



promontory
investment research



Bank of Hawaii
Enbridge
Intel
Novartis

Spring 2023 Equity Report

Foreword

Promontory Investment Research is proud to present its fifteenth equity research report. This spring, our Research Analysts produced high-quality work in six industry coverage pods, and we've selected four reports to share with you: Intel, a semiconductor chip designer and manufacturer; Bank of Hawaii, a financial services firm; Enbridge, a midstream energy pipeline operator; and Novartis, a pharmaceutical company.

As with each of Promontory's equity research publications, we are very proud of the meticulousness and passion exhibited by our Research Analysts this quarter. No stone was left unturned and the unique ideas of our community are showcased here in writing.

Since Promontory's winter recruiting cycle, New Recruits from last quarter were able to employ their newly-acquired skills following their promotion to Research Analysts. As a result, Promontory's Teaching Committee — members of the Board who focus on providing New Recruits with assistance throughout our Basic Financial Training curriculum — were also able to assist with guiding the Research Analysts' work. The product of this additional collaboration and is what you see here: argumentative and original equity research.

In conjunction with our research, we've continued to foster an environment in which the organization's initial commitment to having a tight-knit community is upheld. Membership has continued to increase at a rapid rate throughout this past year, and with it, the frequency of impromptu dinners and engagement events as well. As a Board, we promise that community is always at the forefront of our mission, as a high-quality report is only as good as the strength of the teamwork behind it. Thank you for your support and for taking the time to read our reports — we're excited for you to witness what our future has in store.

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Bank of Hawaii Corporation

Bank of Hawaii Corporation | NYSE: BOH

| Negative | Neutral | Positive |
|--------------------------|---------|-----------------|
| Share price, 05/12/2023: | | \$33.56 |
| Market capitalization: | | \$1.33B |
| Shares outstanding: | | 36.65M |
| 52-week range: | | \$85.45/\$33.56 |
| EPS (FY22): | | \$5.48 |
| Beta: | | 1.0 |
| Average analyst opinion: | | \$51.0 |

Price Chart



Financial Highlights

| (Dollars in Millions) | 2020 | 2021 | 2022 |
|-----------------------|--------|--------|--------|
| Net Income | 153.8 | 253.4 | 225.8 |
| % Change | -31.9% | 64.7% | -10.9% |
| Net Interest Margin | 2.69 | 2.4 | 2.44 |
| % Change | -8.8% | -10.8% | 1.7% |
| Return on Equity | 11.5% | 17.8% | 16.9% |

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Investment Overview

The 2023 banking crisis triggered sharp declines in bank stocks globally. Following the largest bank failures in the United States since the 2008 financial crisis, regional bank share prices in particular fell significantly. This trend in price movement has been the result of, among other things, fears of risks related to uninsured deposits and the failure to account for interest-rate risk. This crisis in confidence in regional banks mistakenly assumes that all such banks face the same fundamental risks. Such a view is deeply flawed, as demonstrated by the unappreciated resilience of Bank of Hawaii (“Bankoh”).

We recommend a **BUY** on Bank of Hawaii’s stock. Our investment thesis views the stock as an undeserving victim of the market’s broader sell-off of regional bank stocks. While Bankoh’s share price has dropped precipitously, the business shares virtually none of the same risks that led to the collapse of banks like Silicon Valley Bank and Signature Bank. With safe deposits and a general detachment from the turmoil on the US mainland, we believe that the market has erroneously priced Bankoh as if it shared the same risks as the regional banks which have collapsed.

Company Overview

Company History

Bank of Hawaii Corporation is a bank holding company headquartered in Honolulu, Hawaii, that offers financial services to customers located in Hawaii, Guam, and other Pacific Islands through its primary subsidiary, Bank of Hawaii. Founded in 1897 by Charles Cooke, Joseph Atherton, and Peter Jones, the bank is the second oldest financial institution and largest locally owned bank in Hawaii due to the significant presence of voting shareholders within the state.

Since the early 2000s and following years of declining earnings and poor stock performance, the bank has had a relatively successful history led by a series of tried and tested executives who have pulled the bank out of its early 2000s-rut and through the 2008 Financial Crisis and COVID-19 pandemic.

Corporate Stewardship

Bank of Hawaii is currently led by Peter S. Ho, who has served as the bank’s president since 2008 and chairman and CEO since 2010. Under Ho, Bank of Hawaii has placed a heavy focus on interpersonal relationships, collaboration, and continuous improvement, which, in addition to a variety of other factors, have helped the Bank outperform its in-state competitors in terms of net income growth since the start of his tenure. The bank’s management team is flexible and decisive with a balanced mix of experienced, long-time executives and fresh, new-perspectives in positions created to meet developing needs and demands.

Bank of Hawaii has embodied Ho’s 2010 vision for keeping its competitive edge sharp through extensive efforts to invest in new technologies. In 2021, Bank of Hawaii expanded its relationship with financial technology company FIS to expand its digital banking offerings for its customers. FIS Digital One will power Bank of Hawaii’s newest digital platform, which will enable the bank to create personalized service offerings to tailor to independent client needs. FIS Code Connect will also permit the bank to integrate third-party fintech solutions within the platform, providing Bank of Hawaii with new insights about their client base. Most recently, the bank appointed Tori Inouye as the Bank’s first

Chief Data Officer. The bank's diverse board, much like its management team, is composed of accomplished industry professionals and knowledgeable community leaders, which helps to cater the Bank's strategy to outperform its local and mainland competitors. Given Bank of Hawaii's current management and Board, it is reasonable to expect similar performance from the Bank in the coming future as it works to stay ahead of the curve and meet customers' changing needs.

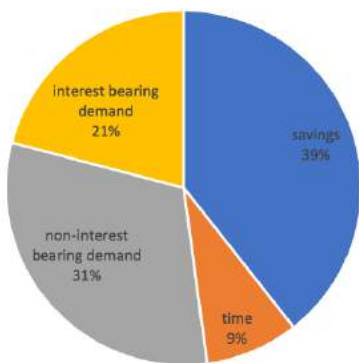
Business Lines

Bank of Hawaii operates in four primary business segments which include consumer banking, commercial banking, investment services, and treasury. The bank's operations are evenly distributed between commercial and consumer activities. Consumer banking primarily serves small businesses and individual customers, offering a range of services such as checking and savings accounts, mortgages, credit cards, personal loans, and online banking. The bank's commercial banking division provides cash management solutions, dealer commercial services, institutional services, international trade services, and business loans. Additionally, Bank of Hawaii's wealth management division provides financial advisory services for both personal and business needs. Finally, the bank's treasury services offer a range of financial solutions to businesses to help manage risk, improve liquidity, and optimize operational efficiency.

Bank of Hawaii holds the second largest asset base in the state, valued at \$23.6 billion, with First Hawaiian Bank taking the lead at \$24.6 billion. Both banks possess an asset base almost three times larger than other major Hawaiian banks. However, when compared to general U.S. regional banks whose assets range predominantly in the hundreds of millions of dollars, Bank of Hawaii has a smaller asset base. This is due to the distinct business model of Hawaiian banks, which cater mainly to everyday individuals and small businesses, rather than large corporations.

Bank of Hawaii Deposit Base

February 2023. Source: Bankoh Operational Overview



Bank of Hawaii Loan Book

December 2022. Source: Bankoh Operational Overview

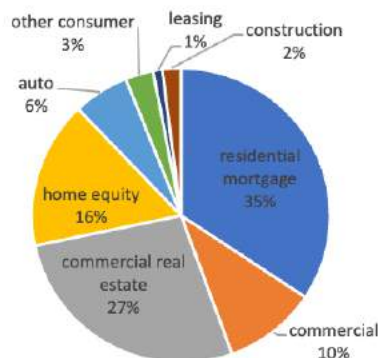


Exhibit 1: Bankoh's Deposit Base and Loan Book

Revenue Model

Bank of Hawaii's revenue structure breaks down into two forms of income: net-interest income and noninterest income. The bank generates net-interest income through interest earned on its investments and loans, as well as interest paid on borrowed funds and deposits, including treasury services. On the other hand, the bank's noninterest income is derived from commissions and fees earned through its wealth management services, trust services, and other banking services. The breakdown of the bank's net-income is roughly as follows: 39% consumer banking, 55% commercial banking, and 6% treasury and other services.

Bank of Hawaii Revenue Breakdown

Source: 2022 Form 10-K

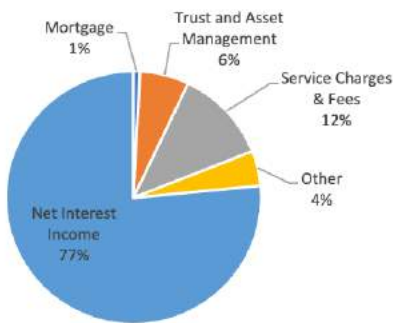


Exhibit 2: Bankoh's Revenue Streams

Bank of Hawaii's noninterest expenses take the form of salaries and benefits, and additional miscellaneous operating expenses. Specifically, expenses attributed to salaries and benefits make up 57% of the bank's total noninterest expenses, with the remaining expenses being costs associated with occupancy, equipment, data processing, professional fees, and FDIC Insurance.

Recent Developments

Bank of Hawaii's current share price is \$33.56, which marks a significant decline compared to its price a few months ago when it was trading in the mid to low 70s. Over the past year, the bank's stock price has fluctuated between a high of \$85.45 and its current low of \$33.56, and year to date, the stock has experienced a drop of over 50%. The recent fall in Bank of Hawaii's stock price can be attributed to the failure of Silicon Valley Bank, which resulted in a general lack of trust in regional banks among investors. This loss of confidence has led to skepticism towards banks, including Bank of Hawaii, causing its stock price to drop precipitously.

Industry Overview and Trends

Competitive Landscape

The banking industry in Hawaii is distinct from that in other U.S. states as many mainstream commercial banks like Chase and Wells Fargo do not have a presence in the islands due to several factors, such as the state's small population and distance from the mainland. The market cap of the bank is valued at approximately \$5.5 billion, and its two biggest players are Bank of Hawaii and First Hawaiian Bank, which retain around 70% of the market share.

The banking industry in Hawaii is highly consolidated, with four banks controlling 97% of the state's deposits. Bank of Hawaii's largest competitor is First Hawaiian Bank, which retains 38.72% market share by capitalization and 35.4% market share by deposit volume. At the micro level, in terms of products, mobile banking services, and financial technology, the banks are quite similar. The bigger picture, though, highlights several differences in the banks. Bank of Hawaii outperforms First Hawaiian Bank in residential mortgages and refinancing by loan volume and dollar amount and has more than twenty more branch locations than does First Hawaiian. Conversely, First Hawaiian Bank, a subsidiary of BancWest, leads Bank of Hawaii in commercial real estate and commercial loans.

There are many barriers to entry into the market. These include normal barriers benefitting most regional banks, like regulatory requirements, building extensive relationships, and financing. Additionally, Hawaii's exorbitantly high real estate costs makes it difficult to establish a large and profitable physical banking presence.

Due to their regionality, Hawaiian Banks are inherently tied to the state's economy, which itself is heavily dependent on tourism. Tourism accounts for around 23% of the Hawaiian economy and while recovering from the pandemic, has not yet reached pre-Covid levels. Hawaii's Department of Business Economic Development and Tourism predicted that the state would welcome 9.8 million visitors in 2023, 10.1 million in 2024, 1.9 percent in 2025 and 3.3 percent in 2026. Hawaii's unemployment rate is currently 3.6% and has not yet reached 2.2%, the level it was at prior to the pandemic. Nominal personal income is expected to increase by 3.0% in 2023, 3.1% in 2024, 2.9% in 2025, and 2.1% in 2006. The median sale price for a home in Hawaii declined 3.2% as of February 2023 and the number of houses sold declined by 45.7%.

The Recent Regional Banking Crisis

There is currently a general unease and distrust toward regional banks in the markets. After the collapse of Silicon Valley Bank (SVB) and Signature Bank in late March of 2023, regional bank stocks plummeted. In three days, the S&P Regional Banking Index fell 21% and the NASDAQ KBW Regional Banking Index fell by 16%. Though the Treasury Department and Federal Deposit Insurance Corporation guaranteed insurance of all deposits for SVB and Signature customers, these failures led to widespread panic among investors and depositors, dragging down share prices of other banks across the world. A few days later, the Swiss Bank Credit Suisse, a systemically important bank, also collapsed, only increasing tension in financial markets and exacerbating existing panic among investors and depositors. Shortly thereafter, on May 1, the Federal Reserve announced it had helped to organize the seizure and sale of First Republic's deposits and assets by JP Morgan Chase. To date, both regional banking indices are down 35% and 29%, respectively.

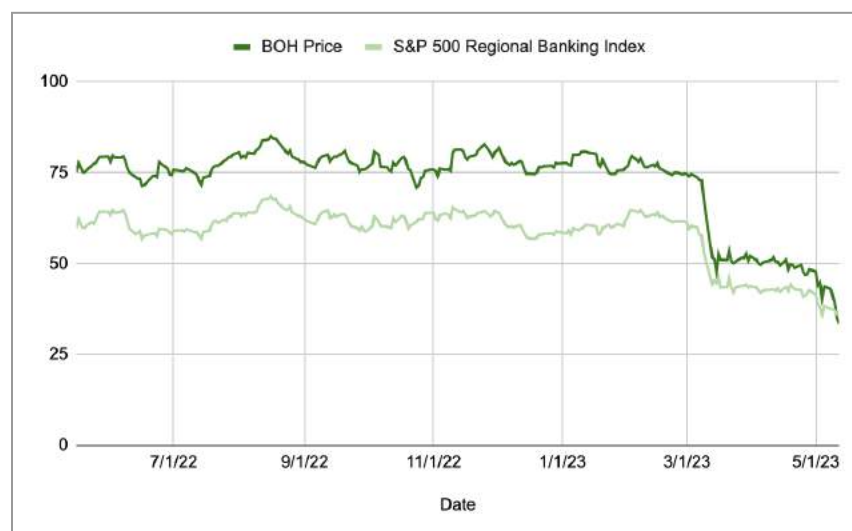


Exhibit 3: Bankoh's Share Price and S&P Regional Banking Index

Expansion of Banking Services for Businesses

In a regional industry where nearly half of firms' interest income derives from commercial loans, it is understandable for banks to prioritize promoting and providing services tailored to businesses to sustain and improve their profitability. Commercial loans account for 42.5% and 51% of Bank of Hawaii's and First Hawaiian Bank's loan portfolios, respectively, and so long as the borrowing landscape remains unfavorable for both banks and borrowers, Hawaii's banks will need to find new ways to attract new customers and strengthen relationships with their existing customers.

Bank of Hawaii has approached this challenge through building new relationships with notable partners across the state, namely Mana Up, one of the state's largest entrepreneurship accelerators. American Savings Bank and First Hawaiian Bank have taken the more conventional approach, competing over interest rates, payment plans, and speed and availability of services.

Greater Demands for Efficiency and Mobile Banking

Since the mid-1990s, Hawaii's banks have done well in keeping up with trends in the financial services industry; Bank of Hawaii has traditionally been the state's leader in picking up these trends, launching the state's first online banking platform in 1998, first wireless banking platform in 2007, and first digital checking account in 2015.

In recent years, Hawaii's banks have seen a surge in mortgage applications, and demand for loan appointments and personal banking, among other services. To keep pace with its mainland peers, banks have modernized their branches through widespread incorporation of new technologies like digital tellers and improved the efficiency of their mobile banking solutions through the introduction of streamlined services. Bank of Hawaii led these movements through its "Branch of Tomorrow" initiative in 2016, committing to improve teller-customer relationships through the incorporation of financial technologies, introduction of Simplifi Mortgage in 2018 to streamline mortgage applications, and Zelle in 2019 for interpersonal payments. Bank of Hawaii's foresight in digital banking contributed to the bank's vigorous recovery from the COVID-19 pandemic in 2021.

Increased Importance on Community Engagement and Organizational Values

Hawaii's banks have recognized community engagement plays a crucial role in implicitly marketing their services and solidifying their position as institutionally important organizations in the state. By sponsoring local events, supporting local organizations, and participating in community initiatives, banks build a positive reputation and demonstrate their commitment to Hawaii and its people. This leads to increased trust and loyalty among potential customers, who may be more inclined to do business with a bank that they perceive as being invested in their community. Bank of Hawaii epitomizes this model through their community service projects, where the "Bankoh Blue Crew," teams of Bank of Hawaii employees, engage in community service projects across the state. First Hawaiian Bank, as the largest financial institution in the state, leverages their size and financial resources to focus on philanthropy, donating \$3.91 million to 200 different charities in 2022.

Investment Thesis

Undervaluation Due to Market Sentiment

The market currently has priced Bank of Hawaii as if they face risks similar to the other regional banks which have failed in recent months. On March 8th, 2023, before the failures of SVB and Signature Bank, their stock was priced at \$72.92. Nevertheless, by March 15th, 2023, their share price fell to \$47.50. For this drop in share price to be justified, Bankoh would need to share the key risk which led to the failure of SVB and Signature: a high level of uninsured deposits concentrated in a few sophisticated industries—venture capital and real estate—that will pull deposits out at once. Bankoh's deposit mix tends towards insured clients; 98% of Bankoh's depositors are fully FDIC insured, 48% of balances are FDIC insured. By contrast, in SVB and Signature's case, over 90% of deposits were not insured and concentrated in basically one industry: VC world and NY real estate. Bankoh does not face the same flight risk because they do not have such a high concentration of uninsured deposits. Moreover, they also do not have uninsured deposits concentrated in industries that are as both insular and sophisticated as venture capital and real estate where information and fear can travel far faster than a bank's ability to contain it.

Hawaii's unique dynamic as a state lends itself towards far more loyalty among Bankoh's customer base than what one might see in the Bay Area or New York. Nathaniel Hartmann, associate professor of marketing at UH Manoa's Shidler College of Business explains that "Hawaiian consumers are more brand loyal than folks on the mainland" because "ties to family and community are especially strong" in Hawaii. This bears itself out in the fact that Hawaii has maintained to have state-specific banks while every other state lends itself to regional or national banks. Hawaii's ability to maintain these types of lenders suggests a level of consumer loyalty and interest in remaining with their Hawaiian banks.

Bankoh is also best positioned and trusted among the subset of Hawaiian banks, thus placing them in a position of arguable benefit during any crisis of confidence. Bankoh's strong position among the subset of Hawaiian banks bears itself out in both its brand recognition and in its relationships with Hawaiian consumers. Most major Hawaiian publications ranked Bank of Hawaii as the state's best bank in 2022, with the Honolulu Star Advertiser doing so since 2010. Newsweek named Bankoh as one of its "Most Trustworthy Companies in America," making it the only business in Hawaii to appear on that list, revealing its unique place with the Hawaiian marketplace. Moreover, when examining who Hawaiians bank with, Bankoh's strength becomes self-evident. When surveyed in 2021, 39% of residents listed Bankoh as the most identifiable financial institution; their next closest competitor was First Hawaiian Bank at 19%. Likewise, when considering their primary banking relationship, 24% of Hawaiians considered Bankoh as their primary banking relationship while only 17% of Hawaiians considered First Hawaiian Bank and 16% of Hawaiians considered American Savings Bank as their primary banking relationship. Therefore, we see that the dynamic of the Hawaiian banking market is unique in

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two ways. Firstly, any crisis of confidence would not see the capital flow into the major national banks as Hawaiians feel the safest and most confident with their own local institutions. Hence, this capital would flow into the most trusted Hawaiian bank, Bankoh. Hence, Bankoh does not face any of the same concerns that any mid size regional bank on the mainland would face in any banking crisis.

Strength of Business Model Promises Future Growth

Bankoh's financial performance is inextricably linked to the performance of Hawaii's economy because Bankoh serves a predominantly Hawaiian customer base. In terms of their loan book, 91% of their loans are to Hawaiian residents or businesses. By contrast, First Hawaiian Bank only has 70% of their loans to local businesses or residents. Therefore, Bankoh is less prone to global/national macroeconomic shocks and more sensitive to endogenous economic changes. Through 2026, Hawaii's Department of Business projects GDP growth at roughly 3.82%, implying a steady level of growth among Bankoh's depositor base and loan customers. Amid the current macroeconomic turmoil, mainland US peers will struggle to achieve such growth among their customer base.

Bankoh's model empowers them to create long term enduring relationships with both retail and commercial customers. Attesting to their enduring relationships, Bankoh has held 74% of its deposits for more than 10 years and 51% of their deposit base for more than 20 years. These figures indicate just how sticky Bankoh's client relationships are. Moreover, they suggest the intimate relationship between the local economic performance of Hawaii and Bankoh.

Importantly, this tie between Bankoh's business focus and the Hawaiian economy speaks to a decreased level of macro risk within their loan book as compared with other regional banks who have a national focus. In particular, the credit risk faced by Bankoh is only subject to Hawaiian economic shocks and is immune from national and global shocks that would test the loan book of other banks. This creates a loan book with a unique risk profile. They combine this loan book with a portfolio of debt securities with a value of roughly 50% of their loan book which has a duration of roughly ~5 years and hedged interest rate risk. The portfolio is primarily in treasuries and various kinds of mortgage backed securities. This mix both derisks the credit risk as well as the interest rate risk due to the hedges in place.

Bankoh is uniquely positioned in the banking sector; its business is intimately tied to the Hawaiian economy. Hence, it is exposed to an economy which projects to grow at a growth rate higher than the nation. At the same time, their loan book is not exposed to the growing macroeconomic headwinds. They also hedge their exposure to the hawaiian economy with a large hedged portfolio of investment securities.

Investment Risks

Reputational Risks

Bank of Hawaii is a highly respected financial institution, frequently earning awards and placing easily among the top three banks in the state. However, the bank consistently falls behind First Hawaiian Bank in public rankings. As a community-oriented state, word of mouth plays a critical role in shaping public perception, and negative customer experiences with Bank of Hawaii's customer service may be a contributing factor to its lower ranking. Despite customer service being a top priority, customers report encountering unsatisfactory service experiences at the bank's branches, particularly related to the online banking system and sometimes rude and unhelpful employees.

While Bank of Hawaii is known for taking excellent care of its employees and offering great benefits, it has a high turnover rate compared to other banks. Low pay, poor management, and lack of communication are issues that have been reported by employees. Internal improvements may foster healthier relationships and improve the experience of its workers, potentially reducing turnover rates and improving overall employee satisfaction.

Rising Vacancy Rates and Toxic Real Estate Assets

Despite the bank's emphasis on possessing high-quality assets, it's important to recognize that the bank's asset composition is predominantly composed of loans, accounting for 57.8%, with 27% of these loans being commercial real estate loans. This makes Bank of Hawaii vulnerable to suffering significant losses if vacancy rates in Hawaii continue to rise.

As of now, Hawaii is experiencing record-high commercial office vacancy rates, with Oahu's office vacancy rate reaching 14.18%. Compared to typical American regional banks, where commercial real estate lending represents approximately 18% of all loans, Bank of Hawaii is nearly twice as susceptible to suffering large losses if downturns occur in the real estate sector. However, it's important to note that Bank of Hawaii's commercial properties are predominantly industrial and retail centers that are primarily grocery and drug stores, rather than more risky properties such as hotels. This means that although Bank of Hawaii may experience an impact from rising vacancy rates, their asset compositions are relatively well protected.

Investors should be aware that the bank is increasingly overleveraged to the Hawaiian economy. But its asset composition that includes assets tied to the success of the state's economy, such as tourism-based retail properties, mitigate some of the credit risks.

Potential Decline in Tourism

The bank of Hawaii's success is intrinsically linked to the status of the state's economy, which is largely dependent on tourism. The decline of tourism poses a significant risk to the bank's operations. A decline in tourism would lead to a decrease in economic activity, resulting in fewer loans and transactions for the bank. The COVID-19 pandemic has adversely affected the tourism industry in Hawaii, specifically visitor arrivals through the first 11 months of 2022 were down by more than 11% compared to the same period in 2019. The reduction in visitors' numbers has led to a decline in the bank's revenues, with the 2022 revenues not yet reaching pre-pandemic levels. Additionally, while Bank of Hawaii has large investments in other sectors, they are all interconnected with tourism, which means that a downturn in tourism will also impact these sectors. However, the bank's reliance on Hawaii's economy means that general shutdown in the Hawaiian economy will lead to a decrease in deposits, particularly those from Hawaiian customers, majorly impacting the bank's ability to profit.

In 2019, Bank of Hawaii generated \$770 million, a large portion of which was derived from tourism related activities. However, the pandemic's impact on the tourism industry led to a decrease in visitor spending, with total visitor spending falling by nearly 20% in 2022. In that way, tourism plays a significant role in the bank's revenues, and a continued trend in declining tourism could lead to a substantial decrease in the Bank of Hawaii's earnings.

Valuation Analysis

Comparable Company Analysis (note: all data from market close, 4/28/2023)

| Category | Company | Market Valuation | | | | | |
|--------------------|--------------------------|------------------|-------------------------------|----------------------|-----------------------|-----------------------------------|--------------------------------|
| | | Share Price | Shares Outstanding (millions) | Market Cap (million) | Total Debt (millions) | Cash & ST Deposits Due (millions) | Net Interest Income (millions) |
| Hawaii Bank | First Hawaiian Bank | \$19.11 | 127.52 | \$2,519 | \$75.00 | \$297.50 | \$613.55 |
| Hawaii Bank | Central Pacific Bank | \$15.88 | 27.04 | \$439 | \$110.86 | \$97.15 | \$215.56 |
| Hawaii Bank | Territorial Savings Bank | \$16.75 | 9.05 | \$163 | \$151.00 | \$9.72 | \$55.49 |
| Regional Bank | Fidelity D&D Bank | \$43.29 | 5.67 | \$245 | \$21.67 | \$3.54 | \$72.27 |
| Regional Bank | Preferred Bank | \$48.08 | 14.36 | \$690 | \$148.00 | \$747.53 | \$247.36 |
| Regional Bank | Banc of California | \$11.35 | 58.71 | \$666 | \$1,002.35 | \$47.43 | \$314.37 |
| Regional Bank | Enterprise Bank | \$28.84 | 12.22 | \$352 | \$62.40 | \$36.90 | \$151.80 |
| Regional Bank | Average Case | | | | | | |
| Hawaii Bank | Bank of Hawaii | \$48.43 | 39.84 | \$1,944 | \$1,135.00 | \$316.68 | \$540.56 |

| Category | Company | Multiples | | | | |
|--------------------|--------------------------|---------------------|---------------|--------------|-------------|-------------|
| | | Net Interest Margin | ROE | ROA | P/B | P/E |
| Hawaii Bank | First Hawaiian Bank | 2.78% | 10.79% | 1.10% | 1.07 | 8.91 |
| Hawaii Bank | Central Pacific Bank | 3.09% | 14.62% | 1.08% | 0.95 | 6.15 |
| Hawaii Bank | Territorial Savings Bank | 2.69% | 6.30% | 0.77% | 0.59 | 10.85 |
| Regional Bank | Fidelity D&D Bank | 3.20% | 16.02% | 1.32% | 1.39 | 8.32 |
| Regional Bank | Preferred Bank | 4.09% | 21.17% | 2.07% | 1.10 | 5.02 |
| Regional Bank | Banc of California | 3.59% | 11.95% | 1.42% | 0.69 | 7.34 |
| Regional Bank | Enterprise Bank | 3.54% | 13.58% | 1.02% | 1.13 | 8.12 |
| Regional Bank | Average Case | 3.32% | 11.04% | 1.16% | 0.98 | 7.83 |
| Hawaii Bank | Bank of Hawaii | 2.50% | 15.42% | 0.99% | 1.47 | 9.15 |

Exhibit 4: Table of Financial Indicators for Comparable Companies

The above comparables display Bankoh trading at a higher price-to-earnings, as well as price-to-book ratio, when compared to the average US regional bank (in addition to select regional banks that we have identified as having relatively similar financial profiles, even though they are based on the mainland). Bankoh also generates a lower net interest margin than its Hawaiian competitors. However, the bank does enjoy a higher return on equity when compared to both Hawaiian competitors and US regional banks at large.

Overall, there is no strong case made by Bankoh's trading multiples that imply it as being either significantly undervalued or overvalued relative to competitors. Although the bank is priced at a somewhat higher premium than the average case for a regional bank in the US, there is not enough of an outsized difference to draw much of a conclusion from such a trading comparable. We therefore view the strength of our recommendation in favor of the stock as stemming from the market's misunderstanding of the key differences between Bankoh and other regional banks. It is precisely that the market prices unfairly Bankoh similarly to other regional banks which fuels our investment thesis.



Enbridge (NYSE: ENB)

| Enbridge NYSE: ENB | |
|--------------------------|-----------------|
| Negative | Neutral |
| Share price, 05/13/23: | \$38.44 |
| Market capitalization: | \$78,295 mm |
| Shares outstanding: | 2029 mm |
| 52-week range: | \$47.67/\$35.02 |
| EPS (FY23): | \$0.88 |
| Beta: | 1.03 |
| Average analyst opinion: | \$44.50 |
| Price target: | \$37.63 |

Investment Overview

We recommend a **HOLD** rating on Enbridge (NYSE: ENB). Enbridge is one of North America's largest midstream energy infrastructure companies transporting 20% of America's natural gas. However, despite Enbridge's track record of success, Enbridge's accumulation of debt coupled with considerably low ROI makes it difficult to stay confident in the company's health as it continues to invest heavily in renewable energy as its "fourth platform." Enbridge's ill geographical positioning as the oil scene in North America shifts is a point of weakness for the company. Unless the company can create fruitful returns on their investments into renewable energy, we believe that Enbridge is a hold.

Company Overview

Company History

Enbridge began as the Interprovincial Pipe Line Company and was incorporated in 1949, receiving its charter from the Canadian federal government. It first began its pipeline operations in Canada and began their operations in the United States. To operate in the US, the Interprovincial Pipe Line Company created the Lakehead Pipe Line Company, which is now Enbridge Energy Partners. The company was then acquired by Interprovincial Pipe Line System Inc. (IPL) and later on acquired Enbridge Gas Inc. to diversify its business into the gas distribution industry. Throughout the next few years, the IPL acquired multiple companies to expand its gas and oil pipeline network, and in 1998, IPL changed its name to Enbridge Inc. Enbridge began its investment in renewable energy in 2002 and aims to achieve net-zero greenhouse gas emissions by 2050 and reduce 35% of emissions by 2030. In 2017, Enbridge merged with Spectra Energy, expanding its operations to not just distribution but to transmission and storage and gathering and processing natural gas. Revenue increased from \$26B to \$34B from 2016 to 2017 and has remained steady.

Price Chart



Financial Highlights

| (Dollars in millions) | 2020 | 2021 | 2022 |
|-----------------------|---------|--------|--------|
| Revenue | 39087 | 47071 | 53,309 |
| % Growth | -21.93% | 20.43% | 13.25% |
| EBIT | 8105 | 7976 | 8423 |
| % Rev | 20.74% | 16.94% | 15.80% |

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Business Lines

Enbridge's business model primarily revolves around transporting and storing energy products through its vast network of pipelines and storage facilities across North America. More specifically, Enbridge's model consists of four core businesses: **Liquids Pipelines** (concerning the transport and export of crude oil and other liquid hydrocarbons, accounting for around 64% of EBITDA), **Gas Transmission and Midstream** (concerning the transport and export of natural gas, and accounting for 23% of EBITDA), **Renewable Power Generation** (consisting of investments in wind and solar assets across North America and Europe, accounting for 2% of EBITDA), and **Gas Distribution & Storage** (which concerns serving residential, commercial and industrial natural gas customers across swathes of Ontario and Quebec, accounting for 13% of EBITDA). In terms of market shares, Enbridge transports 20% of natural gas and 30% of crude oil in the US, and it operates North America's third-largest natural gas utility by consumer count. Enbridge is the leading midstream pipeline company across North America. Maps of Enbridge's Gas Distribution & Storage regions, Liquids Pipelines, and Natural Gas transmission lines respectively are shown below:



Revenue Model

Transportation and other services revenue is primarily derived in the form of long-term take-or-pay (TOP) and cost-over-service agreements, which means very little exposure to volume fluctuations, as companies pay for long-term contracted capacity, not actual usage of Enbridge’s infrastructure. As a result, only a very small portion of Enbridge’s total EBITDA derived from transportation is actually exposed to changes in volume. Being the only provider of transportation for many oil & gas routes, Enbridge has a great deal of pricing power; however, many of Enbridge’s assets are “rate-regulated” by public regulatory agencies through frameworks such as Canada’s Competitive Toll Settlement (CTS), limiting the prices Enbridge can charge. The timeframe of such settlements are often in the decades, and renegotiation of such settlements are relatively infrequent. On the other hand, Enbridge’s Gas Distribution & Storage revenue is derived in a manner consistent with other natural gas providers, with Enbridge passing through natural gas costs to the customer and earning a regulator-approved rate of return based on volumes of gas delivered.

Enbridge’s input costs mainly revolve around the construction and maintenance of its infrastructure. Fixed costs, specifically investments in the construction and expansion of pipelines, terminals, and storage facilities, are integral to Enbridge’s continued operations, and require the company to consistently make large capital expenditures. Enbridge’s operating costs primarily involve tasks associated with energy transportation, such as labor, fuel, and maintenance of pipelines. These costs (particularly that of fuel) vary to a large degree as a result of changing macroeconomic conditions, and are tied broadly to upward long-run energy and labor cost trends.

Competitive Positioning

With the service provided by Enbridge essentially identical to that of all other pipeline operators, and rates heavily regulated by governmental agencies, Enbridge’s primary competitive advantage is geography. The company’s pipelines, terminals, and storage facilities form the largest and most complex liquids & gas transportation system in North America, and many routes (particularly those from Alberta, North Dakota, and Montana south to export terminals along the Gulf Coast) are only served by Enbridge pipelines. Enbridge has some competitors in this regard; notably, Kinder Morgan and Enterprise Products operate pipelines across some of the same corridors as Enbridge.

As a company that engages in capital intensive industry, Enbridge has a relatively low ROIC of 3.8% compared to its competitors (Enterprise Products 9.2% and Kinder Morgan 6.7%). While some may claim that an annual dividend yield of 6.78% is substantial, it is simply on par with its competitors. The reason for Enbridge’s slightly lower ROIC is due to the fact that it has put a lot of capital investment into developing a diversified asset portfolio, particularly through investment in renewable energy assets. Ideally, these investments would allow Enbridge to be provided a relative degree of stability if the broader oil & gas industry faces long-term decline,

and give it insulation from carbon taxes and other levies on emissions that its competitors must face. However, at just 2% of EBITDA over FY 2022, these investments haven't been scaled to a point where it would be profitable for the company. Taking the tailwind of renewable energy demand is certainly a solid long-term strategy in retaining Enbridge's position within the industry, however, from a short-term perspective, it might take a toll on the ROIC itself.

Recent Developments

Enbridge has recently increased investments in the renewable energy sector as well as broadening connections with big companies in their other three business segments. For example, Enbridge is working on a joint development and construction of a world-scale low-carbon blue ammonia production facility with Yara Clean Ammonia. The company has also bought a 10% stake in Divert Inc., an impact technology company on a mission to sustainably serve the food insecure. In total, Enbridge has planned \$3.3B worth of new investments. With these new investments, the company has estimated that their EPS and EBITDA will grow 4-6% through 2025, but this growth is heavily dependent on how much return Enbridge will get from these investments. Although management has a positive outlook now, the lack of returns on recent investments paint a more grim picture for Enbridge's future. Investors, however, are still buying stakes in the company. During the 4th quarter of the 2022 fiscal year, Triasima Portfolio Management Inc. bought 223,694 shares, valued at \$8.7M, in Enbridge's pipeline stock. Many investors see Enbridge as a mature, reliable company. It can be expected that investors will continue to support Enbridge, allowing for the company to continue to expand and grow.

Management

There have been some recent changes to Enbridge's management level. Al Monaco was the President and CEO of Enbridge for ten years, and has been at the company for the last 27 years. Under his leadership, Enbridge was able to quickly expand into multiple locations in North America and grow its offshore wind renewable investments dramatically. However, the fact that Monaco has not been in many other oil and gas companies for long may put Enbridge at a disadvantage due to the increasingly fierce competition in the industry. Starting in January 2023, Greg L. Ebel, previously chair of the board, assumed the role of the new President and CEO, and he has more industry experience than Monaco as the previous CFO of Spectra Energy's Group before it got acquired by Enbridge. Additionally, he also served as the President of Union Gas limited and Vice President of Duke Energy Corporation. Even though the leadership transition will bring some overhead and Enbridge will have to adjust to the new CEO, Ebel's industry expertise will help Enbridge thrive in the new environment.

Vern Yu is the current CFO (since March 2022) and also President of New Energy Technologies (since January 2023). He has been at Enbridge for about three decades with a background in engineering. He has led the liquids pipeline, business development team in securing more than \$30-billion in new growth projects, Enbridge's entry into European offshore wind, the Spectra merger, the roll-up of Enbridge's sponsored vehicles and the completion of Line 3.

Overall, it seems like Enbridge has a solid management team who has been with the company for a long time, however, the new CEO is an opportunity for new innovations.

Industry Overview

Competitive Landscape

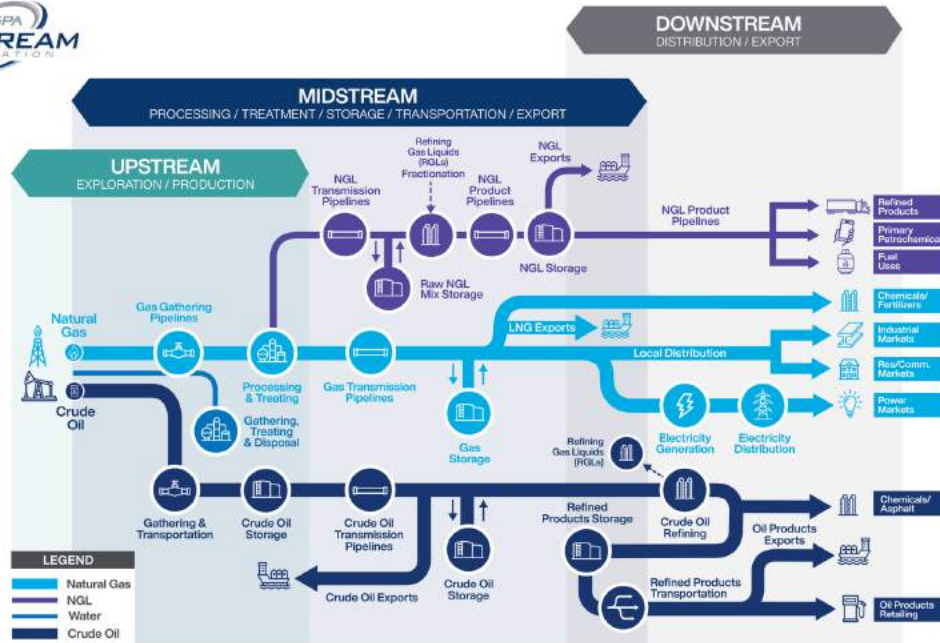
The oil and gas industry is divided into three segments: upstream, midstream, and downstream. Upstream companies are mainly involved in the exploration of new oil sources and production of that oil. Downstream companies are mainly involved in the distribution and export of oil after it is transported. Enbridge is a midstream company meaning the company is involved mainly in the transportation of crude oil and natural gas from production sites to refineries, processing plants, and storage facilities through pipeline, terminal, and storage assets. Companies within the midstream segment make more money the further oil needs to travel, operating on a fee-based business corresponding to the distance each barrel of oil travels. Nearly every barrel of oil travels through a pipeline because of the efficiency and high capacity of pipelines. Due to this, pipelines are cemented as the industry standard for transportation of oil and gas. However, constructing pipelines comes with high costs, permit difficulties, and significant public controversy. Thus, companies with significant pipeline control and transmission assets are at significant advantages as the growing demand for energy and an increased focus on domestically-produced oil and natural gas drives broader industry growth. Despite this growth, the industry is still threatened by the transition to renewable energy and a more stringent focus on climate change by the public and policymakers.

North America is the largest market for pipeline transportation, especially in areas like the Gulf of Mexico. Asia Pacific is an emerging economy as an increase in energy demands propels demands for oil and gas pipelines. China is a main contributor to the market growth within the Asia Pacific region.

Regulations and Geopolitical Factors

The Polaris Institute calculated that 804 spills occurred on Enbridge pipelines between 1999 and 2010. In 2010, a leaking pipeline spilled more than 1,000,000 US gallons (3,800 m³) of oil sands crude oil into the Kalamazoo River. According to a United States Environmental Protection Agency update of the Kalamazoo River spill concluded the pipeline rupture "caused the largest inland oil spill in Midwest history". More recently, Enbridge also got into multiple lawsuits. In 2021, Enbridge Energy faced a criminal charge due to the construction of the Line 3 pipeline, which resulted in a fine of more than \$3.32 million. Additionally, regarding the construction of Line 5 pipeline in Michigan, the Ojibwe tribe won the lawsuit against Enbridge trespassing, yet Enbridge defied the state shutdown order, which led to additional protests from Michigan residents and pressure towards the Biden administration.

It is interesting to note that even though the Biden administration claims on supporting the divestment from fossil fuel, it has been silent on the construction of Line 3, so the current regulatory attitude is still murky. On the Canadian side, there are significant regulatory hurdles that oversee the oil and gas industry, however, they might not be up to date. Enbridge's previous CEO Al Monaco had complained in 2022 that "regulatory hurdles for major projects are 'causing problems' when it comes to attracting investment". In such a heavily regulated industry with hoops to jump through, how Enbridge is able to retain its advantage while still seeking forward momentum is going to be a tough question to answer.



Industry Trends

The clean energy transition is shifting the focus of policymakers and O&G companies to renewable energy and natural gas. New policies expected to accelerate the clean energy transition. Specifically, supportive policies, in combination with higher O&G cash flows in 2022, have enabled O&G companies to increase investment in clean energy, including Enbridge, with a growing wind portfolio. However, increasing demand for solar, wind, and renewable energy has led to reduced investments in oil and gas. The oil and gas sector's carbon footprint (operations and emissions from energy consumed) is at least 2.6 billion ton annually out of the 37.1 billion ton produced by human activity, and the US government is decreasing reliance on oil and gas and shifting its focus toward building renewable energy sources to fulfill its needs: in February 2022, California's Imperial County approved a plan for the development of the Lithium Valley that includes geothermal energy production. In January 2022, the US House of Representatives unveiled the America Competes Act of 2022, which seeks to bolster the country's supply chain and competitiveness and includes USD 3 billion for solar manufacturing. On the flip side, government measures to reduce the carbon footprint and greenhouse gas emissions has prompted more demand for compressed natural gas (CNG) and liquified natural gas (LNG) as an alternative fuel to gasoline and diesel, which will assist in the natural gas infrastructure market. This has manifested in the form of policy and recent US and European regulations have promoted the sustainable development of natural gas. There also exists high demand for natural gas: the Natural Gas Vehicle (NGV) association noted that as of December 2019, the total number of natural gas vehicles globally is around 28.5 million and the US Energy information administration also notes that more than 50% of the residential sector in the country uses natural gas for space heating. The shift towards natural gas is beneficial for Enbridge, who already transports a quarter of America's natural gas.

Upstream sector is expected to witness significant growth, likely prompting growth in the midstream. The upstream sector is witnessing growth from new projects as well as increases in demand from urbanization. In February 2022, the British multinational oil and gas company BP PLC announced the start of the Herschel Expansion project in the Gulf of Mexico. In December 2021, ConocoPhillips, an American multinational corporation engaged in hydrocarbon exploration and production, began production at its GMT-2 oil project in the National Petroleum Reserve-Alaska. Moreover, population growth and urbanization and industrialization may lead to increased energy demands. In a 2021 report by the International Energy Agency, energy demand is far greater than what can be obtained by renewable sources, and thus there is still demand for traditional oil and gas. The growth in the upstream sector will filter down to the midstream sector, as companies need an avenue to transport the oil and gas. Enbridge, being the transporter of 30% of all crude oil produced in North America, will benefit from this growth in the upstream sector.

Investment Thesis

I. Long-Term Negative Outlook for the Bakken & Alberta Oil/Gas Production

As the previously provided network maps display, many of Enbridge's liquid and gas transmission operations (which collectively contribute 87% of the company's EBITDA) center around the transportation of oil and natural gas from the Bakken Formation (in western North Dakota and eastern Montana) and from the Alberta oil sands. Therefore, much of Enbridge's financial future is tied to the long-term fate of these hydrocarbon producing geographies.

Of these two oil and gas producing regions, the future of the Bakken Formation is particularly in danger. Independent reports have found that almost all of the top and second quintile drilling sites into the formation have already been depleted, forcing producers to shift to less productive and more difficult sites. This transition increases the price at which producers break-even, which, at around 36-45 dollars a barrel, is already one of the world's highest. As a result, Bakken oil production, already below its 2014 peak of 1.5 million barrels per day, is projected to decline steadily over the coming decade, with similar trends expected in gas production.

Worse, mature oil wells have recently been producing more gas and impurities than expected, further inhibiting production volume and making the prospect of an even steeper decline likely.

Alberta oil sands production is expected to stagnate at around current levels, increasing by about 14% over the next ten years from 3.05 to 3.5 million barrels per day. However, the world's shift to renewable energy and stagnating North American energy demand are expected to cause that figure to decline over the subsequent decades. In addition to a stagnating demand outlook and competition from companies such as Kinder Morgan, Enbridge's Alberta pipelines also face regulatory challenges, with the Canadian government introducing a carbon tax, strengthening regulation, and nationalizing pipelines such as Kinder Morgan's Trans Mountain Line, all leading to higher costs.

Collectively, these factors mean that the oil and gas Enbridge depends on for much of its revenue is likely to decrease in volume and value in the near future. Unless Enbridge can find a way to increase its already large market share in transport of such hydrocarbons, or invest in alternate markets, this is likely to lead to a steep decline in income.

II. Enbridge has accumulated a large amount of long-term debt in order to fulfill short-term obligations.

Enbridge's financial statements show that the company has high net debt while having a low level of cash. Net debt in the latest fiscal year was reported to be \$59.2B and Total Cash and Cash Equivalents to be \$630.5M. Compared with its competitors, Enbridge's net debt is higher, while having less cash. For example, TC Energy Corporation has a net debt of \$42B and \$3.85B of cash. Cheniere Energy, Inc. has \$27B of net debt while having \$1.35B worth of cash.

Since Enbridge is a fairly mature company, there is little room for it to grow exponentially. This is evident in Enbridge's low return on investment (ROI). The company's ROI is 1.87%, while the average ROI for the upstream, downstream, and midstream oil and gas industries is about 19.04%. While there is little data on the ROI for specifically midstream oil companies, 1.87% is still low for how much Enbridge has begun investing recently. This low ROI is also consistent with Enbridge's negative \$6M in working capital. While Enbridge makes most of its revenue from its two main business segments, Liquid Pipelines and Gas Transmission and Midstream, their investments are focused on its Renewable Energy business segment. Enbridge is planning on using its entire \$6B investment capacity in 2023. In 2022, the company advanced \$18B worth of investments, yet Enbridge's revenue has remained steady and at times even decreased. Although these investments may lead to long-term growth, there is low return in the short-run, making it difficult for Enbridge to stop its accumulation of debt.

Enbridge also had a decrease in their GAAP earnings due to the increased cost of capital in their Gas Transmission reporting unit. With increasing costs and relatively little positive change in its revenue and EBITDA even after billions of dollars put into investments, Enbridge does not seem to have a good footing in paying off its debt. The company is accumulating more debt in order to make these investments that don't seem to give them high returns. There is also no indication that management has a plan to restructure the company to avoid even more debt.

III. As the transporter of a quarter of America's natural gas, Enbridge is well-positioned to take advantage of the key role natural gas plays in clean energy transition.

While new policies are expected to accelerate the clean energy transition, leading to reduced investments in oil and gas, government measures to reduce both the carbon footprint and greenhouse gas emissions have prompted more demand for compressed natural gas (CNG) and liquified natural gas (LNG) as an alternative fuel to gasoline and diesel, which will assist in the natural gas infrastructure market. Following Russia's invasion of Ukraine and consequently higher European gas prices, policy direction has shifted from phasing out natural gas to reducing emissions from natural gas. Therefore, natural gas investment, including related infrastructure and greenhouse gas (GHG) reducing developments, are expected to increase in 2023.

Two specific US policies were introduced in 2022 that aid the sustainable development of natural gas. First, a joint statement between the US and the European Commission on European energy security specified commitments to increase US LNG exports to Europe until 2030 in order to reduce GHG emissions of LNG infrastructure. Second, the US Inflation Reduction Act imposes fees on excess methane emissions and offers grants to O&G companies to reduce methane. The act introduces a \$430-billion clean energy subsidy package.

For Enbridge, these policies are good news. The company currently transports about 20% of all natural gas consumed in the United States, and this sizable market share and new policies will allow Enbridge to thrive and take advantage of the changing energy landscape. Following the new energy subsidies provided by the Inflation Reduction Act, Enbridge announced on March 1st a \$2.4 billion USD investments towards natural gas and liquids infrastructure and renewable power this year, as well as acquisition of the US Gulf Coast gas storage assets for \$335 million, which comprise of 35 billion cubic feet of gas storage that taps into high demand for North American LNG exports after Russia's invasion of Ukraine upended global gas supplies. The energy company expects its renewables to grow over 400% by 2028 and an annual earnings growth rate of 4%-6% through 2025.

Enbridge's projected EBITDA growth is contingent on its ability to capitalize on the renewable investments through taking advantage of the industry tailwinds, however, it is very difficult to realize that growth in the near future. And due to the short-term challenges previously mentioned, Enbridge will face a tough growth bottleneck in the next few years.

Investment Risks

Regulatory and environmental risks:

Enbridge's operations are heavily regulated by both Canadian and US government agencies. Regulatory risks include changes in government policies, rules, and regulations that could impact the company's ability to operate its pipelines and other energy infrastructure. Enbridge has faced several environmental challenges, including oil spills and leaks that have caused significant harm to the environment and the communities surrounding its pipelines. Green legislation is currently being passed through governments at a rate and with intensity never before seen. With previous incidents and both Canada and America's goal to reach net zero in terms of carbon emissions by 2050, Enbridge's position as the top energy provider in North America could be at risk. Any future incidents could result in significant legal, financial, and reputational damage for the company.

Enbridge has implemented several measures to address regulatory and environmental risks. The company has invested in advanced pipeline monitoring technology, including drones, satellite imagery, and sensors, to detect leaks and prevent spills. Enbridge has also improved its emergency response procedures, investing in spill response equipment and training its employees on how to respond to incidents quickly and effectively. Additionally, the company has committed to reducing its greenhouse gas emissions and increasing its use of renewable energy sources.

Dependence on oil and gas prices:

As an energy transportation company, Enbridge's revenue and profits are largely dependent on the prices of oil and natural gas. The prices of these commodities are subject to significant volatility due to various factors, including global demand, supply, and geopolitical events. A decline in oil and gas prices could lead to reduced revenue and profitability for Enbridge.

Enbridge has taken steps to diversify its business and reduce its dependence on oil and gas prices. The company has expanded its business to include renewable energy, investing in wind and solar power projects. Enbridge has also increased its investment in natural gas pipelines, which are less susceptible to price volatility than oil pipelines. Additionally, the company has implemented a hedging program to mitigate the impact of fluctuations in oil and gas prices on its financial performance.

Transition to renewable energy:

The world is increasingly transitioning towards renewable energy sources to reduce greenhouse gas emissions and combat climate change. Although Enbridge has investments in forms of renewable energy with the main contributor being wind, this energy is only enough to power 966,000 homes. Transitioning to renewables is a must at some point in the future even if Enbridge reduces their carbon footprint. This transition presents a significant risk to Enbridge's business model, which is heavily reliant on the transportation of fossil fuels. As governments and consumers shift towards renewable energy, demand for Enbridge's services may decline, potentially resulting in reduced revenue and profitability for the company.

Enbridge is actively participating in the transition to renewable energy sources. The company has set a target to reduce its greenhouse gas emissions by 35% by 2030 and achieve net-zero emissions by 2050. Enbridge is investing in renewable energy projects, including wind, solar, and geothermal power, and has formed partnerships with companies that specialize in renewable energy development. Additionally, the company is exploring the potential of using hydrogen as a clean energy source, which could potentially replace natural gas in some of its pipelines.

Valuation

Assumptions

Revenue: pre-COVID data exhibits an 8% increase YoY, and thus revenue from 2022 to 2023 is projected to increase 8%. However, as a result of thesis point 1 and 2, revenue growth rate is projected to decline afterwards until the terminal growth rate of 2% in 2027.

EBIT: due to stagnation and new carbon policies in Alberta, production costs will likely increase in the next 2-3 years, and thus EBIT is projected to trend down from 15% to 12%.

D&A: projected to stay consistent relative to previous years. *CAPEX:* Enbridge in February took a 1.6 billion USD loss due to higher cost of capital related to natural gas transmission. This increasing cost of gas transmission is reflected in a higher CAPEX in 2023 and 2024.

| In Millions | Historical | | | | | Projected | | | | |
|----------------|------------|-----------|-----------|-----------|-----------|-------------|-------------|-------------|--------------|--------------|
| | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| Year | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| Revenue | 46,378.00 | 50,069.00 | 39,087.00 | 47,071.00 | 53,309.00 | 57573.72 | 60452.406 | 62265.97818 | 63511.29774 | 64781.5237 |
| revenue growth | 0.00% | 7.96% | -21.93% | 20.43% | 13.25% | 8% | 5% | 3% | 2% | 2% |
| EBIT | 7,069.00 | 8,784.00 | 8,105.00 | 7,976.00 | 8,423.00 | 8636.058 | 7858.81278 | 7471.917382 | 7621.355729 | 7773.782844 |
| %rev | 15.24% | 17.54% | 20.74% | 16.94% | 15.80% | 15% | 13% | 12% | 12% | 12% |
| (+) D&A | 3,246.00 | 3,391.00 | 3,712.00 | 3,852.00 | 4,317.00 | 5181.6348 | 5440.71654 | 5603.938036 | 5716.016797 | 5830.337133 |
| %rev | 7.00% | 6.77% | 9.50% | 8.18% | 8.10% | 9% | 9% | 9% | 9% | 9% |
| (-) CapEx | -6,806.00 | -5,492.00 | -5,405.00 | -7,818.00 | -4,647.00 | -7484.5836 | -7254.28872 | -6849.2576 | -6351.129774 | -5830.337133 |
| %rev | -14.68% | -10.97% | -13.83% | -16.61% | -8.72% | -13% | -12% | -11% | -10% | -9% |
| NWC | 2,199.00 | 2,421.00 | 2,487.00 | 1,686.00 | 1,530.00 | 2878.686 | 2418.09624 | 2490.639127 | 1905.338932 | 1943.445711 |
| %rev | 4.74% | 4.84% | 6.36% | 3.58% | 2.87% | 5% | 4% | 4% | 3% | 3% |
| Change in NWC | | 222.00 | 66.00 | -801.00 | -156.00 | 1,348.69 | -460.58976 | 72.5428872 | -585.3001949 | 38.10677865 |
| FCF | | 6,461.00 | 6,346.00 | 4,811.00 | 8,249.00 | 4,984.42 | 6505.83036 | 6154.054931 | 7571.542947 | 7735.676065 |
| Discounted FCF | | | | | | 4653.415987 | 5670.438863 | 5007.630486 | 5751.912424 | 5486.345062 |

| Terminal Value: Gordon Growth Method | | WACC calculation | |
|--------------------------------------|------------|--|-------|
| Terminal Growth Rate | 2.00% | Weighted average of coupon rates (from 10-K) | |
| Terminal Value | 154,313.84 | Cost of Debt | 4.50% |
| Present Value of TV | 109,443.44 | | |
| Sum of Near Term Cash Flows | 26,569.74 | Risk free rate | 3.53% |
| Implied Enterprise Value | 136,013.18 | Average market re | 9.57% |
| Implied Equity Value | 76,347.18 | Beta (Levered) | 1.03 |
| Shares Outstanding | 2029.00 | Cost of Equity | 9.77% |
| Implied Share Price | 37.63 | | |
| Current Share Price | 39.31 | WACC | 7.11% |
| Downside | -4.47% | | |

| Company | Share Price | Shares Outstanding | Market Cap | Net Debt | Enterprise Value (EV) | Revenue | EV/Revenue | EBITDA | EV/EBITDA | |
|--------------------------------|-------------|--------------------|------------|----------|-----------------------|----------|------------|--------------|-----------|-------------|
| ambina Pipeline Corporation | | 32.7 | 550.4 | 17994.5 | 8249.7 | 27920 | 8579.2 | 3.254382693 | 2106.6 | 13.25358397 |
| ains All American Pipeline, LP | | 13.18 | 698.4 | 9204.8 | 8349 | 23302.8 | 57342 | 0.4063827561 | 2526 | 9.225178147 |
| Energy Corporation | | 41.22 | 1022.7 | 42105.5 | 42545.8 | 86635.8 | 11066.3 | 7.828795532 | 6440.9 | 13.45088419 |
| der Morgan, Inc. | | 17.37 | 2241.2 | 38929.9 | 31380 | 71666.9 | 18795 | 3.813083267 | 6376 | 11.24010351 |
| ergy Transfer LP | | 12.77 | 3094.6 | 39518 | 48850 | 102544 | 89876 | 1.140949753 | 12288 | 8.345052083 |
| eniore Energy, Inc. | | 150.41 | 243.5 | 36623.9 | 26540 | 65961.9 | 33306 | 1.980480994 | 5621 | 11.73490482 |
| gellan Midstream Partners, LP | | 56.25 | 203.3 | 11435.3 | 5160 | 16596.2 | 3200.4 | 5.185664292 | 1241.3 | 13.37001531 |
| terprise Products Partners, LP | | 26.81 | 2174.5 | 58298.6 | 28594 | 88020.6 | 58186 | 1.512745334 | 8729 | 10.08369802 |
| ga Resources Corp. | | 75.61 | 226.3 | 17108.7 | 11360.4 | 30785.6 | 20929.8 | 1.470897954 | 2830 | 10.87830389 |
| IEOK, Inc. | | 66.3 | 447.4 | 29665.3 | 13503.3 | 43168.5 | 22386.9 | 1.928292886 | 3337.5 | 12.93438202 |
| ridge Inc. | | 39.33 | 2024.9 | 79642.4 | 59319.9 | 146594.3 | 39389.2 | 3.721687671 | 9413.3 | 15.57310401 |

| | | | | | | | | | |
|---------------------------|-------------|--------|-------------|-------------|-------------|-------------|------------|-------------|-------------|
| verage | 48.35909091 | 1175.2 | 34593.34555 | 25804.73636 | 63926.96364 | 33005.16364 | 2.93121483 | 5537.236364 | 11.82629182 |
| (millions, except ratios) | | | | | | | | | |

| Comparable Valuation | | Comparable Valuation | |
|-------------------------------|---------------|--------------------------------|---------------|
| EV/EBITDA | | EV/Revenue | |
| EBITDA | 9413.3 | Revenue | 39389.2 |
| EV/EBITDA Average | 11.82629182 | EV/Revenue Average | 2.93121483 |
| Implied EV | 111324.4328 | Implied EV | 115458.2072 |
| Net Debt | 59319.9 | Net Debt | 59319.9 |
| Implied Market Cap | 52004.53275 | Implied Market Cap | 56138.30719 |
| Shares Outstanding | 2024.9 | Shares Outstanding | 2024.9 |
| EV/EBITDA Implied Share Price | 25.68251902 | EV/Revenue Implied Share Price | 27.72398992 |
| Current Share Price | 39.33 | Current Share Price | 39.33 |
| EV/EBITDA Implied Premium | -0.3469992623 | EV/Revenue Implied Premium | -0.2950930608 |
| | -35% | | -30% |

| IAM, CASB, iBPMS, & Conglomerates | | | | |
|-----------------------------------|------|--------------------------|-----------------|----------------|
| EV/Rev of Comparable Companies | | Implied Enterprise Value | Per Share Price | Implied Upside |
| Median | 8.2 | 8394.17 | 54.26 | -77.46% |
| Average | 20.3 | 20639.86 | 133.42 | -44.57% |
| 25 Percentile | 4.1 | 4201.07 | 27.16 | -88.72% |
| 75th Percentile | 14.4 | 14643.85 | 94.66 | -60.67% |



Spring 2023
 Promontory Investment Research
<https://www.promontoryir.com/>

Intel (NASDAQ: INTC)

| Intel NASDAQ: INTC | | |
|--------------------------|-----------------|----------|
| Negative | Neutral | Positive |
| Share price, 05/12/23: | \$28.95 | |
| Market capitalization: | \$120.75bn | |
| Shares outstanding: | 4.17bn | |
| 52-week range: | \$44.93/\$24.59 | |
| EPS (FY22): | \$1.94 | |
| Beta: | 1.09 | |
| Average analyst opinion: | \$29.00 | |
| Price target: | \$46.68 | |

Investment Overview

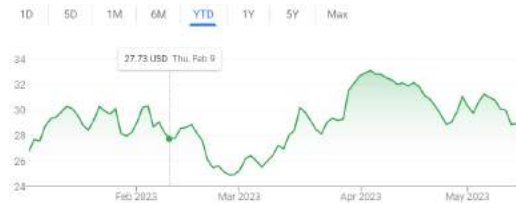
We pitch a hold on Intel with a price target of \$46.68. Intel has significant but unrealized potential in the semiconductors industry due to its new management team, clear direction for the company as well as focused execution strategy. Despite this, the poor macroeconomic environment, continued difficulty in executing its new plans, as well as difficulty building a defensive position on its existing market share have presented significant challenges to Intel's financial prospects. As such, while it is unlikely that Intel is likely to be worse off in the future, there remains significant uncertainty around its ability to achieve its ambitious targets.

Company Overview

Company History

Intel is a major semiconductor chip designer and manufacturer that grew to become a dominant supplier of PC microprocessors.

Price Chart



While Intel has historically been the dominant chip manufacturer, it has lost its prowess over the years. Their rival Advanced Micro Devices Inc. (AMD) gained ground and obtained a market share of 25.6% in processors in 2021 --- the highest in record. For the server segment where Intel used to enjoy over 99% of the market share, AMD's market share increased to 10.7%. Intel's financial performance continues to suffer. For the quarter ending December 2022, Intel had a 31.6% decline in revenue relative to Q4 2021, and a 20.1% year-over-year decline in revenue over a one-year period from the previous fiscal year. Intel's falling revenue over the past few quarters could be attributed not only to a combination of factors including a reversal of the global chip shortage, weak semiconductor demand and slump in Personal Computing (PC) sales but also a series of mistakes.

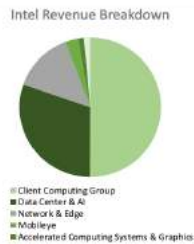


Exhibit 1: Revenue Breakdown

Financial Highlights

| (Dollars in millions) | 2022 | 2023E | 2024E |
|-----------------------|-------|-------|-------|
| Revenue | 63054 | 65745 | 72657 |
| % Growth | -20.2 | 4.3% | 10.5% |
| EBIT | 2334 | 1972 | 2180 |
| % Growth | -88% | -15% | 11% |
| EPS | 1.94 | 0.30 | 0.31 |

Intel has 6 key revenue-generating segments --- Client Computing Group, Data Center & AI, Network & Edge, Mobileye, Accelerated Computing Systems & Graphics, and Intel Foundry Services. Intel sells its products primarily to Original Equipment Manufacturers (OEMs) as well as Original Design Manufacturers (ODMs). Its largest customers are Hewlett-Packard Company (17% net revenue), Dell Inc. (15% net revenue) and Lenovo Group Limited (12% net revenue) with more than 10% of net revenue.

Intel's decline can be characterized by key missteps over the years resulting in product delay announcements followed by gradual loss of market share as well as several quarters of poor earnings.

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Key Missteps

Under the leadership of Paul Otellini, Intel lost its chance to set foot in the mobile device market when they prioritized margins over risk-taking and expanding into new markets. The result was the formation of another competitor, Arm technology, which began with manufacturing chips for Apple's mobile devices and recently started manufacturing chips for Macintosh Computers as well, which was traditionally manufactured exclusively by Intel.

More fundamentally, its slow and steady decline over the past decade is a result of years of inefficiencies and slow pace of innovation relative to its peers, culminating in a series of product delays. Historically, Intel is a pure play semiconductor business. They enjoy comparative advantages from retaining control over the manufacturing processes of their core products. The lack of innovation of its manufacturing processes meant that it was unable to keep up with its competition in terms of product releases. In 2016, Intel faced issues with yield when manufacturing its 10nm processor, and was only able to launch the processor in 2021 through its product Alder Lake. Intel also revealed in the summer of 2020 that it identified a defect in its 7nm processor, resulting in more product delays. As such, in 2023, they were compelled to outsource the production of chips to TSMC, which were then used to produce their core, high-margin CPUs. During the Q4 earnings call of the 2022 fiscal year, Pat Gelsinger also conceded that there was no improvement to the technology of its data centers over the past 5 years.

Intel's difficulty executing its product roadmaps has led to several product delays for Sapphire Rapids, Ponte Vecchio as well as Granite Rapids, which are code names for its CPU and GPU processors.

Gradual Loss of Market Share

Intel's poor financial performance could primarily be attributed to its lackluster performance in its major business lines, Client Computing Group and Data Center & AI. In an industry where performance and speed of product releases are key to market leadership, Intel's inability to meet performance demands due to inefficiencies in its production processes has caused it to fall behind its competitors. This is evident in how it gradually lost market share to AMD over the past consecutive quarters.

Management

Intel has also undergone several leadership changes, with Bob Swan replacing Brian Krzanich as Chief Executive Officer (CEO) in 2018 and Pat Gelsinger stepping into the position in 2021. An engineer by training, Gelsinger graduated with degrees in electrical engineering, started his career at Intel in an engineering role, and later became Chief Technology Officer (CTO) at the firm before leaving the firm and later serving as CEO position of VMware. Gelsinger's key priorities as CEO are to stabilize the delivery of Intel's products as well as to reestablish Intel's technical expertise and manufacturing prowess in the semiconductor space. With years of experience and ambition for Intel, Gelsinger is well-positioned to reverse the mistakes of his predecessors.

Moving forward, Intel is expected to increase its focus on its core chip manufacturing business segment and as such, has taken strategic measures to increase manufacturing capacity through the spin-off of Mobileye in late 2022 as well as significant investment in its newest business unit, Intel Foundry Services.

Strategy Pivot

Gelsinger's leadership saw several key changes in Intel's direction. He outlined two core strategies shaping Intel's direction moving forward. The first is its IDM (Integrated Design Manufacturing) 2.0 strategy, with the objective of becoming the largest foundry capacity in the US and Europe. The second is its "Five nodes four years" strategy, which outlines a product roadmap necessary for Intel to regain its credibility and competitiveness moving forward.

In line with his vision, Intel announced the acquisition of Tower — a foundry business, divested Mobileye, as well as conserved capital through layoffs, dividend cuts from 36.5 cents to 12.5 cents and reduced executive compensation.

Drivers of Intel Stock

Over the past few years, Intel's stock has declined by more than 50%. There are two consistent drivers to Intel's periodic declines in share prices — product delay announcements and weak quarterly earnings. Longer-term challenges such as a gradual loss of market share to AMD as well as overall weak semiconductor demand have contributed to further reductions in investor confidence in the company.

As of 2023, Intel continues to suffer from earnings losses. While Intel beat earnings estimates in Q1 2023, AMD's gain in market share from Intel, industry-wide weakness in demand as well continued reduction in sales for the 5th consecutive quarter has further shaken investor confidence, leading to further stock declines.



Exhibit 2: Intel's Stock Price History

Industry Overview

Industry Outlook

The semiconductor chip industry is a critical and rapidly growing sector of the global economy. Semiconductor chips are at the heart of modern electronics and are essential components of everything from personal computers and smartphones to medical devices and cars.

The semiconductor chip industry is primarily divided into two segments: memory chips and logic chips. Memory chips store and retrieve data, while logic chips process data and perform computational tasks. Memory chips include dynamic random-access memory (DRAM), static random-access memory (SRAM), and flash memory. Logic chips include microprocessors, microcontrollers, digital signal processors, and field-programmable gate arrays (FPGAs).

Moore's law is the conventional wisdom in the semiconductor industry, stating that the number of components within a processing chip would double every two years. This rule has held since the idea was coined by Intel's Co-Founder, Gordon Moore, in 1975. The industry is characterized by rapid innovation and a constant drive to increase processing power and reduce chip size and power consumption. This has led to the development of new materials, such as gallium nitride and silicon carbide, and new manufacturing processes, such as extreme ultraviolet (EUV) lithography. These advanced technologies are crucial for producing the intricate chip designs – and for increasing the density. In fitting with Moore's law, semiconductor manufacturers seek to increase the density of transistors within their CPUs – the density is notated by the nanometers (nm) between transistors. The difference between 14nm and 7nm is essentially the density of transistors in the chip – the less distance between transistors, the more processing power that can be fit in a small chip.

However, the industry is subject to cyclical demand patterns and supply chain disruptions, as well as geopolitical tensions that can impact global trade and investment. Semiconductor chip shortages, for example, have recently affected industries ranging from automobiles to gaming consoles. Currently, the squeeze has begun to loosen, as widespread investments in new chip production occurred at the 2020-2021 peak. Regardless, long term demand looks promising and increasing – especially as the economy is increasingly digitized.

Competitive Landscape

Intel operates in an oligopolistic, but highly competitive landscape within the semiconductor industry, where it faces competition from a range of established and emerging players. These competitors have continuously eaten away at Intel's market. Some of Intel's key competitors include:

- 1. Advanced Micro Devices (AMD):** AMD is Intel's main competitor in the market for microprocessors. AMD's Ryzen processors are designed to compete directly with Intel's Core processors, and AMD has been gaining market share in recent years.
- 2. Qualcomm:** Qualcomm is a leading provider of processors for smartphones and other mobile devices. Its Snapdragon processors compete with Intel's Atom processors in the mobile market.
- 3. Nvidia:** Nvidia is a leading provider of graphics processing units (GPUs) used in gaming, artificial intelligence, and other applications. Its products compete with Intel's integrated graphics solutions.
- 4. Samsung Electronics:** Samsung is a major player in the semiconductor industry, with a significant presence in memory chips and microprocessors. Its Exynos processors are used in some Samsung smartphones and tablets.
- 5. Taiwan Semiconductor Manufacturing Company (TSMC):** TSMC is the world's largest contract manufacturer of semiconductor chips, producing chips for a wide range of companies, including Apple and AMD. It is also a key supplier of chips to Intel's main competitor, AMD.

To remain competitive, Intel invests heavily in research and development and works to stay at the forefront of emerging technologies. Intel also pursues strategic partnerships and acquisitions to expand its capabilities and product offerings. For example, in 2020, Intel acquired Habana Labs, an Israeli-based AI chipmaker, to enhance its AI offerings. Furthermore, there is much to be gained from Intel's breadth of experience across the semiconductor market.

Intel has received large grants from the US government to expand chip production. The chips act is a huge boon to Intel's long term prospects, as the US government is offering \$3B for the chip factories (fabs). Though TSMC and Samsung will also receive benefits, Intel is set to receive the biggest share.

Macroeconomic trends and current market cycle

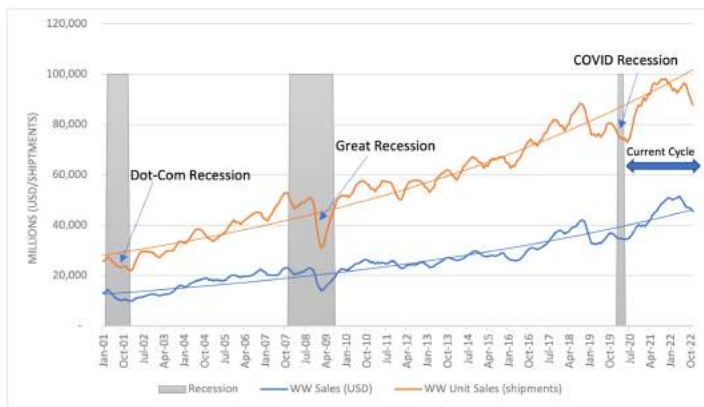


Exhibit 3: 3 month moving average of sales (in USD) and unit sales

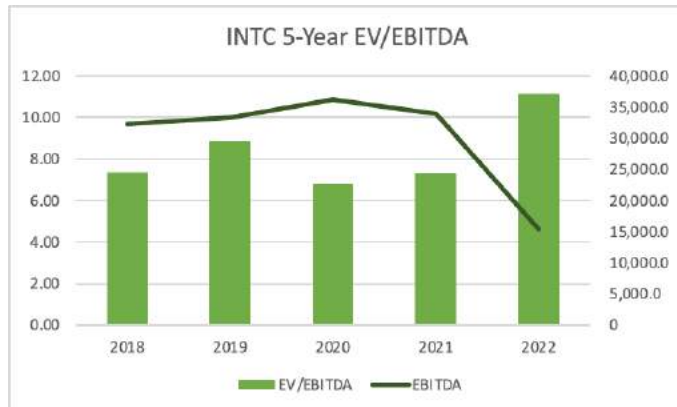


Exhibit 4: INTC 5-Year EV/EBITDA

At this point, we are seeing a reduction in unit sales for semiconductors and related products across all companies within the industry. This has significantly impacted the earnings of semiconductor companies and a general decline in share price across the board. Once the semiconductor cycle recovers, we will expect increases in both the dollar value of sales as well as number of shipments, thus driving top-line growth into the next 5 years. Multiple expansion, however, is unlikely given the high multiples during this period, meaning that Intel's future valuations would be driven mainly by EBITDA expansion.

Investment Thesis

Thesis 1: Intel's stock is mired by quarters of weak earnings and negative publicity, causing market to overlook its improving fundamentals and growing potential in new product markets

Intel's poor financial performance could be attributed to market share losses due to product delays, gradual loss of market share in the CPU market, as well as overall weak demand in the semiconductor industry. The problem was exacerbated by compressing margins as it flooded the markets in Q1 2023 with excess CPU inventory in an effort to sideline AMD in the client computing group business segment. From an operating margins standpoint, this is offset by expected cost savings of 3bn by 2023.

On aggregate, PC sales shipments have declined 30% in Q1 2023 and are caused by economic uncertainty, decreased economic growth and inflationary pressures. It is thus reasonable to expect continued declines in quarterly earnings throughout 2023, which is attributable to the poor macroeconomic environment. Intel's earnings decline is hence a reflection of overall market weakness, rather than purely its inability to compete in its various business sectors.

While market movements have merely been a reflection of earnings estimates and product delays, they have failed to price in gradual operational improvements driving recent product releases. Intel's Sapphire Rapids Xeon Scalable processors (Datacenter and AI business segment) released in Q1 2023 after over a year of production delays puts it on par with or better than Amazon's 64-core Graviton3 and AMD's 96-core Epyc 4. Within its Accelerated Computing Systems & Graphics business line, Intel launched its top processor Ponte Vecchio (Rebranded as Intel Data Center GPU Max 1550), which is currently comparable with Nvidia's A100. In Exhibit 5, when comparing the gap between the release dates of comparable products, it is evident that Intel has gradually been able to reduce product delays to better position itself relative to its peers.

| Product | Expected Release Date | Actual Release Date |
|-------------------|-----------------------|---------------------|
| Alder Lake (10nm) | 2016 | 2021 |
| Sapphire Rapids | Q1 2022 | Q1 2023 |
| Ponte Vecchio | Q1 2022 | Q1 2023 |
| Raptor Lake | Second half of 2022 | Q4 2022 |

Exhibit 5: Release Schedules and Final Release Date of Intel Products

Secondly, Intel's strategy pivot and improved capabilities well-positions it to develop new revenue streams and gain traction in less-ventured markets. Because Intel is traditionally viewed as a leading-edge manufacturer of semiconductor chips, the loss of market leadership overtime has largely influenced market sentiment on its business prospects in this field. Intel has, however, a growing edge in mid to low-tier products. Intel announced the acquisition of Tower Semiconductor, a foundry of analog semiconductor solutions that targets the mid and low-tier chip manufacturing market. Intel's acquisition of Tower provides it with chip-making capabilities along with an additional 1.3% market share in the foundry business, better positioning itself to expand its Foundry services beyond leading-edge chip manufacturing. Another area of opportunity for Intel is its untapped potential in the GPU market, where Nvidia currently exploits its leading market position of over 75% of GPU market share to hike prices. Intel's Arc A770 costs \$349 at launch, which is significantly more affordable than Nvidia's RTX 4070 priced at \$600. While there are material performances, the lack of market players in the lower-tier GPU market despite a demand for affordable, lower-tier GPU processors present a great opportunity for further expansion into the space. Intel's Arc A770, which provides better value, is thus well-positioned to compete in this market.

The combination of improved prospects on leading-edge product lines, development of new revenue streams, as well as improved macroeconomic conditions over the next 3 years is expected to improve Intel's financial performance over time.

Thesis 2: Intel's Push Towards Vertical Integration as Seen Through its Foundry Model Creates a Differentiated Product for Clients and Makes it More Responsive to Market Trends

Intel's internal foundry model that embraces a unique, integrated model between design and production teams. This more streamlined organizational structure will allow Intel to accelerate its ability to produce next-gen products at scale and on time. The internal foundry model represents an attractive offering to customers. By integrating design teams with fabricating teams, Intel's Internal Foundry Model allows designers - their clients - to express their desires to other designers with similar expertise. The ease of communication between clients and Intel should make this service a more attractive offering than other fabricators. This new venture has already received a vote of confidence. Intel has received a contract from SoftBank-backed company Arm to fabricate many of Arm's chips. Certainly, this partnership is already lucrative, but the partnership is more meaningful for investors in terms of what it means for the future. The semiconductor design industry faces geopolitical challenges in the form of the geopolitical conflict between China and Taiwan. If Arm's partnership with Intel is successful, it would illustrate to other chip designers that Intel is a viable competitor to its Taiwanese counterparts. This could lead to Intel receiving more orders for its fabrication service as it would become a viable hedge for designers against the growing risk of increased tension between Taiwan and China.

Intel's commitment and focus on improving its core chip fabrication and innovation capabilities via its Foundry Services is reflected in its reduction in dividends, discontinuation of other non-core R&D projects such as Virtual Reality and Electric Vehicles as well as increased investment in capacity expansion. As Foundry Services is a high CAPEX endeavor, Intel's reduction in quarterly dividends from 36.5 to 12.5 cents and spinoff of the autonomous vehicle company Mobileye raising \$800million should be welcome news as these decisions should free up capital for reinvestment into Fabs. In addition Intel's partnership with Brookfield Asset Management allows it to access even more funds for its expansion plans

While the market has traditionally regarded Intel's participation in the fabrication industry poorly, this not only ignores the clear path to a dominant market position in the space as described above but it also fails to account for the way in which this vertically integrated business model - in which Intel designs and manufactures chips - protects Intel from market risks. By controlling the entire value chain, Intel can differentiate its products, respond faster to market trends, and maintain better control over costs. The company's recent efforts to improve its manufacturing capabilities will further enhance its competitive position, as it expands production capacity and invests in cutting-edge technologies. While AMD has made significant strides in recent years, relying on third-party foundries such as TSMC for manufacturing, Intel's renewed focus on advanced manufacturing processes (Intel 7, Intel 5, and Intel 3) will help it regain the upper hand. This technological leadership, combined with

Intel's IDM 2.0 strategy, will allow the company to optimize its supply chain and allocate resources efficiently. Moreover, Intel's commitment to ramping up manufacturing capacity and investing in new fabs will help it mitigate global chip shortages, enabling it to better serve customers and gain a competitive edge over AMD.

Thesis 3: Geopolitical Competition Between the US and China, Coupled With the US's Protectionist Instincts Should Give Intel Access to Capital its Rivals Don't Have

Intel was also able to successfully obtain external sources of funding through the Chips Act to support its chip foundry expansion. These funds will be especially important in improving margins as the FABS tax credit and other additional funding will alleviate much of the high fixed cost burden that Intel had planned to incur when building new plants in Arizona and Ohio. The CHIPS Act could be seen as a one time subsidy to the semiconductor industry, but we do not believe that this will be the case. The CHIPS act is one of the rare pieces of legislation that received bipartisan support. A key part of this is to bolster the indigenous US semiconductor fabrication industry. Many critical semiconductor components - which are integral for machines ranging from smartphones to cars - are manufactured in Taiwan, an island increasingly under threat of invasion or blockade. In order to hedge against this long-term possibility, it appears that continued subsidies of the semiconductor fabrication industry may be necessary, placing Intel in a position to access cheaper capital than TSMC and other international fabricators.

Although other fabricators have received money from these government programs; however, some of these companies have faced regulatory challenges that may dissuade them from investing in the US. TSMC, for example, has struggled in negotiations with the Federal Government over profit sharing clauses that are tied to the provision of Federal funds. If foreign fabricators like TSMC pull out of their originally proposed US investments, more CHIPS Act funding will become available to future Intel projects. In addition, the Biden administration has broadly pivoted away from providing Federal funds to foreign companies. This protectionist trend should benefit Intel as one of the largest semiconductor fabricators in the US and a firm with a desire to invest more in domestic fabrication capacity.

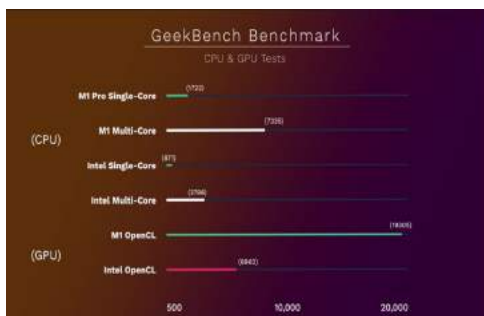
Intel could benefit from this geopolitical tension regardless of whether Congress or the Executive chooses to appropriate new funds or tax credits to them. Intel's domestic competitors - including AMD and Apple - have focused only on design and have chosen to outsource manufacturing to chip makers – mainly to TSMC with 56% of the market share in 2022. While this allows said rivals to focus on chip design and avoid billions in CAPEX, it prevents them from being self-reliant. This problem is compounded by the fact that much of TSMC's production is based out of Taiwan and that its US expansion has hit regulatory roadblocks. This risk has been reflected in recent statements made by executives both at Intel and at Samsung, noting that geopolitically resilient supply chains will be essential to the future of the semiconductor industry. With its base in the US and a willing partner in the Federal Government, Intel is better positioned to craft such a resilient supply chain which is becoming an increasingly important consideration.

With the rise of geopolitical tension between the American and Chinese governments over the state of Taiwan, TSMC's position is risky. China may attempt to block exports of integrated circuits from Taiwan as they represent a third of all exports. Such a risk may be too much for firms like AMD and Apple to bear - nudging them away from the currently technologically superior TSMC and towards the geopolitically safer Intel. Samsung also may not be best positioned to capitalize on this development. The protectionist American policies mentioned above will hurt Samsung, as the US looks to incentivize the growth of domestic rather than foreign firms in this space.

Thesis 4: The Jack of All Trades, and a Master of None. Why Intel's Vertical Integration Has and Will Continue to Lose Intel Market Share.

Though Intel's unique position as a manufacturer and designer of semiconductors would traditionally be seen as a positive attribute, the highly technical and rapidly changing field of semiconductors has created problems for Intel going forward. Their vertical interaction, and the problems resulting from it, have allowed competitors on all sides to gain the upper hand. Many areas of Intel's former market dominance have been chewed away by specialized competitors. Apple was able to design their own M1 chipset, which dealt a massive blow to Intel's sales through Mac computers. Qualcomm, by contracting chips from TSMC, was able to overtake the mobile chip market, which Intel did not enter. The mobile chip market was a huge area of growth that Intel missed out entirely because of their lack of specialization. AMD went from a far second competitor to a close rival of Intel's, making superior CPUs in many cases.

Apple is a pertinent case study for its direct impact on Intel top-line revenues. For over a decade, Apple's popular iMac laptop series used Intel CPUs and currently makes up 17% of the US laptop market (8-10% of the global market). From Apple's efforts on designing the A-Series chips for their iPhone and iPad, they sought to create an integrated chipset that included the CPU, GPU, and DRAM. With a new ARM architecture and partnership with TSMC to source semiconductors, Apple's M1 and M2 CPUs were used for Apple's iMac laptops. The M1 chipset was far superior in side-by-side comparisons with Intel's peer chipset (Exhibit 6).



AMD's rise to competition with Intel is indicative of what is perhaps Intel's greatest threat. Though it is important to note that Intel still enjoys a majority of the microprocessor industry, this dominance has been etched away. AMD's Zen series saw rapid innovation in the late 2010s and early 2020s, moving from 14nm in line with Intel, to 7nm now. AMD's higher price for performance has made it the best option for consoles (Xbox and Playstation both use AMD chips) and for desktop/laptop gamers – gaming hardware is expected to have a CAGR of 12% over the next decade. If the discrepancy in performance remains, then Intel will continue to lose market share to AMD, as slower moving enterprise buyers move to utilize AMD's higher price to performance. TSMC is already in mass production of its 3nm chips, which AMD is expected to integrate into its own product lines. Though Intel is set to ship its 7nm chips by the end of 2023, TSMC is expected to be producing 2nm chips by 2024.

Exhibit 6: Comparison of Apple and Intel Chips

In conclusion, Intel has not gained the expected fruits of vertical integration. Whatever the explanation – management problems, monopolistic positioning, unexpected hurdles to technological progress – Intel’s lack of innovation in its core chip product has let it fall behind its competitor (AMD), prevented Intel from expanding into growing segments (mobile), and lose large customers (Apple). Intel remains dominant in enterprise CPUs, due to the slow nature of enterprise technology adoption – this advantage can only remain for so long, especially given TSMC’s build-out of new fabs. In order to regain a competitive advantage, Intel must catch up to TSMC’s manufacturing expertise, outdo AMD’s rapid integration of new technologies into their chip designs, and innovate on specific use-cases for buyers that may be tempted to design their own chips like Apple.

Investment Risks

Risk: Management has Shown a Tendency to Make Erratic Decisions - Spending Vast Sums on Potentially Lucrative Projects Only to Axe Them Not Long After

Recently, Intel has announced that they will be axing their plans to design and manufacture a chip optimized for mining cryptocurrencies. Intel had announced their plans for this chip in 2022. This episode - along with Intel’s cancellation of plans to build a new 700 million dollar data center focused on sustainability - could indicate that management is too easily swayed by short-term market forces and lacks long-term thinking. This may indicate that if the fabrication business looks less lucrative temporarily, management might cancel their investment in fabrication which serves as the basis for much of our optimism.

Mitigation: Activist Pressures in the Semiconductor Industry Should Hedge Against Bad Management

Third Point Management has recently taken a position in AMD - after having previously invested in Intel. Given that activist investors are circling the space, any prolonged run of bad management decisions will likely be met by an activist push that will result in either a new leadership team or a roll back of unpopular decisions.

Risk: Intel’s Push Into Selling AI Solutions With BCG Could Expose Intel to Reputational Harm

Intel has recently partnered with BCG to sell generative AI solutions. While AI has become a promising business line for a panoply of tech companies, it also comes with many risks. Recently, the failure of Google’s Bard AI has resulted in a loss of \$100bn in Google’s stock price. Should Intel’s AI solutions also fall embarrassingly short, it is possible that its stock could also experience a considerable drop due to reputational harm.

Mitigation: Intel Will Not Face as Considerable a Drop in Market Value as Its Future Success is Not Seen to be Tied to AI

Although Intel is moving into AI, it is already not seen as a leader in AI enabled solutions. Within the Semiconductor space, Nvidia is already seen by the market to gain the most from any future growth in AI.

Valuation

Revenue Assumptions

- **Intel Foundry Services:** Expected to be the fastest growing business segment
- **Client Computing Group:** Mature business segment; we expect Intel to continue experiencing losses due to poor macroeconomic environment, but growth will increase towards end of projection period
- **Other business segments:** We expect growth rates to decrease gradually during projection horizon

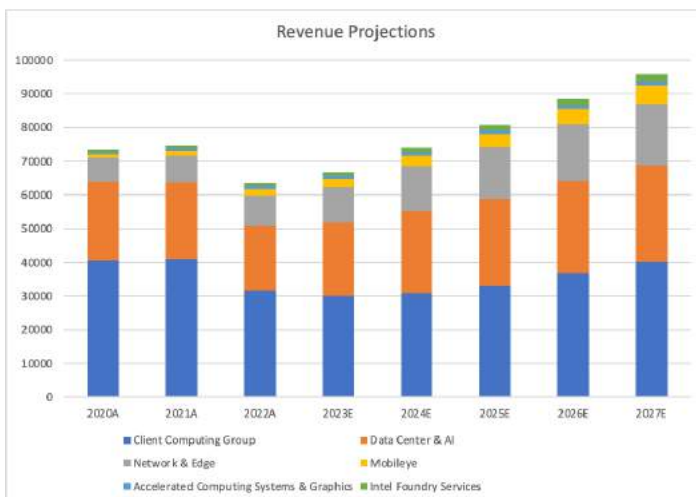


Exhibit 7: Intel’s Revenue Projections

EV/EBITDA

| | |
|-----------------|-------|
| Average | 25 |
| 25th Percentile | 11.22 |
| 50th Percentile | 15.58 |
| 75th Percentile | 27.00 |

Beta

| | |
|-----------|------|
| Average | 0.80 |
| Intel D/E | 0.41 |
| Beta | 1.09 |

Exhibit 8: Comp Set Betas and Trading Multiples

Key Cost Assumptions

- **Gross Margins:** COGS include continued capital investments into Intel’s IDM 2.0 strategy. We expect gradual improvements in gross margins

- through (i) scale and (ii) establishment of foundry services
- **R&D Costs:** R&D as a % of revenue is likely to remain flat. We believe Intel's future product development successes would be driven by its reallocation of capital, rather than significant increases in R&D margins
- **PPE:** We expect continued, significant increases in PPE given expenditure on foundry services and other equipment in line with IDM 2.0 strategy

| | 2018A | 2019A | 2020A | 2021A | 2022A | 2023E | 2024E | 2025E | 2026E | 2027E |
|---------------------------|--------|--------|--------|--------|--------|-----------|----------|---------|---------|----------|
| EBIT | 23316 | 22035 | 23678 | 19456 | 2334 | 1972 | 2180 | 4747 | 6936 | 7505 |
| <i>Effective Tax Rate</i> | 10% | 13% | 17% | 8% | 0% | 10% | 10% | 10% | 10% | 10% |
| NOPAT | 21052 | 19278 | 19732 | 17811 | 2334 | 1775 | 1962 | 4272 | 6243 | 6755 |
| (+) D&A | 9085 | 10826 | 12239 | 11792 | 13035 | 13877 | 15026 | 16142 | 17347 | 18538 |
| (-) Capex | -15181 | -16213 | -14259 | -19733 | -24844 | -27145 | -23872 | -19255 | -19561 | -19862 |
| (-) Change in NWC | | -3232 | 13566 | 8601 | -12844 | -1403 | -3307 | 6024 | 3493 | 11808 |
| Unlevered FCF | | 10659 | 31278 | 18471 | -22319 | -12897 | -10190 | 7184 | 7521 | 17239 |
| Discount Rate | | | | | | 0.93 | 0.86 | 0.80 | 0.74 | 0.69 |
| PV FCF | | | | | | -11968.94 | -8776.78 | 5742.10 | 5579.34 | 11868.32 |

Exhibit 9: DCF Model

| Company Comp Set | Type | Market Capitalization | Total Debt | EV | EBITDA | EV/EBITDA | Debt/Equity Ratio | Levered Beta | Unlevered Beta |
|---|------------------|-----------------------|------------|--------|--------|-----------|-------------------|--------------|----------------|
| Advanced Micro Devices, Inc. (NasdaqGS:AMD) | Chip Design | 144493 | 2467 | 146960 | 4700 | 31 | 0.045 | 1.43 | 1.37 |
| Micron Technology, Inc. (NasdaqGS:MU) | Chip Fabrication | 67776 | 10270 | 78046 | 9642 | 8 | 0.237 | 0.87 | 0.72 |
| NVIDIA Corporation (NasdaqGS:NVDA) | Chip Design | 682268 | 12030 | 694298 | 7121 | 98 | 0.440 | 1.6 | 1.15 |
| Texas Instruments Incorporated (NasdaqGS:TXN) | | 163407 | 8235 | 171642 | 11020 | 16 | 0.599 | 0.77 | 0.50 |
| QUALCOMM Incorporated (NasdaqGS:QCOM) | Chip Fabrication | 131971 | 12070 | 144041 | 16295 | 9 | 0.897 | 1.1 | 0.61 |
| Broadcom Inc. (NasdaqGS:AVGO) | | 263629 | 39500 | 303129 | 20005 | 15 | 1.690 | 0.89 | 0.36 |
| Marvell Technology, Inc. (NasdaqGS:MRVL) | | 36196 | 4510 | 40706 | 1791 | 23 | 0.229 | 1.46 | 1.21 |
| Microchip Technology Incorporated (NasdaqGS:MCHP) | | 44246 | 8428 | 52673 | 3870 | 14 | 0.998 | 1.19 | 0.63 |
| Analog Devices, Inc. (NasdaqGS:ADI) | | 95900 | 6540 | 102440 | 6570.9 | 16 | 0.370 | 0.89 | 0.67 |

Exhibit 10: Comp Set



Novartis AG

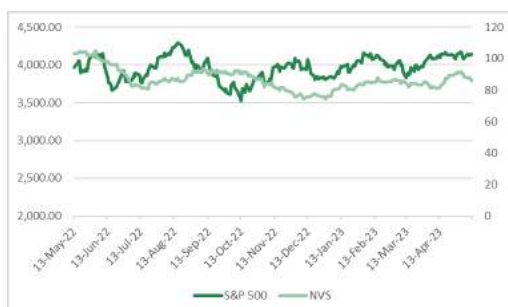
| Novartis AG NYSE: NVS | | |
|--------------------------|---------|----------------|
| Negative | Neutral | Positive |
| Share price, 05/13/23: | | \$103.14 |
| Market capitalization: | | \$204,290mm |
| Shares outstanding: | | 2,097.4 mm |
| 52-week range: | | \$105.5/\$74.1 |
| EPS (FY22): | | \$3.05 |
| Beta: | | .55 |
| Average analyst opinion: | | \$107.34 |
| Price target: | | \$127.20 |

Investment Overview

We have a positive outlook for Novartis AG (NYSE: NVS). Novartis is a pure-play company focusing on treatment for niche diseases such as MLS medication for babies and chemotherapies for rare cancers. Novartis focuses heavily on developing technologies in core areas with high unmet needs. The company demonstrates a clear emphasis on innovation and diversification through its investment in cutting-edge technology platforms, and is tightening focus to areas of high growth and institutional expertise, such as xRNA and Radioligand therapy, which can generate growth and evade markets with high cost competition.

The company is part of the global pharmaceutical market that generates high yearly revenue. The market sees increasing global demand for pharmaceuticals generally, increasing demand for novel and breakthrough technologies specifically, and continuing supply chain disruptions from COVID. Due to the “blockbuster” industry model, it is essential for Novartis to consistently produce effective drugs in areas with high demands.

Price Chart



Company Overview

Company History

Novartis AG is a multinational pharmaceutical company, based in Basel, Switzerland, that specializes in the discovery, development, manufacturing, and marketing of a wide range of healthcare products. The company was formed in 1996 through the merger of Ciba-Geigy and Sandoz Laboratories. Novartis operates globally, with a presence in more than 140 countries, and is considered one of the largest pharmaceutical companies in the world by market capitalization.

Business Lines

Novartis operates through three main business segments:

Innovative Medicines: This segment comprises two business units – Pharmaceuticals and Oncology. The Pharmaceuticals unit focuses on a range of therapeutic areas, including cardiology, immunology, neuroscience, ophthalmology, and respiratory, among others. The Oncology unit primarily develops and markets a portfolio of innovative treatments for various cancer types, such as breast, lung, and leukemia.

Sandoz: The Sandoz segment is Novartis' generics and biosimilars division, offering a wide range of high-quality, affordable generic drugs, biosimilars, and drug-delivery systems. It operates in key therapeutic areas, such as cardiovascular, central nervous system, dermatology, gastrointestinal, and hormonal therapies.

Functional Genomics & Digital Platforms: This segment aims to leverage cutting-edge genomic technologies and digital health solutions to create new therapies, optimize drug discovery and development, and improve patient care. The division focuses on partnerships with academia, start-ups, and other industry players to advance its capabilities in functional genomics and digital platforms.

Pipeline and Therapeutic Focus

Novartis mainly focuses on treating niche diseases like MLS medication for babies or chemotherapies for specific cancers, where demand is usually high and unmet, allowing Novartis to sell with little

Financial Highlights

| (Dollars in millions) | 2022 | 2023E | 2024E |
|-----------------------|--------|--------|--------|
| Revenue | 48270 | 54083 | 57599 |
| % Growth | 2% | 7% | 6.5% |
| EBIT | 12859 | 12980 | 12672 |
| % Revenue | 25.4% | 24.0% | 22.0% |
| EV/EBITDA | 12.2x | 18.4x | 15.0x |
| EPS | \$3.05 | \$3.50 | \$3.32 |

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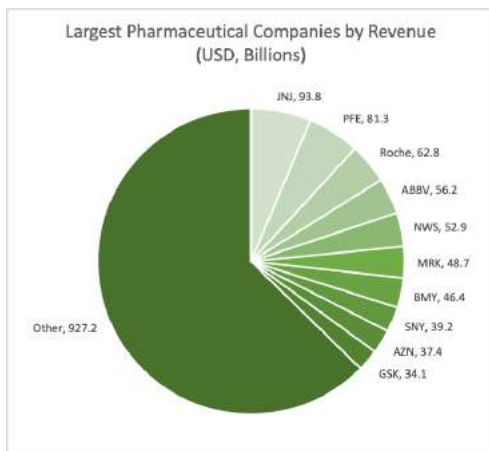


Exhibit 1: Pharmaceutical Market Share

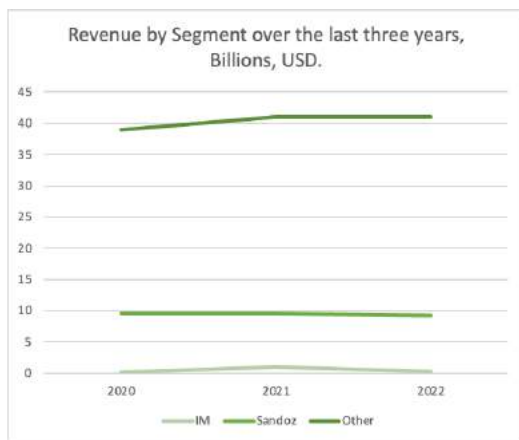


Exhibit 2: Revenue By Segment

competitive pressure and high margins. To offset the potential risks, the company also sells drugs for diabetes, a more common disease with large and stable demand.

Novartis focuses on 5 core areas: cardiovascular, immunology, neuroscience, solid tumors, and hematology. Currently, gene & cell therapy, radioligand therapy, and 'xRNA' are being prioritized in addition to chemistry and biotherapeutics in R&D efforts. Its in-market brands include: Cosentyx, Entresto, Zolgensma, Kisqali, Kesimpta, Leqvio, Pluvicto and Scemblix.

The company's pipeline showcased a number of catalysts set to drive investment and cash flow in the mid & near-term:

Kisqali (ribociclib); data from the NATALEE trial in adjuvant HER2-negative breast cancer in both high- and intermediate-risk patients with breast cancer in 2023. **Iptacopan**; first phase 3 trial results in patients with paroxysmal nocturnal hemoglobinuria later this year with more data readouts in other indications in 2023. **Pluvicto**; phase 3 data from the PSMAfore trial in metastatic castration-resistant prostate cancer late 2022/early 2023. **Remibrutinib**; phase 3 data from two trials in chronic spontaneous urticaria in 2024 and from two phase 3 trials in relapsing multiple sclerosis in 2025. **Scemblix** (asciminib); data from the CML-CP trial in first line CML in 2024.

Recently, Novartis dropped 10% of its pipeline, allowing it to invest further in their 5 key therapeutic areas of competence and produce blockbuster products. Within their focus areas, solid tumors received the biggest cut, suggesting a strategic play from Novartis in focusing its investment in niche areas. We project Novartis will save at least \$1 billion annually by 2024 as a result.

A number of drugs from Novartis demonstrated strong growth in sales. Sales of its top-selling drug, the heart failure pill Entresto, increased by 28% to \$1.4 billion from a year earlier. Sales of breast cancer treatment Kisqali rose 74% year over year to \$415 million, while sales of its prostate cancer drug Pluvicto rose to \$211 million from \$171 million in the fourth quarter.

After successful trials by the end of 2022, Pluvicto saw great increase in demand. Novartis's decision to expand production will positively benefit sales. Novartis's factory in New Jersey received FDA approval to produce Pluvicto on April 21, 2023. Novartis is building another site in Indianapolis that it expects could be operational by the end of the year. This can be a large catalyst for revenue growth for Novartis.

Industry Overview

Industry Overview

Novartis AG operates in the global pharmaceutical and healthcare sector, which encompasses the research, development, manufacturing, and marketing of various healthcare products, including prescription drugs, generics, biosimilars, and medical devices. The market has experienced significant growth during the past two decades, and the global pharmaceutical market is estimated to be valued at over \$1.3 trillion as of 2021, with a compound annual growth rate (CAGR) of approximately 3-6% expected over the next few years. For 2021, the revenue of the global pharmaceutical market was estimated at 1.42 trillion U.S. dollars.

Business Model

Like all Pharmaceutical companies, Novartis has a capital-intensive business model which is characterized by a long time horizon: it can be 5-7 years and hundreds of millions of dollars in capital expenditure before a new product can be brought to market.

This defining feature of the pharmaceutical industry has led to the prevalence of two common business models: the block business model, and the incremental improvement model. The traditional business model for pharmaceutical companies is called "Block Business Model", which hinges on the ability to identify promising new molecules, test them in large clinical trials and promote them with an extensive marketing and sales presence. The "block" in the name refers to any drug that generates annual sales of over US\$1 billion, which is said to be a blockbuster. Common uses of these drugs are for the treatment of common medical issues such as diabetes, asthma, high blood pressure, cancer, and high cholesterol, etc. These drugs are also usually hard to discover and manufacture, thus the pharmaceutical industry is characterized by high capital expenditures on research and development (R&D) and a long period between initial research and finally getting a product to market. In addition, to ensure revenue during periods when breakthroughs in blockbusters are not yet made, pharmaceutical companies usually develop hundreds of drugs that provide minor variations of existing drugs and then market them heavily to doctors and patients alongside to generate consistent revenue. The common costs to the pharmaceutical companies also include the purchase of API (Active Pharmaceutical Ingredient), CRAMS (Contract Research and Manufacturing), importing and exporting, and getting approval for each phase of clinical trials (see image below) .

Phase transition success rates by disease area

| Phase Success | Phase I to II | | Phase II to III | | Phase III to NDA/BLA | | NDA/BLA to Approval | |
|------------------------|---------------|--------------|-----------------|--------------|----------------------|--------------|---------------------|--------------|
| | n | Phase POS | n | Phase POS | n | Phase POS | n | Phase POS |
| Hematology | 92 | 69.6% | 106 | 48.1% | 82 | 76.8% | 72 | 93.1% |
| Metabolic | 136 | 61.8% | 149 | 45.0% | 66 | 63.6% | 48 | 87.5% |
| Infectious disease | 403 | 57.8% | 414 | 38.4% | 197 | 64.0% | 156 | 92.9% |
| Others | 154 | 63.6% | 228 | 38.6% | 90 | 60.0% | 69 | 88.4% |
| Ophthalmology | 88 | 71.6% | 200 | 35.5% | 82 | 51.2% | 45 | 91.1% |
| Autoimmune | 413 | 55.2% | 471 | 31.4% | 219 | 65.3% | 202 | 94.1% |
| Allergy | 55 | 56.4% | 92 | 28.3% | 34 | 64.7% | 20 | 100.0% |
| Gastroenterology | 45 | 46.7% | 73 | 34.2% | 35 | 57.1% | 33 | 90.9% |
| All indications | 4414 | 52.0% | 4933 | 28.9% | 1928 | 57.8% | 1453 | 90.6% |
| Respiratory | 179 | 55.9% | 215 | 21.9% | 62 | 64.5% | 45 | 95.6% |
| Psychiatry | 150 | 52.7% | 164 | 26.8% | 71 | 56.3% | 57 | 91.2% |
| Endocrine | 319 | 43.3% | 293 | 26.6% | 151 | 66.2% | 124 | 86.3% |
| Neurology | 516 | 47.7% | 504 | 26.8% | 226 | 53.1% | 165 | 86.7% |
| Oncology | 1628 | 48.8% | 1732 | 24.6% | 495 | 47.7% | 324 | 92.0% |
| Cardiovascular | 214 | 50.0% | 252 | 21.0% | 105 | 55.2% | 80 | 82.5% |
| Urology | 22 | 40.9% | 40 | 15.0% | 13 | 69.2% | 13 | 84.6% |

Exhibit 3: Success rate of Clinical Trials by Phase

Competitive Landscape

Industry Trends

Tailwinds: Increasing global demand for cutting-edge pharmaceuticals driven by aging populations and rising incomes in emerging economies, with particular growth opportunities in novel and breakthrough technologies in developed economies

Pharmaceuticals demand is growing worldwide, with medicine use growing 36% over the past decade and projected to grow 8% between 2022 and 2027 [1]. Much of this growth is expected in emerging economies in Latin America, Africa, and Asia, where a combination of rising incomes, urbanization, and demographic transitions towards older populations will drive increases in medicine use and healthcare spending. Growing global medicine use can also be attributed to aging populations across the globe who require more healthcare spending. This general growth in medicine use will help expand the total size of the pharmaceutical industry, helping expand Novartis's revenue by proxy. But beyond this broad increase in medicine use, better access to healthcare in developing countries will lead to less deaths from infectious disease and longer lifespans, causing the countries' disease burden to shift to more chronic diseases such as cancer and cardiovascular disease – diseases that Novartis specializes in developing treatments for. [4]

On the other hand, more moderate increases in growth in medicine use are expected in Europe and North America where drug use per capita is already very high and the market is largely saturated. Nevertheless, this saturation means that most of the growth in the pharmaceuticals industries in these countries will occur in the realm of innovative medicines and breakthrough therapies for rare diseases where Novartis maintains a competitive advantage. New modalities, such as cell and gene therapy and mRNA vaccine technology, have increased from 11 to 21 percent of the drug development pipeline—the fastest growth ever seen in the sector. [2] For this reason, industry experts estimate that specialty medicines will represent about 43% of global spending on pharmaceuticals in 2027 and 56% of total spending in developed markets [1]. This trend is accentuated by the aging demographics of rich economies. Aging populations will increase demand for therapies to chronic and rare illness, which tend to require the kind of complicated and specialized treatments that Novartis specializes in. And since populations in these richer countries will have more income to spend on such therapies, Novartis will be able to capture a large increase in revenue by focusing on this market segment.

Headwinds: Continuing supply chain disruptions from the pandemic and geopolitical environment

Inflation is continuing to lead to increased costs for labor, raw materials, and transportation for pharmaceutical companies. Supply chains are also facing pressures as increased state interventions and protectionist trade policies are creating new pressures on manufacturing networks and could drive increased regionalization. This lead McKinsey to estimate that while high inventories should insulate the industry in the short term, they estimate that “over a given ten-year period, the likelihood of supply chain disruptions still represents a potential loss of 25 percent of EBITA.” [4]

While these challenges affect all players in the pharmaceuticals industry, it is generics manufacturers rather than patent drug development companies like Novartis that are feeling the brunt of the challenges. Generics manufacturers face pressures to keep prices low from two sides, as low barriers to entry lead to high competition between manufacturers and regulators impose price caps to avoid excessive profiteering from generics companies. This makes any supply-side pressures particularly acute for generics manufacturers, as they have much less room to respond by increasing prices than patent drug developers like Novartis. As a result, many European generics manufacturers have cut production of thousands of drugs and issued increasingly urgent pleas to regulators to ease price caps [3], indicating the particularly precarious position the generics industry finds itself in. As generics represent a major competitor to Novartis, this trend represents a tailwind for Novartis who will be able to weather these temporary disruptions through price increases and new patent development while their rivals in generics struggle to stay afloat.

Investment Theses

Novartis management signals intent to focus investment on its core business while sidestepping increased competition in generics.

Novartis is spinning off their underperforming generics and biosimilars unit Sandoz to sharpen its focus on its Innovative Medicines prescription medicine manufacturing business. Given negative price and regulatory pressures on generics manufacturers, coupled with growing global demand trends for their cardiovascular, immunology, and oncology products, this spin-off presents a golden opportunity for Novartis to move away from the less lucrative generics market towards the drug development industry where they have competitive advantages. This spin-off follows a pattern of other recent management decisions to restructure the firm by divesting and spinning-off stakes in side-businesses and investing the cash from these divestments into acquisitions for the benefit of the core business. In April 2019, Novartis spun off their eye care business Alcon into a publicly traded company, and in November 2021 they netted \$20.7 billion by divesting their stake in rival Swiss multinational healthcare conglomerate Roche. Novartis then spent cash gained from these divestments on acquisitions, such as their \$1.5 billion acquisition of gene therapy company Gyroscope Therapies in December 2021 or optogenetics companies Vedere Bio and Arctos Medical. By acquiring these companies, Novartis was able to both defend and expand their moat in the genetic therapies industry by acquiring possible competition for their products while also gaining these firms' research achievements and capabilities. So, as Novartis moves to spin off Sandoz, we can expect they will pursue a similar strategy of using the cash from the spin-off to defend and expand their competitive advantages in innovative medicines development through acquisitions and increased funding for research and development.

Novartis' diversification strategy and technological investments within their core therapeutic competencies will drive long-term growth.

Novartis' diversification strategy within the Innovative Medicines division, which emphasizes focus areas with high unmet patient needs (cardiovascular, immunology, neuroscience, solid tumors, hematology) and investment in cutting-edge technology platforms, positions the company for long-term growth and competitive advantage in the pharmaceutical industry.

Novartis concentrates its efforts on core therapeutic areas characterized by high unmet patient needs, which reduces reliance on a single product or market and drives innovation to address these needs. In addition to focusing on specific therapeutic areas, Novartis invests in cutting-edge technology platforms such as xRNA and Radioligand therapy that can lead to the discovery, development, and commercialization of new therapies. This approach further diversifies the company's portfolio and supports its commitment to innovation.

Novartis has strategically shifted its focus towards niche conditions and rare diseases, positioning itself for a strong competitive advantage in the pharmaceutical market. By targeting underserved areas, such as medication for mucopolidosis type IV (ML4) in babies, chemotherapies for specific cancers, and other rare diseases, Novartis can potentially command higher prices and face reduced competition. This approach is further supported by the company's recent announcement of a new focused strategy, which highlights eight potential multi-billion-dollar peak sales brands and a deep pipeline. By concentrating on these specialized markets and leveraging their expertise in drug development, Novartis sets itself apart from competitors, catering to unmet medical needs and capturing significant growth opportunities within the industry.

The diversification enables Novartis to balance growth opportunities and manage risks more effectively. The company can navigate challenges in one segment while benefiting from the strength of the others, ensuring overall business stability and long-term value creation for shareholders. Additionally, this diversified business model allows Novartis to cross-leverage its expertise and resources, driving innovation, operational efficiency, and competitive advantage across its portfolio.

Novartis' competitive edge in Functional Genomics & Digital Platforms will enable it to capture most of the market growth in gene therapy market share (est. 20%) over the next 5-10 years

Novartis has a future potential with its investment and commitment to genomic technologies through its Functional Genomics & Digital Platforms section of the business. Consequently, in 2020, Novartis acquired the biotech company AveXis for \$8.7 billion, which is now known as Novartis Gene Therapies. Through its efforts in collaborating with academic labs and utilizing tools to accelerate its process of developing the therapies, it has been able to develop the approved drug Adakveo, which alleviates sickle cell anemia, a genetic disorder. In addition, Zolgensma, the Novartis gene therapy for infants and the world's most expensive medicine, continues to perform well commercially in 2020, bringing in \$186 million during the fourth quarter. With these two products, Novartis is now the leading player in the gene therapy market as seen in the image below: it is one of the two companies with the most FDA approved cellular and gene therapy products.

| Company | Approved Products |
|---|--|
| BioVer, Inc., a subsidiary of Amgen Inc. | IMLYGIC |
| Bloodworks | HPC, Cord Blood |
| bluebird bio, Inc. | SKYSONA (elivaldogene autotemcel) |
| bluebird bio, Inc. | ZYNTEGLO (betibedogene autotemcel) |
| Cleveland Cord Blood Center | CLEVECORD (HPC Cord Blood) |
| Clinimmune Labs, University of Colorado Cord Blood Bank | HPC, Cord Blood |
| Celgene Corporation | ABECMA (idecabtagene vicleucel) |
| CSL Behring LLC | HEMGENIX |
| Dendreon Corp. | PROVENGE (sipuleucel-T) |
| Duke University School of Medicine | Duoord, HPC Cord Blood |
| Enzyvant Therapeutics GmbH | RETHYMIC |
| Ferring Pharmaceuticals A/S | ADSTILADRIN |
| Fibrocell Technologies | LAVIV |
| Gamida Cell Ltd. | OMISIRGE (omidubiocel-orig) |
| Janssen Biotech, Inc. | CARVYKT1 |
| Juno Therapeutics, Inc., a Bristol-Myers Squibb Company | BREYANZI |
| Kile Pharma, Inc. | TECARTUS (brexucabtagene autoleucel) |
| Kile Pharma, Incorporated | YESCARTA (axicabtagene ciloleucel) |
| LifeSouth Community Blood Centers, Inc. | HPC, Cord Blood |
| MD Anderson Cord Blood Bank | HPC, Cord Blood |
| New York Blood Center | HEMACORD |
| Novartis Gene Therapies, Inc. | ZOLGENSMA (onasemnogene asepargovovec-xio) |
| Novartis Pharmaceuticals Corporation | KYMRNAH |
| Organogenesis Incorporated | GNLUIT |
| Spark Therapeutics, Inc. | LUXTURN A |
| SSM Cardinal Glennon Children's Medical Center | ALLOCORD |
| Stratatech Corporation | STRATAGRAFT |
| Vericel Corp. | MACI |

Novartis' strength in gene therapy is significant since the gene therapy market has a huge potential, with a CAGR of 18.6%, due to the increasing approval of gene therapy products and rising investment in the R&D of gene therapies. Consequently, as the leader in the gene therapy industry, with no other major pharmaceutical competitors exploring this industry (e.g. Pfizer, Moderna has no products approved as seen in the image), most growth in genetic therapy will be captured by Novartis. This allows Novartis to meet more unmet needs in the status quo and thus increase market share, allowing more total Addressable Market for Novartis.

Investment Risks

Risk #1: Upcoming Patent expirations threaten Novartis's cash on hand and capital to invest.

With upcoming patent expirations on money-making drugs such as multiple sclerosis drug Gilenya, Novartis could see significant drag in sales due to competition with generics manufacturers. Without their non-core businesses like Sandoz to generate cash flow during the years needed for patent development, this could jeopardize their ability to raise the capital to invest in the necessary drug development if their longer-term patents and new patent developments fail to compensate for revenue lost from these expirations.

However, even if sales take a short term hit from patent expirations, in the medium-to-long term their development capabilities should shore up their patented drug portfolio. They have solid late-stage pipelines with drugs in high-demand areas like immunology and oncology, and maintain competitive edges in fields such as cardiovascular health that give them enough of an economic moat to weather these short term challenges.

Risk #2: FDA signals regulatory overhaul that may significantly reduce costs for Novartis's competitors

The FDA, attempting to stimulate innovation in the Pharmaceutical industry, has taken several steps to decrease the capital and time cost for certain drug approvals. They have instituted accelerated approval pathways, such as fast track designation, priority review, real time review, and breakthrough designation. The overall purpose of these review designations and pathways is to lighten the cost of approval for biosimilars and "incremental improvement" drugs that are chemically similar to drugs already on the market. Since Novartis focuses primarily on "blockbuster" drugs, they are extremely unlikely to qualify for any expedited or reduced-cost review, whereas their competitors in generics and biosimilars likely will.

However, any massive overhaul of licensing, or subsidies for generics manufacturers are unlikely in the near- to mid- future, as it would require legislative approval beyond the FDA's regulatory authority. Further, the current regime of expedited review pathways has proven difficult to access by established pharmaceutical manufacturers and startups alike. We expect that for every dollar saved in expedited review, a new dollar will be incurred in pre-review to qualify for an expedited pathway.

Valuation

Assumptions

We assume that Novartis will have excess cash on hand from the Sandoz spin-off in 2023, and that they will use this cash to spend on acquisitions and research and development, increasing CapEx. This leads to projected increases in CapEx and projected decreases in Cash and Cash Equivalents in 2024 and 2025, as cash balances and incoming cash is spent on CapEx. The increased spending in CapEx also contributes to decreased operating margin during the years projected. Then, we assume that these acquisitions and positive long-term trends for the company will lead to stable revenue growth, supporting strong revenue growth of 6% during projected years and a terminal growth rate of 5% in line with the rate of inflation.

| (in millions USD) | 2018 | 2019 | Actual | | | Forecasted | | | | |
|-----------------------|--------|--------|--------|--------|--------|------------|--------|--------|--------|--------|
| | | | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| Revenue | 44,833 | 47,498 | 48,659 | 51,626 | 50,545 | 54,083 | 57,599 | 61,054 | 64,718 | 68,601 |
| Growth | - | 5.94% | 2.44% | 6.10% | -2.09% | 7.00% | 6.50% | 6.00% | 6.00% | 6.00% |
| EBIT | 8,924 | 9,086 | 10,152 | 12,824 | 12,859 | 12,980 | 12,672 | 12,211 | 12,944 | 15,092 |
| %rev | 19.90% | 19.13% | 20.86% | 24.84% | 25.44% | 24.00% | 22.00% | 20.00% | 20.00% | 22.00% |
| NOPAT | 7,407 | 7,541 | 8,426 | 10,644 | 10,673 | 10,773 | 10,517 | 10,135 | 10,743 | 12,527 |
| D&A | 1,783 | 1,650 | 1,648 | 1,526 | 1,466 | 1,417 | 1,538 | 1,447 | 1,942 | 2,744 |
| %rev | 3.98% | 3.47% | 3.39% | 2.96% | 2.90% | 2.62% | 2.67% | 2.37% | 3.00% | 4.00% |
| CapEx | 1,254 | 1,379 | 1,275 | 1,378 | 1,198 | 1,622 | 2,304 | 3,053 | 3,236 | 2,058 |
| %rev | 2.80% | 2.90% | 2.62% | 2.67% | 2.37% | 3.00% | 4.00% | 5.00% | 5.00% | 3.00% |
| NWC | 306 | 158 | -2,756 | 373 | 1,109 | -2,848 | -2,189 | -1,950 | -2,293 | -3,693 |
| ΔNWC | - | -148 | -2,914 | 3,129 | 736 | -3,957 | 659 | 239 | -343 | -1,401 |
| FCF | - | 7,960 | 11,713 | 7,663 | 10,205 | 14,525 | 9,092 | 8,290 | 9,791 | 14,613 |
| Discounted FCF | | | | | | 13,368 | 7,701 | 6,462 | 7,024 | 9,648 |

| Change in NWC (in millions) | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
|------------------------------------|----------|----------|----------|----------|-----------|----------|------------|--------------|--------------|--------------|
| Current Assets | 35,563.0 | 29,504.0 | 29,673.0 | 45,718.0 | 36,910.0 | 37,648.2 | 38,401.164 | 39,169.18728 | 39,952.57103 | 40,751.62245 |
| Cash and Cash Equivalents | 15,834.0 | 11,344.0 | 11,404.0 | 28,224.0 | 18,726.00 | 22,471.2 | 21,347.64 | 20,493.7344 | 20,493.7344 | 21,518.42112 |
| Current Liabilities | 29,607.0 | 28,264.0 | 33,059.0 | 30,208.0 | 28,656.00 | 3,008.8 | 3,159.24 | 3,317.902 | 3,449.81808 | 3,587.8108 |
| Other Current Liabilities | 6,936.0 | 8,075.0 | 9,568.0 | 10,398.0 | 9,285.00 | 9,563.55 | 9,850.4565 | 10,047.46563 | 10,248.41494 | 10,453.38324 |
| Long Term Debt due within one year | 3,248.0 | 2,187.0 | 2,466.0 | 2,689.0 | 2,296.0 | 2,500 | 2,500 | 2,500 | 2,500 | 2,500 |
| Net Working Capital | 306 | 158 | -2,756 | 373 | 1,109 | -2,848 | -2,189 | -1,950 | -2,293 | -3,693 |
| Change from Last Year | #REF! | -148 | -2,914 | 3,129 | 736 | -3,957 | 659 | 239 | -343 | -1,401 |

WACC Calculation

Weighted average of coupon rates (from 10-K)

| | | | |
|-----------------------|-------|------------------|---------|
| Cost of Debt | 3.24% | | |
| Risk free rate | 3.57% | Beta (unlevered) | 1.11 |
| Equity Risk Premium | 4.88% | Total Debt | 26,175 |
| Beta (Levered) | 1.32 | Total Equity | 117,453 |
| Cost of Equity | 9.99% | Effective Tax Ra | 0.17 |
| WACC | 8.66% | | |

Exhibit 5: Pro Forma Cash Flow Projections and WACC Calculation

| | |
|-----------------------------|------------|
| WACC | 8.66% |
| Terminal Growth Rate | 5.00% |
| Terminal Value | 254,831.90 |
| Implied EV | 299,035 |
| Net Debt | 9,238.00 |
| Implied Equity | 289,797 |
| Shares Outstanding | 2,277.50 |
| Implied Share Price | \$127.24 |
| Current Share Price | \$100.30 |
| Implied Upside | \$26.94 |
| | 26.86% |

Exhibit 6: Gordon Growth Valuation

| Company | EV/EBITDA | PE ratio | Total Debt to Asset Ratio | EV / Revenue | Price/Cash Flow |
|----------------------|--------------|--------------|---------------------------|--------------|-----------------|
| Novartis | 12.06 | 30.96 | 0.24 | 4.21 | 15.09 |
| Bristol Myers Squibb | 8.38 | 23.92 | 0.42 | 3.90 | 11.53 |
| Merck | 12.01 | 21.55 | 0.21 | 3.78 | 16.67 |
| Roche | 9.71 | 15.72 | 0.32 | 4.00 | 10.35 |
| AstraZeneca | 13.46 | 69.44 | 0.30 | 5.64 | 2376.75 |
| Pfizer | 5.41 | 7.53 | 0.18 | 2.44 | 7.94 |
| Johnson & Johnson | 15.34 | 34.11 | 0.59 | 5.47 | 20.39 |
| Eli Lilly | 40.21 | 55.83 | 0.78 | 13.00 | 49.19 |
| Sanofi | 8.55 | 16.11 | 0.41 | 3.11 | 12.28 |
| Novo Nordisk | 34.54 | 49.60 | 0.65 | 14.79 | 33.53 |
| low | 5.41 | 7.53 | 0.18 | 2.44 | 7.94 |
| mean | 15.97 | 32.48 | 0.41 | 6.03 | 255.37 |
| median | 12.04 | 27.44 | 0.36 | 4.11 | 15.88 |
| high | 40.21 | 69.44 | 0.78 | 14.79 | 2376.75 |

| | |
|-------------------------------------|-------------|
| Exit Multiple (EV/EBITDA) | 15.97 |
| Terminal Value (EV/EBITDA) | 284790.7343 |
| Discounted Terminal Value | 188021.74 |
| Sum of Discounted Cash Flows | 44,203 |
| Implied EV | 232,224 |
| Implied Equity Value | 222,986 |
| | |
| Implied Share Price | 97.90838151 |
| Implied Upside | -2.38% |

Exhibit 7: Comparable Companies Valuation

Works Cited

1. <https://www.iqvia.com/newsroom/2023/01/global-market-for-medicines-to-rise-to-19-trillion-by-2027-says-report-from-iqvia-institute>
2. <https://www.mckinsey.com/capabilities/operations/our-insights/emerging-from-disruption-the-future-of-pharma-operations-strategy>
3. https://www.euractiv.com/section/health-consumers/special_report/how-inflation-has-disrupted-generic-drugs-market/
4. <https://www.hsph.harvard.edu/news/magazine/shadow-epidemic/>
5. <https://www.statista.com/topics/1764/global-pharmaceutical-industry/#:~:text=The%20pharmaceutical%20industry%20is%20responsible,trillion%20U.S.%20dollars%20in%202021>



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