Amgen Inc. (NASDAQ:AMGN)

Recommendation: HOLD

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Company Overview

Amgen Inc. is a leader in Biotechnology with core business operations focused on innovation, discovery, and development of new molecular drug formulas to meet the medical needs of those who suffer from serious diseases. Amgen operates in Canada, Europe, and other foreign countries, but is primarily focused on growth in the United States. Their main business segments consist of oncology/hematology, cardiovascular disease, inflammation, bone health, nephrology and neuroscience. Amgen’s 2016 total revenue consisted of $21,892 million, which was a 4.5% increase from 2015’s total revenue.

Stock Performance Highlights

52 week High  $191.10
52 week Low  $138.83
Beta Value  1.71
Average Daily Volume  2.61 m

Share Highlights

Market Capitalization  $125.11 b
Shares Outstanding  725.91 m
Book Value per share  $43.41
EPS (TTM)  $10.98
Trailing P/E Ratio  15.70x
Forward Dividend Yield  2.65%
Dividend Payout Ratio  40.20%

Company Performance Highlights

ROA  10.18%
ROE  25.37%
Sales  $5.55 b

Financial Ratios

Current Ratio  6.07x
Debt to Equity  1.11x

Current Price: $172.35
Target Price: $180-$188

Growth Fueled by New Drugs

Investment Positives:
Favorable Economic Outlook – By 2025, healthcare will contribute to approximately 20% of the total GDP. This is directly correlated to demographics and the increasing proportion of those aged 65 and older in the U.S population.
Increased Growth from Newer Drugs – Repatha grew 123% from Q3 of 2016 to Q3 of 2017 and is expected to continue with strong growth long-term. KYPROLIS, another drug relatively new to Amgen’s pipeline, grew 13% from Q3 of 2016 to Q3 of 2017 and is forecasted to grow at an even faster rate long-term.
Desirable Up-and-Coming Products – Amgen has several products expected to be introduced in the next few years that will cater to serious medical issues, as well as help the company continue to grow. These include Aimovig, Enbrel AutoTouch, and multiple biosimilars.

Investment Negatives:
Declining Growth from Top Drugs – ENBREL and Neulasta, which currently are Amgen’s top two revenue producing drugs, have both seen negative growth year-over-year. This negative growth is forecasted to continue due to increased competition, expiring drug patents, and current healthcare regime trends.
Increased Competition from Biosimilars – Several of Amgen’s drugs are seeing decreased growth due to competition from biosimilars. One of these drugs is NEUPOGEN, which has seen negative growth the past four years, including -25% growth from Q3 of 2016 to Q3 of 2017.

One Year Stock Performance
Executive Summary

In hopes of improving future portfolio returns our University of Iowa Krause Fund analyst team recommends a HOLD rating for Amgen Inc. Our decision has been carefully decided based on historical performances, growth projections, and increased uncertainty surrounding government regulation.

Forecasts and supporting valuation models reinforce our recommendation of a HOLD rating. Although we have forecasted increased growth in 2017 and 2019 to 2023 for Amgen, we find investment risks including government regulation via U.S. FDA approvals and the future of healthcare insurance coverage. We believe these, amongst other forecasts and assumptions in our model, will drive Amgen’s stock price to fall between a share price of $180-$188.

Economic Outlook

U.S. Real Gross Domestic Product

Real Gross Domestic Product (GDP) is a macroeconomic assessment that is used to measure the number of goods and services produced by a nation. Real GDP is inflation-adjusted for the price changes in the goods and services measured. The exclusion of inflation gives a more accurate picture of the overall economic growth in the economy. A high, real GDP is usually an indication of a strong economy where unemployment is low, wages are increasing, and corporate earnings are growing.

A real GDP growth rate in the 2.5-3.5% range is a widely accepted indicator of a healthy economy. The real GDP yearly growth of the US economy has been below 3% since 2006 and has failed to reach the 2.5% benchmark all but two years. In recent quarters, and shown in Figure 1, real GDP has shown improvement in reaching a growth rate of 3.0% in Q2 and 3.1% in Q3 of 2017.14. Dragged down by slow growth in the first quarter of 2017, the real GDP growth percentage is expected to fall in the range of 2.4%-2.6%. Although the projected range is slightly lower than what would be considered healthy, it is still a positive sign following slow growth of 1.6% in 2016.

The 2016 Presidential election brought a shift to economic strategy. President Donald Trump proposed promises of increased real GDP growth by means of corporate tax reform, healthcare reform, and job growth. These promises have been a strong driver for the U.S. stock market as the S&P 500 Index realized a gain of 21% since President Trump’s election in November 2016. This sharp increase has led to the highest consumer confidence index of 125.9 in the last 17 years as of October 2017.2 Strong consumer confidence leads to increased consumer spending and real GDP growth. The Trump Administration is pushing forward on the corporate tax reform bill they had promised throughout his campaign. They plan to cut the corporate tax rate from 35% to 20% providing companies with increased earnings and capital spending opportunities. In the long run, increased corporate earnings and capital spending will drive real GDP growth.

The US Healthcare sector will be positively affected by real GDP as its growth will lead to increased earnings and investment for innovation across the healthcare sector. Today, Healthcare makes up 17.8% of the real GDP and it is projected to grow at a rate of 5.6% annually until 2025.19. If projections are correct, the healthcare sector will make up 19.9% of real GDP by 2025. Additionally, government spending in the sector is projected to grow at a rate of at 5.9% due to increased spending on Medicare programs for the growing elderly population. This will encourage growth and increased investment in the healthcare sector.

Based on the current economic and political environment, as well as the positive growth for the healthcare sector, we believe that real GDP will be growing at a rate of 5.6% by 2018. Other factors such as government regulation, Federal Reserve policy, and an ageing demographic, are key drivers of our real GDP growth projection, and will be discussed later on in our economic analysis.

Federal Reserve Policy

The Federal Reserve Bank is the central bank of the United States. They develop and administer the United States Federal Reserve policy. Although the Federal Reserve was founded by congress, they are independent from the president, government policy, and other government elected officials. The Federal Reserve Bank is given a dual mandate to maximize employment and to provide stable prices for the economy. They achieve their mandate through monetary policy and their control of bank reserve requirements, open market operations, and the federal interest rate. Decisions on what monetary policy actions to take are based on the current state of the economy, specifically when looking at the rates of unemployment and inflation. The Federal Reserve uses the personal consumption expenditures (PCE) as their measurement of inflation.

In attempts to achieve price stability in the economy, the Federal Reserve works to control inflation. An inflation rate of 2% is what the Federal Reserve considers an acceptable inflation rate. As shown in Figure 2, inflation reached 2.1% in February of 2017, and it was the first time the rate moved above the Federal Reserve’s target rate of 2% since March of 2012.19. Since October 2017, inflation has fallen to a rate of 2.20%. The current projections made by the Congressional Budget Office appear on the last page of this report.
show an inflation rate of 2% in 2018, which will remain the controlled rate for the next 10 years. Inflation growth at a consistent rate will influence Federal Reserve policy and improve consumer spending as people will find greater value in the dollar. Along with inflation, the Federal Reserve analyze the rate of employment to help guide policies.

Figure 2

The Federal Reserve’s dual mandate also includes maximizing employment. Although full employment is desirable, healthy economies have accepted a rate of unemployment to be in the range of 4.50-6%. In November, the unemployment rate fell to the lowest level since February 2001 to 4.1%. Shown in Figure 3, The Congressional Budget Office projects the unemployment rate will settle around 4.4% in 2018 and rise to 4.7% in the following five years.

Figure 3

The healthcare sector has played a large role in the decrease of the unemployment rate. Today, the sector makes up approximately 12.2% of all employment in the United States, and according to the Bureau of Labor Statistics (BLS), this figure will grow to 13.8% by 2026. Additional regulation at the federal and state level are found in healthcare insurance. Programs like Medicaid and Medicare provide healthcare payments and coverage for qualified individuals. Qualifications for Medicaid include low-income patients and nursing home services. Qualifications for Medicare include persons aged 65 and older and those who are disabled. During the Obama Administration, Patient Protection and Affordable Care Act (PPACA) was implemented to provide the healthcare sector with changes through increased insurance coverage, affordability, and accessibility. When implemented, the standards for healthcare insurance were radically changed and the number of uninsured citizens decreased from 44 million to 28 million. For the healthcare sector, this posed great opportunity for healthcare companies to increase the supply of

Figure 4

Government Regulation

The healthcare sector is heavily regulated at both the national and state level. At the national level, The U.S. Food and Drug Administration (FDA) regulates the sector by approving the manufacturing of all healthcare products prior to sale. With approval, manufacturers can market and sell products for a profit. The FDA also has the power to identify products that are deemed unsafe for consumers resulting in a product recall, or the immediate suspension of the manufacturing and sale of product. A product that is recalled will negatively affect a company’s financial statements and their underlying reputation. Sale suspensions, fines, and penalties are all punishments that companies can receive if found in violation of U.S. F.D.A. regulations.

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their products. It also introduced great pressure for the sector as a 2.3% medical device tax was imposed on manufacturers. Although the tax has predicted to raise $29 million in revenue, the health care sector have realized adverse effects financially. Cost-cutting strategies such as reducing the number of domestic employees and moving business operations overseas were introduced to offset the financial losses caused by the medical device tax.

Led by the Donald Trump administration, the primary goal for repealing and replacing the PPACA is to increase the free market in health care and allow American citizens to decide whether or not they will seek health care insurance. Attempts to repeal and replace the PPACA by the GOP have recently failed resulting in the party to turn their attention on tax reform. We believe that health care reform will be revisited later on in Trump’s presidential term. For health care, the reform provides uncertainty on the success of the sector and the ability for companies to manufacture and distribute affordable health care products.

**Demographics**

Demographics remain one of the most important factors for the continued growth of the health care sector. The aging population is more prone to chronic diseases, injury, and the need for medical care. Due to current health care services available, the average life-span is increasing. Shown in Figure 5, and backed by Analyst predictions, total population over the age of 65 will increase from 14.9% in 2015 to nearly 22.1% by 2050. Those aged over 80, will increase from 3.8% to 8.2% during that same time period. We believe that as the aging population starts to become a larger component of the world’s total population, the demand for medical care and services will increase resulting in the overall growth of the healthcare sector. This will provide the healthcare sector a larger demographic to market and distribute medical products.

**Industry Overview**

The Biotechnology sector uses biological processes in the development of a product. The sector is extremely regulated and is currently under immense political pressure. Four large capitalization Biotechnology companies dominate the space; Amgen, AbbVie Inc., Celgene Corporation, and Gilead Sciences. These key players are constantly competing for sales, competing for acquisitions of smaller biotech companies, and legal victories over patent infringement. Biotechnology firms generate revenues through the sale of biologic and biosimilar drugs.

**Product Distribution**

Within the U.S. the primary means of distributing products is through wholesalers, who then distribute the products to health care providers. There are only a few main wholesalers in the biotechnology industry, three of the most prominent are; AmerisourceBergen Corporation, McKesson Corporation, and Cardinal Health Inc. These wholesalers will then sell the product to hospitals, pharmacies, and clinics. The Biotechnology firm is the firm’s manufacturer. The Biotechnology firm then negotiates with a pharmacy-benefit manager (PBM), a group hired by the insurer to manage drug costs. The manufacturer pays the PBM or insurer a rebate so they will provide coverage of their product. The Biotechnology firm sells the drug to a wholesaler, who then sells the product to a health care provider. The healthcare provider will then sell direct to the consumer. The consumers cost will be partially covered through the plan they hold with their insurer.

**Industry Materials Suppliers**

Within the Biotechnology industry, firms manufacture a large portion of their products, but there are incidences in which firms will outsource manufacturing to a third party.

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Important disclosures appear on the last page of this report.
In order to acquire the materials they need to manufacture their product, firms will use third party raw material suppliers. Every materials supplier must be approved by a regulatory agency. Also the manufacturing firm must enter a contract stating what source or sources of raw materials supply they will be using (10K). These regulatory restrictions could lead to potential supply chain disruptions and adversely affect a firm’s ability to manufacture and deliver their product to the wholesaler in a timely manner.

**Regulatory Considerations**

To be approved by the FDA, healthcare companies must first go through several phases to be able to market their drug. Product development cycles are typically about 10 to 15 years from discovery to market. Biotechnology companies often must invest hundreds of millions of dollars into a product before they see profitable returns. After laboratory analysis and preclinical testing in animals, companies file an Investigational New Drug Application with the FDA to begin human testing. Typically, companies undertake an FDA-designed three-phase human clinical testing program. In phase 1, they conduct small clinical trials to investigate the safety and proper dose ranges of their product candidates in a small number of human subjects. In phase 2, they conduct clinical trials to investigate side effect profiles and the efficacy of their product candidates in a large number of patients who have the disease or condition under study. In phase 3, they conduct clinical trials to investigate the safety and efficacy of their product candidates in a large number of patients who have the disease or condition under study. The development cycle of a drug approval process is shown below.

**The FDA Drug Approval Process**

<table>
<thead>
<tr>
<th>Phase</th>
<th>20-101 Healthy volunteers</th>
<th>100-200 Patient volunteers</th>
<th>1,000-4,000 Patient volunteers</th>
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</thead>
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<tr>
<td>Time</td>
<td>Year 1-2</td>
<td>Year 3</td>
<td>Year 4-6</td>
</tr>
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<td>New Drugs Passed</td>
<td>70% of INDs</td>
<td>32% of INDs</td>
<td>27% of INDs</td>
</tr>
<tr>
<td>Subjects</td>
<td>Laboratory and animal studies</td>
<td>Determine safety &amp; dosage</td>
<td>Evaluate effectiveness &amp; side effects</td>
</tr>
<tr>
<td>Purpose</td>
<td>Assess safety &amp; biological activity</td>
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**Industry Trends**

The production of biosimilars was legalized in 2010 with the passage of the BPCIA. Since, large Biotechnology firms with previously established technology and infrastructure have raced to generate biosimilars to compete with their competitor’s expiring drugs. There are currently 7 biosimilar drugs that have been approved and more than 25 are in a phase of FDA testing. Companies in the industry will have to be more innovative than ever as they try to challenge competitor’s drugs.

Biosimilars do not pose as large of a threat as a traditional generics would in the pharmaceutical sector, due to the high costs of producing a biosimilar. High production costs can be attributed to higher clinical, manufacturing and marketing costs. Initial biosimilars are seen to sell at a 15% to 25% discount to the biologic they challenge. However, the discount does not factor in insurance coverage effects (22). There is also no certainty that a medical professional will switch products for their patients based solely on price, especially if they are currently stable patients. This is shown by a study done by InCrowd, depicted in the figure below.

**Within the Affordable Care Act (ACA) there was a Biologics Price Competition and Innovation Act (BPCIA) which implemented new patent rules and allowed for the marketing of biosimilars. A biosimilar is a drug designed to have active properties similar to ones that have previously been licensed. It is similar to a generic besides the fact that a generic is a chemical formula that can be exactly replicated. A biosimilar can only come within certain percentage of similarity as biologics are produced from DNA technology.

Once approved by the FDA, companies can obtain drug patents which last for 20 years from the date the patent application is filled. This patent provides a 12-year market exclusivity and a 4-year data exclusivity beginning when the biologic drug receives FDA marketing approval. Each exclusivity can be extended 6 months for pediatric applications. A biosimilar cannot be marketed until the 12-year exclusivity expires. It is beneficial for biosimilars that the data exclusivity expire before the market exclusivity, so that a biosimilar manufacturer can begin development work to ensure rapid market entry on the expiration of a drug’s market exclusivity. Biosimilar entry leads to greater competition and thus greater pricing discounts for customers. (15)

As mentioned in the economic overview, there is uncertainty surrounding the future on government policies pertaining to healthcare. One of President Donald Trump’s primary campaign promises was to repeal and replace the ACA. So far passing any type of healthcare reform seems unlikely as the most recent house bill expired and congress has turned their attention to tax reform. Although we do not believe a complete repeal will occur, the elimination of the BPCIA could drastically change the biotechnology environment.

Price pressure has become a factor that could affect biotechnology and pharmaceuticals in the near future. Companies have begun to face increased public scrutiny for their drug prices. In recent years health insurers, PBM’s and politicians have become more aggressive on putting the industry drug prices under pressure. At times they have...
refused to cover treatments and have leveraged manufacturers against each other (23).

Mergers and acquisitions activity in Biotechnology has grown quickly in recent years. Due to the low interest rate environment, M&A activity grew quickly from 2013 to 2016. That trend appears to be slowing. In 2016 there were 54 deals worth $4.7 billion, but as of mid-October 2017, there were only 27 deals completed worth $719 million. The slowing trend shows companies are being more strategic with their investments as interest rates rise (24).

**Industry Leaders**

**AbbVie Inc.**

AbbVie is the world’s largest Biotechnology company with a market capitalization of $152 billion. They operate in pharmaceutical products and service a number of areas including autoimmune diseases in rheumatology, dermatology, oncology, and multiple sclerosis. In 2016 they had total revenue of $25,638 million. $15,947 million came from sales in other countries. Almost all of their revenue comes from the same three wholesale distributors that Amgen uses, McKesson Corporation, Cardinal Health, Inc., and AmerisourceBergen. In Q3 of 2017 AbbVie reported revenue of $6,995 billion, bringing them to a total of $20,477 billion for the first nine months of 2017.

**Gilead Sciences**

After Amgen, Gilead Sciences is the world’s next largest Biotechnology company with a market cap of $96 billion. They operate in pharmaceutical products and service a number of areas including autoimmune diseases in rheumatology, dermatology, oncology, and multiple sclerosis. In 2016 they had total revenue of $25,638 million. $15,947 million came from sales in other countries. Gilead generates almost all of their revenue through the three same wholesale distributors that Amgen uses, McKesson Corporation, Cardinal Health, Inc., and AmerisourceBergen. In Q3 of 2017 Gilead Sciences reported revenue of $6,995 billion, bringing them to a total of $20,477 billion for the first nine months of 2017.

**Celgene Corporation**

Celgene is next in line as the world’s largest Biotechnology company with a market cap of $80.5 billion. They operate across many areas including hematology, solid tumors, inflammation, and immunology. In 2016 they saw total sales of $11,229 billion. $7,009 billion came from sales in the U.S., $3,046 billion came from sales in Europe, and $1,173 billion came from sales in other countries. Celgene’s highest revenue producing drug is REVLIMID, used to treat multiple myeloma, which generated $6,973 billion in 2016. Celgene sells their products primarily through wholesale distributors and specialty pharmacies in the U.S. 12% of their 2016 revenue came from CVS and 10.3% came from McKesson Corp. In Q3 of 2017, Celgene generated revenue of $3,287 billion, bringing them to a total of $9,520 billion for the first nine months of 2017.

**Direct Product Competition**

Even drugs under patent face competition. There are many different ways to approach curing a disease, virus, or infection. Many companies have products that address the same issue in a different way. From this next section it is evident that Amgen has many competitors that solve similar problems with different drugs.

**Inflammation**

Amgen’s highest grossing drug over the past two years, ENBREL has main competitors of REMICADE, a Janssen/Merck & Company drug, HUMIRA, an AbbVie drug, and STELARA, another Janssen drug. In 2016 Amgen’s ENBREL logged sales of $5,965 million, with $246 million of these sales coming from Canada and the majority from the U.S. REMICADE had sales of $6,966 million in 2016. HUMIRA had sales of $16,078 million in 2016, $10,432 million of which came from the U.S. and the rest came internationally. STELARA had sales of $3,232 million in 2016. Amgen is a market leader in the space of treating chronic diseases, such as severe rheumatoid arthritis, but falls behind REMICADE and HUMIRA in terms of total revenue. However, ENBREL is the first and only systemic therapy to treat pediatric patients with chronic moderate-to-severe plaque psoriasis.

**Oncology/Hematology**

Aranesp, Amgen’s 3rd highest grossing drug over the past three years competes mainly with PROCRIT, a Janssen drug and MIRCERA a Galenica/Roche drug. Aranesp produced $2,093 million worth of sales in 2016, $1,082 million in the U.S. and $1,011 million in the rest of the world. PROCRIT saw sales of $1,105 million in 2016. MIRCERA saw sales of $512 million in 2016. Aranesp surpasses its competitors, who also treat patients with lower-than-normal number of red blood cells.

EPOGEN competes mainly with MIRCERA, a Galenica/Roche. EPOGEN recorded sales of $1,282 million in 2016, all of which came from the U.S. MIRCERA saw sales of $512 million in 2016. Amgen more than doubles its next leading dialysis drug competitor in revenue.

NEUPOGEN competes mainly with Zarxio, a Sandoz drug, and various companies that market epoetin alfa biosimilars in Europe. NEUPOGEN had sales of $765 million in 2016, with $1,282 million coming from the U.S. and the rest globally. Zarxio had sales of around $100 million in 2016. While there is a rise of biosimilars that treat patients with a low white blood cell count, NEUPOGEN has historically been the market leader.

KYPRELON competes mainly with VELCADE, a Millennium Pharmaceuticals drug, as well as REVLIMID and POMALYST, both drugs by Celgene. KYPRELON produced $692 million worth of sales in 2016, with $554 million in the U.S. and $138 million throughout the rest of the world. VELCADE produced sales of $1,224 million in 2016. REVLIMID had sales of $6,973.6 million in 2016. POMALYST had sales of $1,310.7 million in 2016. KYPRELON is still a very new drug in Amgen’s
pipeline and is posed to catch up with other Multiple Myeloma drugs.

**Cardiovascular**

Repatha competes mainly with PRALUENT, a Regeneron drug. Repatha recorded sales of $141 million in 2016, with $101 million coming from the U.S. and $40 million coming throughout the rest of the world. PRALUENT saw product sales of $116.3 million in 2016, with $94.4 million coming from the U.S. and $21.9 million coming internationally. According to Q3 2017 results, Repatha has 60% of total prescription share in the U.S. and 57% in the EU. Repatha, another relatively new drug to Amgen’s pipeline, has already seen great success in treating Hyperlipidemia.

Neulasta, Prolia, Sensipar/Mimpara, and XGEVA all have numerous competitors, however Prolia has especially been successful. According to Q3 2017 data, Prolia has around 20% market share in most markets. In some countries such as Austria, Switzerland, and Ireland with better treatment rates for osteoporosis, Prolia has a 50% or better market share.

Biosimilars are relatively new to Biotechnology, but represent a high potential for competition to Amgen. Zarxio, a biosimilar of NEUPOGEN, was the first biosimilar entrant into the U.S. market. Companies have pending applications with the FDA for biosimilar versions of EPOGEN and Neulasta, along with additional biosimilar versions of NEUPOGEN. “In August, Sandoz received FDA approval for its biosimilar version of Enbrel, called Erelzi. However, Amgen is confident that they are well positioned to compete and leverage their experience against branded competition, as well as their considerable experience in competing against epoetin alfa and filgrastim biosimilars in Europe.

**Porters 5 Forces**

**Threat of New Entrants:** Moderate

The large Biotechnology firms have very little threat of a smaller Biotechnology firm entering into their territory. The barriers for entry are too high. To produce a biologic drug, it requires significant technology, professional knowledge, and capital to become an FDA approved drug. Although there is a small threat from within the Biotechnology industry, there is still a threat of new entrants from outside large pharmaceutical companies. Since the passage of the ACA, large capitalization pharmaceutical companies and generic manufacturers have formed partnerships to form biosimilars. If they are successful they could challenge large Biotechnology firm’s expiring drugs and steal a percentage of the market share. (10k)

**Competitive Rivalry:** High

The Biotechnology industry is more competitive than ever due to the ACA, political pressure, and rapidly advancing technology. The introduction of biosimilars and shorter patents on biologic drugs, encourages more competition. In order to stay competitive firms will need to spend a higher amount on R&D to continue adapting to the changing climate.

**Bargaining Power of Suppliers:** Low

Companies in the industry work to diversify their raw materials’ supply chain to reduce exposure risk. Large Biotechnology firms often times are a large portion of supplier’s revenues, which gives them leverage over suppliers. Supplier’s materials must be approved by regulatory agencies before a supply contract is entered with the manufacturer. In case of supplier failure, Biotechnology firms work to obtain approval for many suppliers of the same product.

**Threat of Substitutes:** High

Biosimilars can be sold following patent expiration. They are often sold at a lower price and can take market share from specific biologics in a company’s portfolio. Prior to patent expiration, biologics can face competition from drugs that have a different molecular patent, but generate a similar result.

**Bargaining Power of Buyers:** High

Biotechnology firms are in a constant struggle with buyers over drug and rebate prices. Both the Biopharmaceutical wholesalers and insurers have consolidated in recent years. The insurers or PBM’s as explained earlier, have significant leveraging power over the Biotechnology firms because if they choose not to cover the drug then the consumer will be covering the full cost. Many drug prices are high due to the high R&D cost associated with creating and gaining approval of a biologic, making it unlikely that a direct consumer will pay the full cost.
In 2016 Amgen generated 79% of their revenues in the U.S. and 21% in Europe and other foreign countries. The largest concentration of their sales and marketing forces is based in the U.S. and Europe. Additionally, Amgen continues to expand commercialization and marketing of their current products in other geographic territories, including parts of Latin America, the Middle East, and Asia. This expansion is occurring by either establishing their own affiliate, acquiring existing third-party businesses or product rights or in partnering with third parties.

Operating Margin has increased 11% in the last 4 years and is once again on pace to increase margins in 2017. This shows significant improvement in their ability to cut costs as they continue to grow their business. Amgen is cutting costs through restructuring plans they introduced in the second half of 2014. They saw it necessary to improve margins in order to match competitors who had stronger operating margins, and to continue growth of their bottom line through a period of transition in their product mix. The plan specifies a goal of improving operating margins of 52% to 54% by 2018. They are doing this by focusing on decreasing facilities footprint by 23% and reducing staff by 20% (18). Operating margins in 2014 were 43.9% and in 2016 they were 51.9%, an 8% increase. This shows that Amgen is well on track to meeting their operating margin objective and continuing to grow their business. Amgen is cutting costs through a restructuring plan they introduced in the second half of 2014. They saw it necessary to improve margins in order to match their competitors. Competitor’s margins are further discussed in the competition section.

Earnings per share (EPS) grew in both 2016 and 2015 equaling 13.0% and 35.2% respectively. This shows a so far successful adaptation to the changing Biotechnology market. Amgen was able to improve EPS while adapting to the changes in the biosimilar market and decrease in revenue growth due to a changing product mix.

Research and Development has averaged 19% of sales over the past 3 years. This number is right in line with competitors and should remain fairly consistent. Biosimilars have become a focus of Amgen’s research and development team. They increased R&D spending by 48.5% from 2010 to 2014 to adjust for the change in biosimilar laws as specified in the ACA. The investment in biosimilars will lead to positive growth in the future and help offset losses from expiring drugs.

Amgen has shown commitment to returning value for investors. They started paying a dividend in 2012 and have paid quarterly dividends ever since. Amgen’s current dividend yield is 2.58%. Their current dividend yield is below competitors AbbVie at 2.98% and Gilead Sciences at 2.82%, but above Celgene and Biogen who do not pay a dividend. (1)

**Products**

**Repatha**: Repatha is a human monoclonal antibody that inhibits PCSK9, a protein that helps regulate the amount of cholesterol in the bloodstream. Although Repatha is a new drug, it is already seeing significant growth. In Q3 of 2017 Repatha grew 122.5%. Amgen is confident that Repatha will soon be a significant revenue generator. Repatha’s cardiovascular outcomes are currently under priority review by the FDA. With cardiovascular disease being the leading cause of death around the world, improving patient access to Repatha remains a top priority. According to Q2 results, Amgen now holds 58% of the PCSK9 segment in both the U.S. and Europe. Also, in the U.S. new-to-brand patient share averaged 70% in Q2 of 2017. Below are Repatha’s Q3 2017 results.

**Products**

**KYPYRIS**: KYPYRIS is a proteasome inhibitor, which blocks the action of proteasomes, cellular complexes that break down proteins. Proteasome inhibitors have emerged as an important treatment for multiple myeloma. KYPYRIS grew 13% year-over-year from Q3 of 2016 to Q3 of 2017. This growth comes in a very competitive market, however KYPYRIS is in a unique position to have two compelling sets of overall survival data in relapsed multiple myeloma patients. In Q2 of 2017, Amgen completed two pivotal studies showing an overall survival benefit for KYPYRIS patients with relapsed disease. With Amgen’s oncology drugs: Neupogen and Neulasta, facing competition from biosimilars, Amgen introduced KYPROLIS. The study tested KYPYRIS head-to-head against VELCADE, a Takeda drug that also treats multiple myeloma. Results show that KYPYRIS reduced the risk of death by 21% and improved overall survival by about eight months compared to the VELCADE arm. The study also demonstrated that adding
KYPROLIS to REVLIMID and dexamethasone also reduced the risk of death by 21% and improves survival by about eight months. It is clear that multiple myeloma patients live longer when treated with KYPROLIS. Below are KYPROLIS’ Q3 2017 results.

KYPROLIS® Q3 2017 RESULTS

**Q3 ’17 KYPROLIS® SALES GREW 13% YOY**

<table>
<thead>
<tr>
<th>$ Millions, Net Sales</th>
<th>Highlights</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Strong YoY unit growth in a competitive multiple myeloma segment with several new entrants</td>
</tr>
<tr>
<td></td>
<td>- Strong growth continues outside the U.S. in both existing and new markets</td>
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<td></td>
<td>- KYPROLIS® combinations have now demonstrated overall survival improvement in two compelling sets of data</td>
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Enbrel: Enbrel is a fusion protein that inhibits tumor necrosis factor (TNF). TNF is a substance in the body that causes inflammation and swelling. Year-over-year sales from Q3 of 2016 to Q3 of 2017 for Enbrel declined by 6%, due to prescription trends. These prescription trends are expected to continue into 2018. Despite disappointing year-over-year results, Enbrel managed to lose only less than 1 point of market share in both rheumatology and dermatology in Q3. Amgen continues to make investments to maximize Enbrel’s long-term value, such as the imminent launch of their Enbrel AutoTouch, a reusable auto injector that is designed to meet the needs of rheumatoid arthritis patients. Below are Enbrel’s Q3 2017 results.

Enbrel® Q3 2017 RESULTS

Neulasta: Neulasta is a pegylated protein, primarily used to help reduce the chance of infection due to a low white blood cell count. Neulasta saw a decline of 6% year-over-year from Q3 of 2016 to Q3 of 2017 partly due to a shift in the timing of purchases from some larger end customers, as well as a decline in the number of myelosuppressive chemotherapy regimens. Looking at cancer therapy in total, PD1s and other new novel therapies are causing a low single digit decline in the usage of myelosuppressive agents. In spite of decreased use of myelosuppressive regimens, there has been an increase in the number of hospital admissions for febrile neutropenia and Amgen continues to focus on improving penetration of Neulasta for the benefit of patients and for the reduction of unnecessary hospitalization costs. “The Onpro is an On-body injector that fits on an individual’s arm. After a day of chemo-therapy, the Onpro is designed to administer Neulasta automatically, so an individual does not have to go back to the doctor the next day” (35). The Onpro shows that it drives better adherence to therapy, which leads to lower rates of febrile neutropenia and lower rates of hospitalization. The Onpro kit grew share to 56% of Neulasta units from Q3 of 2016 to Q3 of 2017. Amgen expects to continue Onpro adoption growth in 2018. Below are Neulasta’s Q3 2017 results.

Neulasta® Q3 2017 RESULTS

Aranesp: Aranesp is a recombinant human protein used to treat lower than normal numbers of red blood cells. Aranesp saw declines of 3% year-over-year from Q3 of 2016 to Q3 of 2017, due to unfavorable impact from foreign exchange and unit volume decline. Amgen has been executing their management strategy of successfully transitioning much of the dialysis business to Aranesp and extending their supply contract with DaVita through 2022. Below are Aranesp’s Q3 2017 results.

Aranesp® Q3 2017 RESULTS

Prolia: Prolia contains the active ingredient, denosumab, which is used to treat postmenopausal women with osteoporosis at high risk for fracture. Prolia continues to deliver exceptional results. Prolia grew 22% year-over-year from Q3 of 2016 to Q3 of 2017. The drug experienced a slight decline in Q3, which follows the typical pattern for Prolia in the first and third quarters. There are only about 3.5 million patients on Prolia globally, with about 1 million in the U.S., 1.5 million in Europe, and 1 million throughout the rest of the world. Currently there is an untapped market for the osteoporotic population at risk for fracture. These fractures are detrimental to the independence of patients and place a large burden on caregivers. Amgen is focused on improving treatment rates in order to bring Prolia to more of these at risk patients. Below are Prolia’s Q3 2017 results.

Prolia® Q3 2017 RESULTS

Important disclosures appear on the last page of this report.
**Sensipar/Mimpara:** Sensipar is used for the treatment of sHPT in adults with Chronic Kidney Disease who are on dialysis. Sensipar increased 10% year-over-year from Q3 of 2016 to Q3 of 2017, primarily due to net selling price increase. Below are Sensipar’s Q3 2017 results.

**XGEVA:** XGEVA contains the same primary ingredient as Prolia, but instead is used for the prevention of SREs (radiation to bone) in patients with bone metastases from solid tumors. XGEVA declined 2% year-over-year from Q3 of 2016 to Q3 of 2017. This decline is due to a shift in the timing of purchases from some larger end customers. Despite the decline, XGEVA is expected to see growth in 2018 with the addition of a multiple myeloma indication. The positive results from the Multiple Myeloma study will expand the eligible patient population and provide a new growth opportunity for XGEVA. Below are XGEVA’s Q3 2017 results.

**Epogen:** Epogen is used to treat anemia by Chronic Kidney Disease in patients on dialysis to lessen the need for red blood cell transfusions. Epogen declined 21% year-over-year from Q3 of 2016 to Q3 of 2017. The primary driver here being lower net selling prices, due to Amgen’s extended DaVita agreement. Announced at the beginning of 2017, Amgen has agreed to supply DaVita with EPOGEN and Arnaesp in amounts necessary to meet a specified annual percentage of DaVita’s requirements for drugs used in providing dialysis services in the U.S. and Puerto Rico. DaVita is one of the largest kidney care companies in the U.S. and Amgen does not see any underlying changes in the EPOGEN business. Below are Epogen’s Q3 2017 results.

**NEUPOGEN:** Neupogen is used primarily to help reduce the chance of infection due to a low white blood cell count in people who have received chemotherapy. Neupogen year-over-year sales decreased by 25% from Q3 2016 to Q3 2017. Despite short-acting biosimilar competition, Neupogen continues to maintain pricing discipline. They have maintained pricing discipline over the three-plus years since NEUPOGEN first faced competition in the U.S. Amgen exited Q3 of 2017 with 41% share of the short-acting segment. Below are EpoGEN’s Q3 2017 results.

**Vectibix:** Vectibix is a human monoclonal antibody antagonist of the EGFr, “meaning that it is used treat colon cancer by binding to epidermal growth factor receptors (EGFR).” According to Q2 2017 results, Vectibix now has over 50% of the U.S. EGFR market share. Also in Q2 of 2017, Vectibix received a label update to more precisely define a population with-type RAS for treatment in colorectal cancer. Vectibix has increased 2% year-over-year from Q3 of 2016 to Q3 of 2017 mainly due to an increase in higher unit demand.

**Aimovig:** Currently there is unmet medical need in migraines. Amgen has developed a drug to tackle this problem in Aimovig. Aimovig has been receiving positive feedback and patients and physicians are excited about this drug’s impressive outlook.

**Parsabiv:** Parsabiv is used for the treatment of sHPT in adult patients with Chronic Kidney Disease, who are on hemodialysis. Parsabiv has now been launched in over 10 countries in Europe. Launch in the U.S. is expected to come when CMS reimbursement code for Parsabiv becomes effective on January 1, 2018. Amgen has about 150,000 patients on the drug as of now, which is only about a 26% penetration.

**Biosimilars:** In Q3 AMGEN received approval for their second biosimilar Avastin, a biosimilar to Avastin. They also submitted a biosimilar of Herceptin to regulators for review. However,
Amgen’s most significant biosimilar news deals with their HUMIRA biosimilar, AMGEVITA. They gained clearance to launch in Europe starting in 2018. AMGEVITA is also Amgen’s first biosimilar to receive regulatory approval in the U.S., however it is unlikely to see AMGEVITA launch in 2017, due to litigation with AbbVie. “In September of 2016, Amgen received FDA approval to start selling a biosimilar of Humira in the U.S. AbbVie sued Amgen in federal court in Delaware, seeking to block the copy and alleging it violated many of AbbVie patents. Amgen did not start selling the drug because of patent litigation. They tried to invalidate some Humira patents in a challenge filed with an arm of the U.S. Patent and Trademark Office, but failed.” (27.) Nonetheless, Biosimilar are expected to be a strong source of growth for Amgen.

Amgen is poised for a strong finish to 2017, as well as numerous launches in 2018. These include their Repatha outcomes label, Enbrel AutoTouch device, Aimovig for migraine, Parsabiv, the XGEVA multiple myeloma indication, as well as large opportunities from their biosimilar franchise.

Drug Pipeline
KYPROLIS is currently in phase 1 for treating small-cell cancer. There are currently thirteen other drugs in stage 1. BLINCYTO is currently in phase 2 for treating Diffuse Large B-Cell Lymphoma (DLBCL); R/R Ph+ and minimal residual disease. There are also four other drugs in phase 2. In phase 3, Amgen currently has most of their high profile drugs waiting to be approved for a certain type of treatment. Aranesp is in phase 3 for Myelodysplastic syndromes, ENBREL is in phase 3 for Psoriatic arthritis and Rheumatoid arthritis remission, KYPROLIS is in phase 3 for Multiple Myeloma, Vectibix is in phase 3 for mCRC, Prolia is in phase 3 for Glucocorticoid-induced osteoporosis, Repatha is in phase 3 for Hyperlipidemia, and XGEVA is currently in phase 3 for delay/prevention of bone metastases in breast cancer and cancer-related bone damage in patients with Multiple Myeloma. Amgen also has five other drugs in phase 3.

In addition to awaiting market approval, Amgen also has several drugs with patents set to expire relatively soon. Enbrel’s patent for methods of treating psoriasis in the U.S. is set to expire 8/13/2019. Prolia’s patent for RANKL antibodies; and methods of use in the U.S. and Europe is set to expire 12/22/2017. Sensipar’s patent, calcium receptor-active molecules in the U.S. is set to expire in 3/8/2018. BLINCYTO’s patent, bifunctional polypeptides in the U.S., is set to expire 4/21/2019. Vectibix also has both of its patents set to expire relatively soon. Their Human monoclonal antibodies to EGFr patent in the U.S. is set to expire 5/5/2018 and the same patent in Europe is set to expire 4/8/2020.

Even though Amgen has several patents set to expire soon, their future looks very promising due to their impressive drug pipeline. Specifically their newer drugs Repatha and KYPROLIS present reason to be optimistic. Repatha currently holds 58% of the PCSK9 segment in both the U.S. and Europe. As cardiovascular disease remains the leading cause of death in the world, PCSK9 looks like it may be the answer to fighting the deadly disease. “The FOURIER trial, which was funded by Amgen, shows that PCSK9 inhabitation, decreased the risk of cardiovascular events in high-risk patients receiving therapy. The beneficial effects of this drug were consistent with an absolute reduction in LDL cholesterol levels. However, the FDA is still reviewing Repatha and testing the results on a larger audience.” (28.) The fact that they fourier study was successful and Repatha holds a majority of the PCSK9 market share points to high growth opportunities for Amgen.

KYPROLIS is another excellent drug in Amgen’s pipeline. Two significant results from studies point to positive results for KYPROLIS. The final analysis of the Phase 3 ASPIRE trial took place in mid-July which demonstrated that KYPROLIS, lenalidomide and dexamethasone reduced the risk of death by 21 percent over lenalidomide and dexamethasone alone. The ENDEAVOR study demonstrated that KYPROLIS is the superior proteasome inhibitor versus Velcade. The overall survival benefit from the ASPIRE trial further supports the importance of proteasome inhibition and duration of treatment with KYPROLIS in the treatment of relapsed multiple myeloma. It is clear that KYPROLIS reduces the risk of death and increases the duration of survival in patients with multiple myeloma, which will lead to exciting growth for Amgen. (26.)

*all product information from 2017 Q3 earnings report conference call

Revenue Forecasts
Repatha: Repatha will continue to be one of Amgen’s highest growing drugs. The drug currently holds 58% of the PCSK9 segment in both the U.S. and Europe. It also appears likely that Repatha will be approved for hyperlipidemia by the FDA following their impressive results from the FOURIER trial. The outcomes are under FDA priority review with December 2, 2017 being the action date. Coupled with the fact that PCSK9 has proven to be a viable treatment for cardiovascular disease, Repatha has strong growth perspectives. We expect Repatha to be approved for hyperlipidemia which will lead to steady growth from 2018 through 2023.

KYPROLIS: Similarly to Repatha, we are forecasting strong growth for KYPROLIS. Even though KYPROLIS is in a very competitive market, the drug has proven that it far surpasses its competition. KYPROLIS proved 21% more effective than Takeda’s VELCADE. Although, KYPROLIS is still in phase 3 of multiple myeloma testing, it looks imminent that the drug will soon be approved based on positive tests from the ASPIRE study. The ASPIRE study also concluded that when combined with REVLIMID, the leading multiple myeloma drug, the chances of death are reduced. As REVLIMID continues to perform strongly, we will see KYPROLIS grow as well. We forecast a increased growth year after year for KYPROLIS as it continues to grow and gain market share after it is approved from phase 3.

Enbrel: Enbrel is currently being outperformed by competitors in HUMIRA and REMICADE. The drug has seen an unimpressive past year due to changes in prescription trends. This trend, which ultimately leads to a lower demand for Enbrel is expected to continue in 2018.
Enbrel will also lose one of its key patients in methods of treating psoriasis in the U.S. in 2019. Although Amgen has a segment of Enbrel currently in phase 3, there is no telling when it will be approved. The main question in regards to Enbrel is if Enbrel AutoTouch will help the struggling drug. However, Amgen has not given a timeline to when the reusable auto injector will be launched. We forecast that Enbrel will see increased declines in the next few years due to competition from HUMIRA, REMICADE, and other drugs, as well as a continuing decline in demand and the loss of a key patent. Enbrel will see sales decrease slightly less as it incorporates Enbrel AutoTouch into their pipeline, which adds to the drug’s ease of use.

**Neulasta:** Neulasta is on the decline. PDIs and other new therapies are hurting Neulasta’s growth. “PDIs, which were only introduced a few years ago, have been found to clear tumors in cases of advanced lung cancer.” (34). PDIs are the new revolution in treating tumors and we are seeing a decline in the use of myelosuppressive chemotherapy regimens. In order to help Neulasta continue to grow, Amgen created Onpro. We are forecasting that Neulasta will continue to see negative growth as PDIs continue to suppress chemotherapy regimens. The Onpro is an innovative device that was introduced to help Neulasta grow, but the Onpro seems to be leveling off in terms of Neulasta users. From Q2 of 2017 to Q3 of 2017, the Onpro kit only ticked up 1% to 56%. We forecast that Neulasta will continue to see decreases in growth due to the innovations in non-chemotherapy treatments grow stronger.

**Aranesp:** Although, Aranesp saw a modest year-over-year decrease in growth, they will see increased growth as the drug takes over the dialysis business from Epogen. Epogen no longer has any outstanding patients and will not continue to grow. Aranesp will still see a small decrease in growth in 2018 due to lower net selling prices from the DaVita agreement. Aranesp is currently in a six year agreement with DaVita, which will provide constant returns for the drug. We forecast strong growth for Aranesp as it takes over Epogen’s market share.

**Prolia:** Prolia is a drug in Amgen’s pipeline that will continue to grow. It is currently a market leader, with 20% share in most markets and 50% or better share in a few select countries. In addition to being a market leader there is currently an untapped market for the osteoporotic population. There are only about 3.5 million patients on Prolia and we forecast this number to steadily grow through 2023.

**Sensipar/Mimpara:** Sensipar saw increased growth year-over-year primarily due to a net selling price increase. We do not expect to see this same kind of growth long-term, but we feel there is still a strong demand for Sensipar.

“Secondary HPT is a serious condition and the proportion of patients unable to reach recommended secondary HPT lab targets has more than doubled in the last five years” (36). We forecast steady revenue for Sensipar with minimal growth.

**XGEVA:** XGEVA slightly declined year-over-year, however we see long-term growth with the addition of a multiple myeloma indication in 2018. XGEVA is currently in phase 3 awaiting approval. We forecast continued decrease in growth for 2017 and 2018, but an increase to the drug’s growth after they add a multiple myeloma indication to it. This will expand the eligible patient population and present growth for XGEVA.

**Epogen:** Epogen saw a high decrease in growth year over year because of net lower selling prices. These lower selling prices are due to an agreement with DaVita to supply them with Epogen for the next six years. We forecast a continued decline in growth to Epogen in 2017 and 2018 due to a decrease in selling prices. However, after a year of selling DaVita, Epogen’s growth will stabilize for the next few years.

**NEUPOGEN:** Biosimilars have recently negatively affected NEUPOGEN’s growth. However, NEUPOGEN still manages to hold 41% share of the short-acting segment. Also, NEUPOGEN has maintained pricing discipline for the past three years. This statistic is impressive, given that biosimilars are meant to increase competition and thus decrease prices. We forecast that NEUPOGEN will maintain pricing discipline for the rest of 2017 and 2018. However, after NEUPOGEN sees even more decreased growth, Amgen will decrease the drug’s price and in turn NEUPOGEN will see less severe decreased growth.

**Vectibix:** Vectibix saw year over year growth, however we do not see anticipate much further growth for the drug. Although Vectibix is currently in phase 3 for metastatic colorectal cancer, its two other patents are expected to expire by 2020. We forecast decreased growth for Vectibix after 2017 as their patents expire.

**Other Products:** Other products, which include Enbrel AutoTouch device, Aimovig for migraine, Parsabiv, and other biosimilars are among the most promising drugs from Amgen. Parsabiv is especially exciting in that it is the only treatment of secondary hyperparathyroidism (HPT) in adult patients with chronic kidney disease (CKD) on hemodialysis. The drug advanced from phase 3 early in 2017 and high growth is expected. Amgen is also expanding more into the biosimilars and should expect to see growth in Europe after AMGEVITA is launched. We forecast significant growth for Amgen’s other products as they expand and treat new areas including migraines, and sHPT for in patients with CKD on hemodialysis.

After attaching growth rates to each drug from 2017E to 2023E, there was a positive growth each year except for a minimal decline in 2018. 2017 grew by .3%, 2018 decreased by .4%, 2019 increased by 3.0%, 2020 increased by 4.4%, 2021 increased by 6.7%, 2022 increased by 8.6%, and 2013 increased 10.5%. We are currently seeing that Amgen is in a transitioning phase. Their main drugs are seeing negative growth and their upcoming drugs are in early stages. As time increases, Amgen’s pipeline with strengthen with new drugs and they will see increased growth year after year.

**Weighted Average Cost of Capital (WACC)**
We calculated a weighted average cost of capital of 9.09%. This is derived from Amgen’s capital structure of 75.90% equity and 24.10% debt. We do not anticipate this capital structure changing long-term.
**Cost of Debt**

To calculate our cost of debt, we took the average yield of Amgen’s bonds set to mature in 30+ years with a rating of A. This resulted in a 4.75% cost of debt. We then calculated the after-tax cost of debt by multiplying the pre-tax cost of debt by one minus Amgen’s marginal tax rate of 15.73%. The after-tax cost of debt we calculated for Amgen is 4.00%.

**Cost of Equity**

We used the Capital Asset Pricing Model (CAPM) to calculate Amgen’s cost of equity. The three variables we used to calculate the CAPM are as follows:

- Beta (raw) = 1.71
- Market risk premium (MRP) = 4.63%
- Risk-free rate = 2.79%

The beta was calculated using Amgen’s 5-year average raw beta that was outsourced from Bloomberg. The market risk premium was taken from Aswath Damodaran’s trailing 12 month adjusted market premium. Lastly, the risk-free rate we used is the yield on the 30-year Treasury bill.

**Discounted Cash Flow and Economic Profit Model**

We believe our discounted cash flow and economic profit models best reflect our opinions of Amgen’s adjusted stock price of $184.74, which reflects a premium of 7.19% to the market price of $172.35 on November 10, 2017.

Our NOPLAT figure steadily grows from 2018E to 2023E. This growth is mainly caused by the positive outlook for the following drugs; Prolia, Repatha, KYPROLIS, Aimovig, Parsabiv, and Amgen’s biosimilars. In our models we calculated a continuing value from our CV Growth Rate of NOPLAT of 2.20% and out CV Growth of ROIC of 84.53%. Our growth rate assumption reflects the current economic inflation rate of 2.20% and out CV Growth Rate of NOPLAT of 4.00%

We also calculated the after-tax cost of debt by multiplying the pre-tax cost of debt by one minus Amgen’s marginal tax rate of 15.73%. The after-tax cost of debt we calculated for Amgen is 4.00%.

Our adjusted implied relative value for P/E (EPS17) is $147.6 and is $127.2 for P/E (EPS18).

We find that P/E relative valuation does not reflect Amgen’s future expectations and performances, rather it reflects their performance in comparison to their competitors. We believe Amgen is valued at a premium because of their strong forecasted growth and large market share in the Biotechnology subindustry. We also used an EV/EBIT multiple to value Amgen. We decided on this multiple because EV/EBIT gives a rough measure of how valuable a company is relative to its operational cash flow. EV/EBIT is also useful in industries where CapEx is more important to factor in. Specifically in the biotechnology industry, CapEx is extremely important as it used to fund R&D centers, which contribute to the development of new drugs.

Amgen’s competitor EV/EBIT multiple was 17.18x. This was calculated by removing the highest and lowest outliers, ALXN and GILD, from the calculation. We also used each company’s last twelve month’s EBIT for multiple. Amgen’s EV/EBIT multiple is currently 11.8x, which shows they are valued at a 31.31% discount to its competitors.

Our adjusted relative value for EV/EBIT is $193.18. We calculated this share price by arriving at an enterprise value, subtracting out total debt and adding cash to back into its equity value. We then divided by their equity value by their 2017 number of shares outstanding to arrive to their implied share price.

Again, we find that EV/EBIT relative valuation does not reflect Amgen’s future expectations and performances. We believe that Amgen is valued at a discount in terms of EV/EBIT mainly because of their forecasted negative growth from their main drugs, including EREL and Neulasta.

**Sensitivity Analysis**

In our sensitivity analysis we used a series of sensitivity tables to analyze how changes in our assumptions would impact our model. These changed assumptions will reflect the foreseen uncertainty surrounding the future of government regulation within the biotechnology industry.

**CV Growth of NOPLAT vs. WACC**

In testing the sensitivity of the CV Growth of NOPLAT and the Weighted Average Cost of Capital, we observed a high intrinsic stock price when our table was sensitized to forecast a high CV Growth of NOPLAT against a lowered WACC.

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In testing the sensitivity of the CV Growth of ROIC versus the WACC, we observed incremental changes when CV Growth of ROIC was increased. We observed high stock price volatility when sensitizing the WACC as this rate would influence all previous assumptions built within the discounted cash flow and economic profit model.

**Beta vs Risk-Free Rate**
When considering the perceived risk when investing in the biotechnology industry, we sensitized the changes in Beta and the Risk-Free Rate. When Beta and the Risk-Free Rate increased, we backed into a smaller stock price that is associated with the perceived risk within the biotechnology industry.

**CV Growth of NOPLAT vs CV Growth of ROIC**
We tested the sensitivity of the CV Growth Rate of NOPLAT and the CV Growth Rate of ROIC to determine how stock price would change with differences in the growth rates of our valuation drivers. Although increased growth rates in both figures will yield a higher stock price, we found that changes in the CV Growth of NOPLAT had the largest impact, as NOPLAT is the free-cash flow used in our discounted cash-flow model.
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References


