Rigorous DCF Analysis show Stryker trading close to true share price

Recommendation: HOLD

Current Price: $132.94

Target Price: $131.80

Stock Downside Potential: 0.86%

Date: Saturday 22nd April 2017

- DCF analysis and sensitivity analysis shows that market has correctly priced Stryker's share price.
- Launch of Mako Total Knee will result in 5% increase in knee implant market share.
- Global hip implant market is expected to grow at CAGR of 9.68% for next 5 years supported by increase in global over-65 population.
- Expansion of FDA approval for Trevo™ Retriever a bright spot for Neurotechnology & Neurovascular.
- Lack of competitive advantage will result in loss of Spine market share.
- Acquisitions will continue to drive MedSurg growth for the next 5 years.

stryker®

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Capitalisation as at 22/04/2017	
Share Price (USD)	132.94
Shares Outstanding (MM)	373
Market Cap (USD MM)	49,596
- Cash & STI (USD MM)	3,384
+ Total Debt (USD MM)	6,914
+ Preferred Equity	-
+ Minority Interest	-
= Enterprise Value (USD MM)	53,126

Summary	
P/E	24.7
P/B	5.2
EBITDA (USD)	2,658
EBIT (USD)	2,323

Valuation	
DCF Valuation (USD MM)	49,163

Company Overview

Stryker Corporation is a developer, manufacturer and marketer of specialty surgical and medical products with their headquarters in Kalamazoo, Michigan, USA. The company is split into three main groups: Orthopedics, MedSurg and Neurotechnology and Spine. The company has a wide global reach operating approximately 30 manufacturing and R&D facilities in the Americas, EMEA and Asia/Pacific regions and the company's products are sold in over 100 countries worldwide.

Stryker is committed to expanding its operations through a balance of internal R&D programs (maintaining R&D expenses at between 5-7% of sales each year), partnerships and steady stream of acquisitions. In order to grow internationally they target countries like Brazil, Russia, India and China with their regular product line but also offer a lower-cost brand of products. The company is constantly keeping up with trends in technology through a consistent level of innovation and upgrading existing products. In recent years, the company has accelerated its acquisition operations ensuring new software and advanced technologies are always part of the company's resources. Since 2012, the company has acquired over 20 different companies and there are no signs of this slowing down in the future. The company has grown considerably since its foundation in 1941 by Dr. Homer Stryker, an orthopedic surgeon turned inventor.

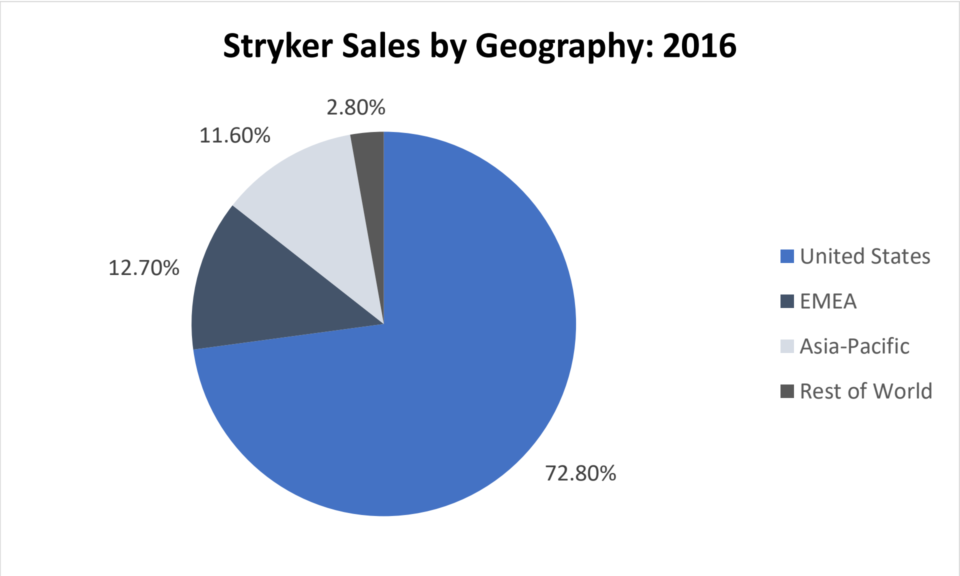

Figure 1: Sourced from Bloomberg

Recent Financial Performance:

In the past 5-year period between January 2012 and March 2017, Stryker's share price has experienced a 137.51% rise, from $55.43 to $131.65. Stryker has out-performed the S&P 500, the S&P Healthcare Index and the iShares Medical Devices ETF. In particular, Stryker has experience a positive 2016 fuelled by a 13.9% rise in revenue from 2015. This was largely due to international growth in hip and knee sales and an increase in orthopaedic procedure sales

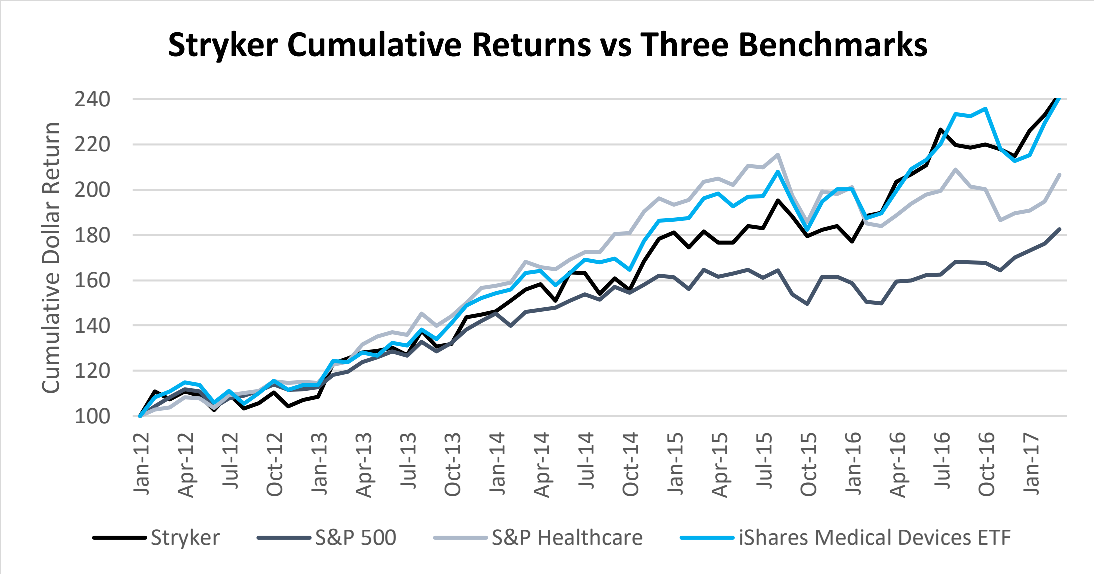

Figure 2: Share prices sourced from Bloomberg

Current Valuation:

Before we delve into the main body of our analysis, we felt compelled to examine the core reasons as to why Stryker is currently trading at $132.94. It is vital to gain an understanding of why the market currently values Stryker at $49.6bn to help the investment committee make an informed decision before analysis on individual line items can be conducted.

To help facilitate our investigation, we constructed a very basic discounted cash flow (DCF) model that is built on a number of simple but relatively intuitive assumptions. The forecasted income statement and free cash flows are depicted in the Appendix A.

Assumptions:

Revenue: We calculated the compound annual growth rate (CAGR) for each individual service line over a 5-year historical period (2012-2016) and assumed that they will continue to grow at the same rate for the next 5 years (2017-2021).

Expenses: Please see 'DCF Assumptions' on p.23.

WACC: Please see 'Weighted Average Cost of Capital' on p.24.

This is displayed in Table 1.

Current Market Explained: Implied Market Cap and Share Price									
Time period	1	2	3	4	5	TV	DCF Valuation	Market Cap	Disc(Prem)
FCF (USD MM)	1,630	1,843	2,092	2,384	2,728	59,216			
Disc Factor	0.93	0.87	0.81	0.76	0.71	0.71			
PV FCF (USD MM)	**1,520**	**1,603**	**1,697**	**1,804**	**1,925**	**41,786**	**50,335**	**49,596**	
Shares Out. (MM)							373.0	373.0	
Share Price (USD)							**134.94**	**132.94**	**1.5%**

Table 1: Current Price Explained. See Appendix for forecasted Income statement and cash flows

We calculated Stryker's implied share price to be $134.94. If Stryker continues to grow at its 5-year CAGR, this is the fair price it should be trading at and shows that the current price is trading at a premium of 1.5%.

<u>What does this tell us?</u>

By using nothing other than historical averages and compound annual growth rates to project free cash flows, we arrive at a relatively similar figure to Stryker's current market cap. This tells us that the market believes that Stryker will continue to grow at relatively similar rates into the future. It is easy for analysts and ordinary investors to arrive at this conclusion given the enormous success Stryker has enjoyed in recent years. Stryker is a well-established company that consistently delivers lucrative returns to its investors.

The purpose of our report is to investigate how accurate this market perception of Stryker is by projecting each line item of Stryker's income statement into the forecasting period. We examine Stryker's current device portfolio, their product pipeline, the competitive advantages and disadvantages that Stryker holds against its competitors and the growth rates in the markets that Stryker operates in. By undertaking this analysis, we can calculate Stryker's true implied share price and can convince the SOM/Smurfit Committee to follow our recommendation.

<u>Revenue</u>

Stryker's sales can be broken down into the following three segments:

- Orthopaedics
- Neurotechnology & Spine
- MedSurg

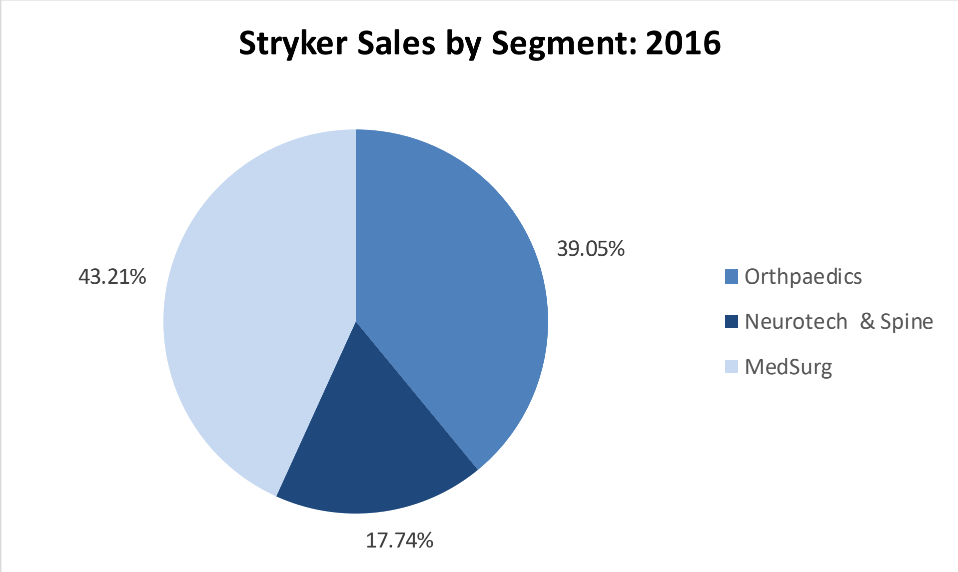

Figure 3: Sourced from Stryker 2017 10-K

We analysed each revenue stream and projected revenue 5 years into the future in accordance with the length of the DCF forecasting period.

Orthopaedics:

Orthopaedics is split into four different segments:

- Knees
- Trauma & Extremities
- Hips
- Other Orthopaedics

The division brought in $3.8bn in revenue in 2016 and comprised 39.1% of Stryker's revenue in 2016. It was split in the following way:

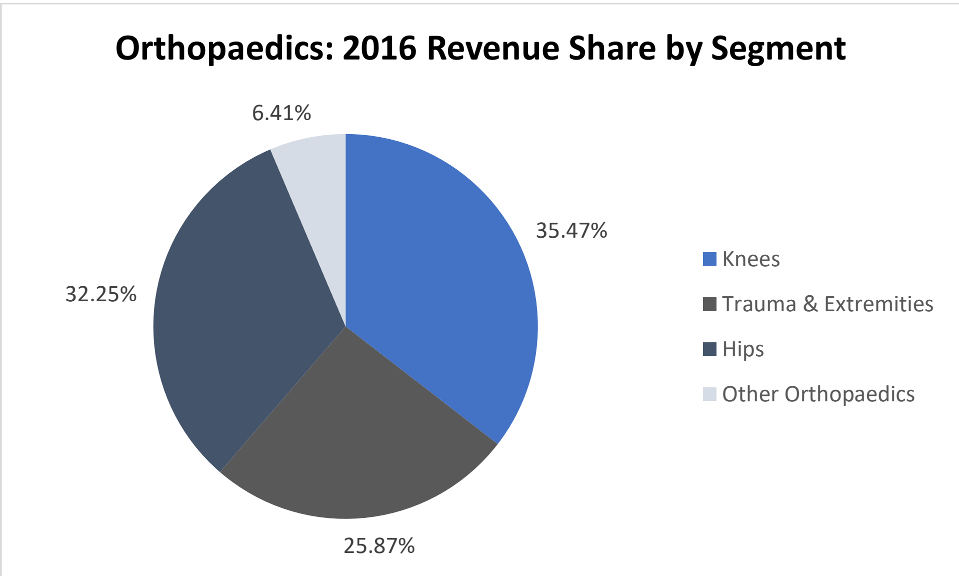

Figure 4: Sourced from Stryker 2017 10-K

Knees

The global knee implant market was valued at $6.76bn in 2016 and is dominated by four of the medical device industry's major players who make up over 98% of the market: Zimmer-Biomet, Johnson & Johnson, Stryker and Smith & Nephew. Knee replacement surgery is performed on patients with joint damaging diseases like arthritis and is a common procedure for people over the age of 65. Moreover, knee surgeries are becoming more and more popular for the younger generation as success rates increase and the availability of new technologies allows for a broader range of surgeries.

Stryker generate revenue streams from a variety of different products which they sell to healthcare providers and hospitals in the United States, as well as medical device outsourcers and agents internationally. The company provide a variety of different solutions for surgeons to treat patients. Their portfolio of products is split into three different areas: total knee replacements, partial knee replacements and revision knee replacement systems for when complex situations arise during surgery or revised procedures are required.

However, the company has a major competitive advantage – the Mako Robotic Assisted Arm. Stryker acquired MAKO Surgical Corp in December 2013 for $1.65bn (15x EBITDA) with a clear motivation to penetrate the Robotics segment. The company rolled out the technology's 'partial knee' replacement assisted surgery and has grown knee revenues 3.31% YOY since the acquisition. In Q3 2016, Stryker installed 30 new Mako Robots, up 75% on the same period in 2015. This is a clear indicator of the progress being made by the company and its marquee product which enables Stryker to generate above average revenues. The popularity of the Mako product has resulted in 40% of the placements going into non-Stryker hospitals, increasing the advantage they have over their peers. In 2017, the company will enter a new phase of the robotic assisted arm surgeries when it launches its Mako 'Total Knee' line and we expect Stryker to gain significant market share.

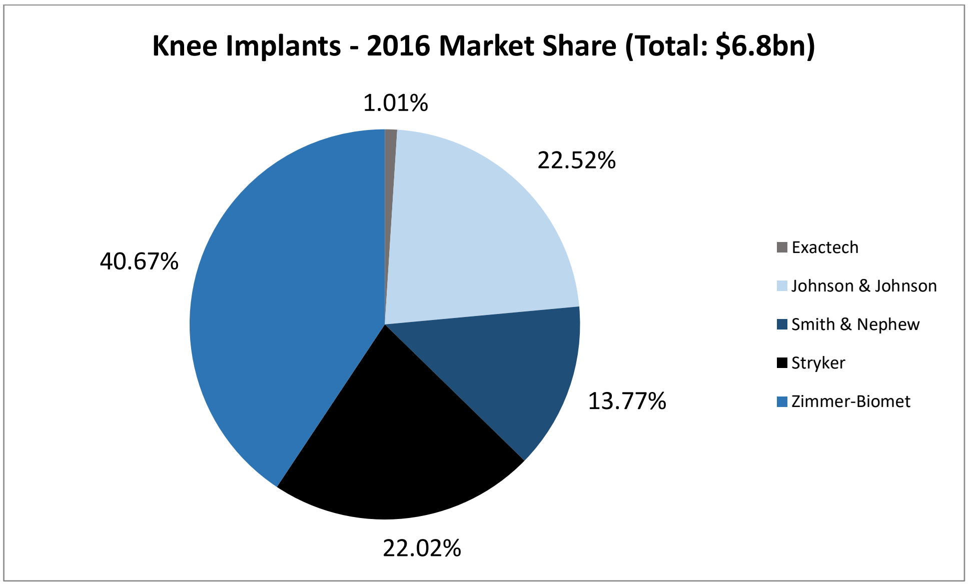

Figure 5: Knee Implants Market Share 2016

Thorough research of the market shows that Stryker are ahead of their competitors and are best positioned in the market place to gain market share. We believe that the company can grow revenues at a CAGR of 12% over the next five years and add 5.01% to their share of the knee implant market. Please see below some of the assumptions we have made to project revenues:

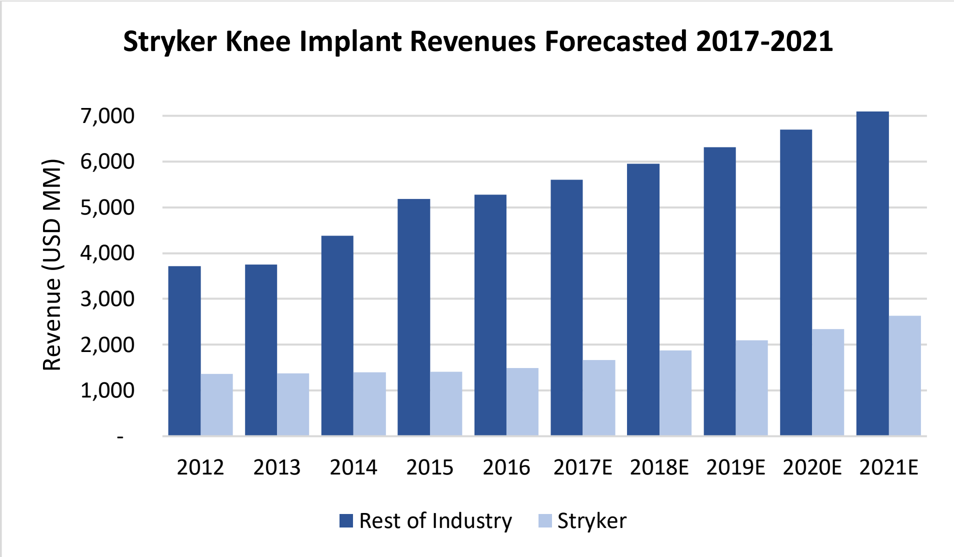

Figure 6: Sourced from Bloomberg and authors' calculations

Assumptions:

Exactech Inc: Exactech are a small firm in the industry who comprise an insignificant share of the market and have been losing market share for the last 5 years. They have recently launched two main products which have are due to be launched in 2017. Therefore, we are projecting an upturn in their recent performance in this field and expect Exactech to grow at a CAGR of 7.1%.

Johnson & Johnson: Johnson and Johnson have struggled since their penetration of the knee market back in 2014 contracting at a slightly negative CAGR. For this reason, we2 believe that the company will fail to grow at a rate that is in line with the sub-sector and instead grow at a rate that is slightly less than the market. Their DePuy REACH knee product line is a respected product within the industry and is capable of supporting this slower than average growth.

Smith & Nephew: Smith and Nephew have experienced incredible steady growth in the industry over the past 5 years growing at a rate of 1.62% YOY for the past 5 years. The company are second behind Stryker in developing Robotic technology and will see benefits from what is sure to be a slow growth process because of the lack of data around Robotic knees and FDA requirements of their proposed product. We believe that they will continue to grow at their historic CAGR.

Stryker: We believe that Stryker have the ability to grow by 12% YOY from 2017-2021. This is supported by the company's leading technology in robotic-assisted surgeries and a product portfolio that encompasses the entirety of the knee surgery procedure. This results in Stryker gaining 5% market share in the knee implant market and made possible by capitalising on Johnson & Johnson's difficulties. This results in Stryker overtaking Johnson & Johnson in 2017 to become the second largest firm in the market.

Zimmer-Biomet: We have assumed that Zimmer Biomet Holdings will grow at a rate that is in line with the market (7.5%). From our research of the industry, Zimmer Biomet are well positioned to start realising gains from their acquisition of Biomet and to consolidate their position as the market leaders.

New Competitors: We acknowledge the threat of new competition entering the market. However, when Johnson & Johnson entered the market in 2014, the knee market grew considerably. While Zimmer suffered the most as they lost a 21% market share, the entry of new competition coincided with their tumultuous acquisition of Biomet. Stryker lost only 2% and still managed to grow revenues and we believe that Stryker are in a more than capable position to combat against any new entrants in the future, just like they did in 2014.

Please see Table 2 the historical and projected global knee market share:

Knee Market Share Forecasted 2017-2021										
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Exactech	1.61%	1.57%	1.36%	1.08%	1.01%	0.95%	0.91%	0.92%	0.92%	0.94%
Johnson & Johnson	-	-	26.54%	22.71%	22.52%	22.42%	22.21%	21.88%	21.47%	20.97%
Smith & Nephew	17.25%	16.87%	15.11%	13.40%	13.77%	13.02%	12.31%	11.63%	11.00%	10.40%
Stryker	**26.77%**	**26.74%**	**24.17%**	**21.29%**	**22.02%**	**22.94%**	**23.90%**	**24.90%**	**25.94%**	**27.03%**
Zimmer-Biomet	54.38%	54.82%	32.81%	41.52%	40.67%	40.67%	40.67%	40.67%	40.67%	40.67%

Table 2: Sourced from Bloomberg and authors' calculations

Trauma & Extremities

Stryker generated revenues of $1.36bn dollars from their trauma and extremities division which caters for procedures on body parts such as the foot, ankle and shoulder and also boast a plethora of innovative products to treat peripheral nerves and small bones. The company has grown revenues steadily over the last number of years with a compound quarterly growth rate of 2% in the period 2012-2016.

In 2014, the company acquired SBi Inc. as a source of external innovation in the trauma and extremities market and the acquisition has proved relatively successful with new products such as their STAR (Scandinavian Total Ankle Replacement) Ankle helping to steadily increase revenues in a competitive market where they are not a leader.

The Trauma & Extremities market is dominated by five firms: Johnson & Johnson, Smith & Nephew, Stryker, Wright Medical and Zimmer-Biomet. According to 2016 sales levels, Stryker's market share corresponds to 19.7%. Stryker has lost significant market share due to Johnson & Johnson's penetration of the orthopaedics implant market in 2014 and the merger of Zimmer-Biomet in 2015.

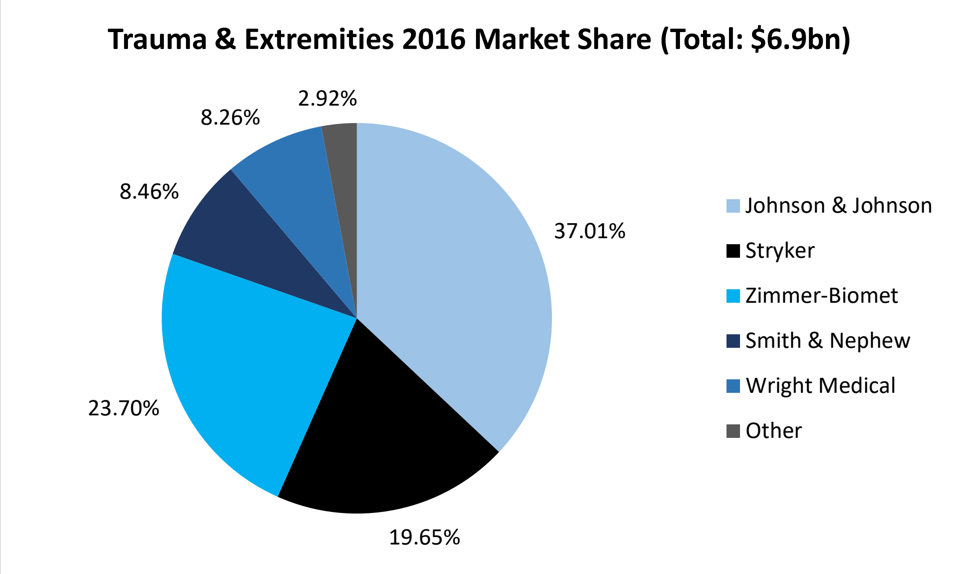

Figure 7: Trauma & Extremities Market Share 2016

Growth in this market has been largely fuelled by a number of different factors: the rise in the population aged 65 years and older, increased life expectancy and the rise of GDP per capita. Given that the majority of Stryker's business is based in the United States, all of these factors have been trending upwards. The rise of robotic-assisted surgeries, among other technological advancements, has improved the efficiency of procedures in this field and will help to maintain growth levels into future.

Based on this, we forecast that the market will continue to grow at its recent 5-year CAGR of 9.68%. We project that the market will reach revenue levels of $11bn by 2021 and for Stryker to reach revenue levels of $1.9bn. Please see below for our list of assumptions. Table 3 shows the forecasted market share of Stryker and its competitors in the industry for 2017-2021.

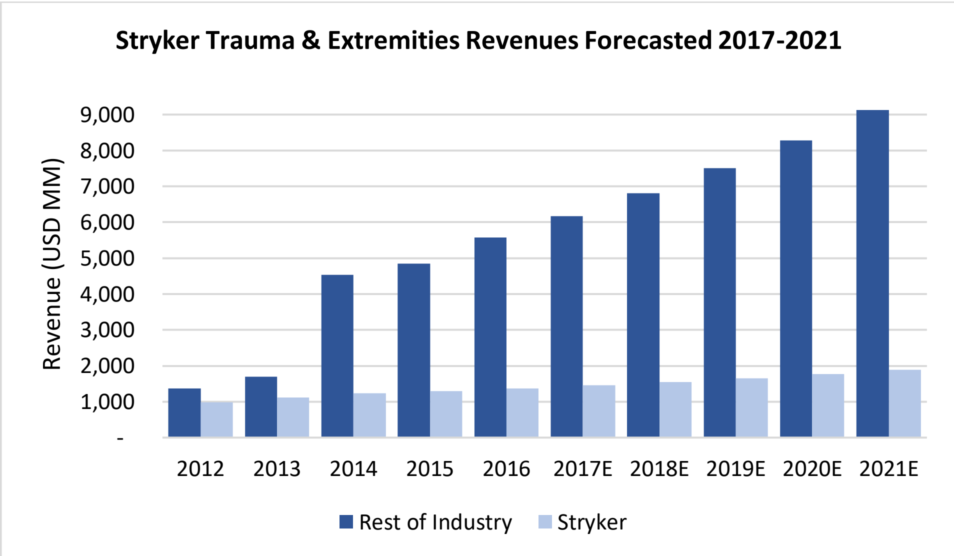

Figure 8: Stryker and Industry Revenues Projected 2017-2021

Assumptions:

Exactech: Exactech have out-performed the market in this field due to innovative shoulder products. This can be attributed to the performance of the Equinoxe line. The launch of the Vantage will help Exactech gain a foothold in the foot and ankle market. Finally, the projected rise in the Extremities market revenues will allow well-established firms in the field to avail of growth opportunities. We believe Exactech are well-placed to do this and that they will overtake Orthofix in 2017.

Johnson & Johnson: Johnson & Johnson's penetration of the Extremities market in 2014 immediately saw them gain a 46% market share and established them as industry leaders. Their year-on-year growth has been contracting since then as revenues have been declining at 1.35% per annum. We anticipate that their revenue levels will return to positive growth but will give up nearly 3% market share by 2021.

Orthofix: Orthofix have not been able to capitalise on growth rates in the industry. In 2016, Orthofix began to recover to 2012 revenue levels and we project that they will continue to rise at 2016 growth rate of 6.98%.

Smith & Nephew: Smith & Nephew were the third biggest firm in Extremities before the entry of Johnson & Johnson and lost over half of their market share. However, our research suggests that they will be well-placed to take advantage of industry growth opportunities. Therefore, we project that Smith & Nephew will grow at the market rate of 9.68% from 2017-2021.

Stryker: We did not uncover any research that indicates Stryker will hold any competitive advantage in Trauma & Extremities in the next 5 years. While their product pipeline is good, they are yet to roll out their Mako capability in this division. Based on this, we project that Stryker will continue to lose market share going forward and will grow at a CAGR of 6.81% to maintain their position as the second largest firm by revenue in this division.

Wright Medical: Wright Medical and Tornier NV's merger at the end of 2014 allowed the combined company to establish itself in the Extremities industry through a combined innovative product line. We project that they will continue to grow at a rate above the industry average for 2017-2021.

New Competitors: There are very few firms with the capability of seizing market share in the same fashion that Johnson & Johnson did in 2014. In our opinion, Medtronic are the only firm that could possibly enter. However, there is no indication that Medtronic nor any other medical device firm will enter this industry. We believe that Stryker are well positioned to defend their market share in any case.

Trauma & Extremities Market Share Forecasted 2017-2021										
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Johnson & Johnson	-	-	45.75%	41.15%	37.01%	35.14%	33.37%	31.69%	30.10%	28.58%
Stryker	**41.83%**	**39.60%**	**21.32%**	**21.01%**	**19.65%**	**19.08%**	**18.54%**	**18.05%**	**17.58%**	**17.15%**
Zimmer-Biomet	22.34%	28.17%	14.96%	19.77%	23.70%	25.50%	27.20%	28.64%	29.77%	30.94%
Smith & Nephew	20.05%	17.60%	9.98%	9.86%	8.46%	8.46%	8.46%	8.46%	8.46%	8.46%
Wright Medical	8.85%	8.63%	4.72%	5.24%	8.26%	8.89%	9.56%	10.29%	11.07%	11.91%
Orthofix	4.74%	3.67%	1.90%	1.56%	1.48%	1.44%	1.41%	1.37%	1.34%	1.31%
Exactech	2.20%	2.32%	1.37%	1.41%	1.44%	1.49%	1.46%	1.50%	1.69%	1.66%

Table 3: Sourced from Bloomberg and authors' calculations

Hips

The global hip implant market was worth over $5.2bn in 2016. Similar to the knee implant market, the hip market is dominated by the 4 giants of the orthopaedic medical device market: Zimmer-Biomet, Johnson & Johnson, Stryker and Smith & Nephew. These firms comprise 99% of the industry. Hip replacements are very complicated procedures and success rates are not as high as the knee implant market. They are seldom carried out on young to middle-aged individuals and is much more common for people aged over 65 to ease pain caused by osteoarthritis.

Stryker are the worldwide leader in total hip replacements and generate revenues from a variety of different products. The company's comprehensive and versatile portfolio of hip replacement products gives surgeons a wide range of options to choose from, and can meet the needs of almost any patient. Similar to their portfolio of knee products, the portfolio of hip products is divided into three categories: Actebular (where the head of the femur meets the pelvis) Components, Primary Femoral Components and Revision Femoral Components. In 2016, Stryker posted hip revenues of $1.3bn which represents 11.3% of the firm's overall sales.

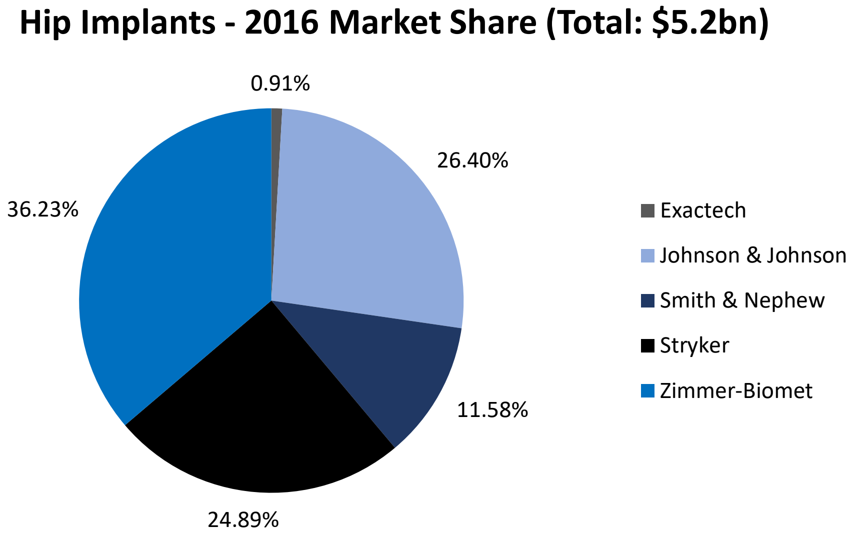

Figure 9: Projected hip market revenues using our model

The hip market, like all other reconstructive surgery markets, is correlated with the percentage of old age people, which has been growing at an increasing rate over the last number of years. This is a trend that is set to continue. Similarly, the steady upturn in the US economy since the recent financial crisis will mean that hip implant operations will be more affordable and will increase patient numbers. This gives Stryker a bigger market to sell its products and will facilitate growth opportunities. We forecast Stryker to reach $1.8bn by 2021 and for the market to reach $7.3bn by the same year.

Please see below our assumptions for making these projections. Table 7 shows forecasted revenue levels for Stryker and its main competitors.

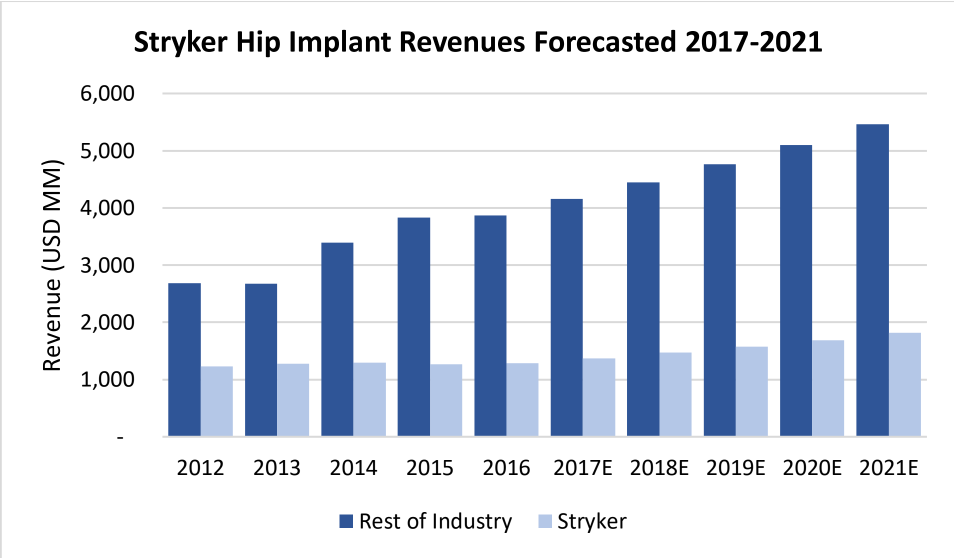

Figure 10: Projected hip market revenues using our model

Assumptions:

Exactech: We believe that Exactech can continue to build on their solid performance over recent years. The introduction of the Monobloc Revision product in 2016 has proven that they are developing products that physicians are interested in using. The planned launch of their new hip stem in the latter half of 2017 will ensure they do not lag behind competitors. However, no blockbuster new products or innovations makes it difficult to reconcile anything above last 5 years CAGR.

Johnson & Johnson: Johnson & Johnson's penetration of the Hip Implant market in 2014 immediately saw them gain a 29% market share. Their year-on-year growth has been falling since then as revenues have been declining slowly at 0.26% per annum. With their incredibly large economies of scale and an enormous wealth of expertise we believe that they can recover and that revenues will increase at a rate equivalent to the hip industry revenue growth rate.

Smith & Nephew: Smith and Nephew have been a long-standing player in the global hip implant market and have the resources to turn around their misfortune of late. We project that they will grow at a rate that is in line with the market.

Stryker: Best positioned in the market place because of their innovative efforts in Robotic assisted surgeries which have proven to be a massive success in the knee implant market. They plan to roll out a Total Hip Robotic assisted surgery platform in the coming years which will enable them to gain slightly more market share at the expense of Johnson & Johnson and Zimmer-Biomet. We project them to reach $1.8bn by 2021 with a CAGR slightly greater than the industry.

Zimmer-Biomet: We have assumed that Zimmer Biomet Holdings will grow at a rate that is in line with the market (7.13%). From our research of the industry, Zimmer Biomet have public ensured investors that the supply chain issues that hampered much of their results in Q4 2016 will be ironed out by the second half of 2017 and are second only to Stryker in terms of innovative efforts and product placements.

New Competitors: There are very few firms with the capability of seizing market share in the same fashion that Johnson & Johnson did in 2014. In our opinion, Medtronic are the only firm that could possibly enter. However, there is no indication that Medtronic nor any other medical device firm will enter this industry. Therefore, the threat from new competitors is minimal.

Hip Implant Market Share Forecasted 2017-2021										
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Exactech	1.04%	1.04%	0.93%	0.85%	0.91%	1.00%	0.97%	0.93%	0.90%	0.87%
Johnson & Johnson	-	-	29.21%	26.15%	26.40%	26.40%	26.40%	26.40%	26.40%	26.40%
Smith & Nephew	17.01%	16.55%	13.97%	11.86%	11.58%	11.58%	11.58%	11.58%	11.58%	11.58%
Stryker	**31.50%**	**32.24%**	**27.57%**	**24.80%**	**24.89%**	**24.79%**	**24.83%**	**24.86%**	**24.89%**	**24.92%**
Zimmer-Biomet	50.45%	50.17%	28.32%	36.34%	36.23%	36.23%	36.23%	36.23%	36.23%	36.23%

Table 4: Projected hip market revenues using our model

Total Forecasted Orthopaedic Growth

Based on all of our above analysis, we forecast orthopaedic growth to accelerate from its 2016 5-year CAGR and grow at a rate of 8.66% year-on-year until 2021 to reach revenue levels of $6.7bn.

Neurotech & Spine

Neurotech & Spine has been a solid growth area for Stryker in the last 5 years with a CAGR of 6.37%. The revenue is split between two areas:

- Neurotechnology & Neurovascular
- Spine

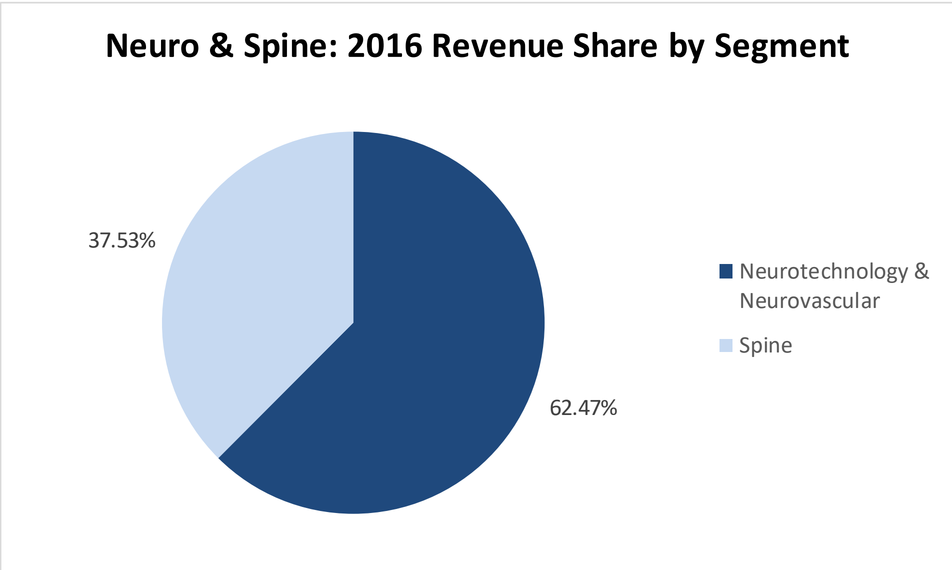

Figure 11: Sourced from Stryker 2017 10-K

Neurotech & Neurovascular

Stryker's neurotechnology and neurovascular division focuses on offering high-quality products that range from minimally invasive endovascular techniques to products that aid the treatment of acute ischemic and haemorrhagic stroke victims.

One of the industry-leading products in this field is Stryker's Trevo^{TM} Retriever. This allows physicians to visualise blood clot interaction during treatment for haemorrhagic stroke victims. In September 2016, Stryker received approval for the use of two Trevo^{TM} Retriever products in front-line treatment to reduce paralysis, speech difficulties and other stroke disabilities in patients experiencing acute ischemic stroke. Trevo^{TM} is the first thrombectomy device to receive this expanded indication. Stryker added the Trevo^{TM} devices to its portfolio after its acquisition of Concentric Medical.

Innovative products in this area and increased unit volume shipments of neurotechnology products have been the driving force behind Stryker's stellar performance in this industry in the last 5-years. The neurotechnology and neurovascular device industry earned $8.3bn in revenue in 2016 with a 5-year CAGR of 3.32%. During the same period, Stryker has experienced a 10.49% 5-year CAGR in the revenue from its neurotechnology and neurovascular division, overtaking CR Bard Inc. as the third largest firm in this area and increasing its global market share by 3.5% to 15.1% overall.

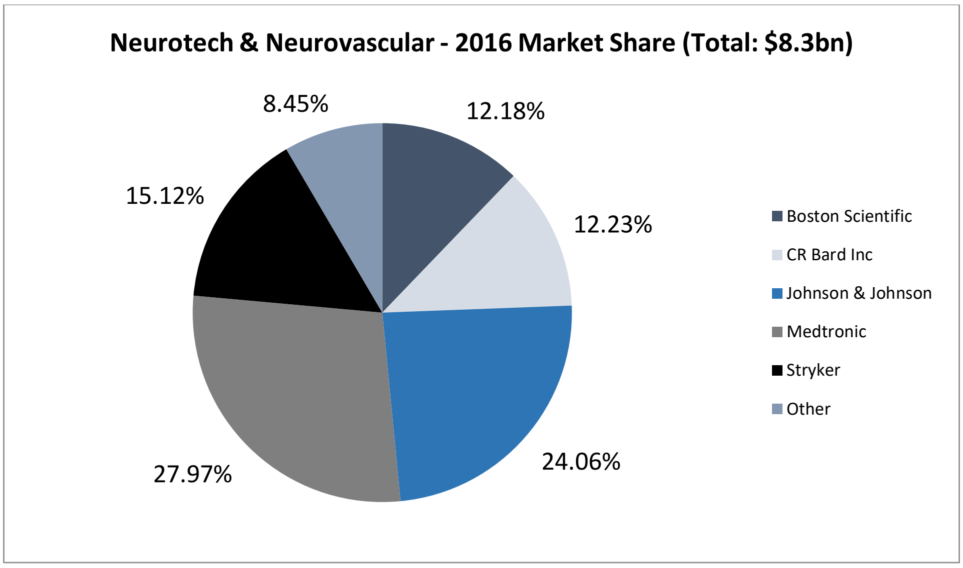

Figure 12: Sourced from Bloomberg

For the forecasting period, our research informs us that the industry can continue to maintain its steady growth via innovative products offered by the main companies in this field. The current industry pipeline has been performing steadily and we have not found any evidence that suggests there will be major disruptions in this field. Therefore, we are forecasting the neurotechnology and neurovascular industry to grow at a 3.32% year-on-year and to bring in $9.8bn in revenue in 2021. Figure 9 shows Stryker's forecasted revenue levels alongside the market sales.

Below are some of the assumptions we made about Stryker and its competitors while forecasting into the future. Table 8 displays our forecasts.

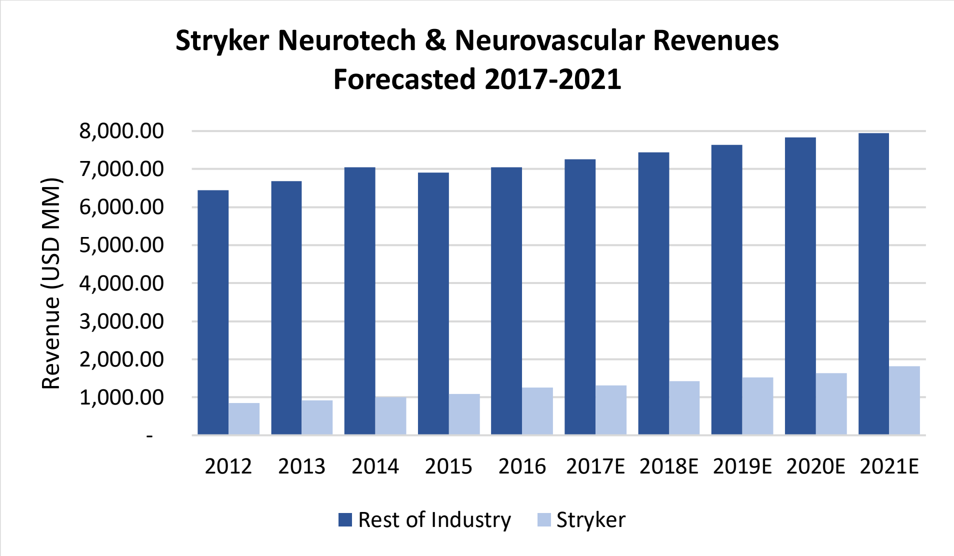

Figure 13: Sourced from Bloomberg and authors' calculations

Assumptions:

Abbott Laboratories: Abbott's performance in recent years has been above industry average and we fully expect them to maintain their performance and standing in the market. Therefore, we projected them to continue growing at their current 5-year CAGR of 5.53% and will see them reach revenue levels of $735.7MM in 2021.

Boston Scientific: Similar to Abbott, Boston Scientific have been performing well in the market. We project them to grow at a level similar to their recent 5-year CAGR.

CR Bard: The launch of the True Flow Valvuloplasty Balloon family in Q2 2016 has been receiving generally positive reviews and we firmly believe that this will sustain CR Bard's excellent performance in the sector. We forecast that they will continue to grow at a level close to their current 5-year CAGR of 4.69%.

Edwards Lifesciences: Edwards Lifesciences are not a big player in this industry with only 0.6% of the market share and have yet to demonstrate any evidence that they can cause major disruptions to change their status. We projected their revenue levels to grow at the US GDP growth rate of 2.16%.

Johnson & Johnson: The merger of Medtronic and Covidien has resulted in stagnant growth in Johnson & Johnson's revenue in this area and they have been overtaken by Medtronic in this area. Their revenue levels began falling in 2015 upon completion of the aforementioned merger and this has caused their 5-year CAGR to be -1.18%. They are the worst performing firm in this industry over the last 5 years and our analysis does not show any major disruptions that will cause a massive shift in this trend.

LeMaitre Vascular: LeMaitre Vascular have experienced the highest organic growth rate in the industry mainly due to the specific focus of their business model on neurovascular products. However, they remain a small player in the industry with 1.07% market share. We anticipate that they will continue to grow faster than the industry for the next 5 years to reach revenue levels of $113.8MM.

Medtronic: Medtronic's $49.9bn acquisition of Covidien in January 2015 allowed Medtronic to experience the revenue synergies of Covidien's neurotech and neurovascular portfolio. Within 2 years, Medtronic usurped Johnson & Johnson as the leader in this field. The consolidation of their revenues inflated Medtronic's 5-year CAGR to 13.93% (Table 8 adjusted to combine Covidien's revenue for 2012-14 with Medtronic's). We do not anticipate that Medtronic will make another acquisition of this magnitude and therefore believe that this is not a sustainable growth rate for Medtronic for our forecasting period. Therefore, we anticipate Medtronic to experience positive growth that is less than the market growth rate.

Stryker: We are very bullish on Stryker's position in this market. Trevo™ is a revolutionary product and receiving FDA approval to market the product will allow to Stryker to consolidate its position as one of the leading firms in the industry. Stryker is the first firm out of the major players in this industry to receive approval to treat the side effects of acute ischemic stroke. None of their closest competitors have a product with this much potential that has been given the go-ahead by the FDA. For this reason, we anticipate Stryker to grow at a 5-year CAGR of 8.55% and gain significant market share at the expense of Johnson & Johnson.

New Entrants: From our research, the threat of new firms entering the industry and causing disruptions to Stryker's revenue streams appears to be negligible. All of the firms already discussed are well-established within this area and it is very unlikely that a new firm will be capable of entering the industry within the next 5 years and obtain market share.

Neurotech & Neurovascular Market Share Forecasted 2017-2021										
Neurotech & Neurovascular	**2012**	**2013**	**2014**	**2015**	**2016**	**2017E**	**2018E**	**2019E**	**2020E**	**2021E**
Abbott Laboratories	6.22%	6.25%	6.54%	6.50%	6.77%	6.92%	7.06%	7.22%	7.37%	7.53%
Boston Scientific	10.63%	10.60%	10.56%	11.29%	12.18%	12.38%	12.81%	13.25%	13.71%	13.56%
CR Bard Inc	11.60%	10.92%	11.52%	12.14%	12.23%	12.39%	12.55%	12.72%	12.89%	12.74%
Edwards Lifesciences Corp	0.71%	0.64%	0.62%	0.60%	0.60%	0.60%	0.59%	0.58%	0.58%	0.57%
Johnson & Johnson	28.75%	29.57%	29.69%	27.66%	24.06%	23.79%	22.75%	21.76%	20.82%	19.91%
LeMaitre Vascular	0.78%	0.85%	0.88%	0.98%	1.07%	1.09%	1.11%	1.13%	1.15%	1.16%
Medtronic	29.76%	29.13%	27.74%	27.21%	27.97%	27.54%	27.11%	26.69%	26.28%	25.88%
Stryker Corp	**11.56%**	**12.04%**	**12.43%**	**13.61%**	**15.12%**	**15.31%**	**16.01%**	**16.65%**	**17.21%**	**18.65%**

Table 5: Sourced from Bloomberg and authors' projections

Spine

The major issues plaguing both domestic and international growth in Stryker's spine division was supply constraints and this caused a number of Stryker's competitors out-perform Stryker. This was mentioned by CEO Kevin Lobo in Stryker's Q4 2016 earnings call and highlighted as a concern going into the early parts of 2017. However, the FDA recently claimed that Stryker's AccuLIF® Expandable Lumbar Interbody Fusion Technology is manufactured with enough porosity to promote bone ingrowth within the device itself, making it one of the most innovative products on the market. This is a big breakthrough as previous high-quality titanium spine interbody devices do not facilitate bone growth.

Firms in the spinal products industry achieved revenue levels of $9.73bn in 2016 with a 2.74% year-on-year growth rate between 2012-2016. During this period, Stryker struggled to keep pace with the growth in the global spine market and only managed a 0.92% CAGR for the same period. This resulted in Stryker losing global market share, from 8.3% in 2012 to 7.7% in 2016. Stryker has now dropped one place to become the fourth largest firm in the market after NuVasive overtook them and are in real danger of being surpassed by the rapidly-emerging presence of Zimmer-Biomet in this field, who have recorded a 33.42% 5-year CAGR.

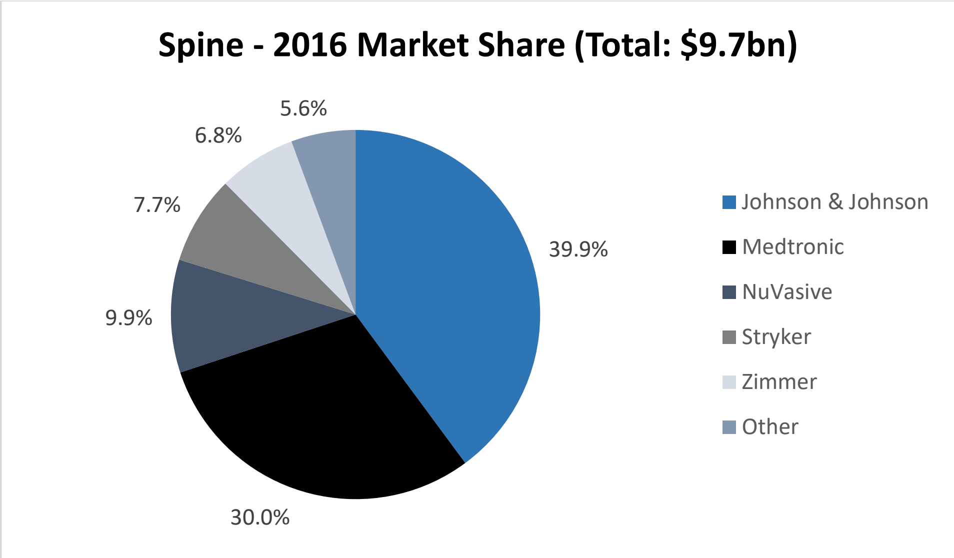

Figure 14: Sourced from Bloomberg

When examining the outlook for the Spine market, we do not anticipate any technological advancements that will cause major disruptions to industry revenues. Our research tells us that robotic-assisted surgery is unlikely to be introduced to spinal surgeons in the next 5 years. Therefore, we project Spine market revenues to continue growing at the recent 5-year CAGR of 2.74%. Based on this, we forecast the market revenues to reach $11.1bn by 2021 and we project Stryker's Spine revenue to reach $951.9MM by the same year. Please read the assumptions below:

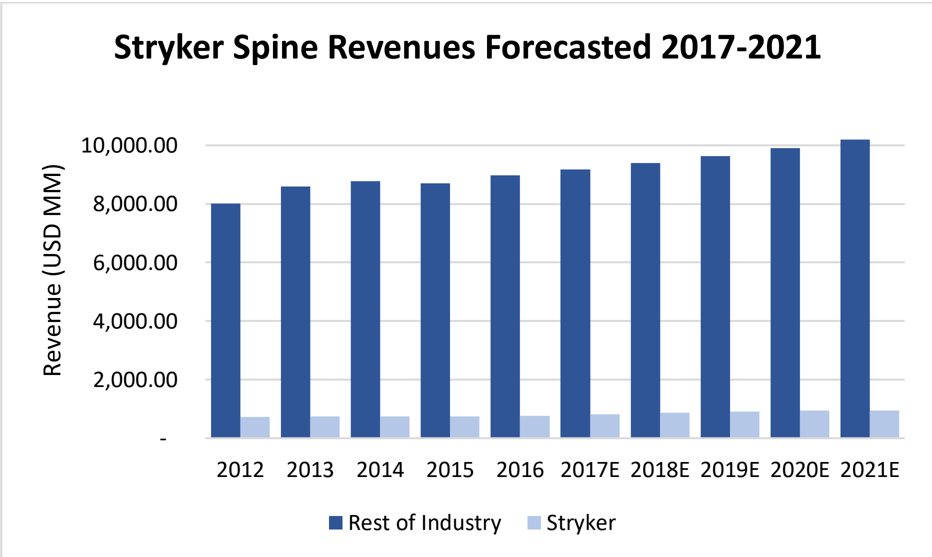

Figure 15: Sourced from Bloomberg and authors' projections

Assumptions:

Alphatec: Alphatec have not benefitted from the increased number of firms in in the spine market. Alphatec's revenue of $120MM is down 58% from its 2014 levels and we are bearish on its outlook for the next 5 years. We forecasted revenue levels to be $65.1MM in 2021 at a CAGR of -11.54%.

Exactech: In January 2017. Exactech sold its Spine division so that they could focus on its core orthopaedic products. We have accounted for this in our projections and assume that they will not return to manufacturing spinal products before 2021.

Johnson & Johnson: A 5-year CAGR of 4.98% disguises the fact that Johnson & Johnson have experienced a fall in spine revenue levels for both 2015 and 2016. However, given that Johnson & Johnson's spinal subsidiary DePuy Synthes recently acquired Interventional Spine's spinal fusion technology portfolio, we anticipate Johnson & Johnson to recover and have decided to forecast their revenue growing at a rate of 2.16% per annum, which is equivalent to US GDP growth, to $4.3bn in 2021. However, they will still retain their position as the market leader in the industry with a 38.75% market share.

Medtronic: Medtronic's spinal revenue has been falling every year since 2010 and our research does not point to any products that will change this trend. 2010 marks the first year that all 8 major firms were first in the industry together. Since then, an uninspiring product-line and no significant acquisitions in this field have resulted in the rest of the industry catching up on Medtronic. We forecast that Medtronic will continue to grow at a CAGR of -2.73%. We firmly believe that Medtronic will be the big loser out of all the firms in the market and will only occupy 22.85%, compared to 37.4% in 2012.

NuVasive: NuVasive have benefitted from their business model that specialises solely in the spinal market and have experienced huge growth in the industry due to their industry-leading NVM5 Nerve Monitoring System. This positions them well for growth within the industry. We project that NuVasive's revenue levels will grow at their 5-year CAGR of 11.6% for the projection period due to their exclusive focus on the development of spinal products and their innovative product line.

Orthofix: Orthofix is another company that has been performing poorly in recent years due to and have lost market share due to NuVasive and Zimmer-Biomet's rapid growth. However, they returned to positive growth in revenue levels in 2016 with a 3.35% rise from 2015 sales. Based on this, we project that they will continue to grow at this rate of 3.35% for the duration of the projection period.

Stryker: We project that the aforementioned supply issues that Stryker has been having will be overcome towards the middle of 2017 and will allow them to experience decent growth. Leading products such as the AccuLIF® Expandable Lumbar Interbody Fusion Technology will allow Stryker to escape from the doldrums of <1% growth and recover to $951.9MM 2021 revenue.

Zimmer-Biomet: Zimmer-Biomet's growth in the market can be largely attributed to shrewd acquisitions. Firstly, Zimmer's merger with Biomet in 2014 has led to formidable combined revenue synergies. Secondly, Zimmer-Biomet is committed to expanding their presence in this field through their acquisition of LDR Holdings, a company who are focused on developing technology for spinal surgery. Zimmer-Biomet represent a major threat to Stryker and we forecast that they will overtake Stryker in 2018. Given the limited projected growth in the whole market and the immediately attainable lucrative revenue synergies that occur after a merger, it in infeasible that Zimmer-Biomet will continue to grow at its current rate. Therefore, we project that that revenue growth rates will slow down to 17% in 2017 and 10% for 2018-2021 to account for this, leaving Zimmer-Biomet with a 10% market share.

New Entrants: As mentioned above, we do not anticipate any new competitors entering the market and causing major disruptions.

Spine Market Share Forecasted 2017-2021										
Spine	**2012**	**2013**	**2014**	**2015**	**2016**	**2017E**	**2018E**	**2019E**	**2020E**	**2021E**
Alphatec	2.25%	2.19%	2.17%	1.96%	1.24%	1.06%	0.92%	0.79%	0.68%	0.58%
Exactech	0.28%	0.27%	0.25%	0.24%	0.20%	0.00%	0.00%	0.00%	0.00%	0.00%
Johnson & Johnson	37.12%	42.31%	43.43%	41.39%	39.87%	39.64%	39.42%	39.19%	38.97%	38.75%
Medtronic	37.41%	33.52%	31.95%	31.48%	30.05%	28.44%	26.93%	25.49%	24.13%	22.85%
NuVasive	7.10%	7.33%	8.01%	8.59%	9.89%	10.74%	11.66%	12.67%	13.76%	14.95%
Orthofix	5.13%	4.26%	4.23%	4.20%	4.21%	4.24%	4.26%	4.29%	4.31%	4.34%
Stryker	**8.32%**	**7.95%**	**7.77%**	**7.84%**	**7.75%**	**8.13%**	**8.52%**	**8.69%**	**8.64%**	**8.54%**
Zimmer-Biomet	2.39%	2.17%	2.18%	4.29%	6.80%	7.75%	8.29%	8.88%	9.51%	9.99%

Table 6: Sourced from Bloomberg and authors' calculations

Neurotech & Spine: Overall Forecast:

Based on the above, we forecast a slight increase in the growth rate in the Neurotech & Spine division to a CAGR of 6.89%. This will result in revenue levels reaching $2.8bn.

MedSurg

Stryker's diverse MedSurg product-line provides surgical equipment, computer assisted surgery, minimally invasive surgical solutions and a host of other products designed to optimise the quality of medical and surgical procedures. The division is split into 4 main segments:

- Instruments
- Medical
- Endoscopy
- Other MedSurg

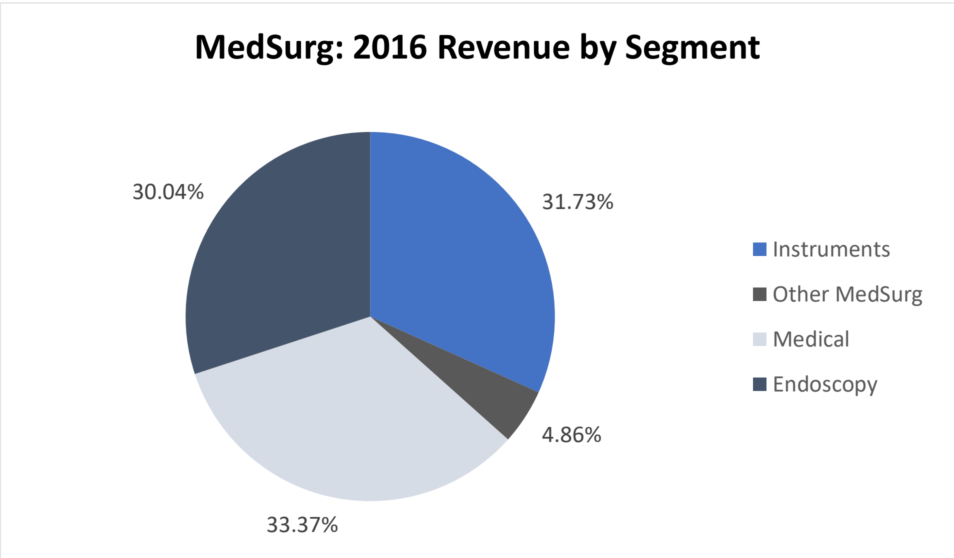

Figure 16: Sourced from Stryker 2017 10-K

MedSurg has been a strong growth area for Stryker since 2012. Revenue levels in the division have grown 10.65% year-on-year for the past 5 years. One of the main drivers of this growth is an innovative product-line with products such as the Neptune 3 Waste Management System experiencing 33% year-on-year growth between 2000 and 2014 and the industry-leading SurgiCount Safety-Sponge System.

However, Stryker's growth is primarily fuelled by their acquisitions of companies with specific products that can be immediately added to the MedSurg portfolio. Although organic growth has been experienced by Stryker through these acquisitions, the majority of this growth is due to the cash flows of the target company being added to Stryker's revenue streams.

In 2016 alone, Stryker made 3 significant acquisitions to enhance the product offerings within their MedSurg division.

1. The largest of these deals occurred when Stryker completed the acquisition of Sage Products LLC for $2.88bn in April 2016. Sage Products designs a range of surgical products that focus on curbing infection levels in hospitals.

2. Also in April 2016, Stryker acquired Physio-Control Inc. for $1.28bn and thus added Physio-Control's portfolio of external defibrillators and emergency medical response devices.

3. Finally, the last significant acquisition made by Stryker was the all-cash undisclosed purchase of Synergetics' neurology portfolio in February 2016. Synergetics specializes in microsurgical instruments for ophthalmic and neurological applications, and manufactures electrosurgical generators and disposable neurosurgical tools.

These acquisitions have all added huge value to the MedSurg division and dramatically increased Stryker's revenue levels in its Medical sub-division. Revenue went up from $823MM in 2015 to $1.63bn in 2016, a 98.42% increase, and this can be largely attributed to these acquisitions. Stryker has also experienced high growth rate in its Endoscopy department due to the successful launch of the 1588 AIM camera Platform. During the Stryker Q4 2016 earnings call, when asked whether the recent $250MM share repurchase agreement would deter future M&A activity in 2017, CEO Kevin A. Lobo declared this to be a "pretty modest amount" and that Stryker continue to be "*actively looking across our portfolios for acquisitions*". He also added: "*Our first priority is acquisitions, and we have the capacity and the willingness to do more deals*".

Given the acquisitive practices of the MedSurg division and Stryker's stated commitment to maintain these trends, we cannot ignore this when forecasting revenue levels into the future period. Therefore, we examined Stryker's 10-K annual reports for the years 2012-2016 to extract the true organic growth rates and acquisition growth rates for the previous 5 years. We then used a moving average model which places 20% weight on the most recent acquisition growth rate and places 80% weight on the previous 4 years to forecast the growth rate obtained through acquisitions. We then assumed that the ratio of acquisition growth rates to organic growth rate remains constant for the forecasting period to calculate organic growth rates and added the two together to calculate our MedSurg revenue growth rate for 2017 to 2021.

$$g_{Med,t+1} = 0.2\left(g_{Med,t}\right) + 0.8\left[\frac{1}{4}\sum_{i=1}^{4} g_{Med,t-i-1}\right]$$

It should be noted that the acquisition growth rate refers to the accounting growth rate in an acquired company's revenue streams being added to Stryker, while the organic growth rate refers to Stryker's own innovation in the field.

Table 10 displays the MedSurg growth rates separated into organic growth and growth through acquisitions forecasted until 2021:

Stryker MedSurg Revenue Growth Rates Forecasted 2017-2021										
	2012	2013	2014	2015	2016	2017E	2018E	2019E	2020E	2021E
Total Growth	**3.30%**	**2.88%**	**12.56%**	**3.02%**	**25.65%**	**7.62%**	**7.90%**	**9.40%**	**10.50%**	**12.10%**
- Acquisitions	0.10%	0.00%	3.00%	1.70%	19.10%	5.68%	5.88%	7.00%	7.82%	9.01%
- Organic Growth	3.20%	2.88%	9.56%	1.32%	6.55%	1.95%	2.02%	2.40%	2.68%	3.09%

Table 7: Projected MedSurg growth rate using our model

Below are the forecasted revenue levels we obtained:

Stryker MedSurg Revenue Forecasted 2017-2021												
	2012	2013	2014	2015	2016	CAGR	2017E	2018E	2019E	2020E	2021E	CAGR
Total MedSurg	**3,265**	**3,359**	**3,781**	**3,895**	**4,894**	**10.65%**	**5,267**	**5,683**	**6,217**	**6,869**	**7,701**	**9.96%**
- Instruments	1,261	1,269	1,424	1,466	1,553	5.35%	1,671	1,803	1,973	2,180	2,444	9.96%
- Other MedSurg	202	213	209	216	238	4.19%	256	276	302	334	375	9.96%
- Medical	691	710	766	823	1,633	23.99%	1,757	1,896	2,074	2,292	2,570	9.96%
- Endoscopy	1,111	1,167	1,382	1,390	1,470	7.25%	1,582	1,707	1,867	2,063	2,313	9.96%

Table 8: Projected MedSurg revenue growth rate our model

We forecast MedSurg revenues to grow at a slightly slower rate than the current 5-year CAGR, but 9.96% year-on-year still represents a major growth area for Stryker. We believe it is very achievable to attain $7.7bn revenue levels in this market considering the success of Stryker's model in recent years and we are satisfied that we have accurately modelled the acquisition growth rate correctly. We believe it would be completely unrealistic to project Stryker adding 19.1% growth in revenue levels per annum.

Revenue:

By analysing each of Stryker's divisions and making forecasts, we forecast that Stryker's revenue will rise at a CAGR of 8.93% and reach $17.15bn by 2021.

Before we completely accept our revenue forecast, we felt that it was prudent to depict the levels of growth experienced by Stryker and its direct competitors in the medical devices industry. Inspired by Mauboussin (2016), we calculated a rolling window of 5-year revenue compound annual growth rates for Stryker and its main medical device competitors from 1991. It is hard to justify any projections in revenue growth without initially establishing the base CAGR at which the revenues of medical device firms grow at.

Initially, we examined all the companies for the duration of their lifetime from 1987-2016 and built a sample based on their 5-year revenue CAGR. This yielded the following results:

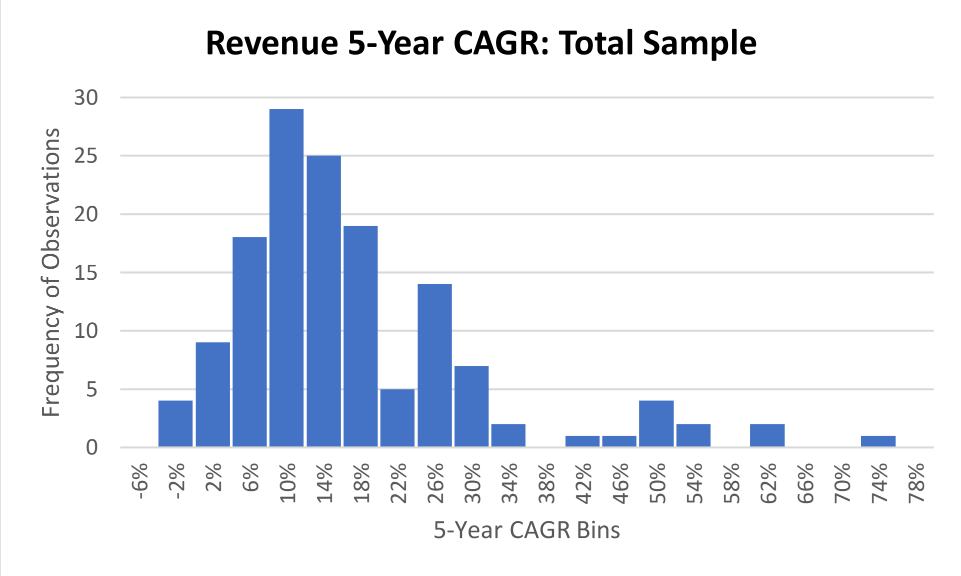

Figure 17: Revenue 5-Year CAGR for full sample

Summary Statistics: Total Sample	
Sample Size	143
Mean (%)	15.15
Standard Deviation (%)	13.50
Skewness	1.70
Kurtosis	3.51

Table 9: Summary Statistics for full sample

After further reflection, we decided to adjust our sample to leave out the first 5 years of each individual firm. We felt that the extremely high growth rates in revenues experienced by some of the firms within their first 5 years are not relevant to a well-established firm like Stryker and will not realistically be achieved within our projection period. Below are our results with our reduced sample:

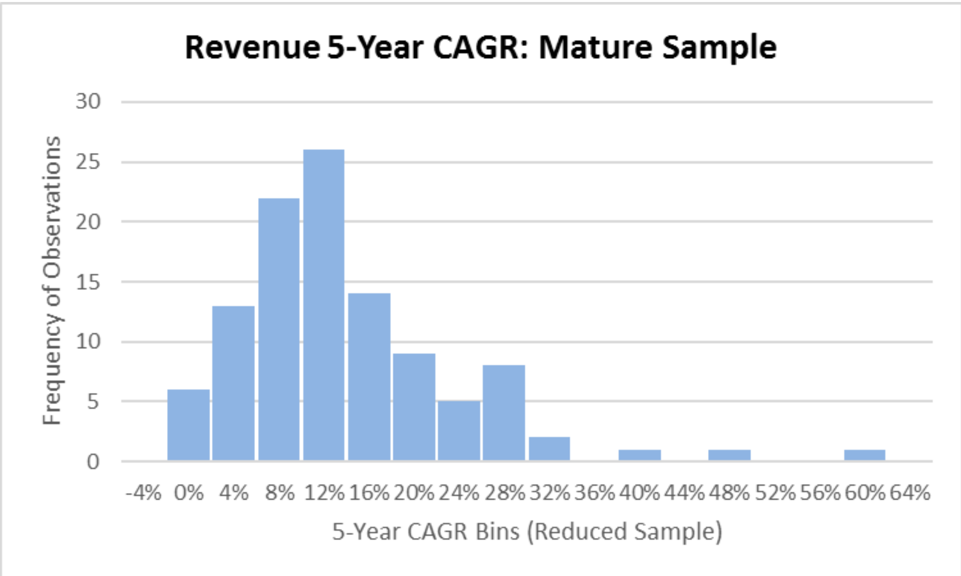

Figure 18: Revenue 5-Year CAGR for reduced sample

Summary Statistics: Total Sample	
Sample Size	108
Median (%)	10.01
Standard Deviation (%)	9.77
Skewness	1.76
Kurtosis	5.20

Table 10: Summary Statistics for reduced sample

All of this tells us a number of things. Firstly, the median 5-year CAGR is 10.01% for these companies. This is the average revenue growth levels that have been experienced year-on-year by the main companies within this industry. 91% of the revenue growth levels achieved in the sample period are between 4% - 28%.

Our projected 8.93% 5-year CAGR in revenue levels is easily within 1 standard deviation of the median revenue CAGR in the medical devices industry. This reinforces our revenue projections with the knowledge that this type of revenue growth rate is very common in the industry for well-established companies.

DCF Assumptions:

Cost of Goods Sold (COGS): For the historical period, COGS has remained at a consistently proportional level to revenue). We took the mean of the previous 3 years' COGS/Revenue ratio (33.62%) and assumed that it would remain at this level for the forecasting period.

COGS Forecast 2017-2021			
2014	2015	2016	2017-21E
34.02%	33.48%	33.37%	**33.62%**

Table 11: COGS Forecast

Selling, General & Administrative Expenses (SGA): Similar to COGS, SGA has remained at a consistently proportional level to revenue. We applied the same method and took the mean of the previous 3 years' SGA/Revenue ratio (34.93%) to forecast SGA expenses for the next 5 years.

SGA Expenses Forecast 2017-2021			
2014	2015	2016	2017-21E
34.69%	35.29%	34.83%	**34.93%**

Table 12: SGA Forecast

R&D Expenditure: Since 2000, Stryker have committed to spending 5.0-6.4% of revenue on research & development. There has been no indication by management that this will change in the next 5 years. Between 2014-2016, R&D as a percentage of revenue has been closer to the higher end of this bracket. Using similar methodology to above, we forecasted R&D expenditure to remain at a constant level of 6.31% of revenue for the next 5 years as this is the average of the last 3 years.

R&D Expenditure Forecast 2017-2021			
2014	2015	2016	2017-21E
6.35%	6.28%	6.31%	**6.31%**

Table 13: R&D Expenditure Forecast

Capital Expenditure (Capex): In Stryker's Q4 2016 earnings call, CEO Kevin A. Lobo projected that Capex would be $450MM for 2017. We examined previous Q4 earning announcements and found that Stryker's management are reasonably accurate at forecasting capex and their errors do not trend in any particular direction. Rather than trying to fit a model to accommodate these minor fluctuations and lack of guidance from 2018 onwards, we have decided to simply use the projection by management due to their decent track record.

Capex Forecast 2017-2021				
$MM	2014	2015	2016	2017-21E
Management	250.0	280.0	470.0	450.0
Actual	233.0	270.0	490.0	**450.0**
% Difference	-6.80%	-3.57%	4.26%	-

Table 14: Capex Forecast

Depreciation & Amortization: In the absence of any guidance, we projected Depreciation & Amortization to remain at its 2016 level of $319MM for the next 5 years.

Net Working Capital: We calculated the mean of the changes in net working capital from 2014 to 2016 ($465MM) and assumed that this would remain constant for the next 5 years.

Terminal Growth Rate: We assumed that the terminal growth rate will be 2.5%.

Weighted Average Cost of Capital (WACC)

Due to the constantly proportionate debt-to-equity levels, we chose to use the WACC method to discount the free cash flows going into the future. Please see below some of the assumptions that we made:

Capital Structure: We took an average of the debt to enterprise value levels for the last 5 years and assumed that debt levels would always remain constantly proportional to this. This gives us the following:

Capital Structure	
Debt-to-Total Capitalization	10.06%
Equity-to-Total Capitalization	89.94%

Table 15: Capital Structure

Cost of Debt: We calculated the cost of debt by taking the interest paid in 2016 and dividing it by the mean of the total debt level in 2015 and 2016. Stryker's good credit rating enables them to access capital at extremely competitive rates. This is equal to 1.65%.

Tax Rate: The tax rate of 9.28% was calculated by taking the mean of the income tax paid by Stryker in 2015 and 2016, and dividing it by the mean of the previous 2 years' EBIT figures.

Risk-free rate: We used the yield from 1-year US Treasury bills as at 22nd April 2017 as our risk-free rate due to Stryker's major presence in the United States.

Market Risk Premium: The market risk premium is the required rate of return an investor requires to invest in the market. It is the compensation an investor receives for bearing the risk involved with investing in the market security. It is one of the most researched figures in finance with hundreds of financial literatures debating the topic. In order to calculate the market risk premium, we have utilised the library of Eugene Fama and Kenneth French.

In 1992, Fama and French developed an asset pricing model known as the Three-Factor Model. One of the inputs to this model is the market risk premium and we believe their extensive online library will provide us with the most accurate figure. Using monthly data stretching back to the start of 1930, we took an average of the 1,047 monthly market risk premiums. Annualising this gave us a figure of 7.62%.

Beta: We regressed Stryker's monthly returns on the Russell 3000 index for the last 10 years and created 60-month rolling windows to show how Stryker's beta has changed over the last 5 years. We used the mean beta for these rolling windows because Stryker's betas have been at historically low levels and they have been reverting back to its mean in the last few months. The beta we used was 0.9042.

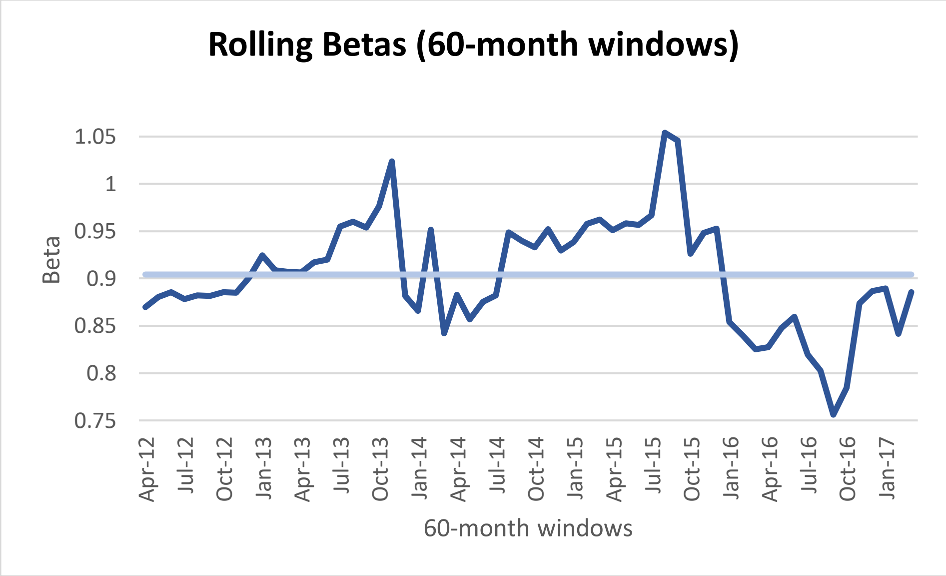

Figure 19: Rolling Beta calculated using MATLAB

Cost of Equity: We used the above inputs and calculated the cost of equity using the CAPM model. This is equal to 7.86%.

$$r_e = r_f + \beta(r_{mkt} - r_f)$$

Final WACC Calculation: Using all of the above, we calculate the WACC to be 7.22% using the following formula:

$$WACC = \left(\frac{E}{D+E}\right) r_e + \left(\frac{D}{E+D}\right) r_d (1 - T_c)$$

Projected Income Statement and Free Cash Flow Calculations:

We projected out Stryker's income statement using our previous analysis and calculate the discounted free cash flows for the period 2017 – 2021 using our WACC figure. Please see the Appendix A for these calculations.

Verdict: HOLD

Based on our DCF analysis, we have calculated Stryker's true share price to be $131.80 and this implies that Stryker is currently trading at a 0.86% premium. Despite the fact that our model tells us that Stryker is slightly overpriced, we do not believe that this is enough of a buffer to warrant issuing anything other than a 'Hold' recommendation. We believe that the market has correctly priced the factors affecting Stryker's financial performance into our projection period.

There are a number of reasons for this. Our comprehensive analysis of Stryker's revenue streams going forward indicate that Stryker will continue to grow at similar levels to those of the last 5 years. Additionally, Stryker and its major competitors are well-covered by analysts from all the main investment banks. Therefore, investors can avail of more equity research for large cap medical device manufacturers such as Stryker.

Implied Market Cap and Share Price from Our Model									
Time period	1	2	3	4	5	TV	DCF Valuation	Current	Disc(Prem)
FCF (MM USD)	1,619	1,822	2,057	2,323	2,661	57,768			
Disc Factor	0.93	0.87	0.81	0.76	0.71	0.71			
PV FCF (MM USD)	**1,510**	**1,585**	**1,669**	**1,758**	**1,878**	**40,764**	**49,163**	**49,596**	
Shares Out. (MM)							373.0	373.0	
Share Price (USD)							**131.80**	**132.94**	**-0.86%**

Table 16: Authors' calculations

Table 16 shows sensitivity analysis on Stryker's share price with regards to the perpetuity growth rate and the WACC used in our DCF valuation. Implied share prices highlighted in red indicate that Stryker is currently trading at a 10% premium or higher, while green indicates that the price is trading at a 10% discount. All the values in yellow indicate the situations where the share price falls within 10% of the current price. Based on this sensitivity analysis, our recommendation is clearly robust.

Therefore, we encourage the SOM/Smurfit Committee to hold Stryker for the next 12 months.

DCF Sensitivity Analysis						
	Perpetuity Growth Rate					
WACC		**2.00%**	**2.25%**	**2.50%**	**2.75%**	**3.00%**
	6.82%	131.28	137.50	144.43	152.21	161.02
	7.02%	125.86	131.53	137.83	144.87	152.79
	7.22%	120.85	126.05	131.80	138.19	145.34
	7.42%	116.22	120.99	126.26	132.08	138.57
	7.62%	111.91	116.31	121.15	126.48	132.38

Table 17: Sensitivity analysis on DCF valuation

Appendix A:

Forecasted Free Cash Flows using Historical Revenue CAGR

Stryker Corp (SYK US) - Current Valuation												
In Millions of USD	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	CAGR ('12-'16)	FY 2017E	FY 2018E	FY 2019E	FY 2020E	FY 2021E	CAGR ('17-'21)
Revenue	**8,657**	**9,021**	**9,675**	**9,946**	**11,325**	*6.95%*	**12,228**	**13,263**	**14,455**	**15,835**	**17,441**	**9.28%**
- Orthopaedics	3,823	4,004	4,153	4,223	4,422		4,595	4,780	4,976	5,185	5,408	
- Knees	1,356	1,371	1,396	1,403	1,490	*2.38%*	1,526	1,562	1,599	1,637	1,676	*2.38%*
- Trauma & Extremities	989	1,116	1,230	1,291	1,364	*8.37%*	1,478	1,602	1,736	1,881	2,039	*8.37%*
- Hips	1,233	1,272	1,291	1,263	1,283	*1.00%*	1,296	1,309	1,322	1,335	1,348	*1.00%*
- Other Orthopaedics	245	245	236	266	285	*3.85%*	296	307	319	332	344	*3.85%*
- Neurotech & Spine	1,569	1,658	1,741	1,828	2,009		2,148	2,300	2,468	2,653	2,856	
- Neurotech & Neurovascular	842	915	1,001	1,088	1,255	*10.49%*	1,387	1,532	1,693	1,871	2,067	*10.49%*
- Spine	727	743	740	740	754	*0.92%*	761	768	775	782	789	*0.92%*
- MedSurg	3,265	3,359	3,781	3,895	4,894		5,485	6,183	7,011	7,997	9,178	
- Instruments	1,261	1,269	1,424	1,466	1,553	*5.35%*	1,636	1,723	1,816	1,913	2,015	*5.35%*
- Other MedSurg	202	213	209	216	238	*4.19%*	248	258	269	280	292	*4.19%*
- Medical	691	710	766	823	1,633	*23.99%*	2,025	2,510	3,113	3,859	4,785	*23.99%*
- Endoscopy	1,111	1,167	1,382	1,390	1,470	*7.25%*	1,577	1,691	1,814	1,945	2,086	*7.25%*
Cost of Goods & Services	**2,763**	**2,931**	**3,291**	**3,330**	**3,779**	*8.14%*	**4,111**	**4,459**	**4,860**	**5,324**	**5,864**	*9.28%*
Gross Profit	**5,894**	**6,090**	**6,384**	**6,616**	**7,546**	*6.37%*	**8,117**	**8,804**	**9,595**	**10,511**	**11,577**	*9.28%*
- Operating Expenses	3,808	3,982	4,158	4,345	4,978		5,044	5,471	5,962	6,532	7,194	
+ Selling, General & Admin	3,214	3,308	3,356	3,510	3,944	*5.25%*	4,272	4,633	5,050	5,532	6,093	*9.28%*
+ Research & Development	471	536	614	625	715	*11.00%*	772	838	913	1,000	1,101	*9.28%*
- Non-Operating (Income) Loss	36	33	86	126	245	*61.52%*	300	325	350	375	400	
EBITDA	**2,086**	**2,108**	**2,226**	**2,271**	**2,568**	*5.33%*	**2,773**	**3,008**	**3,282**	**3,604**	**3,983**	*9.48%*
- Depreciation & Amortization	123	138	188	210	319	*26.90%*	319	319	319	319	319	
EBIT	**2,050**	**2,075**	**2,140**	**2,145**	**2,323**	*3.17%*	**2,454**	**2,689**	**2,963**	**3,285**	**3,664**	*10.54%*
EBIT*(1-Tc)							2,226	2,439	2,688	2,980	3,324	
Add Depreciation/Amortization							319	319	319	319	319	
Less Increase in NWC							465	465	465	465	465	
Less CapEx							450	450	450	450	450	
FCF							**1,630**	**1,843**	**2,092**	**2,384**	**2,728**	*13.74%*

Figure 22: DCF – Current Valuation

Forecasted Free Cash Flows using our analysis

Stryker Corp (SYK US) - Forecasted Free Cash Flows (2017-2021)												
In Millions of USD	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	CAGR ('12-'16)	FY 2017E	FY 2018E	FY 2019E	FY 2020E	FY 2021E	CAGR ('17-'21)
Revenue	**8,657**	**9,021**	**9,675**	**9,946**	**11,325**	***6.95%***	**12,179**	**13,171**	**14,300**	**15,567**	**17,149**	***8.93%***
- Orthopaedics	3,823	4,004	4,153	4,223	4,422	*3.71%*	4,787	5,194	5,641	6,133	6,673	*8.66%*
- Knees	1,356	1,371	1,396	1,403	1,490	*2.38%*	1,669	1,869	2,093	2,345	2,626	*12.00%*
- Trauma & Extremities	989	1,116	1,230	1,291	1,364	*8.37%*	1,452	1,549	1,653	1,767	1,890	*6.81%*
- Hips	1,233	1,272	1,291	1,263	1,283	*1.00%*	1,369	1,469	1,576	1,690	1,813	*7.27%*
- Other Orthopaedics	245	245	236	266	285	*3.85%*	296	307	319	332	344	*3.85%*
- Neurotech & Spine	1,569	1,658	1,741	1,828	2,009	*6.37%*	2,125	2,294	2,441	2,565	2,775	*6.89%*
- Neurotech & Neurovascular	842	915	1,001	1,088	1,255	*10.49%*	1,313	1,419	1,524	1,628	1,823	*8.55%*
- Spine	727	743	740	740	754	*0.92%*	813	875	917	937	952	*4.03%*
- MedSurg	3,265	3,359	3,781	3,895	4,894	*10.65%*	5,267	5,683	6,217	6,869	7,701	*9.96%*
- Instruments	1,261	1,269	1,424	1,466	1,553	*5.35%*	1,671	1,803	1,973	2,180	2,444	*9.96%*
- Other MedSurg	202	213	209	216	238	*4.19%*	256	276	302	334	375	*9.96%*
- Medical	691	710	766	823	1,633	*23.99%*	1,757	1,896	2,074	2,292	2,570	*9.96%*
- Endoscopy	1,111	1,167	1,382	1,390	1,470	*7.25%*	1,582	1,707	1,867	2,063	2,313	*9.96%*
Cost of Goods & Services	**2,763**	**2,931**	**3,291**	**3,330**	**3,779**	*8.14%*	**4,095**	**4,428**	**4,808**	**5,234**	**5,766**	*8.93%*
Gross Profit	**5,894**	**6,090**	**6,384**	**6,616**	**7,546**	*6.37%*	**8,084**	**8,743**	**9,492**	**10,333**	**11,383**	*8.93%*
- Operating Expenses	3,808	3,982	4,158	4,345	4,978		5,024	5,433	5,898	6,421	7,074	
+ Selling, General & Admin	3,214	3,308	3,356	3,510	3,944	*5.25%*	4,255	4,601	4,995	5,438	5,991	*8.93%*
+ Research & Development	471	536	614	625	715	*11.00%*	769	832	903	983	1,083	*8.93%*
- Non-Operating (Income) Loss	36	33	86	126	245	*61.52%*	300	325	350	375	400	
EBITDA	**2,086**	**2,108**	**2,226**	**2,271**	**2,568**	*5.33%*	**2,760**	**2,985**	**3,243**	**3,537**	**3,909**	*9.09%*
- Depreciation & Amortization	123	138	188	210	319	*26.90%*	319	319	319	319	319	
EBIT	**2,050**	**2,075**	**2,140**	**2,145**	**2,323**	*3.17%*	**2,441**	**2,666**	**2,924**	**3,218**	**3,590**	*10.12%*
EBIT*(1-Tc)							2,215	2,418	2,653	2,919	3,257	
Add Depreciation/Amortization							319	319	319	319	319	
Less Increase in NWC							465	465	465	465	465	
Less CapEx							450	450	450	450	450	
FCF							**1,619**	**1,822**	**2,057**	**2,323**	**2,661**	*13.23%*

Figure 23: DCF – Our Valuation

Projected Revenue Tables

Knees

Knee Industry Revenue Forecasted 2017-2021												
	2012	2013	2014	2015	2016	CAGR	2017	2018	2019	2020	2021	CAGR
Exactech	81	81	79	71	68	*-4.23%*	69	71	77	83	91	*7.10%*
Johnson & Johnson	-	-	1,533	1,496	1,524	*-0.29%*	1,631	1,737	1,839	1,940	2,037	*5.72%*
Smith & Nephew	874	865	873	883	932	*1.62%*	947	962	978	994	1,010	*1.62%*
Stryker	**1,356**	**1,371**	**1,396**	**1,403**	**1,490**	***2.38%***	**1,669**	**1,869**	**2,093**	**2,345**	**2,626**	***12.00%***
Zimmer-Biomet	2,755	2,811	1,895	2,736	2,752	*-0.03%*	2,958	3,180	3,419	3,676	3,951	*7.50%*
Industry Total	**5,066**	**5,127**	**5,776**	**6,589**	**6,766**	***7.50%***	**7,274**	**7,820**	**8,407**	**9,037**	**9,715**	***7.50%***

Table 18: Sourced from Bloomberg and authors' calculations

Trauma & Extremities:

Trauma & Extremities Industry Revenue Forecasted 2017-2021												
	2012	2013	2014	2015	2016	CAGR	2017	2018	2019	2020	2021	CAGR
Johnson & Johnson	-	-	2,640	2,528	2,569	*-1.35%*	2,676	2,787	2,903	3,024	3,150	*4.16%*
Stryker	**989**	**1,116**	**1,230**	**1,291**	**1,364**	***8.37%***	**1,452**	**1,549**	**1,653**	**1,767**	**1,890**	***6.81%***
Zimmer-Biomet	528	794	863	1,215	1,645	*32.85%*	1,942	2,272	2,624	2,991	3,410	*15.12%*
Smith & Nephew	474	496	576	606	587	*5.49%*	644	706	775	850	932	*9.68%*
Wright Medical	209	243	273	322	574	*28.67%*	677	799	943	1,112	1,312	*18.00%*
Orthofix	112	103	110	96	103	*-2.14%*	110	118	126	135	144	*6.98%*
Exactech	52	66	79	87	100	*17.79%*	114	122	138	169	182	*12.54%*
Industry Total	**2,365**	**2,818**	**5,770**	**6,144**	**6,942**	***9.68%***	**7,614**	**8,352**	**9,160**	**10,048**	**11,021**	***9.68%***

Table 19: Sourced from Bloomberg and authors' calculations

Hips:

Hip Implant Industry Revenue Forecasted 2017-2021												
	2012	2013	2014	2015	2016	CAGR	2017	2018	2019	2020	2021	CAGR
Johnson & Johnson	-	-	1,368	1,332	1,361	*-0.26%*	1,458	1,562	1,673	1,793	1,920	*7.13%*
Stryker	**1,233**	**1,272**	**1,291**	**1,263**	**1,283**	***1.00%***	**1,369**	**1,469**	**1,576**	**1,690**	**1,813**	***7.27%***
Zimmer-Biomet	1,975	1,980	1,326	1,851	1,868	*-1.38%*	2,001	2,144	2,296	2,460	2,635	*7.13%*
Smith & Nephew	666	653	654	604	597	*-2.70%*	640	685	734	786	842	*7.13%*
Exactech	41	41	43	43	47	*3.44%*	55	57	59	61	63	*3.44%*
Industry Total	**3,915**	**3,946**	**4,683**	**5,093**	**5,156**	***7.13%***	**5,523**	**5,917**	**6,338**	**6,790**	**7,274**	***7.13%***

Table 20: Sourced from Bloomberg and authors' calculations

Neurotech & Neurovascular:

Neurotech & Neurovascular Industry Revenue Forecasted 2017-2021												
Neurotech & Neurovascular	2012	2013	2014	2015	2016	CAGR	2017E	2018E	2019E	2020E	2021E	CAGR
Industry Total	**7,284**	**7,602**	**8,055**	**7,996**	**8,300**	***3.32%***	**8,576**	**8,860**	**9,154**	**9,458**	**9,772**	***3.32%***
Abbott Laboratories	453	475	527	520	562	*5.53%*	593	626	661	697	736	*5.53%*
Boston Scientific	774	806	851	903	1,011	*6.91%*	1,062	1,135	1,213	1,297	1,325	*5.70%*
CR Bard Inc	845	830	928	970	1,015	*4.69%*	1,062	1,112	1,164	1,219	1,245	*4.05%*
Edwards Lifesciences Corp	52	49	50	48	50	*-0.78%*	51	52	53	54	56	*2.16%*
Johnson & Johnson	2,094	2,248	2,392	2,212	1,997	*-1.18%*	2,040	2,016	1,992	1,969	1,946	*-1.18%*
LeMaitre Vascular	57	65	71	78	89	*11.96%*	94	98	103	108	114	*5.00%*
Medtronic	2,168	2,215	2,235	2,176	2,321	*1.72%*	2,361	2,402	2,444	2,486	2,529	*1.72%*
Stryker Corp	**842**	**915**	**1,001**	**1,088**	**1,255**	***10.49%***	**1,313**	**1,419**	**1,524**	**1,628**	**1,823**	***8.55%***

Table 21: Sourced from Bloomberg and authors' calculations

Spine:

Spine Industry Revenue Forecasted 2017-2021												
Spine	**2012**	**2013**	**2014**	**2015**	**2016**	**CAGR**	**2017E**	**2018E**	**2019E**	**2020E**	**2021E**	**CAGR**
Industry Total	**8,733.5**	**9,342.0**	**9,517.7**	**9,437.1**	**9,731.6**	***2.74%***	**9,998.5**	**10,272.6**	**10,554.3**	**10,843.8**	**11,141.1**	***2.74%***
Alphatec	196.3	204.7	207.0	185.3	120.2	*-11.54%*	106.3	94.1	83.2	73.6	65.1	*-11.54%*
Exactech	24.5	25.5	23.8	22.8	19.5	*-5.55%*	-	-	-	-	-	-
Johnson & Johnson	3,241.9	3,952.7	4,134.0	3,906.0	3,880.0	*4.59%*	3,963.7	4,049.2	4,136.5	4,225.7	4,316.8	*2.16%*
Medtronic	3,267.0	3,131.0	3,041.0	2,971.0	2,924.0	*-2.73%*	2,844.0	2,766.3	2,690.6	2,617.0	2,545.4	*-2.73%*
NuVasive	620.3	685.2	762.4	811.1	962.1	*11.60%*	1,073.7	1,198.2	1,337.2	1,492.2	1,665.3	*11.60%*
Orthofix	447.6	397.6	402.3	396.5	409.8	*-2.18%*	423.5	437.7	452.4	467.5	483.2	*3.35%*
Stryker	**727.0**	**743.0**	**740.0**	**740.0**	**754.0**	***0.92%***	**812.7**	**875.3**	**917.3**	**936.8**	**951.9**	*4.03%*
Zimmer-Biomet	208.9	202.3	207.2	404.4	662.0	*33.42%*	774.5	852.0	937.2	1,030.9	1,113.4	*9.50%*

Table 22: Spine – Market Share projected

Appendix B:

Bloomberg. (2017) *Bloomberg Professional*. [Online]. Available at: Subscription Service (Accessed: 03 April 2017).

Mauboussin, M.J., Callahan, D. & Majd, D. (2016), 'The Base Rate Book: Integrating the Past to Better Anticipate the Future'. *Credit Suisse Global Financial Strategies*.

Stryker Form 10-K 2012

Stryker Form 10-K 2013

Stryker Form 10-K 2014

Stryker Form 10-K 2015

Stryker Form 10-K 2016