



“Industry and Company
Analysis” – Chapter 4
from *Equity Asset Valuation, 3rd Edition*
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Table of Contents

- Introduction
- Financial Modeling: An Overview
 - Income Statement Modeling: Revenue
 - Income Statement Modeling: Operating Costs
 - Income Statement Modeling: Non-operating Costs
 - Income Statement Modeling: Other Items
 - Balance Sheet and Cash Flow Statement Modeling
 - Scenario Analysis and Sensitivity Analysis
- The Impact of Competitive Factors on Prices and Costs
- Inflation and Deflation
 - Sales Projections with Inflation and Deflation
 - Cost Projections with Inflation and Deflation
- Technological Developments
- Long-Term Forecasting

Table of Contents

- Building a Model
 - Industry Overview
 - Company Overview
 - Construction of Pro Forma Income Statement
 - Construction of Pro Forma Cash Flow Statement and Balance Sheet
 - Valuation Inputs
- Summary

Learning Outcomes

- Compare top-down, bottom-up, and hybrid approaches for developing inputs to equity valuation models.
- Compare “growth relative to GDP” and “market growth and market share” approaches to forecasting revenue.
- Evaluate whether economies of scale are present in an industry by analyzing operating margins and sales levels.
- Forecast the following costs: cost of goods sold, selling general and administrative costs, financing costs, and income taxes.
- Describe approaches to balance sheet modeling.
- Describe the relationship between return on invested capital and competitive advantage.

Learning Outcomes

- Explain how competitive factors affect prices and costs.
- Judge the competitive position of a company based on a Porter's five forces analysis.
- Explain how to forecast industry and company sales and costs when they are subject to price inflation or deflation.
- Evaluate the effects of technological developments on demand, selling prices, costs, and margins.
- Explain considerations in the choice of an explicit forecast horizon.
- Explain an analyst's choice in developing projections beyond the short-term forecast horizon.
- Demonstrate the development of a sales-based pro forma company model.

Introduction

Chapter outline

- Overview of developing a forecast model
- General approach to forecasting income statement components, balance sheet, and cash flow statements.
- Impact of competitive factors on prices and costs
- The effects of inflation and deflation
- Technological developments
- Long-term forecasting
- Building a company model
- Conclusions and summary

Financial Modeling: An Overview

- Financial forecasts are the basis for fundamental equity valuation based on discounted cash flows and/or market multiples. An effective forecast model must be based on a thorough understanding of:
 - A company's business
 - Management
 - Strategy
 - External environment, and
 - Historical results

Financial Modeling: An Overview

- An analyst begins with a review of the company and its environment:
 - Its industry
 - Key products
 - Strategic position
 - Management
 - Competitors
 - Suppliers
 - Customers

- An analyst identifies:
 - Key revenue and cost drivers
 - Assesses the likely impact of relevant trends of economic conditions and technological developments

Financial Modeling: An Overview

For most companies financial modeling begins with the income statement.

- Most companies derive the majority of their value from future cash flow generation.
- Banks and insurance companies for which the value of existing assets and liabilities on the balance sheet may be more relevant to overall value than projected income.
- The income statement provides a starting point for modeling a company's balance sheet and cash flow statements.

Financial Modeling: An Overview

Segment disclosures in companies financial reports are often the richest source of information for analyzing revenue. Segment disclosures typically include:

- How segments are defined
- Segment revenues
- Expenses
- Assets
- Liabilities
- Analysis of revenue by geographical area
- Reconciliation of segment accounts to the consolidated financial statement.

Financial Modeling: An Overview

- Segment disclosure is any segment which accounts for more than 10% of:
 - Revenue,
 - Operating income, or
 - Assets of the combined company

- Valuable information can be found in:
 - Interim and annual financial reports issued by the company
 - Regulatory filings
 - Management presentations
 - Management conference calls
 - External data sources

Financial Modeling: An Overview

- Revenue can be analyzed by:
 - Geographical source
 - Business segment
 - Product line
- Geographic analysis is very helpful where the underlying growth rates of countries differ significantly.
- Analysts' should make an independent judgment about whether a company's chosen segmentation for its business is relevant and material.
- A product line analysis provides the most granular level of detail and is most relevant for a company with a manageably small number that behave differently, but when combined they account for most of a company's sales.

Financial Modeling: An Overview

The three typical approaches to understanding the company's revenue model are:

- **Top-down approach** - begin at the level of the overall economy then down to individual sectors, industry, and market for a specific product to arrive at a revenue projection for the individual company.
- **Bottom-up approach** - starts with the individual company product lines, locations, and business segments which are aggregated for the overall company, then the industry, and finally the economy.
- **Hybrid approach** - combines elements of both top-down and bottom-up analysis and can be useful for uncovering implicit assumptions or errors that may arise from using a single approach.

Top-Down Approaches

■ Growth relative to GDP:

- The analyst forecasts the growth rate of nominal gross domestic product.
- The growth rate of the specific company is then considered.
- The analyst may use the GDP growth rate to project volumes
- The inflation forecast may be used to project product prices
- Company life-cycle stage is utilized to help estimate the growth rate by using premiums or discounts (embryonic, growth, shakeout, mature, or decline).

■ Market growth and market share approach:

- The analyst first forecasts growth in a particular market
- Then the analyst considers the company's current market share.
- Thinks about how that share is likely to change over time.
- Uses regression analysis if the product's market revenue has a predictable relationship with GDP.

Bottom-up and Hybrid Approaches

- **Bottom-up approaches** to modeling revenue include:
 - Time series - forecasts based on historical growth rates or time-series analysis. (i.e., use can use Excel's TREND formula). This type can also be used for top-down analysis.
 - Return on capital - forecasts based on balance sheet accounts.
 - Capacity-based measure -- forecast for example based on same-store sales growth and sales related to new stores.
- **Hybrid approaches** and in practice they are the most commonly used method.
 - Could use a market growth and market share approach to model individual product lines or business segments.
 - Could then aggregate the individual projections to arrive at a forecast for the overall company.
 - Volume and price approach - the analyst makes separate projections for volumes (e.g., the number of products sold or the number of customers served) and average selling price.

Income Statement Modeling

Income statement modeling - you could model costs separately by:

- Different geographic regions
- Business segments
- Product lines
- High vs. low margin products - if a low-margin product is expected to grow faster than a relatively high-margin product analysts may project overall margin deterioration.
- Very important to separate fixed from variable costs which might be modeled as a percentage of revenue. Fixed costs may not be directly related to revenue and may grow at their own rate.

Income Statement Modeling

- Will higher expected volumes of production lead to economies of scale where:
 - Lower average costs per unit of a good or service.
 - Greater bargaining power with suppliers.
 - Lower cost of capital
 - Lower per unit advertising expenses.
 - The company is able to improve gross and operating margins with higher sales levels.

- Aspects that affect the uncertainty of cost estimates include:
 - Competitive factors
 - Technological developments
 - Estimating future credit losses
 - Estimating long-duration pension liabilities.

Cost of Goods Sold

- Cost of goods sold (COGS) include:
 - Raw materials
 - Direct labor
 - Overhead used in producing the goods
- Typically COGS is forecast as a percentage of sales - factors to consider:
 - Use of historical data as a starting point, but adjust as necessary.
 - If losing market share due to emergence of new products look for pressure on prices and gross margins.
 - If the company is gaining market share because it has introduced new competitive and innovative products are they achieving cost advantages and are gross margins likely to improve.
 - A small error in forecasting COGS can have a significant impact on forecasted operating profit.
 - Analysts need to identify the most effective method to analyze these costs; segment, product category, or volume and price components.

Input Costs and Margins

- Input costs - is the company subject to sudden shocks in its input costs which can affect operating profit significantly (e.g., airlines with unhedged fuel costs).
 - Commodity driven companies gross margins decline almost automatically decline if input prices increase significantly.
 - A key question to understand is how effectively can the company pass any increase in input costs through to the customers by increasing prices.
 - Hedging strategies are typically revealed in the footnotes of the annual report.
 - Firms can gradually increase sales prices to mitigate the impact of a significant price increase's impact on sales volume.
- Looking at competitors gross margins can also provide a useful cross check for estimating a realistic gross margin.
 - Does the competitor have a large market share such that they can achieve cost savings in their purchases?
 - Are they able to achieve a higher margin due to private label products.
 - The business model can also provide insight - does the company own its real estate assets or does it operate a franchise model where operating costs are incurred by the franchisee?

Selling, General and Administrative Expenses

- Selling, general and administrative expenses - these have a less direct relationship with the revenue of the company.
 - Selling and distribution expenses often have a large variable component and can be estimated as a percentage of sales.
 - Selling expenses frequently increase with an overall increase in wages and benefits for additional sales people.
 - Overhead costs may be related to the number of employees at the head office and those that support IT and other administrative operations.
 - Research and development expenses are another example of where trends are not aligned with sales, but are probably more fixed in nature (e.g., as a percentage of operating costs).
 - Benchmarking a company against its competitors can be useful in developing certain metrics (e.g., sales per square foot).
 - Sales and expense projections are enhanced when a company provides a breakout of product and/or geographical segments in their footnotes to the annual report.

Modeling Line Items Below Operating Profit

Line items on the income statement that appear below operating profit also need to be modeled including:

- Interest income
- Interest expense
- Taxes
- Minority interest
- Income from affiliates
- Share Count
- Unusual Charges

Modeling Line Items Below Operating Profit

- **Interest income** depends on:
 - The amount of cash and investments on the balance sheet
 - Rates of return
 - Interest income is a key component of revenue for banks and insurance companies.
 - Interest income is less likely to be less significant for most non-financial companies.
- **Interest expense** depends on:
 - The level of debt on the balance sheet
 - The interest rate associated with the debt.
 - Analyst's should focus on the effect of changing interest rates on the market value of a company's debt and interest expense.

Modeling Line Items Below Operating Profit

Key determinants when forecasting financing expenses are:

- Capital structure of the company.
- The debt level in combination with the interest rate are the main drivers in forecasting debt financing expenses.
- Notes to the financial statements typically detail the maturity structure of the company's debt and the corresponding interest rates.
- This information can be helpful in estimating future financing expenses.

Taxes

Taxes are primarily determined by jurisdictional regulations, but can also be influenced by:

- The nature of the business.
- Special tax treatment for research and development tax credits.
- Accelerated depreciation of fixed assets.
- Analysts should understand the difference between taxes reported on the income statement and cash taxes which can result in deferred tax assets or liabilities.
- Analysts should also be aware of any governmental or business changes that can alter tax rates.

Taxes

- Generally there are three types of tax rates:
 - The statutory tax rate, which is the tax rate applying to what is considered to be a company's domestic tax base.
 - The effective tax rate, which is calculated as the reported tax amount on the income statements divided by the pre-tax income.
 - The cash tax rate, which is the tax actually paid (cash tax) divided by pre-tax income.
 - Differences between cash taxes and reported taxes typically result from differences between accounting and tax calculations; and are reflected as a deferred tax asset or a deferred tax liability.
- Factors that cause differences between the statutory tax rate and the effective tax rate can arise for many reasons:
 - Tax credits
 - Withholding tax on dividends
 - Adjustments to previous years
 - Expenses not deductible for tax purposes

Taxes

Effective tax rates can also vary due to being active in countries outside the country in which a firm is domiciled.

- A high profit in a high tax rate country, and a low profit in a low tax rate country can skew the effective rate to the upside, and this rate can be higher than the simple average rate of both countries.
- Companies have minimized their taxes by creating special purpose entities especially specialized financing and holding companies to minimize the amount of profit in high tax rate countries.
- Using special purpose entities also has risk if tax laws change.
- In general an effective tax rate that is consistently lower than statutory rates or below the rate of competitors may warrant additional attention.
- Notes to the financial statements should be used to help reconcile and understand any significant variations and also items which could reverse in the future.

Normalizing Operating Income

- Analysts should develop a good method to normalize operating income:
 - Before the results from associates
 - Before the results from special items
 - This normalized rate should be a good indication of the future tax expenses adjusted for special items in the analyst's earnings model.
 - By building a model the effective tax rate amount can be found in the profit and loss projections, and the cash amount on the cash flow statement.

- Other items to consider when working on income statement modeling:
 - Dividend policy and anticipated dividend growth rate
 - Joint venture, affiliate, and consolidated accounting requirements
 - Consideration of extraordinary or unusual items which could skew the calculation of normalized earnings.

Share Counts and the Impact of Dilution

Share counts which matter from the perspective of:

- Dilution related to stock options, and convertible bonds.
- Issuance of new shares
- Share repurchases
- Projections for share repurchases and share issuance are part of the broader analysis of the company's capital structure.

Balance Sheet Modeling

Balance sheet modeling can benefit from the analysis of efficiency ratios:

- Project the accounts receivable balance using the average days outstanding times the projected sales amount.
- Inventory balances can be forecast using the inventory turnover rate and the cost of goods sold projection.
- Inventory turnover is a measure of how much inventory a company keeps on hand, or alternatively how quickly a company sells through its inventory.
- In general if efficiency ratios are held constant then the working capital accounts will grow in line with the related income statement accounts.
- Working capital projections can also be modified by top-down or bottom-up considerations for example in the retail sector - if sales are projected to decline inventory turnover would slow.

Property, Plant, and Equipment

Projections for property, plant and equipment are less directly tied to the income statement for most companies.

- PP&E changes as a result of capital expenditures and depreciation.
- Depreciation forecasts are usually based on historical depreciation and disclosure about depreciation schedules.
- Capital expenditure forecasts depend on the analyst's judgment for new PP&E.
- Two types of capital expenditures which must be considered - maintenance capital expenditures (maintain current business) and growth capital expenditures (expand the business).

Capital Structure Analysis

The future capital structure requires analysts to make assumptions and this is usually completed using leverage ratios:

- Debt-to-capital
- Debt-to-equity
- Debt-to-EBITDA
- These ratios will be impacted by historical company practice, management's financial strategy, and finally the capital requirements for the company implied by other model assumptions when projecting the future capital structure.

ROIC and ROCE

- Once future income statements and balance sheets are constructed the analyst can use them to determine the return on invested capital (ROIC).
 - ROIC measures the profitability of the capital invested by the company's shareholders and debt holders.
 - The numerator of ROIC is usually **N**et **O**perating **P**rofit **L**ess **A**adjusted **T**axes (NOPLAT) or earnings before interest expense.
 - The denominator for ROIC is invested capital which is calculated as operating assets less operating liabilities, typically calculated as a average over two periods.
 - ROIC is not impacted by a company's degree of financial leverage.
- Return on Capital Employed (ROCE) is essentially ROIC before tax.
 - Defined as operating profit divided by capital employed, both debt and equity.
 - ROCE can be useful in several contexts such as peer comparisons of companies in countries with different tax structures.
 - Underlying profitability could be biased in favor of companies benefitting from low tax regimes.

Modeling Projected Statements

- Once projected income statements and balance sheets have been constructed future cash flow statements can be projected, and analysts can make assumptions about how the company will use future cash flows:
 - Share repurchases
 - Dividends
 - Additional capital expenditures
 - Acquisitions
- Sensitivity analysis involves changing one assumption at a time to see the effect on the estimate of intrinsic value.
- Scenario analysis has the same goal, but involves changing multiple assumptions at the same time for example changing assumptions about:
 - Revenue growth
 - Operating margin
 - Capital investment

Modeling Projected Statements

Either sensitivity analysis or scenario analysis can be used to determine a range of potential intrinsic value estimates or a probability distribution based on a variety of assumptions about the future including:

- Economic growth
- Inflation levels
- Success of a particular product
- For mature, large, stable companies in non-cyclical businesses intrinsic value estimates of upside and downside may be close to base-case intrinsic value.
- For new venture companies exposed to technological or regulatory change, or companies with significant financial or operating leverage, the range of intrinsic value estimates could be much wider.

Modeling Projected Statements

- Special case estimates could include:
 - Debt laden companies which have exposure to insufficient cash flow coverage of interest and principal payments where the ultimate value of equity could be zero.
 - A company with a single untested product could be worth very little or a lot depending if the product turns out to be a success.
 - Typically a probability weighted scenario analysis is used with these types of companies.

- A company's future competitive strength impacts analyst's projections for:
 - Revenue growth
 - Margin development
 - Capital expenditures
 - Working capital investment

Utilizing Porter's Five Forces

- Porter's five forces help evaluate the possibilities for the company
- Threat of substitute products:
 - Limited pricing power when numerous substitutes exist and switching costs are low.
 - Companies have pricing power if few substitutes exist and/or switching costs are high.
- Intensity of rivalry among incumbent companies where pricing power is limited in industries that are:
 - Fragmented
 - Have limited growth
 - High exit barriers
 - High fixed costs
 - More or less identical product offerings

Utilizing Porter's Five Forces

- Bargaining power of **suppliers** is often the result of:
 - Function of relative size
 - The relative importance the supplier places on a particular product
 - The availability of alternatives
 - The ability of the supplier to increase prices and/or limit supply place downward pressure on a company's potential profitability.

- Bargaining power of **customers** is the reverse of supplier bargaining power and is generally lower in markets with:
 - A fragmented customer base
 - A non-standard product
 - High switching costs for the customer
 - Strong customer bargaining power places downward pressure on a firm's profitability.

Utilizing Porter's Five Forces

- Threat of new entrants:
 - Above-market returns in a market lead to new entrants which places downward pressure on profitability.
 - If there are barriers to entry it may be costly for new competitors to enter a market.
 - It is easier for incumbents to raise prices and defend their market position when entry barriers are high.

- Understanding the industry and competitive landscape of a company helps analysts estimate:
 - Whether sales growth will be high or low
 - Whether profit margins are likely to be relatively high or low relative to historical profit margins
 - This is a process that requires significant judgment in its application.

Inflation and Deflation Impacts

Inflation and deflation can affect a company significantly and the impact is different for revenue and expense categories with some companies being better positioned to pass on costs:

- Coca Cola - strong branding enables them to pass on costs
- Apple - proprietary technology enables them to pass on price increases
- Companies with these characteristics are likely to have higher and more stable profits and cash flow relative to their competitors.

Inflation and Deflation Impacts

An example of industry inflation impact using beer in which AB InBev controls about half of the market in a three-tier structure:

- Producers (brewers)
- Wholesalers
- Products
- Producers have to use wholesalers to get their products to the consumers which is a fragmented customer base, but they have been able to increase costs to account for inflation.
- European brewers are able to distribute to a more concentrated customer base; retailers, which results in a weaker pricing position for them as there is no dominant brewer in Europe.

Inflation and Deflation Impacts

- In the highly competitive consumer goods market pricing is strongly influenced by movements in input prices which can account for half of the cost of goods sold.
 - Higher price typically leads to lower volumes and sales.
 - Lower input costs drive higher sales volumes due to more attractive pricing.
- The impact of higher prices on volumes depends on price elasticity of demand - how much the quantity demanded varies with price.
 - If demand is relatively price inelastic, revenues will benefit from inflation.
 - If demand is relatively price elastic, revenue can decline even if unit prices are raised.
 - Estimating the impact of inflation is further complicated by the international mix of a company's sales impacted on the revenue side by increases in inflation and also on the cost side if they are using local inputs for production of their products.

Inflation and Deflation Impacts

High inflation creates challenges in developing an accurate revenue forecast.

- InBev sales in Argentina for example grew by 24.7% of which only 2.1% was driven by volume and the rest by price increases reflecting higher inflation in that country.
- The implications of higher inflation are a local country's currency will come under pressure and any pricing gain may be wiped out by the currency losses.
- Many analysts adjust for high inflation in foreign countries by assuming a normalized growth rate for both revenues and costs after one or two years which is based on an underlying growth rate assumption for the business.
- Other analysts reflect the high impact of inflation in their forecasts on revenues and expenses and adjust growth rates for the expected currency (interest rate parity) impact although this method is difficult given the challenge in projecting currency rates.
- Identifying a company's major input costs provides an indication of likely pricing.

Inflation and Deflation Impacts

The impact of company strategy on increasing input costs creates several options:

- A company can decide to preserve its margins by passing on the costs to customers.
- The company may decide to accept some margin reduction to increase its market share.
- A company could also decide not to pass on cost increases during recessionary conditions out of concern for not financial weakening already recession-affected customers.
- Price increases could be used as a way to decrease demand intentionally such as an increase in cognac prices to create an inventory of vintage cognac which would command higher prices over the longer term.

Inflation and Deflation Impacts

In forecasting a company's costs it is helpful to segment the cost structure by category and geography.

- What is the impact of potential inflation and deflation on input prices?
- Can the company substitute cheaper alternatives for expensive inputs?
- Can they increase efficiency to offset the impact of increases in input prices?
- Can the firm reduce other costs to offset the impact of higher input costs and maintain a slightly higher overall operating margin?

Technological Developments

- Technological developments have the potential to change the economics of individual businesses and entire industries.
 - Use scenario analysis and/or sensitivity analysis to determine the range of potential earnings outcomes.
 - Does the new product threaten to cannibalize demand for an existing product?
 - For new products will the cannibalization impact be different across different segments because of the threat of substitutes?

- Technological developments can affect:
 - Demand for a product
 - The quantity supplied of a product
 - Possibly both factors

Demand Curve Shifts

- Demand curves shifts:
 - Technology changes leading to lower manufacturing costs will cause **the supply curve to shift to the right** as suppliers produce more of a product at the same price.
 - Technology changes that result in the development of substitute products will cause **the demand curve to shift to the left.**

Impact of Shifts in Product Mix

Steps to take to look at the impact of shifts in product mix:

- Look at the mix of segment sales and related margins for each segment.
- Estimate the average selling price (ASP) for each segment.
- What is the impact on volume of potential cannibalization of a particular product?
- Estimate the revenue impact to the cannibalized product segment.
- Estimate the impact of lower unit volumes from the cannibalized segment on operating costs and margins.
- Analyze the cost structure of the company to estimate the fixed and variable costs for the firm. This can be estimated as: $\% \triangle (\text{Cost of Revenue} + \text{Operating Expense}) / \% \triangle \text{ in Revenue}$.
- Revenue is reduced each year to reflect the expected impact from cannibalization.
- Measure the change in the CAGR for revenue over time.
- Then assess the impact to operating margin over the forecast period of time.

Selection of a Time Horizon

- Factors that influence the choice of the forecast time horizon:
 - The investment strategy for which the stock is being considered.
 - Cyclicity of the industry - may influence the analyst's choice of a timeframe.
 - Company specific factors - recent acquisition or restructuring activity may influence the holding period.
 - The analyst's employer's preferences - what type of DCF model is used to value the stock.
- Most professionally managed equity investment strategies describe:
 - The investment timeframe or average holding period for a stock (one/portfolio turnover).
 - The stated investment objectives of the strategy.
 - The timeframe ideally should correspond with the average annual turnover of the portfolio.
- Longer term projections often provide a better representation of the normalized earnings potential of a company than a short-term forecast, especially when temporary factors are present.

Normalized Earnings and Trend Determination

- **Normalized earnings** - the expected level of mid-cycle earnings for a company in the absence of any unusual or temporary factors that impact profitability. Temporary factors could include:
 - Stage of the business cycle
 - Recent merger and acquisition activity
 - Restructuring activity
 - Cash flow adjustments for less recurring capital expenditures
- Tools to use include The Excel "**TREND**" formula:
 - This is one way to perform a linear regression using the least squares method to find the best fit.
 - After computing the best fit regression model, the TREND formula returns predicted values associated with new points in time.

Terminal Values Considerations

Considerations in using terminal values based on long-term projections:

- When using a historical multiples-based on long-term projections the analyst is implicitly assuming that the past is relevant to the future in terms of growth expectations and required rates of return.
- If a multiple is used - it should be consistent with the long-term expectations for growth and required return.
- Common practice - use a historical average multiple as the basis for the target multiple in the terminal value calculation.
- Any difference in future profitability or growth should be reflected as a premium or discount to the historical multiple to reflect these differences.

Discounted Cash Flow Approaches

When using Discounted Cash Flow (DCF) approaches to developing a terminal value the analyst should:

- Avoid mechanically applying a long-term growth rate to a terminal year cash flow projections.
- Consider whether the terminal year cash flow projections should be normalized before that cash flow is incorporated into a long-term projection.
- Decide how the future long-term growth rate will differ from the historical growth rate.
- Consider if a mature company will be able to accelerate their long-term growth rate through product innovation?
- Consider if a well-protected growing company will experience an unanticipated decline in the business as a result of technological change?

Inflection Point Issues

Inflection points are one of the greatest challenges facing an analyst in valuing a company:

- Will the future look like the past?
- DCF models rely on a perpetuity calculation assuming a constant growth rate.
- Cash flows used should be representative of "normalized" or "mid-cycle" results.
- Cyclical companies - avoid using a boom or a trough year as the starting point as this will lead to an intrinsic value either too high or too low

Regulation and Technology Impacts

Regulation and technology are two other important considerations.

- Government actions can have extreme, sudden, and unpredictable impacts on some businesses.
- Technology can turn fast-growing innovators into obsolete dinosaurs in a matter of months.
- Utilities for example experience intense regulation, but may not be impacted by technology for decades.
- Semiconductor manufacturers must constantly keep up with new technology.
- Medical device manufacturers are heavily exposed to both regulation and technological advances.