	-0.67%	-0.00036	4.53426E-05
1.13%	5.30%	-1.06%	4.22%	-0.00045	0.001780575
1.04%	4.34%	-1.15%	0.91%	-0.00038	0.001062206
-0.19%	2.77%	-2.38%	1.68%	-0.0004	0.000283796
3.27%	-0.23%	1.08%	-1.31%	-0.00014	0.000172564
-9.36%	-6.01%	-11.55%	-7.09%	0.008187	0.005022517
7.36%	3.52%	5.17%	2.44%	0.001263	0.000595515
-0.52%	1.71%	-2.71%	0.63%	-0.00017	3.91683E-05
-3.40%	2.51%	-5.59%	1.42%	-0.0008	0.000202751
-1.94%	1.99%	-4.13%	0.91%	-0.00038	8.26782E-05
1.21%	-1.30%	-0.98%	-2.38%	0.000234	0.000565082
5.45%	0.57%	3.26%	-0.52%	-0.00017	2.65671E-05
2.08%	0.18%	-0.11%	-0.90%	1.01E-05	8.07251E-05
-1.98%	5.86%	-4.17%	4.78%	-0.00199	0.002287882
4.10%	1.28%	1.91%	0.19%	3.72E-05	3.78365E-06
12.36%	3.34%	10.17%	2.26%	0.002293	0.000508992
6.48%	2.37%	4.29%	1.29%	0.000554	0.000167226
8.33%	2.36%	6.14%	1.28%	0.000785	0.000163729
3.99%	-1.85%	1.80%	-2.94%	-0.00053	0.000861504
2.60%	5.72%	0.41%	4.64%	0.000189	0.002155516
-1.12%	-3.00%	-3.31%	-4.08%	0.001352	0.001665133
13.58%	2.66%	11.39%	1.58%	0.001803	0.002505531
11.06%	5.14%	8.87%	4.06%	0.003602	0.001647785
2.87%	2.96%	0.68%	1.88%	0.000129	0.000354337
2.04%	2.04%	-0.15%	0.96%	-1.4E-03	9.16357E-05
-8.23%	-3.00%	-10.42%	-4.08%	0.004253	0.001666529
2.92%	4.55%	0.73%	3.47%	0.000254	0.001204212
-2.11%	0.39%	-4.30%	-0.69%	0.000299	4.82865E-05
2.81%	1.14%	0.62%	0.06%	3.61E-06	3.36243E-07
4.83%	2.32%	2.64%	1.24%	0.000327	0.00153574
-5.40%	1.58%	-7.50%	0.50%	-0.00038	2.46379E-05
-5.31%	-0.87%	-7.50%	-1.95%	0.001463	0.000381259
5.25%	3.95%	3.06%	2.86%	0.000676	0.000820799
1.07%	-1.84%	-1.12%	-2.92%	0.000328	0.000852546
-0.89%	0.94%	-3.08%	-0.14%	4.27E-05	1.91338E-06
7.57%	2.75%	5.38%	1.67%	0.000895	0.000277493
-2.70%	-0.80%	-4.89%	-1.88%	0.00092	0.000354405
11.84%	-2.43%	9.65%	-3.51%	-0.00339	0.00123116
3.77%	5.62%	1.58%	-3.51%	0.000129	0.002060335
0.10%	-2.01%	-2.08%	-3.09%	0.000644	0.000954415
-4.49%	1.43%	-6.68%	0.35%	-0.00024	1.24359E-05
-1.97%	1.29%	-4.16%	0.20%	-8.5E-05	4.17207E-06
-0.65%	-2.49%	-2.84%	-3.57%	0.001013	0.00127994
3.93%	2.71%	1.74%	1.63%	0.000284	0.000265942
-9.36%	5.36%	-11.55%	-6.45%	0.007443	0.004155198
0.85%	-3.80%	-1.34%	-4.88%	0.000656	0.002383735
13.07%	9.60%	10.88%	8.52%	0.009265	0.007251308
-1.77%	-0.10%	-3.96%	-1.18%	0.000466	0.000138565
0.02%	2.31%	-2.17%	-3.39%	0.000735	0.001149909
-16.92%	-4.41%	-19.11%	-5.49%	0.010499	0.00301922
-1.62%	0.08%	-3.81%	-1.16%	0.000444	0.00135486
8.41%	6.18%	6.22%	5.10%	0.003169	0.002598534
6.19%	0.91%	4.00%	-0.17%	-6.8E-03	2.87831E-06
-6.42%	1.70%	-8.61%	0.62%	-0.00053	3.84111E-05
3.79%	-0.17%	1.60%	-1.25%	-0.0002	0.00156969
2.92%	4.19%	0.73%	3.10%	0.000226	0.000964092
-3.15%	0.12%	-5.34%	-0.96%	0.000513	9.24774E-05
2.61%	-0.50%	0.42%	-1.58%	-6.7E-05	0.000249075
8.11%	-1.24%	5.92%	-2.32%	-0.00137	0.00053762
5.71%	3.68%	3.52%	2.60%	0.000916	0.000677274
5.00%	1.43%	2.81%	0.35%	9.78E-05	1.21066E-05
4.97%	2.39%	2.78%	1.31%	0.000364	0.000171088
10.29%	3.93%	8.10%	2.85%	0.002306	0.000810979
-1.03%	-0.31%	-3.22%	-1.39%	0.000447	0.000193237
4.51%	1.43%	2.32%	0.35%	8.12E-05	1.22911E-05
1.51%	1.41%	-0.67%	0.33%	-2.2E-05	1.08832E-05
6.20%	0.15%	4.01%	-0.93%	-0.00037	8.69121E-05
22.61%	2.55%	20.42%	1.47%	0.003005	0.000216591
-1.15%	0.29%	-3.34%	-0.79%	0.000264	6.23492E-05
6.70%	1.51%	4.51%	0.43%	0.000194	1.84706E-05
1.48%	2.86%	-0.71%	1.78%	-0.00013	0.000317903
7.30%	3.06%	5.11%	1.98%	0.001008	0.000390144
7.12%	0.70%	4.93%	-0.38%	-0.00019	1.46927E-05
20.16%	6.18%	17.97%	5.09%	0.009156	0.002595378
2.21%	-3.64%	0.02%	-4.72%	-1.1E-05	0.002225419
-9.03%	-3.13%	-11.22%	-4.21%	0.004724	0.001772766
1.73%	0.92%	-0.46%	-0.16%	7.41E-06	2.62403E-06
5.58%	2.43%	3.39%	1.35%	0.000457	0.000182116
-4.25%	0.13%	-6.44%	-0.96%	0.000616	9.13725E-05
6.20%	4.17%	4.01%	3.09%	0.001238	0.000954147
-3.79%	3.19%	5.98%	2.11%	-0.00126	0.000445466
9.03%	0.14%	6.84%	-0.94%	-0.00064	8.8389E-05
-4.58%	-6.49%	-6.77%	-7.57%	0.005126	0.005731127
-2.28%	1.85%	-4.47%	0.77%	-0.00035	5.98364E-05
-6.57%	-9.33%	-8.76%	-10.42%	0.000912	0.010848677
				0.225557	0.1687247

