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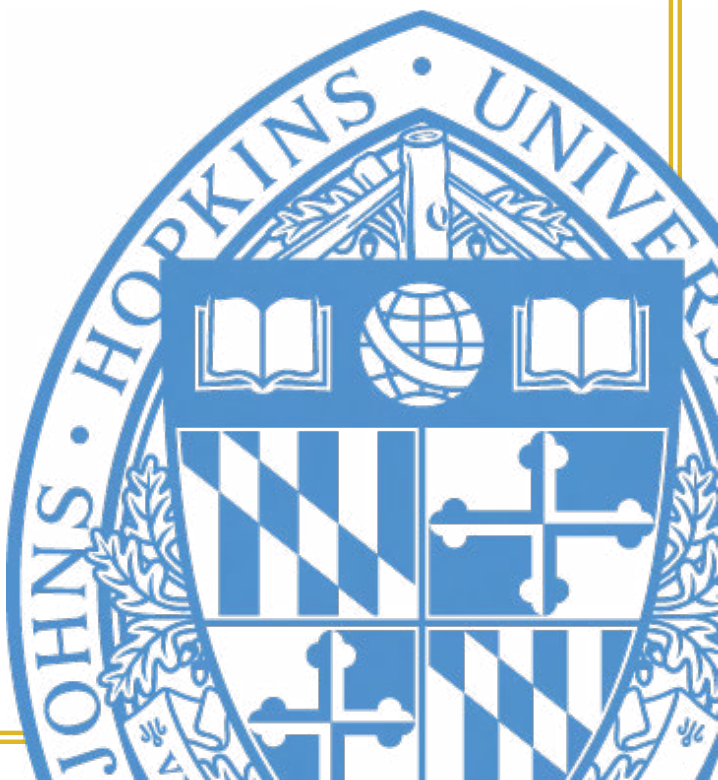
INVESTMENT THESIS FOR MICRON TECHNOLOGY, INC (NASDAQ: MU)

Kenneth-Von Blackmon



Johns Hopkins Institute for Applied Economics, Global Health, and the Study of Business Enterprise

Investment Thesis for Micron Technology, Inc. (NASDAQ: MU)

By Kenneth-Von Blackmon

Disclaimer: These research reports are primarily student reports for academic purposes and are not specific recommendation to buy or sell a stock. Potential investors should consult a qualified investment advisor before making any investment. This study was completed on October 5, 2017.

About the Series

The Studies in Applied Finance series is under the general direction of Professor Steve H. Hanke (hanke@jhu.edu), Co-Director of The Johns Hopkins Institute of Applied Economics, Global Health, and the Study of Business Enterprise, and Dr. Chris Culp (christopher.culp@jhu.edu) and Dr. Hesam Motlagh (hnekoor1@jhu.edu), Fellows at the Institute for Applied Economics, Global Health, and the Study of Business Enterprise.

This working paper is one in a series on Applied Financial Economics, which focuses on company valuations. The authors are mainly students at The Johns Hopkins University in Baltimore who have conducted their work at the Institute as undergraduate equity researcher analysts.

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Keywords: MU, Micron, Technologies, Semi-Conductors, Discounted Cash Flow, Free Cash Flow, Monte-Carlo Simulations, Investment Thesis, Compensation.

Rating: BUY – Average Free Cash Flow per Share $63.83:

Company Name	**Micron Technology, Inc.**
Date	**10/5/17**
Fiscal year ends (current period)	**08/2017 (Q4 - Ends 8/2017)**
Current Price	**$39.37**
52 week high (date)	**$40.54 (10/03/17)**
52-week low (date)	**$16.17 (10/13/16)**
Market Cap	**$ 43,860 M**
Enterprise Value	**$49,798 M**
Total Debt	**$ 11,134 M**
Cash	**$ 6,045 M**
Total Debt/Enterprise Value	**22.36%**
Dividend	**Cash Dividend Discontinued (1996)**
Shares Outstanding/Float	**1,114.1 M/1,063.5M**
Current P/E	**8.70x**
2019 P/E (EPS)	**6.17x ($6.38)***
2018 P/E (EPS)	**5.31x ($7.42)***
2017 P/E (EPS)	**8.31x ($4.74)***
2016 EPS	**$0.06****
2015 EPS	**$2.72****
2014 EPS	**$2.52****

***Consensus Estimates as of 10/5/2017**

**** Comparable Actual from Bloomberg**

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Executive Summary

Micron Technology, Inc. (NASDAQ: MU) is a producer of semiconductors based out of Boise, Idaho. With its focus on innovative dynamic random-access memory (DRAM) and non-volatile flash storage (NAND or NOR) products, Micron has been instrumental in developing today's technological age. Although innovative in its production of memory solutions, Micron has struggled to maintain its growth and market share as compared to its competitors. With Micron's recent acquisitions and the currently tight semiconductor market, we believe the company has turned a new leaf in its market positioning. In an effort to analyze the outcome and longevity of Micron's innovation and expansion, we have evaluated the Company's historical financials by studying the most recent 10-K report of September 2016, DEF 14A of January 2016, 10-Q of June 2017, and Q4 2017 Earnings Call of September 2017. Using a Probabilistic Discounted Cash Flow (PDCF) Model coupled with Monte Carlo simulations, we determined the fundamental value for Micron. Through our analysis, we have concluded that Micron's discounted cash flow value is $63.83—a 62% upside against Micron's currently trading share price of $39.37. Therefore, we have rated MU a **BUY**.

Catalysts and Risks

Catalysts

- **At present, the semiconductor market is tight, with demand outpacing industry supply, and average selling prices per bit rising**
- **Micron's acquisitions will aid in manufacturing and guaranteeing supplies of semiconductor memory solutions to its clients**
- **The growing multitude of market demand for memory and flash storage, especially within next generation technology, will result in larger contracts within Micron's smaller business segments**

Risks

- **Future declines in the average product sales prices for the semiconductor market could negatively affect Micron's gross margins**
- **Failure to maintain DRAM and NAND production due to restructuring after acquisitions could hinder Micron's growth and negatively affect its ability to meet supply obligations**
- **Debt obligations could adversely affect the financial outlook of Micron if they are not able to generate sufficient cash flows on a long-term basis to pay down debt, finance operations, and continue their capital investments**

Company Description and Historical Performance

History of Innovation

In 1978, Micron, the brainchild of Ward Parkinson, Joe Parkinson, Dennis Wilson, and Doug Pitman, was founded in the basement of a dental office in Boise, Idaho. Originally a semiconductor design consulting group, in 1979 it tasked its engineers to develop a smaller, faster 64K DRAM, that would beat out existing industry products. With its innovation of the 64K DRAM design, Micron transitioned from a consulting company to a manufacturer. In 1981, Micron produced its first 64K DRAM product, found in many of the first mass-produced personal computers of the decade.

Making a splash in the industry, Micron did not stop there with its innovative efforts: in 1984, Micron developed the world's smallest 256K DRAM chip, and in 1988 brought 1Mb DRAM to market.[1] Coming out of 1999, Micron set the standard for data, producing the industry's first double data rate (DDR) chipset.

Approaching the 2000s, Micron continued to push industry standards while expanding the application of its technology. With its unveiling of pseudo-static SRAM in 2004 (the basis for today's DRAM products featured in many mobile devices), 16GB DDR2 in 2006 (the world's highest-density server memory module), Micron Ships RealSSD™ C300 in 2009 (the industry's fastest client SSD for notebooks and desktop computers), and 16nm NAND flash device in 2013 (with a single 300mm wafer delivering almost 6TB of storage), Micron has grown leaps and bounds since its semiconductor consulting days.[2] For over 35 years, Micron has been a leader in the industry's significant technological advancements.

At present, Micron is confident in its combined efforts with Intel to revolutionize the industry again with its innovative 3D NAND and 3D XPoint technology. This next generation tech promises non-volatile memory storage 1,000 times faster than conventional NAND with 1,000 times greater endurance. [3]

Micron is one of the world's leading manufacturers of cutting-edge semiconductor technologies, with operations in 18 countries and over 26,000 patents. Holding the industry's broadest memory solutions portfolio, Micron continues to expand the application of its products further by offering memory solutions for the latest innovative technologies, "bringing new life to data, and bringing new data to life."[4]

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[1] Micron's 1Mb DRAM became the staple for main PC memory and graphics cards during through the 1990s.

[2] Micron Technology, Inc. (2017). History of Innovation. Retrieved September 28, 2017, from https://www.micron.com/about/our-innovation

[3] Micron Technology, Inc. (2017). History of Innovation. Retrieved September 28, 2017

[4] Micron Technology, Inc. (2017). About. Retrieved September 28, 2017, from https://www.micron.com/about

Micron's Business Segments

Although the business itself has two overarching product segments, dynamic random-access memory (DRAM) and non-volatile flash storage (NAND and NOR), Micron reports in five business segments reflecting different end-markets:

1. *Compute and Networking Business Unit ("CNBU")*:
    a. Products: DRAM and NOR Flash
    b. Market Application and Sales: Compute, Networking, Graphics, and Cloud Server
    c. Accounted for 36.5% of Micron's Revenues in 2016
2. *Storage Business Unit ("SBU")*:
    a. Products: NAND Flash components and SSDs
    b. Market Application and Sales: Enterprise and Client Storage, Cloud Storage, and Removable Storage
    c. Accounted for 26.31% of Micron's Revenues in 2016
3. *Mobile Business Unit ("MBU")*:
    a. Products: DRAM, NAND Flash, and NOR Flash
    b. Market Application and Sales: Smartphone, Feature Phone and Tablet Mobile-Device Market
    c. Accounted for 20.72% of Micron's Revenues in 2016
4. *Embedded Business Unit ("EBU")*:
    a. Products: DRAM, NAND Flash and NOR Flash
    b. Market Application and Sales: Automotive, Industrial, Home and Consumer Electronics
    c. Accounted for 15.64% of Micron's Revenues in 2016
5. *Other*
    a. Accounted for 0.81% of Micron's Revenues in 2016

An inspection of the Company's revenue generation by segment reveals that most segments have grown (see *Table 1*). But what is not immediately evident is that some of Micron's organic growth potential has been stunted by increasing manufacturing costs and declining average sales prices per gigabyte leading into 2016. Continuing its mission to provide innovative memory solutions, Micron has had to replace fabrication machinery, restructure manufacturing facilities, and increase its investment in Research and Development—all key components of growth required in the already extremely capital-intensive business of semiconductor manufacturing. Not surprisingly, Micron has doubled down and enhanced its ability to grow by engaging in acquisitions.

Table 1: Micron's Revenue Mix and Segment Growth

Fiscal Year	2012	2013	2014	2015	2016
Net Sales by Business Unit (USD ($) in Millions)					
Compute and Networking Business Unit ("CNBU")	2,667	3,462	7,333	6,725	4,529
Revenue Growth Rate (%)		29.81%	111.81%	-8.29%	-32.65%
Margin on Net Sales	32.39%	38.16%	44.83%	41.53%	36.53%
Storage Business Unit ("SBU")	2,842	2,824	3,480	3,687	3,262
Revenue Growth Rate (%)		-0.63%	23.23%	5.95%	-11.53%
Margin on Net Sales	34.52%	31.13%	21.27%	22.77%	26.31%
Mobile Business Unit("MBU")	1,176	1,214	3,627	3,692	2,569
Revenue Growth Rate (%)		3.23%	198.76%	1.79%	-30.42%
Margin on Net Sales	14.28%	13.38%	22.17%	22.80%	20.72%
Embedded Business Unit ("EBU")	1,097	1,275	1,774	1,999	1,939
Revenue Growth Rate (%)		16.23%	39.14%	12.68%	-3.00%
Margin on Net Sales	13.32%	14.05%	10.84%	12.35%	15.64%
All Other	452	298	144	89	100
Revenue Growth Rate (%)		-34.07%	-51.68%	-38.19%	12.36%
Margin on Net Sales	5.49%	3.28%	0.88%	0.55%	0.81%
Total Net Sales	8,234	9,073	16,358	16,192	12,399
Calculated Growth Rate (%)		10.19%	80.29%	-1.01%	-23.43%

The following table is meant to show the uneven and at times augmented growth Micron has experienced due to its acquisitions of the Elpida Memory, Inc. and controlling interest in Rexchip (completed in 2013), now known as Micron Memory Japan (MMJ), and most recently Inotera Memories, Inc. in 2016.
Source: Micron's SEC-10K

The positive growth impact on Micron's revenues as a result of the acquisitions of Elpida Memory Inc. and controlling interest of Rexchip (now known as "Micron Memory Japan" or "MMJ") can be seen in *Table 1*. Revenue growth skyrocketed in 2014 after the completion of the MMJ acquisition in the year before due to greater manufacturing capabilities and higher gross margins. But, this augmented growth could not be sustained in 2015, as the semiconductor market experienced a dive in average sales prices per gigabyte and slowing personal computer (PC) sales that heavily impacted the Company's gross margins.[5] As a result, in the midst of restructuring and implemented cost cutting efforts, Micron produced miniscule results in 2016 across all segments. Yet, within the same year, the Company announced the acquisition of its 7 year-long partner, Inotera.

It is important to note that Micron's business segments do not directly compete with one another. As defined in the business segment breakdown, Micron produces DRAM, NAND, and NOR memory solutions that although similar in fabrication, whether for enterprise or consumer intended use, are applicable to many different technologies available on the market. As such, Micron's segmentation is meant not only to delineate each aspect of revenue generation but

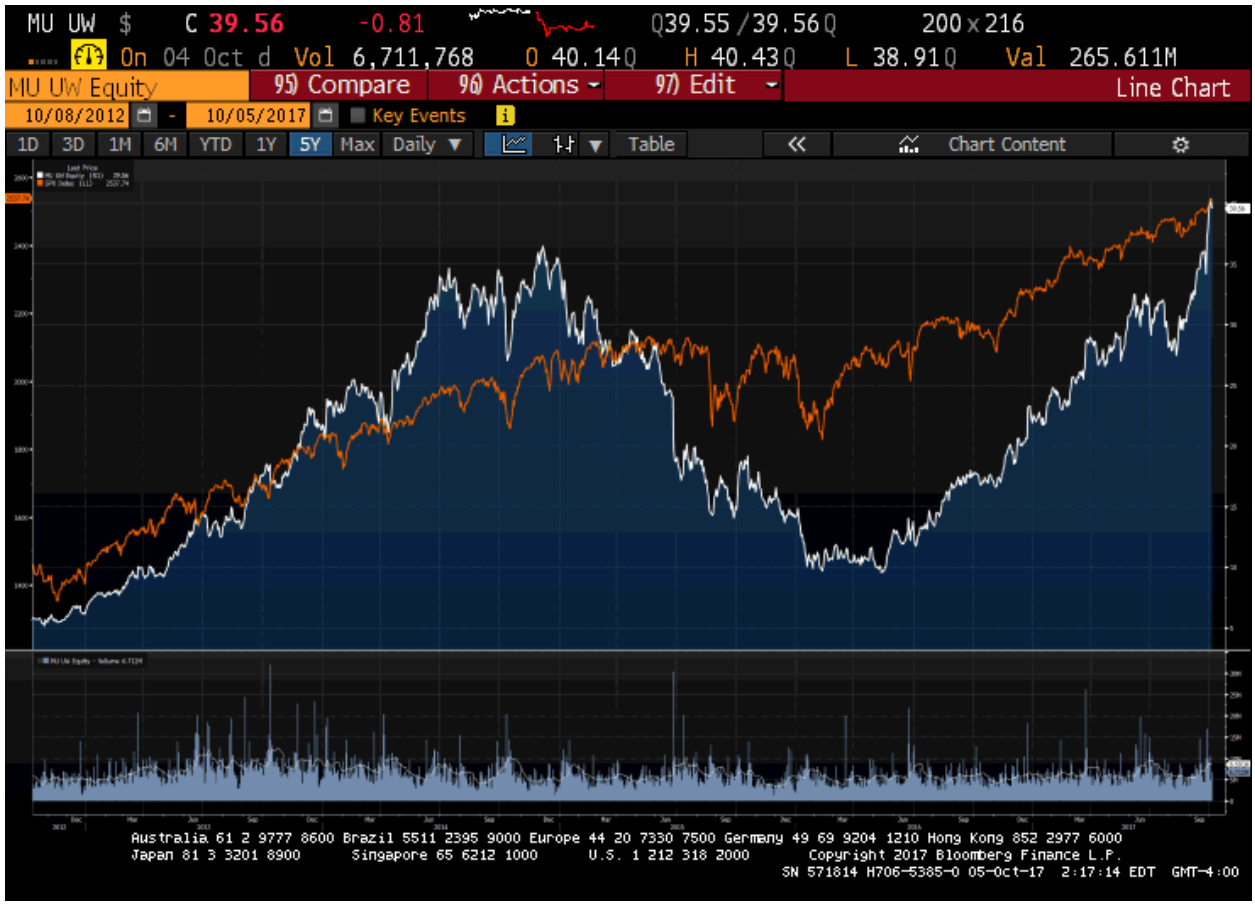
[5] Zacks (2015). "AMD Slumps as Micron Results Show Weakness in PC Market," Retrieved on September 28, 2017 from https://www.zacks.com/stock/news/180011/amd-slumps-as-micron-results-show-weakness-in-pc-market

also to describe the current market for the Company's semiconductor products and their applicable usage.

Historical Stock Price Performance

Over the past 5 years, Micron's stock performance has been anything but steady, reflecting the cyclical nature of the business. *Figure 1* compares Micron against the S&P 500, showing the Company's unsteady and dismal performance through 2015.

Figure 1: Micron's Stock Price vs. S&P 500 Index



From December 5, 2014, to May 5, 2015, Micron's share price fell 73.8%. At present, MU is trading at $39.56, and has made a comeback from its 2015 slump.
Source: Bloomberg Terminal, Command: <GP>, Accessed 10/05/2017

Reaping the benefits of its 2013 acquisition of Elpida Memory, Inc. and controlling interest in Rexchip (now known as MMJ), Micron was able to drive their share price up to $36.49 (as of December 5, 2014). This $949 million-dollar cash acquisition (excluding Micron's assumption and reorganization plan of MMJ's debt obligations exceeding 200 billion yen, roughly $1.7 billion U.S. Dollars) provided a short-term growth spurt followed by high reorganization and restructuring costs. Micron experienced a doubling in net sales generated from its Compute and Networking business unit and a tripling of net sales in its Mobile business unit, but the

Company was unequipped to maintain such growth. Coupled with the personal computer (PC) slump of 2015 and price wars with competing firms, Micron proved unable to lower manufacturing costs quick enough as compared to its competitors, leading to a 73.8% drop in its share price.[6]

On December 14, 2015, with shares at $13.66 after closing, Micron announced its acquisition of Inotera, its partner for seven years, for approximately $3.2 billion.[7] Although Micron's share price would continue to fall 5 months after the acquisition announcement, Micron's actions coupled with the development of its 3D NAND and 3D XPoint technology in 2015 would turn a new leaf; the impact of DRAM output, acquired fabrication facilities, and frontier technology allowed the Company to pull itself out of its slump and raise its share price significantly.

Micron is currently trading at $39.56, aided by strong industry growth. Overall, the semiconductor industry grew by 6.1% in the second quarter of 2017, with the memory solutions market growing by 10.7% within the same period. Reaching a new high of $30.2 billion attributable to the rise in DRAM (at 14% growth) and NOR flash memory (at 12.3% growth), the growth within the memory solutions has propelled the semiconductor industry.[8] With average selling prices on the rise with market supply and demand remaining tight, Micron, by way of acquisitions and manufacturing growth, has positioned itself to make a splash in fiscal 2018. The company beat expectations in fourth quarter earnings released September 26, 2017, posting $2.02 EPS against the expected $1.83 EPS.[9] The present analyst recommendations (see *Figure 2*) have an average twelve-month target market price of $49.06, representing the bullish sentiment of the market.

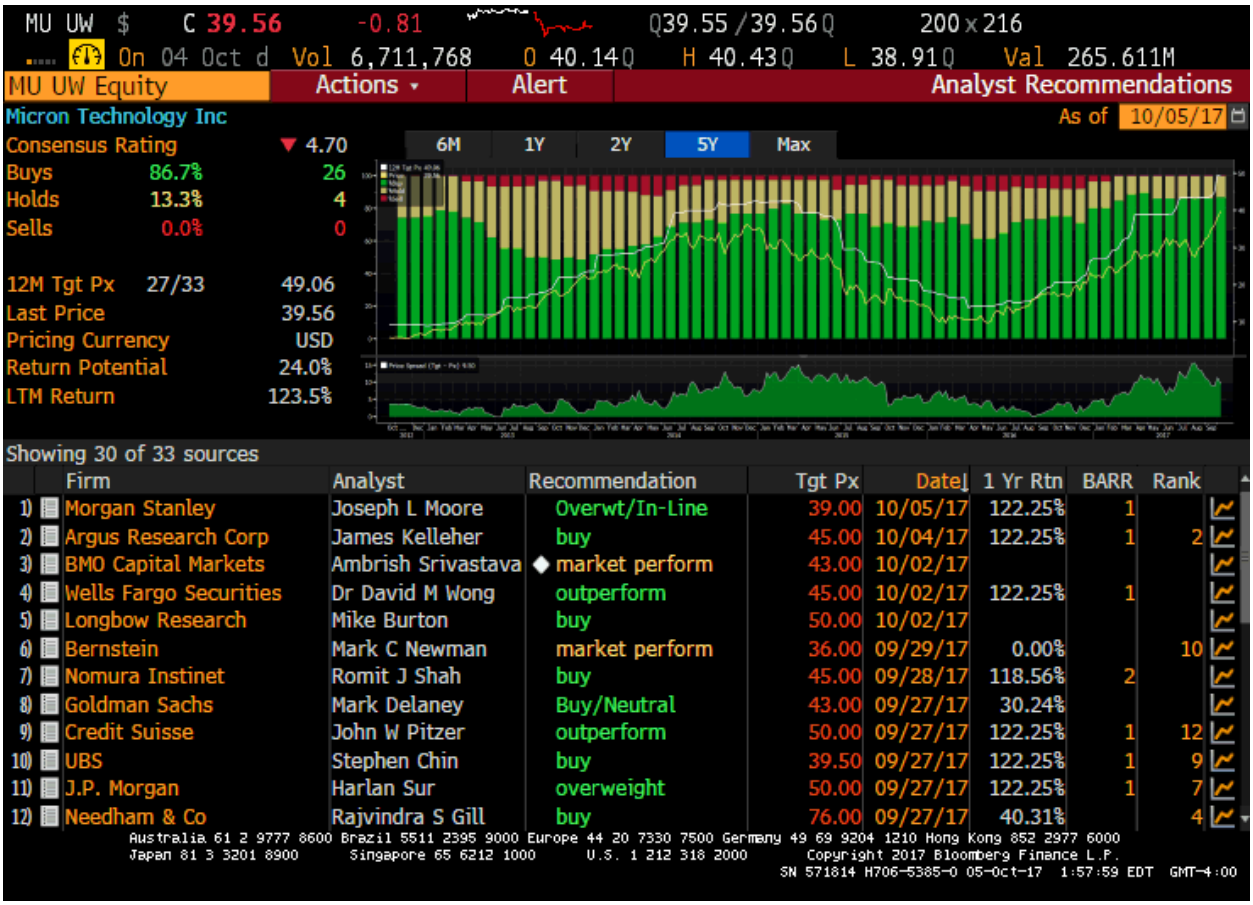
[6] Micron Technology, Inc. (2016). 2016 Form 10-K. Retrieved September 28, 2017 from https://www.sec.gov/Archives/edgar/data/723125/000072312516000269/a2016q4.htm

[7] Micron Technology, Inc. (2017). Micron Technology Agrees to Acquire Remaining Interest in Inotera Memories of Taiwan. Retrieved September 28, 2017, from http://investors.micron.com/releasedetail.cfm?releaseid=946777

[8] EPS News (2017). "Semiconductor Sales Hit Record Growth," Retrieved October 4, 2017 from https://epsnews.com/2017/09/15/semiconductor-sales-hit-record-growth-q2/

[9] CNBC News (2017). "Micron shares rise after earnings beat," Retrieved October 5, 2017 from https://www.cnbc.com/2017/09/26/micron-earnings-q4-2017.html

Figure 2: Analyst Recommendations for Micron



Source: Bloomberg Terminal, Command: <ANR>, Accessed 10/05/2017

Model Assumptions

In an effort to determine the fundamental value of Micron, we incorporated our industry discussion with a Probabilistic Discounted Cash Flow (PDCF) Model, which forecasts the cash flows explicitly for the next 10 years. Our PDCF is based on historic averages for revenue growth, cost structure, working capital, and capital expenditures. Our assumptions deviated from historical averages when these averages failed to account for heavy swings in revenues or costs, or when management provided guidance that explicitly delineated the path of Micron's future expenditures.

For Micron, the delineated business segments were used as the basis for forecasting revenue growth while taking into the account the market climate and management guidance.

Balance Sheet and Income Statement Trends and Highlights

Full results are contained in the 'Balance Sheet' and 'Income Statement' tabs of the accompanying spreadsheet.

The Balance Sheet

Figure 3: Micron's Consolidated Balance Sheet – Assets

Consolidated Balance Sheets - USD ($) $ in Millions	5-Years of 10-K's				
Assets	Aug. 30, 2012	Aug. 29, 2013	Aug. 28, 2014	Sep. 03, 2015	Sep. 01, 2016
Current Assets:					
Cash and equivalents	$2,459	$2,880	$ 4,150	$ 2,287	$ 4,140
Short-term investments	100	221	384	1,234	258
Receivables	1,289	2,329	2,906	2,507	2,068
Inventories	1,812	2,649	2,455	2,340	2,889
Restricted Cash	0	556	0	0	0
Other current assets	98	276	350	228	140
Total Current Assets	5,758	8,911	10,245	8,596	9,495
Long-Term Assets:					
Long-term marketable investments	374	499	819	2,113	414
Property, plant, and equipment, net	7,103	7,626	8,682	10,554	14,686
Equity method investments	389	396	971	1,379	1,364
Intangible assets, net	371	386	468	449	464
Deferred tax assets	47	861	816	597	657
Goodwill	0	0	0	0	104
Other noncurrent assets	286	439	415	455	356
Total Long-Term Assets	8,570	10,207	12,171	15,547	18,045
Total Assets	14,328	19,118	22,416	24,143	27,540

Source: Micron's 10-K Consolidated Financial Statements

Upon reviewing the balance sheet there is clear evidence of Micron's recent acquisitions and increase in debt in 2014 (see *Figure 3 & 4*). With uneven cash and cash equivalents from 2013 through 2016, Micron recorded $4 billion in cash and equivalents in 2014 as a result of sales growth through the acquisition of DRAM and NAND from Elpida Memory, Inc., and controlling interest in Rexchip (collectively now known as MMJ). Micron notes in its 2014 10-K that its stated increase in cash and equivalents was placed towards investments in an effort to mitigate credit risks associated with foreign subsidiaries and their holdings of cash and cash equivalents in both USD and foreign currency.

Figure 4: Micron's Consolidated Balance Sheet – Liabilities & Equity

Consolidated Balance Sheets - USD ($) $ in Millions	5-Years of 10-K's				
	Aug. 30, 2012	Aug. 29, 2013	Aug. 28, 2014	Sep. 03, 2015	Sep. 01, 2016
Liabilities					
Current Liabilities:					
Accounts payable and accrued expenses	1,641	2,115	2,864	2,611	3,879
Deferred income	248	243	309	205	200
Equipment purchase contracts	130	182	0	0	0
Current debt (Current portion of long-term debt - 2013 last)	224	1,585	1,618	1,089	756
Total Current Liabilities	2,243	4,125	4,791	3,905	4,835
Long-term Liabilities:					
Long-term debt	3,038	4,452	4,893	6,252	9,154
Other noncurrent liabilities	630	535	1,102	698	623
Total Long-Term Liabilities	3,668	4,987	5,995	6,950	9,777
Total liabilities	5,911	9,112	10,786	10,855	14,612
Shareholders' Equity					
Redeemable convertible notes	$ 0	$ 0	$ 68	$ 49	$ 0
Common stock, $0.10 par value, 3,000 shares authorized, 1,094 shares issued and outstanding (1,084 as of September 3, 2015)	102	104	107	108	109
Additional capital	8,920	9,187	7,868	7,474	7,736
Retained earnings (/Accumulated Deficit)	(1,402)	(212)	2,729	5,588	5,299
Treasury stock, 4 shares held (54 as of September 1, 2016)	0	0	0	(881)	(1,029)
Accumulated other comprehensive income (loss)	80	63	56	13	(35)
Total Micron shareholders' equity	7,700	9,142	10,760	12,302	12,080
Non-controlling interests in subsidiaries	717	864	802	937	848
Total equity	8,417	10,006	11,562	13,239	12,928
Total liabilities and equity	14,328	19,118	22,416	24,143	27,540

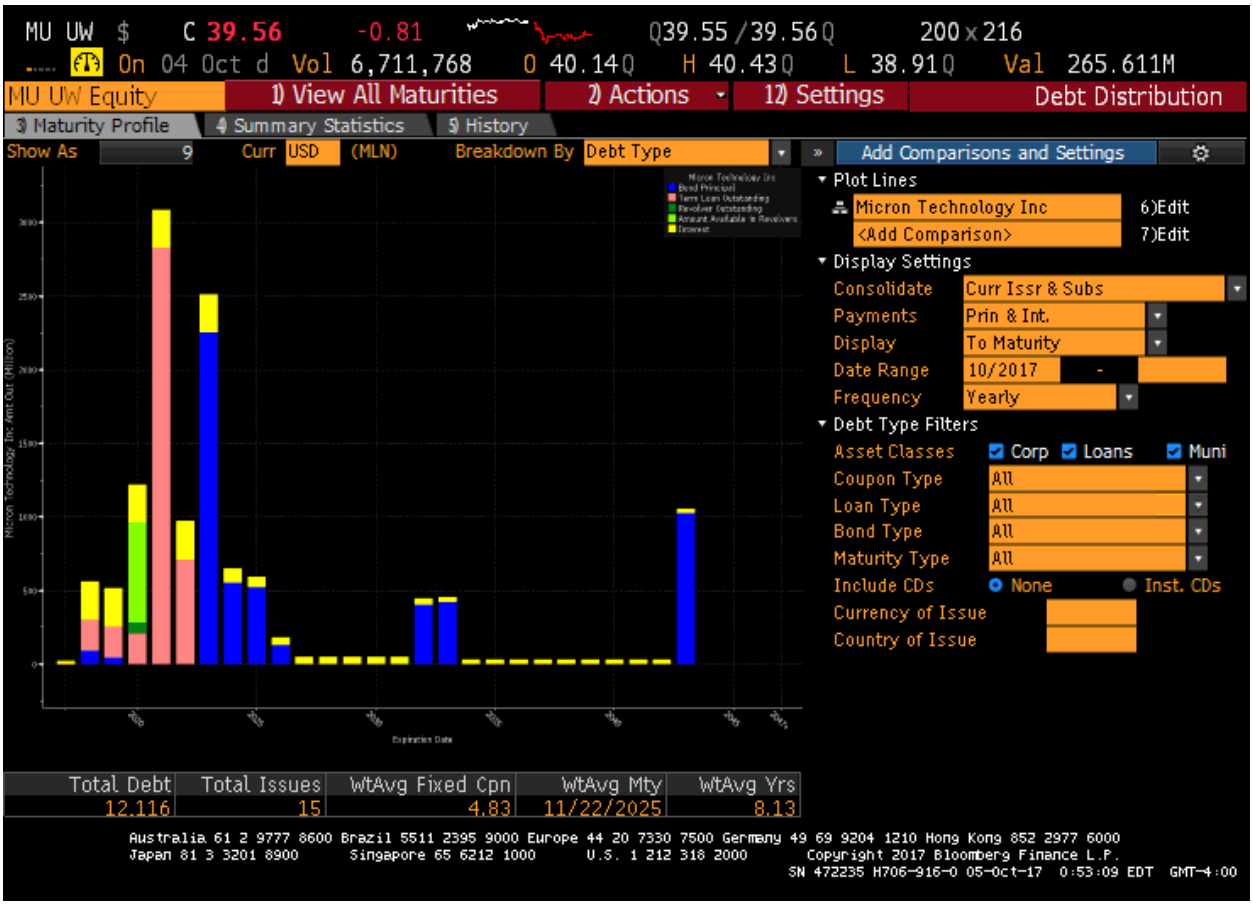
Source: Micron's 10-K Consolidated Financial Statements

In lock step with the influx of cash and investments, Property, Plant and Equipment over past five years grew steadily at average rate of 20%. Further down the statement, long-term debt also grows at an average of 33% to keep up with acquisition costs and set Micron on the course for further growth as seen in 2014 and at the present time.

Micron's Debt Outlook

With our evaluation and focus on probability of return on our investment, we believe it is important to review Micron's debt schedule (see *Figure 5*) and credit rating (see *Figure 6*), as their inability to make principal and interest payments on the debt could adversely affect operations of the business and drive a decline in share price.

Figure 5: Micron's Debt Outlook



Source: Bloomberg Terminal, Command: <DDIS>, Accessed 10/05/2017

Looking at the total outstanding debt to date, we see that Micron is expected to pay down over $12 billion in debt over a weighted average of the next 8 years (see *Figure 5*). Financing its acquisitive growth by bond issuances and cash payments, the Company has grown its outstanding debt balance of the last five years. In 2016 alone, Micron issued $1.25 billion in 2023 Secured Notes and $750 million of its 2022 Term Loan B in order to help facilitate the payments of what was then the proposed acquisition of Inotera. Along with foreign debt, including a loan of up to $80 billion New Taiwan Dollars (equivalent to roughly $2.5 billion U.S. dollars) under a single draw term loan facility held by Nanya Technology (former co-owner of Inotera), Micron is well under pressure to meet its debt obligations.

Reviewing the Company's credit history, we find that Micron has by-in-large been rated below investment grade (see *Figure 6*). But, recent company earnings as well as management guidance towards a lowering debt to $8 or $9 billion during fiscal 2018 has spurred some positive outlook on Micron's rating. Moody's, in particular, affirmed its positive outlook mid-September, citing management's debt reduction plans and Micron's "strong market position in

the memory business, low debt to EBITDA (Moody's adjusted), and large cash and marketable investments balances" as motivation.[10]

Figure 6: Micron's Credit Rating

Source: Bloomberg Terminal, Command: <CRPR>, Accessed 10/05/2017

In accordance with our projected Free Cash Flows (FCF) and management's guidance towards delevering the company, we believe Micron's debt outlook and credit rating should not be of immediate concern to potential investors. Based on our findings, Micron will generate enough free cash flow in fiscal 2018 to pay down its debts in accordance with Management's guidance, and should be able refinance its debt obligations in the near future if necessary. But, we do caution that if the company were to continue financing its acquisitions and operations by way of debt issuances into the long-term, Micron could face debt obligations greater than their FCF. Indeed, if a large share of Micron's debt fell on a year with performance results similar to 2016 (which is possible within the volatile and cyclical semiconductor market), Micron would face a harsher reality than just necessitated cost cutting measures, restructuring, and missed earnings.

[10] Moody's Investor Services (2017). "Rating Action: Moody's affirms Microns Ba2 CFR; outlook positive," retrieved October 5, 2017 from https://www.moodys.com/research/Moodys-affirms-Microns-Ba2-CFR-outlook-positive--PR_372639

The Income Statement

Upon reviewing the Income statement, we see further evidence of Micron's growth (see *Figure 7*). Again, after the acquisition of Elpida Memory, Inc., and controlling interest in Rexchip, collectively now known as MMJ, Micron experienced an augmented result in net sales to the tune of $16 billion in 2014, and carried a similar result into 2015. Notes within the 2016 10-K include that Micron had acquired 2 wafer fabrication facilities focused on mobile DRAM and computing DRAM, and an additional assembly and testing facility, which aided Micron's output for boosting sales in 2014 and 2015. But, what must be kept in mind are the restructuring costs associated with newly acquired facilities. Indeed, one of Micron's greatest risks in its acquisition process are the costs associated with restructuring, an action Micron is not new to.[11]

Figure 7: Micron's Income Statement

Consolidated Statements of Operations - USD ($) $ in Millions, except share data

	5-Years of 10-K's				
Income Statement [Abstract]	**Aug. 30, 2012**	**Aug. 29, 2013**	**Aug. 28, 2014**	**Sep. 03, 2015**	**Sep. 01, 2016**
Revenue:					
Net sales	$8,234	$9,073	$ 16,358	$ 16,192	$ 12,399
Cost of goods sold	7,266	7,226	10,921	10,977	9,894
Total Revenue (Gross margin)	$968	$1,847	$5,437	$5,215	$2,505
Operating Expenses:					
Selling, general, and administrative	620	562	707	719	659
Research and development	918	931	1,371	1,540	1,617
Restructure and asset impairments	10	126	40	3	67
Other operating (income) expense, net	32	(8)	232	(45)	(6)
Operating income (loss)	(612)	236	3,087	2,998	168
Other Income:					
Gain on MMJ Acquisition	0	1,484	0	0	0
Interest income	8	14	23	35	42
Interest expense	(179)	(231)	(352)	(371)	(437)
Other non-operating income (expense), net	29	(218)	(25)	(53)	(54)
Income (loss) before income taxes, net income (loss) attributable to non-controlling interests, and equity in net income (loss) of equity method investees	(754)	1,285	2,733	2,609	(281)
Income tax (provision) benefit	17	-8	(128)	(157)	(19)
Equity in net income (loss) of equity method investees	-294	-83	474	447	25
Net income (loss)	(1,031)	1,194	3,079	2,899	(275)
Net income (loss) attributable to non-controlling interests	(1)	(4)	(34)	0	(1)
Net income (loss) attributable to Micron	(1,032)	1,190	3,045	2,899	(276)

Source: Micron's 10-K Consolidated Financial Statements

[11] CNBC New (2016). "Micron stock sinks amid company restructuring," Retrieved October 5, 2017, from https://www.cnbc.com/2016/07/01/micron-stock-sinks-amid-company-restructuring.html

Value Drivers (P-DCF) Tab

These results are contained in the "Value Drivers" and "P-DCF TUNED" tabs of the accompanying spreadsheet.

To determine Micron's historical performance, we derived the historical margins for Micron and determined drivers of value within the company. We noted points of Micron's efficiencies and followed management's guidance towards the outlook of the semiconductor industry.

Figure 8: Micron P-DCF Assumptions

Model Input Parameters				
Assumption Name	**Assumed**	**Average**	**Std. Dev.**	**Trend**
Revenue Growth Parameters				
Compute and Networking Business Unit ("CNBU")				
Revenue Growth Rate (%)	75.00%	25.17%	31.48%	
Storage Business Unit ("SBU")				
Revenue Growth Rate (%)	20.00%	4.25%	8.83%	
Mobile Business Unit("MBU")				
Revenue Growth Rate (%)	175.00%	43.34%	19.03%	
Embedded Business Unit ("EBU")				
Revenue Growth Rate (%)	16.50%	16.26%	10.23%	
All Other				
Revenue Growth Rate (%)	-30.00%	-27.90%	28.07%	
Total Net Sales				
Calculated Growth Rate (%)	N/A	16.51%	17.12%	
Operating Costs				
Cost of goods sold, Net D&A	42.50%	56.13%	3.86%	
Selling, general, and administrative, net	4.00%	5.56%	1.33%	
Research and development	10.47%	10.47%	1.61%	
Restructure and asset impairments	0.46%	0.46%	0.55%	
Other operating (income) expense, net	0.28%	0.28%	0.68%	
Non-Operating Costs				
Gain on MMJ Acquisition as % of Sales	0.00%	3.27%	7.31%	
Interest expense as % of Total Debt	-4.84%	-4.84%	0.71%	
Interest income as % of Sales	0.19%	0.19%	0.09%	
Other non-operating income (expense), net as % of Sales	-0.59%	-0.59%	1.06%	
Income (loss) before income taxes, net income (loss) attributable to noncontrolling interests, and equity in net income (loss) of equity method investeesas a % of Sales	7.11%	7.11%	11.99%	
Depreciation and ammortization as % of Sales	20.31%	20.31%	5.69%	
Provison for income taxes (as % of EBT)	-1.36%	-1.36%	5.00%	
Cash Flow Drivers				
Change in Working Capital	0.00%	-0.68%	11.20%	
Capital Expenditures (CAPEX)	20.31%	36.41%	8.22%	

In our projections of future revenue and segment growth, the augmented effects of the MMJ acquisition were taken into consideration as well as the predicted growth in segments as a result of Micron's most recent acquisition of Inotera. To reflect such growth rates, assumed values were selected well above average for 2017 (see initial assumptions in *Figure 8*), but were tapered to at or below historically average growth rates in the years to follow.

With cost synergies associated with the acquisitions of MMJ and Inotera, we noted that there would be a continued downward trend in production costs and costs associated with Micron's operations. From our projection of Micron's 2017 financial performance using quarterly data, we assumed costs well below average for the duration of the model cycle. With this we predicted that Micron would be able to generate steady revenue growth in the future with its newly acquired fabrication facilities, testing and assembling sites, and DRAM or NAND production focused on Micron's key business units. These assumptions along with our takeaways from management guidance allowed us to formulate our model's strong growth

output. Placed upon the backdrop of the semiconductor industry, with higher average sales prices, tightening between demand and supply, and overall industry growth, our model indicated that Micron would have healthy growth in each business segment for the forecasted future.

One noteworthy adjustment was made to the historical standard deviations as featured in the "Value Drivers" tab which translated over to our P-DCF. Due to the large standard deviations caused by our selection of the past five years of financial 10-K data, the growth effects in business segment revenue caused by the MMJ acquisition that impacted 2014 were removed in order to calculate standard deviations against our assumptions that were on par with Micron's historical trends. These adjusted standard deviations also shown in *Figure 8* beside our growth assumptions.

(At this point, please refer to the accompanying spreadsheet under "Value Drivers" and P-DCF.)

Model Results

Please reference the "P-DCF" in our accompanying spreadsheet for the full results of our Monte Carlo

Figure 9: Micron's Model Valuation Output

Model Valuation Output		
Estimated FCF/Share	$	63.83
Current Price	$	39.37
%Gain/Loss		62%

Given our assumptions and management guidance, the input values of the P-DCF model yielded a probable average free cash flow per share value of $63.83 against the current share price of $39.37 (see *Figure 9*). With these values, we predicted a 62% upside to Micron's share price and a strong forward outlook as compared to Wall Street estimates past fiscal 2017 and 2018. Although our assumptions were at odds with our historical values, and derived historical standard deviations were adjusted for more conservative values, we believe that Micron is a company with driven value that warrants our buy rating.

Figure 10 & 11: Sensitivity Analysis for Micron P-DCF Model

Before Float

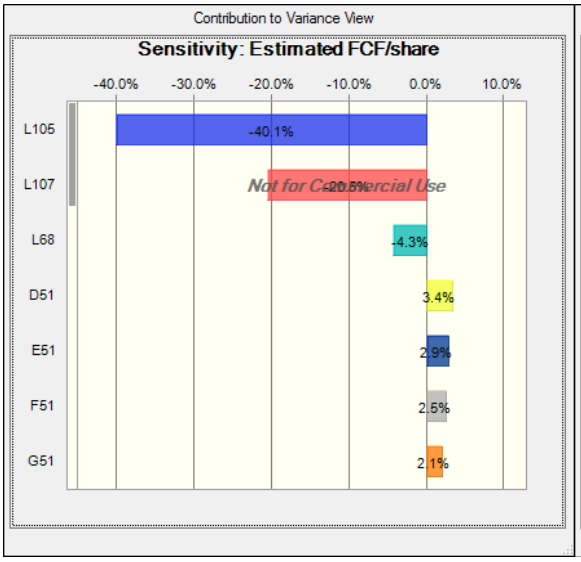


Figure 10

After Float

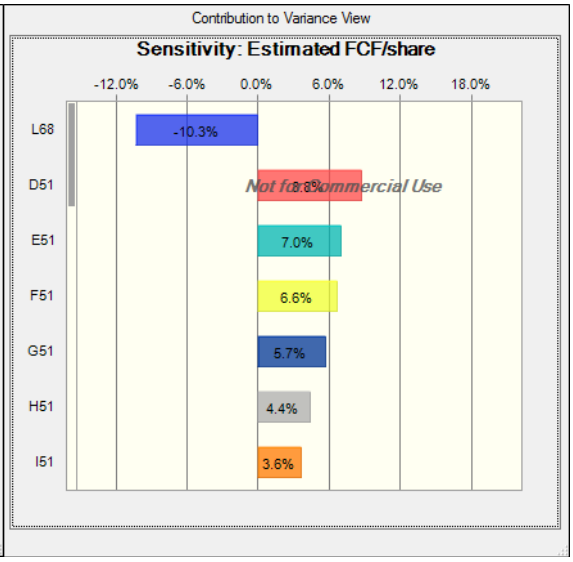


Figure 11

Our model was found to be most sensitive in period 10 with regard to assumptions in working capital and capital expenditure (cells L105 and L107 in *Figure 10*). *Figures 11* shows the result of floating working capital and capital expenditure in the 10th period, which removed assumptions of 0.00% and 20.81% of sales (respectively). As a result of their removal from the Monte Carlo simulation, a more refined result and tighter distribution was generated for our final analysis.

Figure 12 shows the third and final iteration of the Monte Carlo simulation's results. Based on our model valuation output, the current share price of $39.37 was found to provide a 92.76% chance of upside from our subjective distribution.

Figure 12: Monte Carlo Simulation Results for Micron P-DCF model

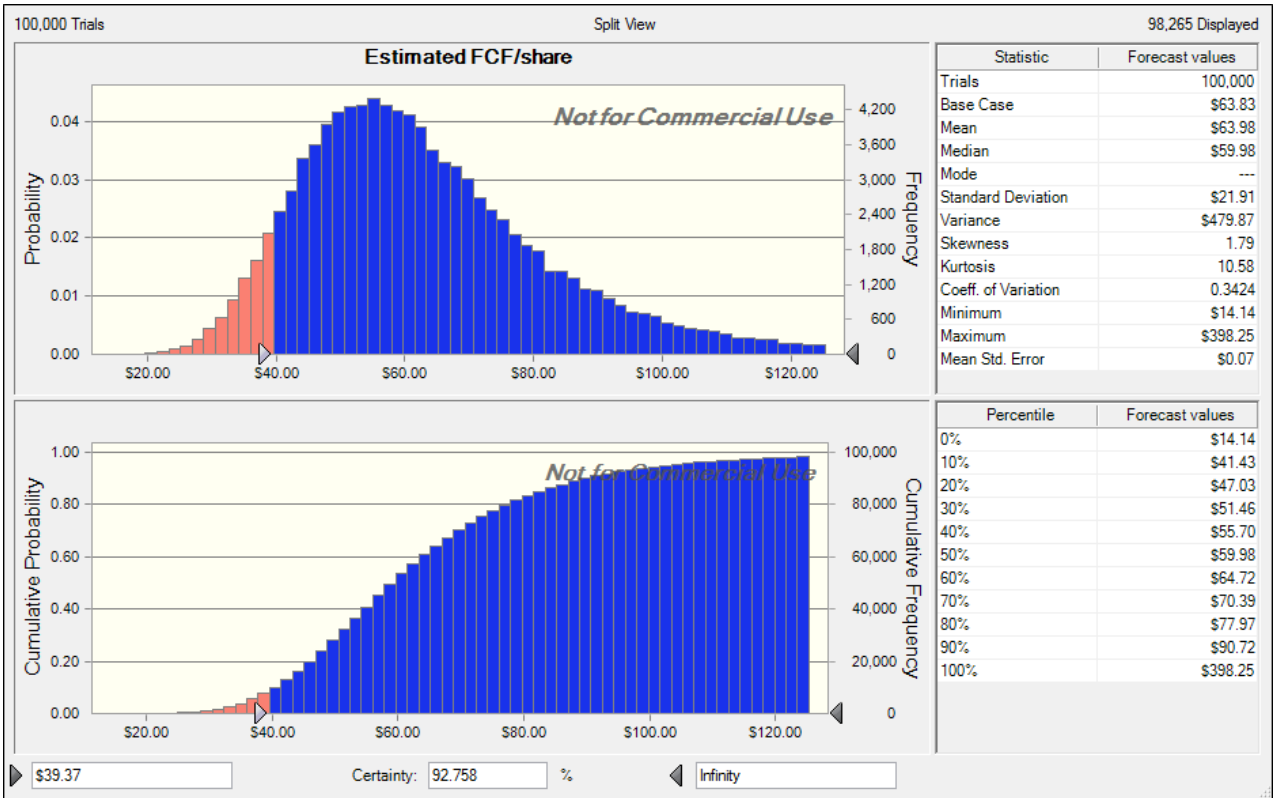


Figure 12 presents the result of a 100,000 Monte-Carlo simulation trials of our Micron P-DCF model. This plot shows the probability of possible free cash flows per share value along with the model's entire distribution of results. The blue indicates possible free cash flows per share above today's share price. We found that today's share price of $39.37 exists with 92.76% certainty within our model.

We speculated that Micron's acquisition of Inotera would result in similar, if not better, revenue growth than had been generated as a result of the MMJ acquisition. This was reflected in our fiscal 2017 assumptions, which were rather conservative in comparison to previous years of expansive revenue growth. Taking our 2017 expectations into account and our assumed historical growth rates thereafter, our analysis proves that the company will be able to generate sufficient free cash flow. Likewise, Micron will have no problem in meeting debt obligations while sustaining capital expenditure, research and development, and, possibly, its most recent acquisition habits.

Proxy Findings

Due to the fact that management has the authority and discretion to allocate capital, we have conducted a compensation analysis based on Micron's latest DEF 14A of January 2016 to see if management has been incentivized to pursue short-term returns or long-term value growth.

Executive Management (the "Named Executive Officers")

Chief Executive Officer – Sanjay Mehrotra

Chief Executive Officer (former) – D. Mark Durcan *(retired May 2017)*

Chief Financial Officer – Ernest E. Maddock

Vice President, Memory Solutions – Brian M. Shirley

Vice President, Technology Department -- Scott J. DeBoer

Vice President, Worldwide Sales – Steven L. Thorsen

President (former – resigned February 1, 2016) – Mark W. Adams

Management Compensation

Outlook of Management Compensation

Micron offers 'reasonable' and 'competitive' compensation in order to attract the best talent, retain and reward qualified individuals, and drive the corporate objective of creating superior value for shareholders. The Compensation Committee, working in conjunction with Mark Durcan, employs Mercer in their annual executive compensation review, using peer group comparison, Market Data, historical pay-for-performance and risk compensation assessment to review compensation mix metrics and incentives.

Reasonable

The Compensation Committee focuses on the Market Data median to offer the "reasonable" range of competitiveness aspect to their compensation mix in comparison to its peer group. Due to the high volatility of the semiconductor industry, Micron holds that its compensation packages marked at the median can land higher or lower in range of competitiveness depending on the year. These shifts can be accounted for in the varying executive compensation as approved by the Compensation Committee in lieu of the volatile market.

Competitive

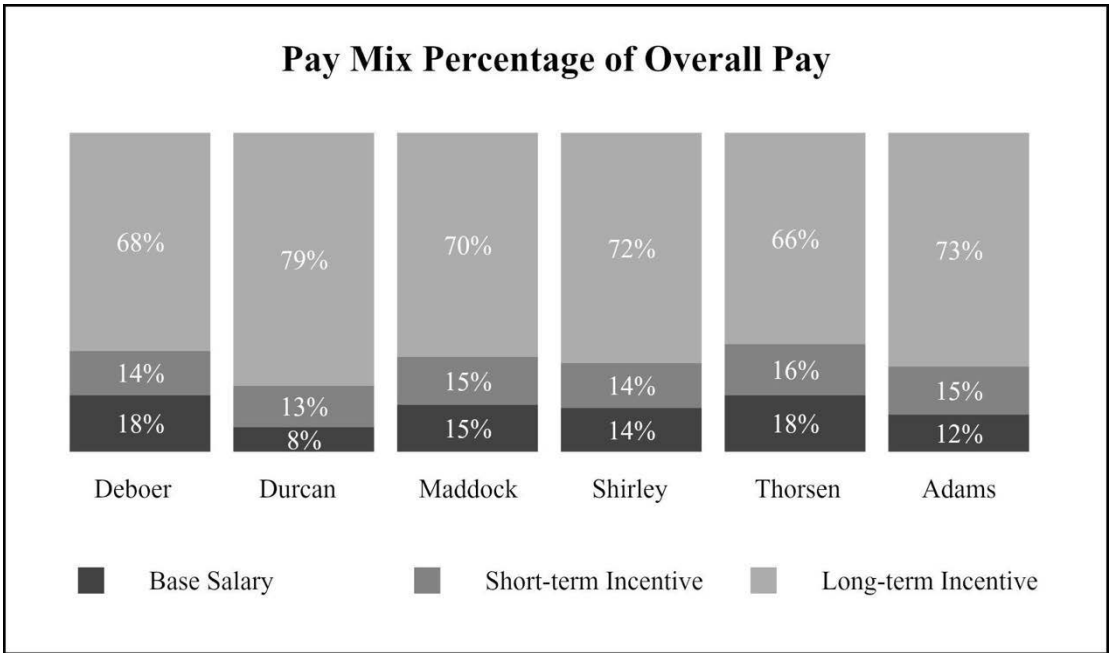
In order to provide the "competitive" aspect of compensation, the Compensation Committee has devised a mixed compensation plan that provides a fixed compensation foundation and a variable performance-based compensation found in their Executive Officer Performance

Incentive Plan ("EIP"). The Committee believes in tying a large portion of variable-based compensation to performance in order to align the interests of management with those of shareholders. However, although the Committee reviews total direct compensation annually, it does not impose a fixed goal for total direct compensation.

Per Micron's 2016 proxy statement, the elements of executive compensation are as follows:

1. Base Compensation (Salary)
2. Short-term Incentive Opportunities (cash bonus programs)
3. Long-term Incentive Opportunities (25% Stock Options, 45% Time-Based Stock and 30% Performance-Based Restricted Stock Units)

Chart 1: Executive Compensation Mix



Source: Micron's DEF 14A, Proxy Statement

Base Compensation (Salary)

The base compensation, or base salary, serves as the foundation of Micron's executive compensation mix and is targeted approximately to the Market Data median as reported by Mercer. At close of fiscal 2015, Market Data revealed that the Named Executive Officers, with respect to their position or rank, were receiving salaries below the 50th percentile. There was no change to base salaries for executives from fiscal 2015 to 2016 except a requested temporary 50% decrease in base salary from Mark Durcan, aligning his interest with the Company's efforts to reduce expenses. Granted, he was the only executive to make this request.

Table 2: Breakdown of Named Executive Officers' Base Salary

Executive Officer	Fiscal 2016 Base Salary	Above (Below) 50th Percentile	Base Salary % Change From Fiscal 2015
Scott J. DeBoer	$ 470,000	(6)%	—%
D. Mark Durcan	525,000	(56)%	(50)%
Ernest E. Maddock	550,000	(16)%	—%
Brian M. Shirley	630,000	(14)%	—%
Steven L. Thorsen, Jr.	485,000	(2)%	—%
Mark W. Adams	775,000	(9)%	—%

Source: Micron's DEF 14A, Proxy Statement

Short-Term Incentives

Short-term incentive compensation, or cash reward, is awarded for the completion and achievement of financial, operational, and strategic objectives as reviewed and accepted by the Compensation Committee on an annual basis. Micron uses these incentives as the "pay for performance" aspect of its compensation mix, deriving its short-term cash bonuses from the Executive Officer Performance Incentive Plan ("EIP"). The EIP, meant to attract seasoned executives who provide value to the company and produce results, provides cash incentives for performance at all levels of the business (individual, business-unit, company-wide, etc.).

In planning for fiscal 2016, the following goals as described directly from form DEF 14A were established:

- Profitability – achieving targeted levels of net income,
- Technology Enablement – executing on DRAM & NAND Technology road maps,
- Product Qualifications – achieving target product milestones,
- Customer Review – achieving customer feedback targets,
- 20nm DRAM – achieving manufacturing targets, and
- 3D NAND – achieving manufacturing targets.

In measuring execution, Micron's Compensation Committee holds the Named Executive Officers to levels of achievement that determine short-term incentive payouts as a percentage of each executive's base salary. Levels of achievement and payouts are determined as follows: threshold (50% payout), target (100% payout), and maximum (200% payout). Target achievements for the Named Executive Officers are shown in *Table 3* (unchanged from fiscal 2015 to 2016).

Table 3: Target Short-term Incentive Awards

Executive Officer	% of Base Salary
Scott J. DeBoer	80%
D. Mark Durcan	150%
Ernest E. Maddock	100%
Brian M. Shirley	100%
Steven L. Thorsen, Jr.	90%
Mark W. Adams	130%

Source: Micron's DEF 14A, Proxy Statement

The EIP, although last approved January 2015, was suspended May 2016 due to prevailing market conditions. New established performance goals were set for fiscal 2016 that the Committee determined would guide executive performance and promote the growth of long-term value and success. No other specifics were given for 2016's selected metrics after the suspension of the EIP, although the delineation of 2016's accrued incentives were provided:

Table 4: Short-term Incentives Accrued Prior to Suspension of EIP

Executive Officer	% of Target Achieved	Bonus Amount	Bonus Paid
Scott J. DeBoer	25%	$ 94,000	$ 0
D. Mark Durcan	25%	196,875	0
Ernest E. Maddock	25%	137,500	0
Brian M. Shirley	25%	157,500	0
Steven L. Thorsen, Jr.	25%	109,125	0
Mark W. Adams	25%	251,875	0

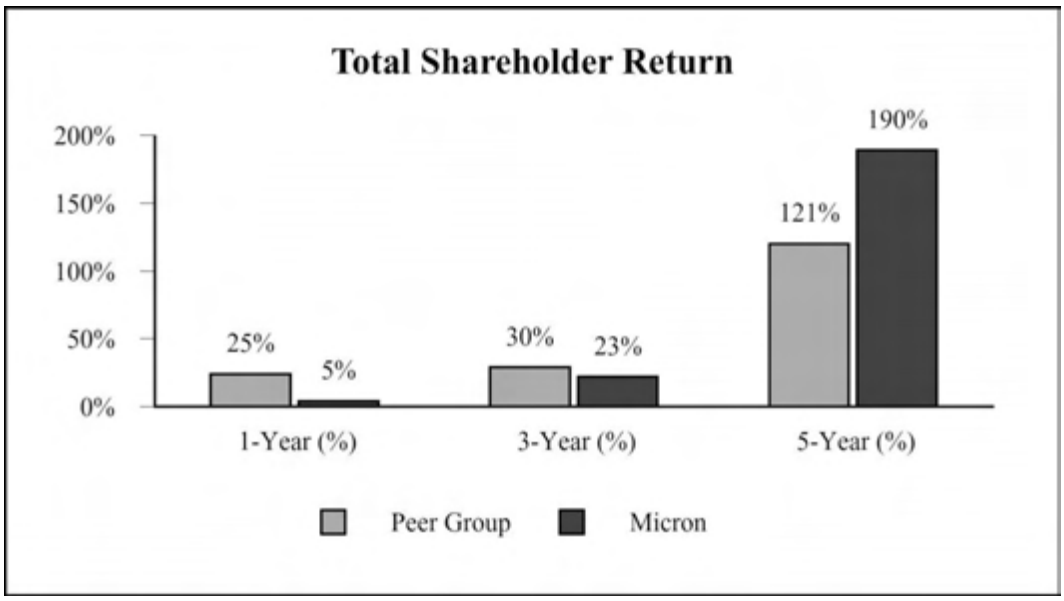
Source: Micron's DEF 14A, Proxy Statement

Long-Term Incentives

Long-term incentives, comprised of 25% Stock Options, 45% Time-Based Stock and 30% Performance-Based Restricted Stock Units, serve as the largest portion of Micron's executive compensation mix and are intended to align the interest of management with the shareholders. Micron focuses on driving shareholder value upwards and ties a majority of their long-term incentives, being the stock option and performance-based restricted stock unit awards, to the performance of their stock price. For retention insurance and as a diversification of the long-term incentives, stock options are also awarded, with shares vesting in one-fourth of the total amounts awarded on each anniversary date of the initial grant.

Micron has worked with Mercer to establish a balance between performance- and time-based incentives that are granted each fiscal year. The percentages initially mentioned with regards to stock options, time-based stock, and performance based RSUs were unchanged from fiscal 2015. For fiscal 2016, the Committee assigned return on assets ("ROA") and a relative total shareholder return ("TSR") as the metrics for performance-based RSUs and had determined that a three-year measurement period rather than year over year basis provides a better measure of performance due to business volatility and, as a result, stock price fluctuations.

Chart 2: Total Shareholder Return ("TSR")



Source: Micron's DEF 14A, Proxy Statement

Compensation Peer Group

As defined by the compensation consultant for Micron, Mercer has identified the following companies as part of Micron's Compensation Peer Group:

Table 5: Micron's Compensation Peer Group

Applied Materials, Inc.	Jabil Circuit, Inc.
Broadcom Corporation	Medtronic Inc.
Corning Incorporated	QUALCOMM Incorporated
Danaher Corporation	Seagate Technology Plc.
Eaton Corporation, Plc.	TE Connectivity Ltd.
EMC Corporation	Texas Instruments Incorporated
Emerson Electric Co.	Thermo Fisher Scientific Inc.
Flextronics International	Western Digital Corp.

Source: Micron's DEF 14A, Proxy Statement

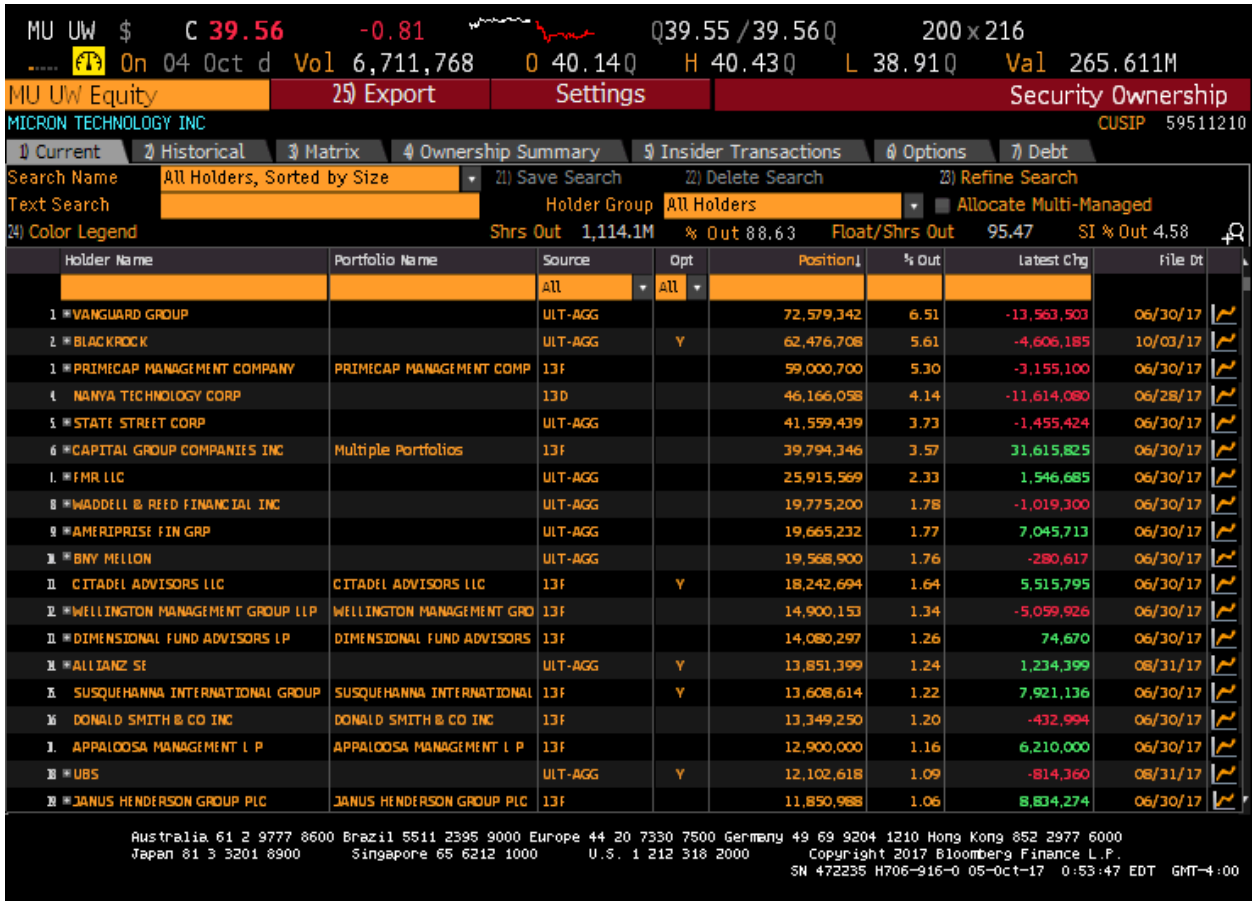
Dividends

Micron has not declared or paid cash dividends since 1996 and does not intend to do so in the foreseeable future.

Holders

With our focus on deriving free cash flow per share value, we felt it was important to review the Institutional holders of Micron and their most recent actions. Top holders include The Vanguard Group, Blackrock, Primecap Management, and Nanya Technology (acquired through Micron's single draw term loan facility held with Nanya). With a greater number of shares bought than sold, we believe investors showed confidence in management's forward guidance after Microns Q3's Earnings Call of June 30th (see *Figure 13*). Going forward, and after yesterday's strong earnings report for Q4, we expect strong, positive movement within the holders of Micron as the share price appreciates with growth.

Figure 13: Microns Holders:

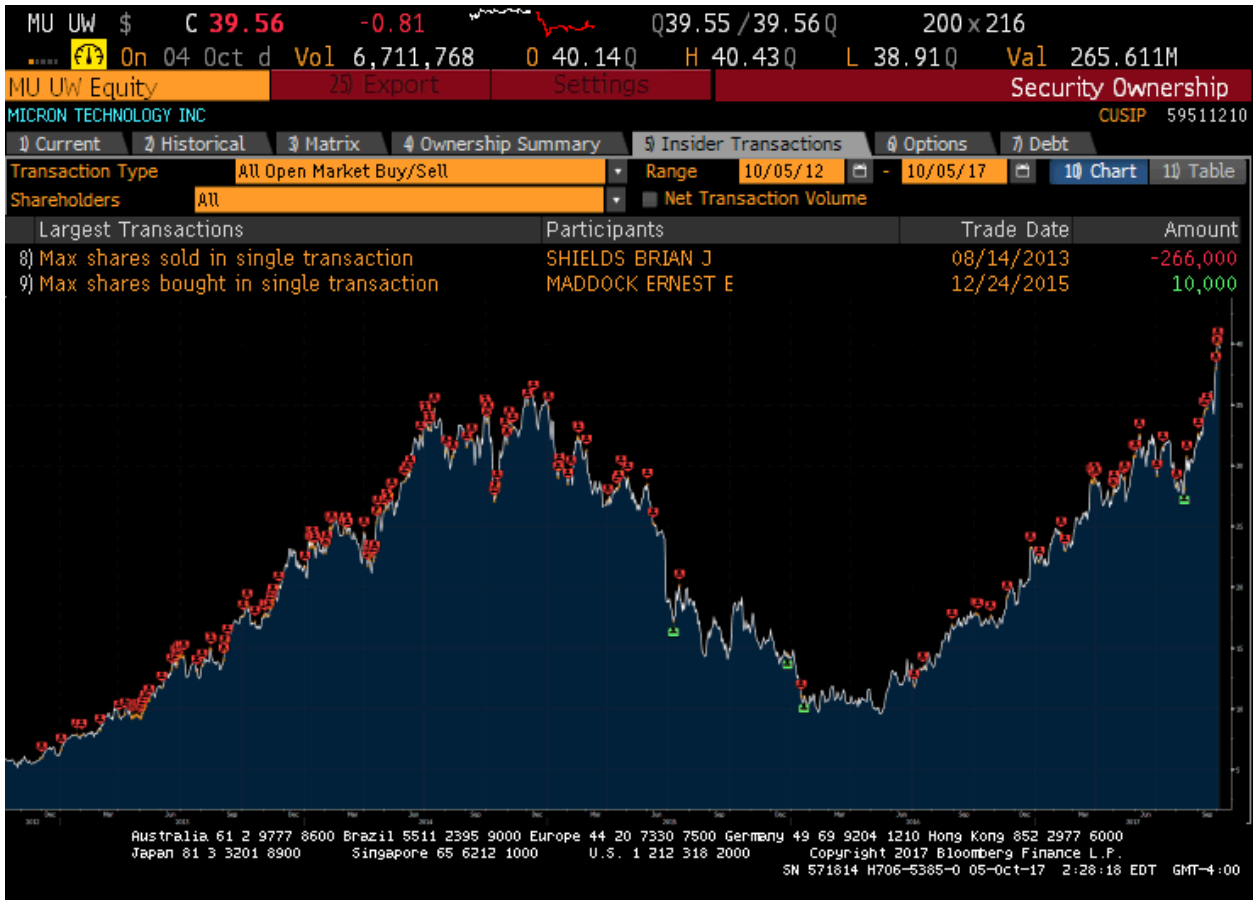


Source: Bloomberg Terminal, Command: <HDS>, Accessed 10/05/2017

Insiders Transactions

We reviewed the actions of Micron's insiders to get any indication if management is buying into their own growth prospects and believes the company will meet expectations. Although we do not speculate the reasoning for sells of shares, we do take note to any purchases and their timing relative to company growth (in retrospect). As we can see in *Figure 14*, there was one purchase by management in 2016, but the last largest purchase was made back in 2015 by Ernest Maddock. Although infrequent buying is not out of the norm due to shares being a component of management compensation, this can indicate that management is not willing to take on extra risk by taking a larger position in the company than required.

Figure 14: Microns Insider Transactions



Source: Bloomberg Terminal, Command: <GPTR>, Accessed 10/05/2017

Conclusions

Based on our findings, the outlook for Micron's share price is optimistic. With current memory solution demand not being met by major holders of market share and consumer demand growing for next generation technology, the market appears to be primed for Micron's taking.

Sanjay Mehrotra (CEO) and Ernie Maddock (CFO) provided positive guidance about the future expectations for Micron during their 4th quarter 2017 earnings call of September 26th. Reporting upon the tight market for DRAM and NAND memory solutions, rising average sales prices, and declining cost of sales, Mr. Mehrotra guided that the current market climate would allow Micron to continue its cost cutting and restructuring efforts, while positioning the company for growth in manufacturing output. Mr. Mehrotra also affirmed that Micron would be adjusting its focus towards higher-value added solutions, moving away from reporting growth in costs per bit and moving towards individual product offerings.

With innovation and development at its forefront, Micron holds a unique position in the tight semiconductor market. We believe if Micron can secure long-term, designer contracts as an innovative and cost-effective memory solutions company, then the Company will be a dominant player in the future of memory solutions.

As a result, we affirm our model valuation results. Our P-DCF implies a stock price of $63.83, providing a 62% upside based on what we consider to be fair and empirical growth estimates. We believe based on management and industry outlook, more upside may be derived with far more bullish assumptions. Therefore, we rate Micron Technology, Inc. (NASDAQ: MU) a BUY, with confidence that Micron will provide a return on investment into the foreseeable future.

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