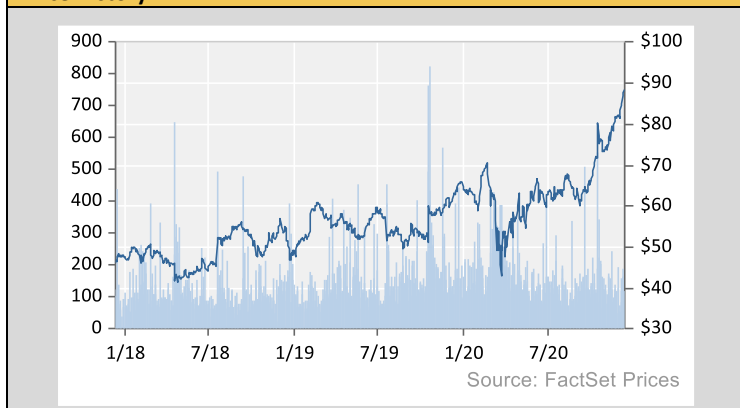


Recommendation: Sell

Current Price	\$88.54	---	Ticker	BMI
1 Year Bear	\$46	-48%	Sh. Out. (M)	29.1
1 Year Base	\$57	-35%	M.Cap. (\$M)	2,578
1 Year Bull	\$66	-25%	EV (\$M)	2,509

Price History

	5Y	3Y	2Y	LTM	YTD	3M	1M
Return	26%	24%	62%	41%	38%	44%	14%

Financials

	2016	2017	2018	2019	2020	2021F	2022F
Sales(\$M)	393.8	402.4	433.7	424.6	420.8	427.2	458.6
Gr. %	4.2%	2.2%	7.8%	-2.1%	-0.9%	1.5%	7.4%
v. Cons.	-	-	-	-	-	6.1%	4.7%
Industry	1.6%	11.0%	14.3%	5.4%	-4.1%	7.0%	5.0%
EPS	\$1.12	\$1.20	\$0.96	\$1.63	\$1.67	\$1.70	\$1.89
Gr. %	24.4%	6.9%	-19.0%	69.6%	2.8%	2.1%	10.9%
v. Cons.	-	-	-	-	-	8.3%	9.3%
Industry	13.9%	6.6%	33.6%	19.4%	-4.2%	-4.3%	14.1%

Ratios

	2016	2017	2018	2019	2020	2021F	2022F
NPM	8.2%	8.6%	6.4%	11.1%	11.5%	11.6%	12.0%
Industry	8.5%	9.6%	7.4%	11.9%	10.8%		
ROE	13.2%	13.0%	9.6%	14.9%	14.2%	13.6%	14.1%
Industry	12.6%	13.4%	8.8%	15.2%	12.9%		
ROA	9.2%	9.3%	7.1%	11.6%	11.1%	10.7%	11.2%
Industry	5.5%	5.8%	4.2%	5.8%	6.6%		
A T/O	1.10	1.09	1.11	1.04	0.97	0.93	0.93
A/E	1.40	1.39	1.35	1.28	1.28	1.27	1.27

Valuation

	2016	2017	2018	2019	2020	2021F	2022F
P/E	33.3	40.2	51.7	40.2	53.3	52.1	46.8
Industry	32.4	33.7	24.5	33.6	38.6	31.1	33.6
P/S	2.70	3.50	3.30	4.50	6.20		
P/B	4.20	5.00	4.70	5.70	7.33		
P/CF	23.5	40.1	27.8	29.9	27.7		
V/EBITDA	15.1	17.8	17.7	21.5	27.8		
D/P	38.7%	41.2%	58.8%	39.6%	39.8%		

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Industrials, Flow Measurement

Badger Meter, Inc**Summary**

I recommend a sell rating with a target of \$57. Although BMI is a leader in flow measurement technology and operates with more efficiency than its competitors, I expect much slower sales growth than consensus. The slower sales growth is a result of a recovering economy from a recession along with stagnant growth in international sales. The stock is overvalued based on relative and DCF analysis.

Key Drivers

- **AMI (Advanced Metering Infrastructure):** There is a 40% untapped market for AMI technology in the U.S. AMI also provides BMI with greater margins.
- **Gross Margin:** Badger Meter's gross margin has been increasing over the past five years. Supplier relations and AMI sales have helped contribute to that increase.
- **International Exposure:** Revenue from Canada, Mexico, and the Middle East have been increasing at the same time European revenue has decreased. A slight increase in sales to Europe could help boost BMI's International revenue exposure.
- **Strong Market Position:** Even though BMI's market cap is much smaller than its competitors, it still holds 43% of revenue share in flow measurement.
- **Macroeconomic Trend:** BMI is positively correlated to PMI and housing starts.

Valuation

Using a relative valuation approach, Badger Meter appears to be overvalued in comparison to the flow measurement industry. DCF analysis implies that the stock is worth \$57. A combination of the approaches suggests that Badger Meter is overvalued, as the stock's value is about \$65 and the shares trade at \$88.54.

Risks

- Competitive pressures could increase
- Suppliers could increase their prices
- Economic and political conditions could adversely affect BMI
- The inability to develop advanced products

Company Overview

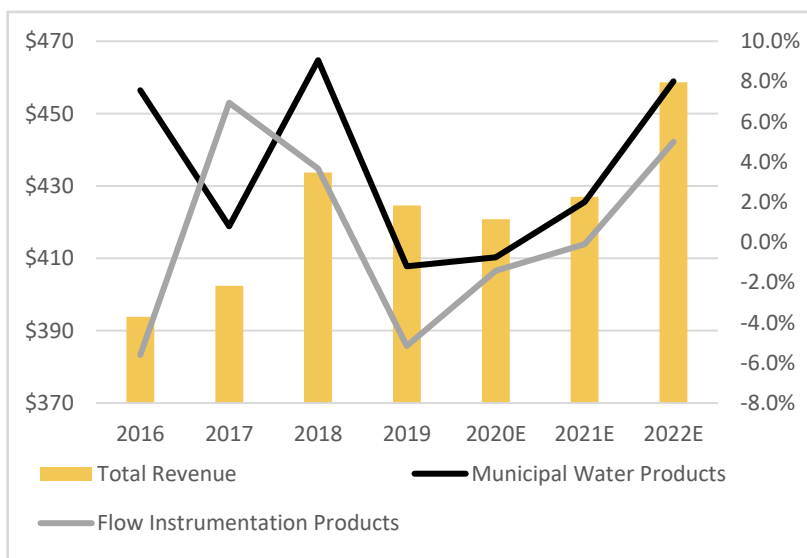
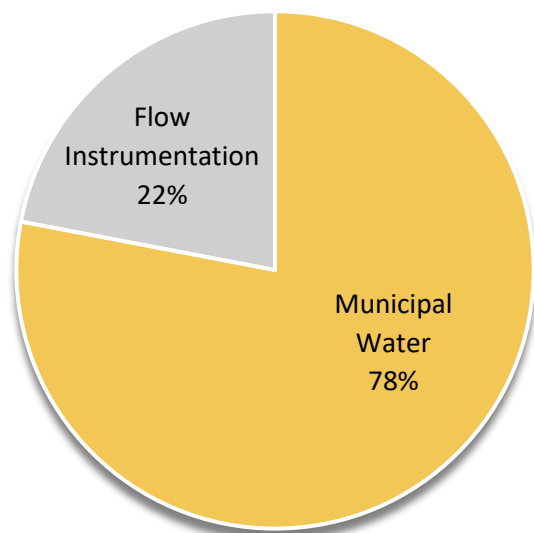
Badger Meter (BMI) is a manufacture and innovator of flow measurement, control, and communications. BMI’s product lines fall into two categories: municipal water and flow instrumentation. Municipal water includes sales of water meters, radios, and related technologies to water utility companies. Flow instrumentation includes sales of meters, valves, and other products for industrial applications in water, wastewater, and other industries. These products are capable of measuring water, oil, chemicals, and other fluids. Badger Meter has become a leader in this industry by selling products known for accuracy, long-lasting durability, and by providing data in a timely manner. The company primarily sells to North America, but it also sells to countries in Europe, Asia, and the Middle East. Badger Meter is headquartered in Milwaukee, Wisconsin.

BMI’s total revenue increased by 7.8% from 2016 to 2019

Badger Meter generates 78% of its total revenue from municipal water products and 22% of revenue from flow instrumentation. BMI has two reporting segments:

- 1) **Municipal Water products:** Water meters, radios, and related technology sold to municipal water utilities. Sales are down 1% in 2019 from 2018 from \$334.7 million to \$330.7 million. In 2020 it is projected this segment will be down 0.8%. This is Badger Meter’s largest segment and makes up 78% of sales. The majority of water meters sold are mechanical in nature; however, ultrasonic meters combined with advanced radio technology is becoming an increasing portion of meters sold.
- 2) **Flow Instrumentation Products:** Meters, valves, and other products for industrial applications. Sales were down 5% in 2019 from 2018 from \$99.0 million to \$93.9 million. In 2020 this segment is projected to be down 1.4%. This segment accounts for only 22% of revenue. Equipment manufacturers are the primary customers for flow instrumentation products and are generally used in the product or manufacturing system.

Figures 1 & 2: Revenue (Percentage) by segment in 2019 (left) and revenue history (in millions) since 2016 (right)



Source: Company reports, Factset

Business/Industry Drivers

Though several factors may contribute to Badger Meter’s future success, the following are the most important business drivers:

- 1) AMI (Advanced Metering Infrastructure)
- 2) Gross Margin Increasing
- 3) International Exposure
- 4) Strong Market Position
- 5) Macroeconomic Trend

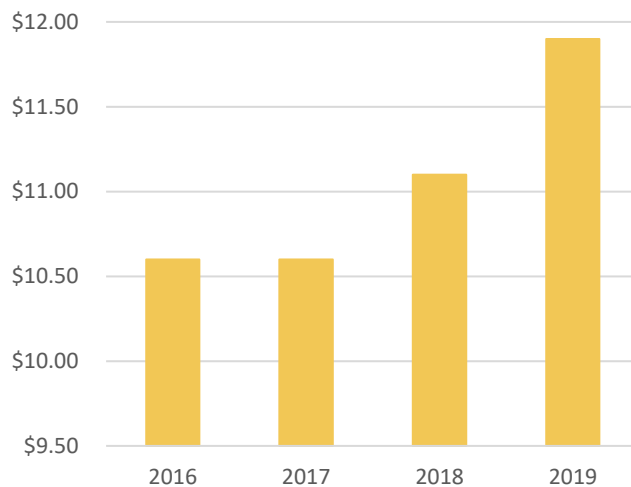
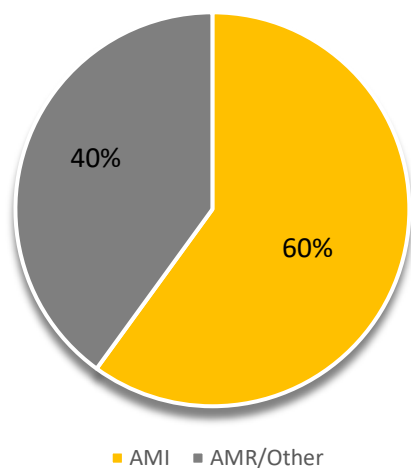
AMI Technology

AMI technology is becoming more adopted by utility companies and provides BMI with potential for growth

AMI (Advanced Metering Infrastructure) systems eliminate the need for utility companies to send personnel to sites to collect data from manually read meters. AMI technology is expected to grow at a 15% CAGR until 2026. It is estimated that approximately 60% of water utilities in the United States have converted to radio metering. This means that 40% of this market is untapped for Badger Meter. AMI technology also provides Badger Meter with higher selling prices and margins than mechanical meters. Badger Meter is also expanding Smart Water AMI. This is AMI without utility companies having to use private infrastructure. BMI is the only water metering company that participates in the AT&T Smart City Alliance which has allowed the company to sell to higher-level decision makers, and will most likely continue in the future. This advancement in AMI technology could lead to higher revenue from European countries which need to upgrade their water utility infrastructure. Only around 50% of Europe’s utility companies have converted to radio metering. Europe also has been spending 0.7% less on infrastructure of GDP than the United States.

Badger Meter has increased its research and development cost over the past four years as seen in figure 4. R&D as a percentage of sales also increased from 2.5% in 2018 to 2.8% in 2019. Research and development is contributing to the further advancement in AMI, as is Badger Meter’s manufacturing process to increase efficiency. Improvement in AMI is the future for utility companies as it reduces cost and waste. Creating the most advanced and efficient AMI technology is a must and increased R&D costs reflect Badger Meter’s focus on having top of the line products.

Figure 3 and 4: Amount of utility companies that use AMI (left) and research and development costs (millions) (right)



Source: Company reports

AMI supports the water conservation effort. Water conservation is the practice of reducing unnecessary water usage by using water efficiently. Only 0.5% of all water available on earth is drinkable fresh water. The practice of water conservation is important as water is not an unlimited resource. AMI technology provides leak detection, remote shutoff, and more accurate meter readings. All of these factors not only save the companies money but also help protect and conserve fresh water.

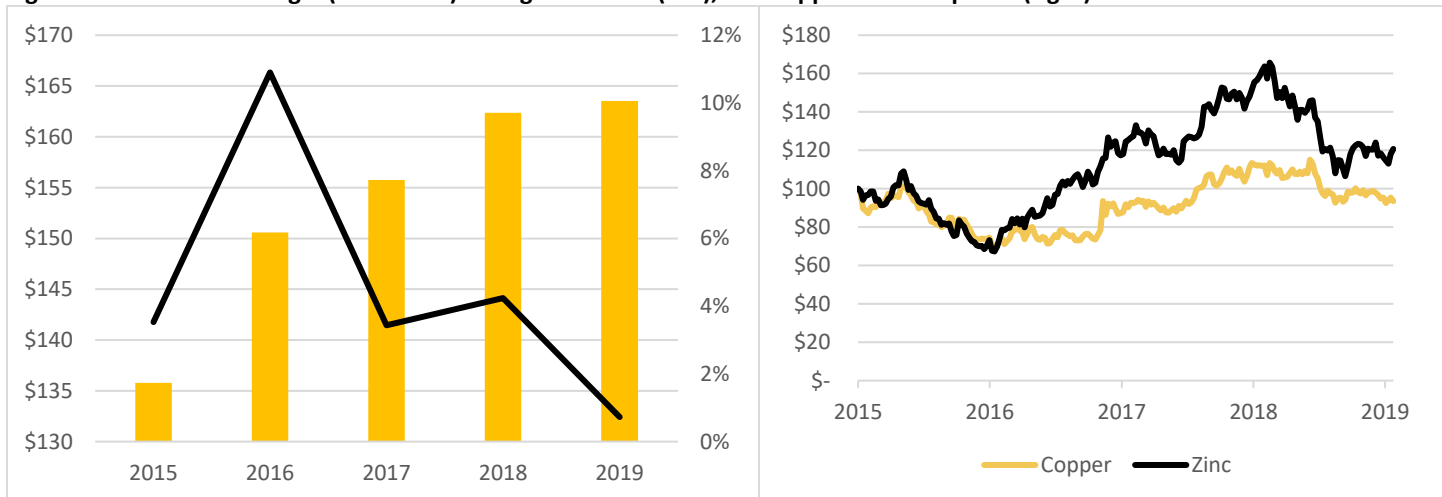
Gross Margin Increasing

Badger Meter’s gross margin has been increasing over the past five years and its growth rate remains positive. Sales for Badger Meter were down 2% in 2019, yet its gross margin increased by 1% from \$162,349,000 in 2018 to \$163,528,000 in 2019. This is due to decreasing cost of goods sold. Cost of goods sold as a percentage of revenue decreased by 1.7% from 2018 to 2019. This decrease is due to lower commodity costs in 2019 such as brass, which is made of copper and zinc. Badger Meter also sold more AMI technology products which have higher margins compared to regular manually read meters. I expect Badger Meter’s AMI technology products to continue growing which in turn will help boost margins.

BMI’s gross margin has risen over the past five years

Badger Meter has only three key suppliers. The relationships Badger Meter has created with its three key suppliers has lowered its cost of goods sold over time. Badger Meter is able to obtain lower cost of materials, with little to no deliver delays and lower quality control costs, and it retains the ability to purchase business interruption insurance when appropriate. Having only three key suppliers also poses a risk as having very few suppliers could turn costly if one of its suppliers fails and/or if they decide to raise prices. To combat this risk, Badger Meter has been purchasing materials from alternative suppliers.

Figure 5 and 6: Gross margin (in millions) with growth rate (left), and copper and zinc prices (right)



Source: Company reports, Factset

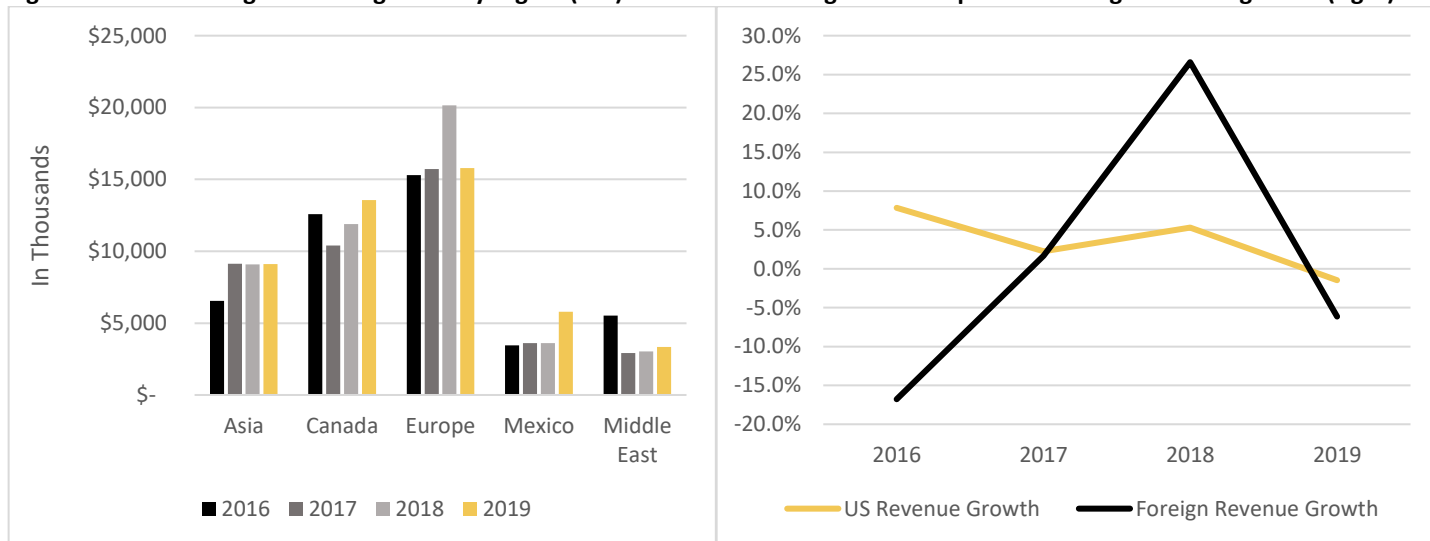
International Exposure

Badger Meter’s foreign revenue and U.S. revenue growth fell in 2019. Although international revenues have decreased 2019 year-to-date, revenue from Canada, Mexico, and the Middle East have risen. Revenue from foreign countries is down 2.1%, mainly due to Europe. Revenue from Germany is down 25%, United Kingdom is down 23%, and France fell 25%. European utility companies are not investing in new waterflow technology. Europe only spends around 1.6% of its GDP on infrastructure, whereas the average country spends around 4%. Europe’s GDP decreased by 2.1 % in 2019 which helps explains the decreased revenue from Europe in 2019. The drop in revenue may also be due to the fact that BMI’s meters conform to the American Water Works Association. By providing AMI (Advanced Metering Infrastructure), Badger Meter’s products will be more accessible to international customers.

BMI’s revenue has risen in Canada, Mexico, and the Middle East

Roughly 94% of Badger Meter’s revenue comes from developed countries. Emerging markets lack efficient water utility companies. The developed countries that Badger Meter serves has a total of 103,863 water utility companies. The countries that Badger Meter serves that are in emerging markets only have around 43,700 water utility companies. Emerging market countries spend 3.9% of their GDP on infrastructure which includes water utility companies and these countries GDP’s are expected to grow an average of 4.5% annually. As these emerging markets become developed, they will build more water utility companies and improve their flow technology to improve efficiency.

Figures 7 and 8: Foreign revenue growth by region (left) and U.S. revenue growth compared to foreign revenue growth (right)



Source: Company reports, Factset

Strong Market Position

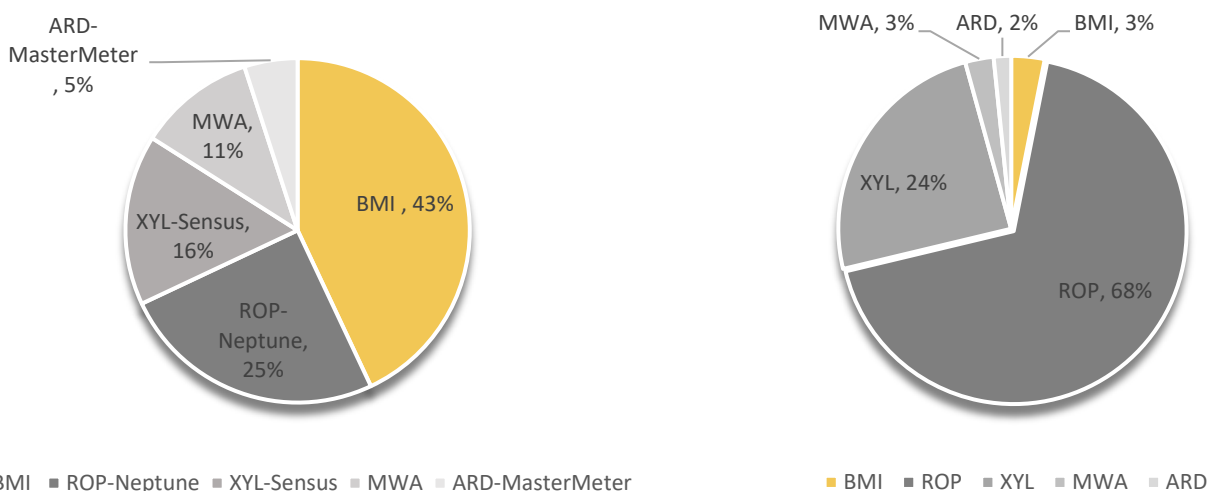
Due to high barriers to entry the water meter industry is not that competitive with very few companies having control of the US market. Advanced technology, creating a recognized brand, and having an effective channel distribution system are all needed to compete. Badger Meter has been able to capitalize on all three of these aspects.

BMI has a small market cap compared to its comps but has over 40% of the revenue in the flow measurement industry

Badger Meter is a leading innovator in advanced meter technology. This can be explained in the figure below. The chart shows the amount of revenue share in the flow measurement industry compared to its major competitors which combined sell in excess of 90% of the water meters in the North American market. In the chart you can see that Badger Meter has almost half (43%) of the total revenue share in flow instruments. The other companies include Roper, Xylem, and Arad and their subsidiaries are Neptune, Sensus, and Master Meter. Brand recognition has also benefited Badger Meter as the firm is known in the U.S. and around the world for having accurate and reliable flow measurement products. Badger Meter also has an extensive water utility distribution channel which makes it more difficult for other companies to compete in its biggest segment.

Badger Meter may lack in financial resources compared to competitors. As a share in market cap, Badger Meter is only 3% compared to competitors as seen in the figure below. Roper, Xylem, and Arad sell additional industrial machinery and equipment beyond flow technology. However, if these companies decide to spend more capital on flow technology, they could pose a greater threat to Badger Meter.

Figure 9 and 10: Comparison of BMI comps by flow measurement sales (left) and market cap (right)



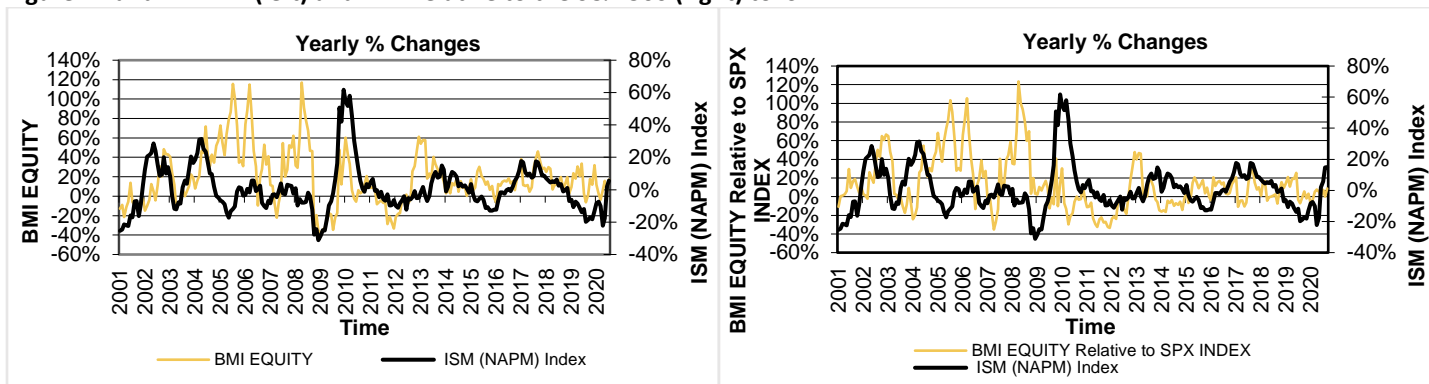
Source: Company Reports, Factset

Macroeconomic Trends

BMI is correlated to the ISM PMI Manufacturing Index and Housing Starts

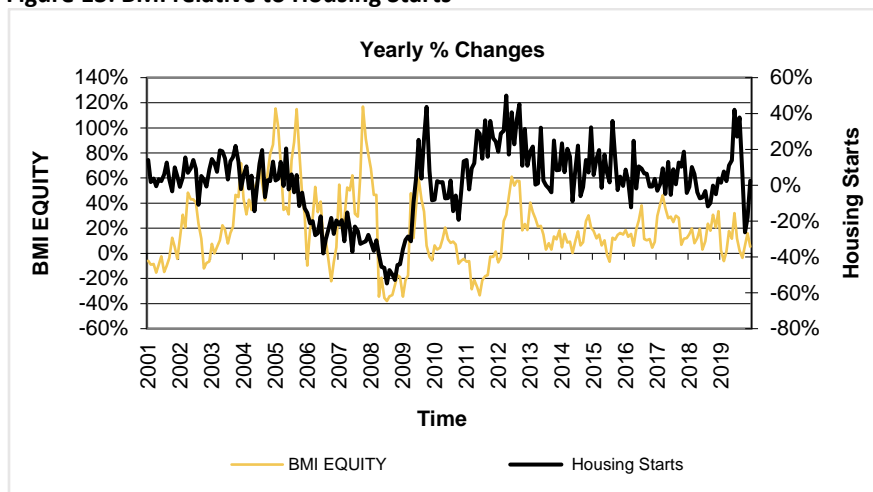
Badger Meter is positively correlated to the PMI manufacturing index. The PMI index measures the manufacturing activity of 300+ manufacturing firms in the United States. A score above 50 indicates an expansion in the manufacturing sector where as a score below 50 indicates a contraction. For the most part, when the ISM increases or decreases so does Badger Meter as shown in figure 11. However, figure 11 shows that Badger Meters relative performance to the S&P 500 versus changes in the PMI is sometimes negative. This is possibly due to the fact that majority of Badger Meter’s customers are utility companies which are very stable as they perform well during both economic contractions and expansions. In the figure below you can see that Badger Meter return has a positive correlation of 0.18 relative to the ISM PMI and its relative return has a positive correlation of 0.10. Badger Meter is also positively correlated to housing starts. Every time a new home is built, a water utility company has to install a new water meter. In figure 12, you can see that Badger Meter has a positive correlation of 0.08. These low correlations imply that the economy does impact Badger Meter; however, drivers such as AMI technology and strong market position are more important.

Figure 11 and 12: BMI (left) and BMI relative to the S&P 500 (right) to ISM PMI



Source: IMCP, Bloomberg

Figure 13: BMI relative to Housing Starts



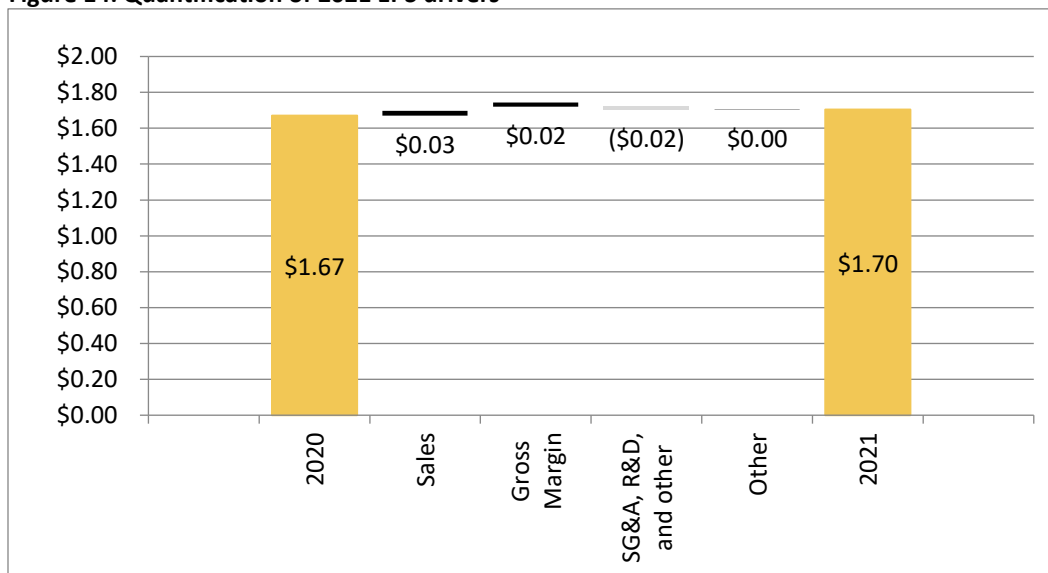
Source: IMCP, Bloomberg

Financial Analysis

Quantification of Drivers

I anticipate EPS to grow to \$1.70 for the fiscal year 2021. Increased sales of 1.5% should contribute \$0.03 to EPS. Municipal Water segment is expected to increase 2% due to the reopening of the economy along with an increasing demand for AMI technology. Flow instrumentation sales growth are projected to be flat. A small rise in gross margins in the Municipal Water segment should add \$0.02. I also anticipate a slight increase in SG&A, R&D, and other as a percent of sales will cost \$0.02. Overall, EBIT margin rises 0.1% from 15.3% to 15.4%.

Figure 14: Quantification of 2021 EPS drivers

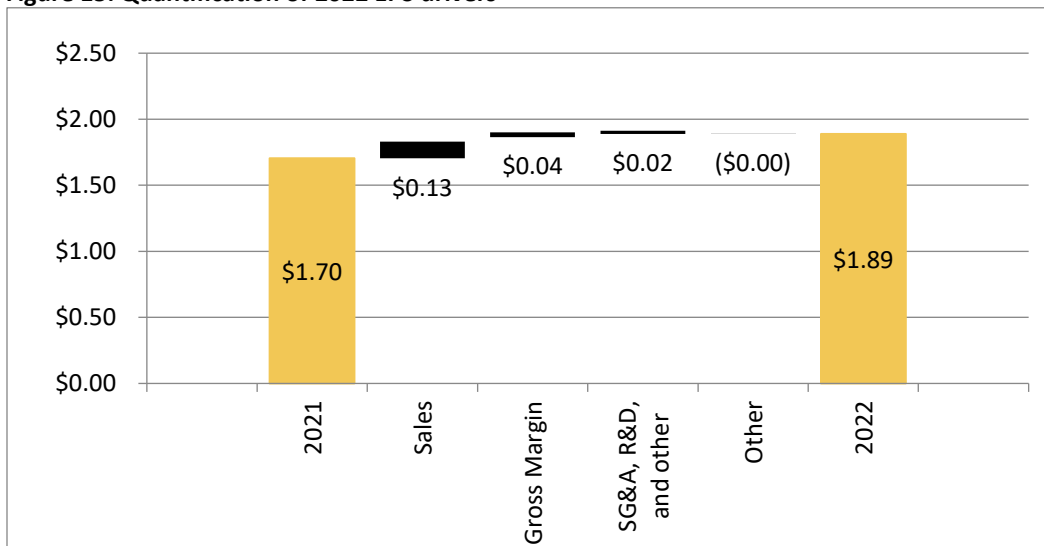


Source: Company reports, IMCP

I expect EPS to grow from \$1.70 to \$1.89 in fiscal year 2022. Sales growth of 7.4% may contribute \$0.13 to EPS. This results from an increase in both the Municipal Segment by 8.0% and Flow Instrumentation by 5.0%. I predict gross margin to increase from 39.5% to 39.8% mainly due to the increase of Municipal Water sales which increases EPS slightly by \$0.04. I predict SG&A, R&D, and other as a percent of sales to

decrease from 24.1% to 23.9% and EBIT Margin to rise from 15.4% to 15.9% all of which contribute \$0.02 to EPS.

Figure 15: Quantification of 2022 EPS drivers



Source: Company reports, IMCP

I am slightly more pessimistic than consensus for sales and EPS for both years. I expect Badger Meter to have positive EPS and sales growth due to being a leading innovator in flow measurement technology, but I don't see sales recovering from the recession as high as consensus is estimating.

Figure 16: EPS and YoY estimates compared to consensus

	2021E	2022E
Revenue - Estimate	\$ 427.24	\$ 458.65
Revenue - Growth Rate	1.5%	7.4%
EPS - Estimate	\$ 1.70	\$ 1.89
EPS - Growth Rate	2.0%	10.9%
Revenue - Consensus	\$ 448.10	\$ 469.30
Revenue - Growth Rate	6.1%	4.7%
EPS - Consensus	\$ 1.83	\$ 2.00
EPS - Growth Rate	8.3%	9.3%

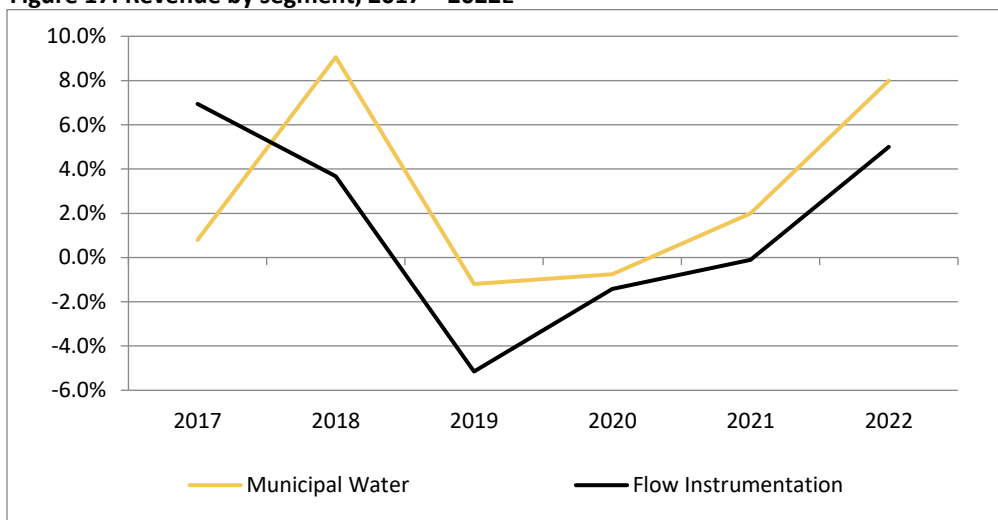
Source: Factset, IMCP

Revenue

An increase in sales from both Europe and the Middle East will help stabilize foreign revenue growth

Revenue was rising until 2018-2019 where they experienced a -2.10% in overall sales. The United States which account for 86% of revenue had dropped 1.5%. A mid-year pause in orders caused by new product launches contributed to the decrease in sales. Europe which accounts for 4% of sales decreased 21.7%. This was the result of a decrease in industrial activity across BMI's European end markets. The Middle East experienced a 30.5% decrease in revenues of 30.5% after the previous year's sales were up a staggering 130.8% due to sales of ultrasonic meters. The Middle East only contributes 2% to revenue. Moving forward into 2021 and 2022, Badger Meter should return to more normal sales growth. With the further adoption of AMI technology and the 40% of untapped market available in the United States, I predict municipal water will be rising faster than flow instrumentation which consists of sales of meters, valves and other products used for industrial applications. As water conservation becomes more and more popular, especially with a democratic president pushing for greener legislative, this will further push up sales growth for Badger Meter's municipal water segment.

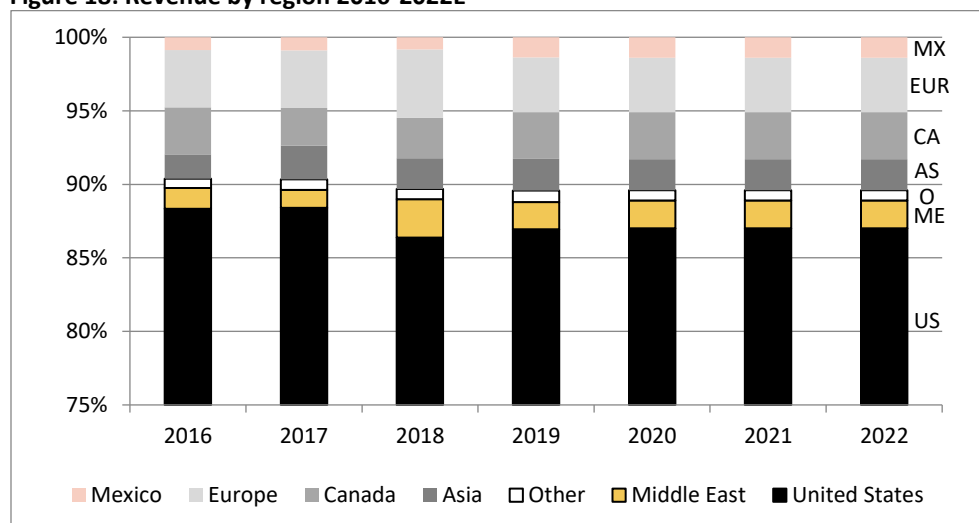
Figure 17: Revenue by segment, 2017 – 2022E



Source: Company Reports, IMCP

International sales slowed drastically in 2019 and recovered slowly in 2020 and I predict that this trend will continue into 2022. With the global economy hopefully recovering from the pandemic in 2021, global sales especially in Europe and the Middle East should return to normal. Europe should get a boost as infrastructure spending grows from just 1.60% of their GDP. The other non-US regions should grow at a constant rate based on past trends.

Figure 18: Revenue by region 2016-2022E



Source: Company Reports, IMCP

Return on Equity

Badger Meter’s ROE has been relatively constant with the exception of 2018 due to a drop in operating profit margin, offset partly by a lower tax burden. The drop in operating margin was caused by the company terminating its defined benefit pension plan which negatively impacted EBIT. The lower tax burden was primarily due to the lowering of the U.S. Federal tax rate from 35% in 2017 to 21% in 2018. In 2019 and 2020, ROE returned to normal levels and I expect it to continue at these levels through 2022. Badger Meter’s ROE is 1.3% higher than the median of its competitors.

Figure 19: ROE Breakdown, 2017 – 2022E

5-stage DuPont	2017	2018	2019	2020	2021E	2022E
EBIT / sales	13.8%	8.5%	14.6%	15.3%	15.4%	15.9%
Sales / avg assets	1.09	1.11	1.04	0.97	0.93	0.93
EBT / EBIT	98.6%	96.9%	99.6%	99.6%	99.6%	99.7%
Net income /EBT	63.0%	77.5%	76.6%	75.5%	75.5%	75.5%
ROA	9.3%	7.1%	11.6%	11.1%	10.7%	11.2%
Avg assets / avg equity	1.39	1.35	1.28	1.28	1.27	1.27
ROE	13.0%	9.6%	14.9%	14.2%	13.6%	14.1%

Source: Company Reports, IMCP

Free Cash Flow

Figure 20: Free cash flows 2016 - 2022E

Year	2016	2017	2018	2019	2020	2021E	2022E
NOPAT	\$33	\$35	\$29	\$47	\$49	\$50	\$55
Growth		6.6%	-18.2%	65.1%	2.9%	1.9%	10.8%
NOWC	131	139	145	179	210	233	255
Net fixed assets	199	233	228	222	216	219	229
Total net operating capital	\$330	\$372	\$373	\$401	\$426	\$452	\$484
Growth		12.6%	0.4%	7.4%	6.4%	6.0%	7.1%
- Change in NOWC		7	7	34	31	22	22
- Change in NFA		34	(5)	(6)	(6)	3	10
FCFF		-\$7	\$27	\$20	\$23	\$24	\$23
Growth			-516.7%	-26.9%	16.1%	3.8%	-3.9%
- After-tax interest expense		0	1	0	0	0	0
+ Net new short-term and long-term debt		17	(33)	(5)	2	(1)	3
FCFE		\$10	-\$6	\$15	\$25	\$23	\$26
Growth			-163.9%	-342.6%	62.7%	-7.7%	13.4%
Sources of cash (FCFE)		\$10	-\$6	\$15	\$25	\$23	\$26
Uses of cash							
Other expense		\$0	\$0	\$0	\$0	\$0	\$0
Increase mkt sec		-	-	-	-	-	-
Dividends		14	16	19	21	24	27
Change in other equity		(1)	(15)	1	7	2	2
		\$13	\$2	\$20	\$28	\$26	\$29
Change in other liab		4	8	4	3	3	3
Total		\$10	(\$6)	\$15	\$25	\$23	\$26
With cash and debt							
FCFF per share		(\$0.23)	\$0.94	\$0.69	\$0.80	\$0.83	\$0.80
Growth			-515.8%	-27.0%	16.1%	3.9%	-3.8%
FCFE per share		\$0.34	(\$0.22)	\$0.52	\$0.85	\$0.79	\$0.89
Growth			-163.7%	-342.3%	62.6%	-7.6%	13.5%

Source: Company Reports, IMCP

Badger Meter's FCF has been sporadic but generally increasing. In the future, management plans to spend more on R&D projects, new assets, and growth projects. This growth in assets explains the increase change in NFA in 2021 and 2022 which lowers FCF in those years. Changes in NOWC should increase at a constant rate. NOPAT has been generally rising, but I believe it will slow in 2021 which cuts into FCF, I see

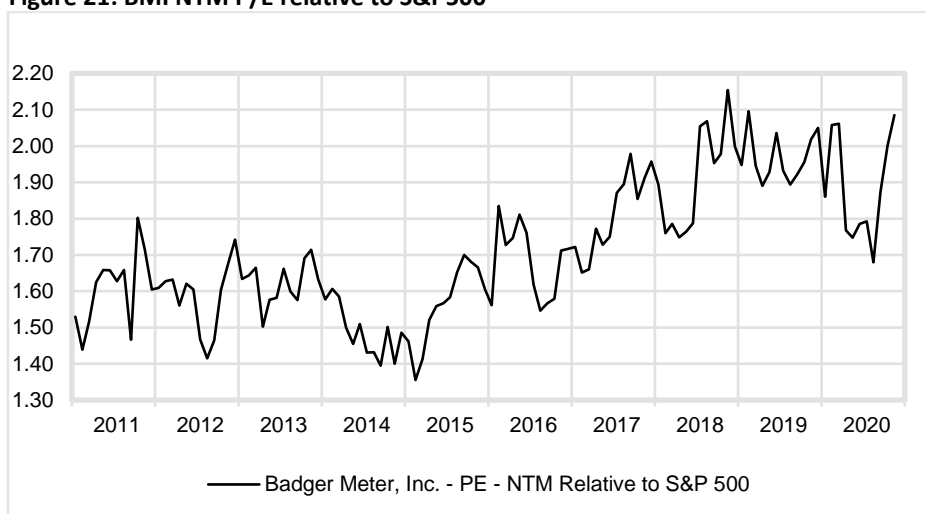
NOPAT increasing more in 2022. Dividends have also been rising around 13% annually which I expect to continue as FCF rises.

Valuation

Trading History

Badger Meter appears overvalued. It has a very high NTM P/E. Assuming some fade to 42, it is worth \$79. The stock is also overvalued versus peers (\$52 target) based on a relationship of P/S and net margin. DCF analysis also suggests a lower than current price (\$89) value of \$56.51. Badger Meter is almost back to its all-time high P/E relative to the S&P500. Investors believe the company has substantial growth potential with the economy coming out of the recession. Badger Meter's current NTM P/E is at 45 compared to its five-year average of 32. I expect the current P/E to come down in the future.

Figure 21: BMI NTM P/E relative to S&P500



Source: Company Reports, IMCP

Based on trading history, relative valuation, and a DCF analysis Badger Meter appears to be overvalued

Assuming the firm's current 45 NTM P/E is reduced to 42 at the end of 2021, it should trade at \$79 by the end of the year:

- Price = P/E x EPS = 42 x \$1.89 = \$79

Discounting \$79 back to today at a 10.5% cost of equity (explained in Discounted Cash Flow section) yields a price of \$71. This valuation is lower than the current price of nearly \$90.

Relative Valuation

Badger Meter is currently trading at a P/E higher than that of most of its peers, with a P/E TTM of 53 compared to the average of 37. Investors appear to be willing to pay a premium for Badger Meter for its higher growth potential. Badger Meter also has much higher P/B and P/S than most of its peers. However, Badger Meter's ROE of 14% is just 1% more than the median ROE of 13%.

Figure 22: BMI comparable companies

Ticker	Name	Current Price	Market Value	Price Change						Earnings Growth						LT Debt/ S&P			LTM Dividend		
				1 day	1 Mo	3 Mo	6 Mo	52 Wk	YTD	LTG	NTM	2019	2020	2021	2022	Pst 5yr	Beta	Equity	Rating	Yield	Payout
BMI	BADGER METER INC	\$87.91	\$2,560	0.9	14.4	43.6	34.3	42.4	35.4	8.7	5.1%	69.5%	5.0%	8.3%	9.3%	9.4%	0.78	2.1%	B+	0.85%	41.6%
ARD-TAE	ARAD LTD	\$14.90	\$369	(1.3)	2.7	14.3	(1.3)	(16.8)	(19.9)			26.9%	8.9%	17.9%	16.7%	5.8%	0.73	34.1%		2.00%	34.5%
ITRI	ITRON INC	\$84.38	\$3,409	(0.4)	16.7	46.3	23.2	3.0	0.5		-220.3%	25.3%	-54.2%	50.7%	59.4%	1.19	179.1%	B-	0.00%		
MWA	MUELLER WATER PRODUCTS INC	\$12.02	\$1,900	(2.6)	2.6	11.9	24.7	2.0	0.3	10.0	23.7%	15.1%	-14.8%	11.5%	13.8%	24.5%	1.33	73.3%	B	1.79%	46.3%
ROP	ROPER TECHNOLOGIES INC	\$415.00	\$43,522	(1.1)	3.5	4.9	3.4	20.9	17.2	12.5	-3.6%	10.5%	-3.1%	15.3%	5.8%	0.99	89.6%	A	0.48%	13.8%	
XYL	XYLEM INC	\$98.21	\$17,701	(0.3)	3.3	19.7	43.4	29.5	24.6	10.0	98.4%	4.9%	-35.8%	36.1%	16.7%	1.03	106.5%		1.08%	82.5%	
Average			\$11,577	(0.8)	7.2	23.5	21.3	13.5	9.7	10.3	-19.3%	25.4%	-15.7%	23.3%	20.3%	13.2%	1.01	80.8%		1.03%	43.7%
Median			\$2,984	(0.7)	3.4	17.0	24.0	11.9	8.8	10.0	5.1%	20.2%	-8.9%	16.6%	15.2%	9.4%	1.01	81.4%		0.97%	41.6%
SPX	S&P 500 INDEX	\$3,668		(0.1)	3.5	9.9	15.0	17.1	13.5			1.5%	-14.6%	21.5%	16.5%						

Ticker	Website	2020 ROE	P/B	P/E						2020				EV/ EBIT	P/CF Current	Sales Growth			Book Equity		
				2018	2019	2020	TTM	NTM	2021	2022	NPM	P/S	NM			OM	ROIC	NTM		STM	Pst 5yr
BMI	http://www.badgermeter.com	14.0%	7.28	51.8	40.3	52.2	53.0	50.4	48.0	44.0	11.7%	6.08	11.1%	14.6%	14.7%	30.0		3.7%	3.5%	3.1%	\$12.07
ARD-TAE	http://www.arad.co.il	72.1%	2.83	3.8	5.0	3.9	21.5		3.3	2.8	10.4%	0.41	7.7%	10.5%	13.5%	16.8				9.7%	\$5.27
ITRI	http://www.itron.com	7.9%	4.41	17.8	25.3	54.8	-52.3	43.5	36.8	23.1	2.7%	1.50	2.0%	6.6%	2.8%	25.8	23.4	0.5%	6.3%		\$19.13
MWA	http://www.muellerwaterproducts.com	12.8%	2.97	17.2	19.6	22.7	26.5	21.4	20.7	18.2	8.5%	1.97	7.5%	13.5%	6.7%	14.7	7.5	2.8%	4.0%		\$4.05
ROP	http://www.ropertech.com	13.1%	4.28	22.6	27.1	33.2	27.9	29.0	28.5	26.9	24.5%	8.03	32.9%	27.9%	13.1%	28.1		14.7%	3.8%		\$96.89
XYL	http://www.xyleminc.com	12.2%	6.17	23.2	26.1	50.6	79.5	40.1	37.2	31.9	7.2%	3.63	7.6%	13.5%	8.0%	22.7	27.1	3.0%	4.7%		\$15.92
Average		22.0%	4.66	22.7	23.9	36.2	26.0	36.9	29.1	24.5	10.8%	3.60	11.5%	14.4%	9.8%	23.0	19.3	4.9%	4.5%	6.4%	
Median		12.9%	4.35	20.2	25.7	41.9	27.2	40.1	32.7	25.0	9.5%	2.80	7.7%	13.5%	10.5%	24.3	23.4	3.0%	4.0%	6.4%	
sp500	S&P 500 INDEX			15.6	19.8	26.3			21.7	18.6											

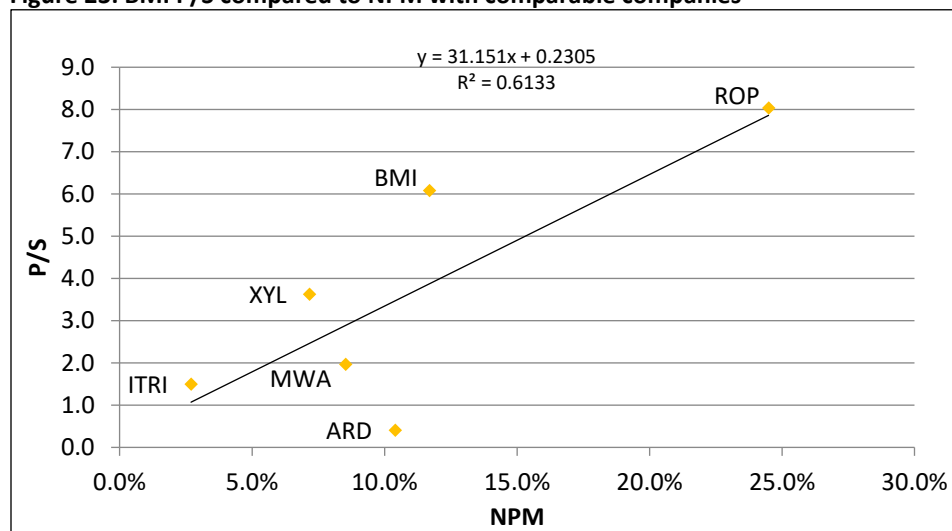
Source: Factset, IMCP

A more thorough analysis of P/S and net profit margin is shown in figure 22. The calculated R – squared of the regression indicates that over 61% of a sampled firm’s P/S ratios are explained by their net profit margins. Badger Meter has a P/S much higher than its peers, along with a much greater net profit margin. I expect Badger Meter to maintain its profit margins in the future. However, I believe sales won’t increase as much as other investors believe.

- Estimated P/S = Estimated 2021 NPM (11.7%) x 31.151x + .2305 = 3.91
- Estimated stock price = Estimated P/S x expected sales per share = 3.91 x 14.72 = \$58

Figure 22 shows that based on NPM and P/S, Badger Meter appears to be overvalued. The estimated price at the end of 2021 is \$58. Discounting the anticipated price at the end of 2021 to today results in a price of \$52. The stock is currently trading at \$89.

Figure 23: BMI P/S compared to NPM with comparable companies



Source: Company Reports, IMCP

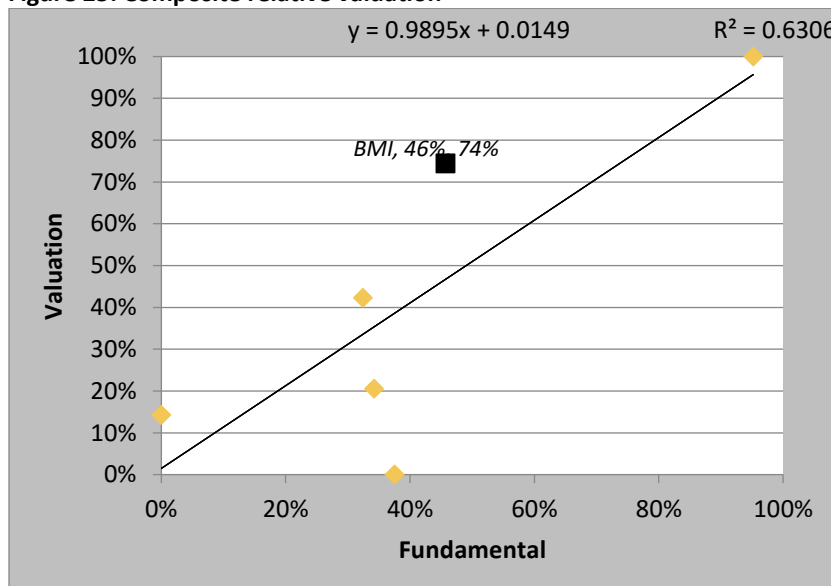
For a final comparison, I created a composite ranking of several valuation and fundamental metrics. Since the variables have different scales, each was converted to a percentile before calculating the composite score. A 15% weighting of NTM earnings growth and 85% for 2020 net profit margin were compared to a 100% weighting of P/S. The regression line had an R – squared of .6306. One can see that Badger Meter is above the line, so it is expensive relative to its peers based on fundamentals.

Figure 24: Composite valuation, % of range

Ticker	Name	Weight		Fundamentals		Valuation
		Fund	Value	15.0%	85.0%	100.0%
				Earnings Growth	2020	
				NTM	NPM	P/S
BMI	BADGER METER INC	46%	74%	71%	41%	74%
ARD-TA	ARAD LTD	38%	0%	50%	35%	0%
ITRI	ITRON INC	0%	14%	0%	0%	14%
MWA	MUELLER WATER PRODUCTS INC	34%	20%	77%	27%	20%
ROP	ROPER TECHNOLOGIES INC	95%	100%	68%	100%	100%
XYL	XYLEM INC	32%	42%	100%	21%	42%

Source: IMCP

Figure 25: Composite relative valuation



Source: IMCP

Discounted Cash Flow Analysis

A three-stage discounted cash flow model was also used to value Badger Meter.

For the purpose of this analysis, the company’s cost of equity was calculated to be 10.5% using the Capital Asset Pricing Model. The underlying assumptions used in calculating this rate are as follows:

- The risk-free rate, as represented by a normalized ten-year Treasury bond yield, is 2.0%.
- A ten-year beta of 1.06 was utilized since the company is slightly riskier 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 10.5% ($2.0 + 1.06 (10.0 - 2.89)$).

Stage One – The model’s first stage simply discounts fiscal years 2021 and 2022 free cash flow to equity (FCFE). These per share cash flows are forecasted to be \$1.53 and \$1.05, respectively. Discounting these cash flows, using the cost of equity calculated above, results in a value of \$2.24 per share. Thus, stage one of this discounted cash flow analysis contributes \$2.24 to value.

Stage Two – Stage two of the model focuses on fiscal years 2023 to 2027. 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 10.5% cost of equity. I assume a 6.5% sales growth in 2023, and 6.0% in 2024 through 2027. I expect NWC to sales to increase back to normal levels to 3.60 from 3.46 in 2022. I also expect NFA turnover to be about 1.98 or stable. The NOPAT margin is expected to decrease slightly from 12.0% in 2022 to 11.8% in 2027. Share growth is expected to be -0.1% each year from 2023 to 2027, as I anticipate the company will continue to buy back a small amount of shares.

Figure 26: FCFE and discounted FCFE, 2021-2027

	2021	2022	2023	2024	2025	2026	2027
FCFE	\$1.53	\$1.05	\$1.27	\$1.29	\$1.37	\$1.45	\$1.63
Discounted FCFE	\$1.38	\$0.86	\$0.94	\$0.87	\$0.83	\$0.80	\$0.81

Added together, these discounted cash flows totaled \$4.25.

Stage Three – Net Income for the years 2019 – 2023 is calculated based upon the same margin and growth assumptions used to determine FCFE in stage two. EPS is expected to increase from \$1.89 in 2022 to \$2.51 in 2027.

Figure 27: EPS estimates for 2021-2027

	2021	2022	2023	2024	2025	2026	2027
EPS	\$1.70	\$1.89	\$1.98	\$2.10	\$2.23	\$2.37	\$2.51

Stage three of the model requires an assumption regarding the company’s terminal price-to-earnings ratio. The P/E has been rising over the last three years and some normalization is expected as growth slows by 2027. However, the market may be slow to recognize this. Thus, I am reducing the P/E to 40 in 2027.

Given the assumed terminal earnings per share of \$2.51 and a price to earnings ratio of 40, a terminal value of \$99.39 per share is calculated. Using the 10.5% cost of equity, this number is discounted back to a present value of \$50.02.

Total Present Value – Given the above assumptions and utilizing a three stage discounted cash flow model, an intrinsic value of \$56.51 is calculated ($2.24 + 4.25 + 50.02$). Given Badger Meter’s current price of \$88.54, this model indicates that the stock is overvalued.

Scenario Analysis

It is difficult to value Badger Meter with certainty since it is impossible to predict every variable involved in the company’s future operations. In addition, it is also difficult to forecast economic factors that may affect the company positively or negatively. For these reasons, I offer a bull and bear case for the company.

Bull Case: I assume sales growth increases by 7% 2023-2027 mainly due to a higher sales growth in foreign revenue. I also expect that NOPAT margin will increase to 12% in 2023-2027. I expect share growth to remain at -0.1% and the terminal P/E ratio to increase to 45. As a result, I anticipate a target price of \$66.04. This is still lower than the current price of Badger Meter which could possibly mean that consensus is overly optimistic at the moment.

Bear Case: Assuming foreign sales do not increase very much and the economy is slow overall, I expect the value of the stock to fall. I expect the sales growth to be 4% in 2023-2027, In addition, I expect NOPAT to remain at 11.6% in 2023-2027. The terminal P/E could decline to 35. As a result, I anticipate a target price of \$45.89.

Figure 28: Base case estimate value for 2021

First stage	\$2.24	Present value of first 2 year cash flow
Second stage	\$4.25	Present value of year 3-7 cash flow
Third stage	\$50.02	Present value of terminal value P/E
Value (P/E)	\$56.51	

Figure 29: Bull case estimate value for 2021

First stage	\$2.24	Present value of first 2 year cash flow
Second stage	\$4.10	Present value of year 3-7 cash flow
Third stage	\$59.69	Present value of terminal value P/E
Value (P/E)	\$66.04	

Figure 30: Bear case estimate value for 2021

First stage	\$2.24	Present value of first 2 year cash flow
Second stage	\$4.71	Present value of year 3-7 cash flow
Third stage	\$38.93	Present value of terminal value P/E
Value (P/E)	\$45.89	

Business Risks

Competitive Pressures Increase

Badger Meter's competition ranges from moderate to strong. Many of its competitors have the financial resources to pose more of a threat if these companies choose to invest more in flow measurement. Doing so would lead to a loss in market share and lower prices, both of which would result in a decrease in profits.

Reliance on Suppliers

Badger Meter only has three key suppliers for certain brass castings, resins, and electronic subassemblies. The company has benefited from lower costs, little to no delivery delays, and lower quality control costs. If one of these suppliers decides to increase its prices and/or lower the quality of its products, this could lead to a drastic increase in raw materials and cut into BMI's margins if the firm is unable to find new suppliers in time.

The Inability to Develop Advanced Products

Badger Meter currently has a competitive edge as it sells products that either meet or exceed industry standards. However, this could change. The lack of financial resources compared to its competitors could make it a challenge to maintain this competitive edge. Investments in R&D, marketing, and manufacturing are required to stay competitive.

Economic & Political Conditions

A downturn in the economy could affect Badger Meter and its water utilities customers. Delays in government stimulus spending and state and local budget cuts or partial shutdowns will impact large city utilities, distributors, and public and private water companies. This economic slowdown will most likely lead to customers delaying projects and upgrades, slowing down demand for Badger Meters products.

Exposure to Foreign Markets

Badger Meter is exposed to multiple countries around the world. Trade policies or withdrawals from international trade agreements could completely cut off a foreign customer and hurt relations. Foreign economic policies or downturns could also impact overseas customers and adversely lower the demand for Badger Meter's products.

Source: Company Reports

Appendix 1: Porter's 5 Forces**Threat of New Entrants** – Relatively Low

Risk of new entrants to Badger Meter is relatively low. The water meter industry is not that competitive with very few companies having control of the U.S. market due to high barriers to entry. Advanced technology, creating a recognized brand, and having an effective channel distribution system are all needed to compete, all of which are very expensive and time consuming.

Threat of Substitution – Moderate

Customers have alternatives and switching over to another meter company would have virtually no cost. However, at the moment Badger Meter has a large market share due to being known for its accurate and reliable flow measurement products.

Supplier Power – High

Badger Meter only has three main suppliers for its raw materials. Up until now, Badger Meter has benefited lower production costs because of good relations with its suppliers. However, if certain suppliers decide to raise their prices, Badger Meter will have to pay the higher costs.

Buyer Power – Relatively Low

Buyers have some power but not much considering there are only a handful of companies selling flow measurement products in the U.S. There are also only a few that have advanced reading technology along with an efficient distribution channel to effectively deliver the products.

Intensity of Competition – Relatively Low

Badger Meter has few competitors and has a competitive edge at the moment. However, some of Badger Meter's competitors have far greater financial resources. If they decide to compete more in the flow measurement industry then this rating could go from relatively low to moderate overnight.

Appendix 2: SWOT Analysis

Strengths	Weaknesses
Brand recognition	Reliance on suppliers
Product quality	Small global penetration
Solid distribution channel	
Opportunities	Threats
International expansion	Increased competition
AMI / Smart meter technology	Economic downturn
New environmental policies	Trade conflicts

Appendix 3: Income Statement

Income Statement							
Items	Dec-16	Dec-17	Dec-18	Dec-19	Dec-20	Dec-21E	Dec-22E
Sales	\$393.761	\$402.440	\$433.732	\$424.625	\$420.770	\$427.241	\$458.646
Direct costs	\$243.185	\$246.694	\$271.383	\$261.097	\$255.450	\$258.481	\$276.105
Gross Margin	\$150.576	\$155.746	\$162.349	\$163.528	\$165.320	\$168.760	\$182.541
SG&A, R&D, D&A, and other	\$99.811	\$100.124	\$125.340	\$101.668	\$100.780	\$102.965	\$109.616
EBIT	\$50.765	\$55.622	\$37.009	\$61.860	\$64.540	\$65.795	\$72.925
Interest	\$0.921	\$0.789	\$1.157	\$0.253	\$0.245	\$0.248	\$0.254
EBT	\$49.844	\$54.833	\$35.852	\$61.607	\$64.295	\$65.548	\$72.671
Taxes	\$17.549	\$20.262	\$8.062	\$14.430	\$15.750	\$16.057	\$17.802
Income	\$32.295	\$34.571	\$27.790	\$47.177	\$48.545	\$49.491	\$54.869
Other	\$0.000	\$0.000	\$0.000	\$0.000	\$0.025	\$0.000	\$0.000
Net income	\$32.295	\$34.571	\$27.790	\$47.177	\$48.520	49	55
Basic Shares	28.887	28.927	28.993	29.028	29.049	29.027	29.009
Fully Diluted Shares	163.0	184.0	196.0	192.0	169.0	169.0	169.0
EPS	\$1.12	\$1.20	\$0.96	\$1.63	\$1.67	\$1.70	\$1.89
EPS Fully Diluted	\$0.20	\$0.19	\$0.14	\$0.25	\$0.29	\$0.29	\$0.32
DPS	\$0.43	\$0.49	\$0.56	\$0.64	\$0.73	\$0.82	\$0.93

Appendix 4: Balance Sheets

Capital							
Items	Dec-16	Dec-17	Dec-18	Dec-19	Dec-20	Dec-21E	Dec-22E
Cash	7.338	11.164	13.086	48.871	93.901	114.442	121.983
Operating assets ex cash	143.674	147.459	151.573	151.223	138.849	140.990	158.233
Operating assets	151.012	158.623	164.659	200.094	232.750	255.431	280.216
Operating liabilities	19.538	19.958	19.486	21.244	22.401	22.644	25.684
NOWC	131.474	138.665	145.173	178.850	210.349	232.788	254.531
NOWC ex cash (NWC)	124.136	127.501	132.087	129.979	116.448	118.346	132.549
NFA	198.687	233.104	228.032	221.799	215.886	219.098	229.323
<i>Invested capital</i>	<i>\$330.161</i>	<i>371.769</i>	<i>373.205</i>	<i>400.649</i>	<i>426.235</i>	<i>451.886</i>	<i>483.855</i>
Marketable securities	-	-	-	-	-	-	-
<i>Total assets</i>	<i>\$349.699</i>	<i>391.727</i>	<i>392.691</i>	<i>421.893</i>	<i>448.636</i>	<i>474.530</i>	<i>509.539</i>
S-T and L-T debt and financing leases	\$56.30	73.151	40.529	36.003	37.791	36.791	39.791
Other liabilities	17.652	21.166	29.173	33.578	36.901	39.901	42.901
Debt/equity-like securities	-	-	-	-	-	-	-
Equity	256.209	277.452	303.503	331.068	351.543	375.194	401.163
<i>Total supplied capital</i>	<i>\$330.161</i>	<i>371.769</i>	<i>373.205</i>	<i>400.649</i>	<i>426.235</i>	<i>\$452</i>	<i>\$484</i>
<i>Total liabilities and equity</i>	<i>\$349.699</i>	<i>391.727</i>	<i>392.691</i>	<i>421.893</i>	<i>448.636</i>	<i>\$475</i>	<i>\$510</i>

Appendix 5: Sales Forecast

Sales Forecast							
Items	Dec-16	Dec-17	Dec-18	Dec-19	Dec-20	Dec-21E	Dec-22E
Sales	\$393.80	\$402.40	\$433.70	\$424.60	\$420.77	427	\$458.65
<i>Growth</i>		2.2%	7.8%	-2.1%	-0.9%	1.5%	7.4%
Municipal Water	304.50	306.90	334.70	330.70	328.20	334.76	361.55
<i>Growth</i>		0.8%	9.1%	-1.2%	-0.8%	2.0%	8.0%
<i>% of sales</i>	77.3%	76.3%	77.2%	77.9%	78.0%	78.4%	78.8%
Flow Instrumentation	89.30	95.50	99.00	93.90	92.57	92.48	97.10
<i>Growth</i>		6.9%	3.7%	-5.2%	-1.4%	-0.1%	5.0%
<i>% of sales</i>	22.7%	23.7%	22.8%	22.1%	22.0%	22.7%	22.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
United States	347.853	355.768	374.650	369.163	366.070	372	399
<i>Growth</i>		2.3%	5.3%	-1.5%	-0.8%	1.5%	7.4%
<i>% of sales</i>	88.3%	88.4%	86.4%	86.9%	87.0%	87.0%	87.0%
Asia	6.539	9.133	9.081	9.111	8.836	9	10
<i>Growth</i>		39.7%	-0.6%	0.3%	-3.0%	1.5%	7.4%
<i>% of sales</i>	1.7%	2.3%	2.1%	2.1%	2.1%	2.1%	2.1%
Canada	12.587	10.407	11.893	13.568	13.464	14	15
<i>Growth</i>		-17.3%	14.3%	14.1%	-0.8%	1.5%	7.4%
<i>% of sales</i>	3.2%	2.6%	2.7%	3.2%	3.2%	3.2%	3.2%
Europe	15.299	15.718	20.147	15.784	15.568	16	17
<i>Growth</i>		2.7%	28.2%	-21.7%	-1.4%	1.5%	7.4%
<i>% of sales</i>	3.9%	3.9%	4.6%	3.7%	3.7%	3.7%	3.7%
Mexico	3.460	3.601	3.603	5.791	5.890	6	6
<i>Growth</i>		4.1%	0.1%	60.7%	1.7%	1.5%	7.4%
<i>% of sales</i>	0.9%	0.9%	0.8%	1.4%	1.4%	1.4%	1.4%
Middle East	5.520	4.904	11.318	7.868	7.994	8	9
<i>Growth</i>		-11.2%	130.8%	-30.5%	1.6%	1.5%	7.4%
<i>% of sales</i>	1.4%	1.2%	2.6%	1.9%	1.9%	1.9%	1.9%
Other	2.503	2.909	3.040	3.340	2.945	3	3
<i>Growth</i>		16.2%	4.5%	9.9%	-11.8%	1.5%	7.4%
<i>% of sales</i>	0.6%	0.7%	0.7%	0.8%	0.7%	0.7%	0.7%

Appendix 6: Ratios

Ratios							
Items	Dec-16	Dec-17	Dec-18	Dec-19	Dec-20	Dec-21	Dec-22
Profitability							
Gross margin	38.2%	38.7%	37.4%	38.5%	39.3%	39.5%	39.8%
Operating (EBIT) margin	12.9%	13.8%	8.5%	14.6%	15.3%	15.4%	15.9%
Net profit margin	8.2%	8.6%	6.4%	11.1%	11.5%	11.6%	12.0%
Activity							
NFA (gross) turnover		1.86	1.88	1.89	1.92	1.96	2.05
Total asset turnover		1.09	1.11	1.04	0.97	0.93	0.93
Liquidity							
Op asset / op liab	7.73	7.95	8.45	9.42	10.39	11.28	10.91
NOWC Percent of sales		33.6%	32.7%	38.2%	46.2%	51.9%	53.1%
Solvency							
Debt to assets	16.1%	18.7%	10.3%	8.5%	8.4%	7.8%	7.8%
Debt to equity	22.0%	26.4%	13.4%	10.9%	10.8%	9.8%	9.9%
Other liab to assets	5.0%	5.4%	7.4%	8.0%	8.2%	8.4%	8.4%
Total debt to assets	21.1%	24.1%	17.7%	16.5%	16.6%	16.2%	16.2%
Total liabilities to assets	26.7%	29.2%	22.7%	21.5%	21.6%	20.9%	21.3%
Debt to EBIT	1.11	1.32	1.10	0.58	0.59	0.56	0.55
EBIT/interest	55.12	70.50	31.99	244.51	263.43	265.71	286.82
Debt to total net op capital	17.1%	19.7%	10.9%	9.0%	8.9%	8.1%	8.2%
ROIC							
NOPAT to sales	8.4%	8.7%	6.6%	11.2%	11.6%	11.6%	12.0%
Sales to NWC		3.20	3.34	3.24	3.41	3.64	3.66
Sales to NFA		1.86	1.88	1.89	1.92	1.96	2.05
Sales to IC ex cash		1.18	1.20	1.19	1.23	1.28	1.31
Total ROIC ex cash		10.3%	8.0%	13.3%	14.2%	14.8%	15.7%
NOPAT to sales	8.4%	8.7%	6.6%	11.2%	11.6%	11.6%	12.0%
Sales to NOWC		2.98	3.06	2.62	2.16	1.93	1.88
Sales to NFA		1.86	1.88	1.89	1.92	1.96	2.05
Sales to IC		1.15	1.16	1.10	1.02	0.97	0.98
Total ROIC		10.0%	7.7%	12.2%	11.8%	11.3%	11.8%
NOPAT to sales	8.4%	8.7%	6.6%	11.2%	11.6%	11.6%	12.0%
Sales to EOY NWC		3.17	3.16	3.28	3.27	3.61	3.46
Sales to EOY NFA		1.98	1.73	1.90	1.91	1.95	2.00
Sales to EOY IC ex cash		1.22	1.12	1.20	1.21	1.27	1.27
Total ROIC using EOY IC ex cash		10.2%	9.7%	8.0%	13.5%	14.7%	15.2%
NOPAT to sales	8.4%	8.7%	6.6%	11.2%	11.6%	11.6%	12.0%
Sales to EOY NOWC		2.99	2.90	2.99	2.37	2.00	1.84
Sales to EOY NFA		1.98	1.73	1.90	1.91	1.95	2.00
Sales to EOY IC		1.19	1.08	1.16	1.06	0.99	0.95
Total ROIC using EOY IC		10.0%	9.4%	7.7%	11.8%	11.4%	11.4%
ROE							
5-stage							
EBIT / sales		13.8%	8.5%	14.6%	15.3%	15.4%	15.9%
Sales / avg assets		1.09	1.11	1.04	0.97	0.93	0.93
EBT / EBIT		98.6%	96.9%	99.6%	99.6%	99.6%	99.7%
Net income / EBT		63.0%	77.5%	76.6%	75.5%	75.5%	75.5%
ROA		9.3%	7.1%	11.6%	11.1%	10.7%	11.2%
Avg assets / avg equity		1.39	1.35	1.28	1.28	1.27	1.27
ROE		13.0%	9.6%	14.9%	14.2%	13.6%	14.1%
3-stage							
Net income / sales		8.6%	6.4%	11.1%	11.5%	11.6%	12.0%
Sales / avg assets		1.09	1.11	1.04	0.97	0.93	0.93
ROA		9.3%	7.1%	11.6%	11.1%	10.7%	11.2%
Avg assets / avg equity		1.39	1.35	1.28	1.28	1.27	1.27
ROE		13.0%	9.6%	14.9%	14.2%	13.6%	14.1%
Payout Ratio		41.1%	58.5%	39.4%	43.5%	48.2%	49.0%
Retention Ratio		58.9%	41.5%	60.6%	56.5%	51.8%	51.0%
Sustainable Growth Rate		7.6%	4.0%	9.0%	8.0%	7.1%	7.2%

Appendix 7: Cash Flow Statement

Cash Flow Statement						
Note: This is not the actual cash flow statement. It is created using the indirect method and various simplifying assumptions.						
Items	Dec-17	Dec-18	Dec-19	Dec-20	Dec-21	Dec-22
Cash from Operations (understated - depr'n added to net assets)						
Net income	\$35	\$28	\$47	\$49	\$49	\$55
Change in Net Working Capital ex cash	(3)	(5)	2	14	(2)	(14)
Cash from operations	\$31	\$23	\$49	\$62	\$48	\$41
Cash from Investing (understated - depr'n added to net assets)						
Change in NFA	(\$34)	\$5	\$6	\$6	(\$3)	(\$10)
Change in Marketable Securities	\$0	\$0	\$0	\$0	\$0	\$0
Cash from investing	(\$34)	\$5	\$6	\$6	(\$3)	(\$10)
Cash from Financing						
Change in Short-Term and Long-Term Debt	\$17	(\$33)	(\$5)	\$2	(\$1)	\$3
Change in Other liabilities	4	8	4	3	3	3
Change in Debt/Equity-Like Securities	0	0	0	0	0	0
Dividends	(14)	(16)	(19)	(21)	(24)	(27)
Change in Equity ex NI and Dividends	1	15	(1)	(7)	(2)	(2)
Cash from financing	\$7	(\$26)	(\$20)	(\$23)	(\$24)	(\$23)
Change in Cash	4	2	36	45	21	8
Beginning Cash	7	11	13	49	94	114
Ending Cash	\$11	\$13	\$49	\$94	\$114	\$122

Appendix 8: 3-stage DCF Model

Year ending January	First Stage			Second Stage				
	2020	2021	2022	2023	2024	2025	2026	2027
<i>Sales Growth</i>	-0.9%	1.5%	7.4%	6.5%	6.0%	6.0%	6.0%	6.0%
<i>NOPAT / S</i>	11.6%	11.6%	12.0%	11.8%	11.8%	11.8%	11.8%	11.8%
<i>S / NWC</i>	3.61	3.61	3.46	3.60	3.60	3.60	3.60	3.60
<i>S / NFA (EOY)</i>	1.95	1.95	2.00	1.98	1.98	1.97	1.97	1.98
<i>S / IC (EOY)</i>	1.27	1.27	1.27	1.28	1.28	1.27	1.27	1.28
<i>ROIC (EOY)</i>	14.7%	14.7%	15.2%	15.1%	15.1%	15.0%	15.0%	15.1%
<i>ROIC (BOY)</i>		14.9%	16.3%	15.9%	16.0%	16.0%	15.9%	15.9%
<i>Share Growth</i>	0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
<i>Sales</i>	\$421	\$427	\$459	\$488	\$518	\$549	\$582	\$617
<i>NOPAT</i>	\$49	\$50	\$55	\$58	\$61	\$65	\$69	\$73
<i>Growth</i>	2.9%	1.9%	10.8%	4.7%	6.0%	6.0%	6.0%	6.0%
<i>- Change in NWC</i>	-14	2	14	3	8	9	9	10
<i>NWC EOY</i>	116	118	133	136	144	152	162	171
<i>Growth NWC</i>	-10.4%	1.6%	12.0%	2.4%	6.0%	6.0%	6.0%	6.0%
<i>- Chg NFA</i>	-6	3	10	17	15	16	17	16
<i>NFA EOY</i>	216	219	229	247	262	278	296	311
<i>Growth NFA</i>	-2.7%	1.5%	4.7%	7.6%	6.2%	6.2%	6.2%	5.4%
<i>Total inv in op cap</i>	-19	5	24	21	23	25	26	26
<i>Total net op cap</i>	332	337	362	382	406	431	457	483
<i>FCFF</i>	\$68	\$45	\$31	\$37	\$38	\$40	\$42	\$47
<i>% of sales</i>	16.2%	10.4%	6.7%	7.6%	7.3%	7.3%	7.3%	7.7%
<i>Growth</i>		-34.6%	-31.3%	21.2%	1.3%	5.9%	5.9%	11.9%
<i>- Interest (1-tax rate)</i>	0	0	0	0	0	0	0	0
<i>Growth</i>	-4.5%	1.1%	2.7%	6.5%	6.0%	6.0%	6.0%	6.0%
<i>FCFE w/o debt</i>	\$68	\$44	\$30	\$37	\$37	\$40	\$42	\$47
<i>% of sales</i>	16.2%	10.4%	6.6%	7.6%	7.2%	7.2%	7.2%	7.6%
<i>Growth</i>		-34.7%	-31.4%	21.3%	1.3%	5.9%	5.9%	12.0%
<i>/ No Shares</i>	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9
<i>FCFE</i>	\$2.34	\$1.53	\$1.05	\$1.27	\$1.29	\$1.37	\$1.45	\$1.63
<i>Growth</i>		-34.7%	-31.4%	21.4%	1.4%	6.0%	6.0%	12.1%
<i>* Discount factor</i>		0.91	0.82	0.74	0.67	0.61	0.55	0.50
<i>Discounted FCFE</i>		\$1.38	\$0.86	\$0.94	\$0.87	\$0.83	\$0.80	\$0.81
Third Stage								
Terminal value P/E								
<i>Net income</i>	\$49	\$49	\$55	\$57	\$61	\$65	\$68	\$73
<i>% of sales</i>	11.5%	11.6%	12.0%	11.8%	11.8%	11.8%	11.8%	11.8%
<i>EPS</i>	\$1.67	\$1.70	\$1.89	\$1.98	\$2.10	\$2.23	\$2.37	\$2.51
<i>Growth</i>	2.8%	2.1%	10.9%	4.8%	6.1%	6.1%	6.1%	6.1%
<i>Terminal P/E</i>								40.00
<i>* Terminal EPS</i>								\$2.51
<i>Terminal value</i>								\$100.48
<i>* Discount factor</i>								0.50
<i>Discounted terminal value</i>								\$50.02
Summary (using P/E multiple for terminal value)								
First stage	\$2.24	Present value of first 2 year cash flow						
Second stage	\$4.25	Present value of year 3-7 cash flow						
Third stage	\$50.02	Present value of terminal value P/E						
Value (P/E)	\$56.51							