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-Sarang Gaikwad

Investment Summary

Models	Derived Value (i)	Weight (ii)	(i) x (ii)
DDM	455.48	0.40	182.19
FCFF	451.77	0.40	180.71
Price multiples	294.04	0.20	58.81
Intrinsic Value			363.28
Market Price			376.20

Date: November 4, 2024	Recommendation: Hold
Ticker: CAT	Sector: Industrial
Closing Price: 376.20	Industry: Construction & mining equipment industry

Our valuation of Caterpillar Inc. utilizes a combination of the Dividend Discount Model (DDM), Free Cash Flow to Firm (FCFF) model, and Price Multiples Analysis, giving a comprehensive view of the company's intrinsic value relative to its current market price of \$376.20.

Dividend Discount Model (DDM):

We projected a high dividend growth rate of 10% CAGR for Caterpillar through 2028, assuming that the company will maintain a strong commitment to returning capital to shareholders. Beyond 2028, a stable growth rate of 7% was applied to reflect a mature growth phase. The DDM estimates Caterpillar's intrinsic value at **\$305.69**, which is below the current market price. This suggests that investors may be overestimating the company's future dividend growth potential or placing a higher premium on the company's capital return strategy.

Free Cash Flow to Firm (FCFF) Model:

For the FCFF model, we assumed a high growth rate of 15% until 2025, capturing the anticipated near-term growth potential for both debt and equity holders. After 2025, we used a stabilized growth rate of 3% to account for Caterpillar's likely shift into a more mature phase in line with industry expectations.

This model provides a higher intrinsic value estimate of **\$455.48** per share, which exceeds the market price, indicating that the company's cash flow generation potential might justify a premium valuation.

Price Multiples Analysis:

Utilizing peer benchmarks, we calculated an average valuation of **\$294.04** per share. This approach considers Caterpillar's position within its industry and applies average valuation multiples (like P/E, P/B ratios) for comparable firms.

The lower value here aligns with the DDM findings, suggesting that Caterpillar's market valuation might not be fully supported by comparable firms' metrics.

Weighted Average Intrinsic Value:

Combining all three models, the weighted intrinsic value is **\$363.28** per share, which is **3.4%** lower than the current market price. This slight discrepancy implies that the stock may be modestly overvalued by market standards.

Recommendation: Hold

Our analysis, based on the 10% rule, indicates that Caterpillar's market price of **\$376.20** is within **10%** of our weighted intrinsic value estimate of \$363.28. This proximity suggests that the stock is fairly valued, as there is neither a strong discount nor a substantial premium to justify a definitive buy or sell action.

Rationale:

Hold is recommended because the current price does not deviate enough from the intrinsic value to justify a "Buy" (which would require a discount greater than 10%) or a "Sell" (which would require an overvaluation above 10%). With the stock trading close to its estimated fair value, holding allows investors to benefit from potential future growth without paying a significant premium.

Business Summary

- **Purpose:**

The Business Summary offers a detailed examination of Caterpillar Inc., covering its organizational structure, industry position, competitive dynamics, historical financial performance, and projected future growth. This section sets the foundation for understanding the company's economics and provides the context necessary for a precise asset valuation.

Content:

- **Company Description**

Overview: Caterpillar Inc. (NYSE: CAT) is a U.S.-based multinational corporation specializing in the design, manufacture, and sale of heavy machinery, engines, and financial services. Founded in 1925 and headquartered in Deerfield, Illinois, Caterpillar is a Fortune 100 company and a recognized industry leader. Its product line includes construction and mining equipment, diesel and natural gas engines, industrial gas turbines, and diesel-electric locomotives.

- **Organizational Structure:**

Construction Industries: This segment focuses on products used in construction applications. It provides machinery such as hydraulic excavators, track-type tractors, and motor graders, primarily serving infrastructure development and commercial and residential construction sectors.

Resource Industries: Caterpillar's Resource Industries division is dedicated to equipment for mining, quarry, and aggregate industries. It produces large-scale machinery like mining trucks, draglines, and underground mining equipment, aligning with global demands for natural resources.

Energy & Transportation: This division manufactures products used in industries like oil and gas, power generation, marine, and rail. It covers a diverse portfolio, including engines, turbines, and locomotives.

Financial Products: Through Caterpillar Financial Services, the company provides financing solutions that support its product sales. This includes loans, leases, and other services that enhance customer access to Caterpillar equipment, driving overall demand and reinforcing long-term customer relationships.

Global Presence: Caterpillar operates on a truly global scale, with over 500 locations in more than 190 countries. Approximately 60% of its sales come from outside the United States, demonstrating the company's diversified geographic footprint. This global reach insulates Caterpillar from regional economic fluctuations and provides opportunities in emerging markets.

- **Industry Analysis:**

Industry Dynamics: Caterpillar operates in the global heavy machinery and equipment industry, valued at approximately \$200 billion annually. This industry is characterized by its cyclical nature, influenced heavily by global economic trends, commodity prices, and government infrastructure spending. Key sectors include construction, mining, and energy, all of which contribute to Caterpillar's revenues and growth prospects.

Growth Drivers:

Infrastructure Investments: Government and private sector investments in infrastructure development, especially in emerging markets, drive demand for construction equipment.

Urbanization: The ongoing urbanization in countries such as China, India, and Brazil continue to fuel demand for construction machinery.

Energy Transition: The shift towards renewable energy and cleaner fuels presents new opportunities for Caterpillar, especially in providing machinery that supports sustainable energy projects and emissions reduction.

Challenges:

Commodity Price Volatility: Fluctuations in prices of commodities, particularly oil and metals, can impact the demand for mining and energy equipment.

Environmental Regulations: As governments impose stricter emission standards, Caterpillar faces pressure to innovate cleaner, more efficient machinery, especially in developed markets.

- **Competitive Analysis**

Competitive Landscape: Caterpillar competes with global heavyweights like Komatsu (Japan), Volvo Construction Equipment (Sweden), and John Deere (U.S.). These competitors offer similar product lines, targeting construction, mining, and industrial sectors. Caterpillar distinguishes itself through its extensive product lineup, strong dealer network, and emphasis on innovation.

Key Competitive Advantages:

Brand Reputation: Caterpillar's brand is synonymous with quality, durability, and reliability, giving it a competitive edge in winning customer trust.

Global Dealer Network: With one of the industry's largest dealer networks, Caterpillar ensures extensive support for parts, service, and financing across the globe.

Product Diversification: Unlike some competitors, Caterpillar serves multiple industries through its diverse product offerings, which helps mitigate risks associated with any single sector.

Technology and Innovation: Caterpillar has invested heavily in digital and automation technologies. For example, its Connected Asset Management system allows customers to monitor and optimize equipment performance, reducing downtime and maintenance costs. The company's focus on autonomous and electric machinery is also expected to be a major growth driver in the future.

Strategic Risks:

Price Competition: Competitors like Komatsu and Hitachi sometimes offer machinery at lower prices, putting pressure on Caterpillar's pricing strategies.

Regulatory Pressures: Caterpillar faces complex environmental and safety regulations in various markets, particularly concerning emissions. Compliance with these regulations can increase operational costs.

- **Historical Performance (Appendix E)**

Liquidity: Caterpillar's current ratio stands at 1.35, indicating it has sufficient current assets to cover short-term liabilities. However, the quick ratio of 0.74 suggests that Caterpillar's liquid assets, excluding inventory, might fall short in immediately covering obligations without relying on inventory sales. The company's inventory turnover of 2.58 and accounts receivable turnover of 3.56 reflect efficient management of assets, supporting its overall liquidity despite some reliance on inventory for meeting liabilities.

Leverage: Caterpillar's debt-to-equity ratio of 1.70 shows a significant use of debt financing relative to equity, allowing the company to leverage its capital structure for growth. Additionally, with debt making up 38% of its capital, Caterpillar demonstrates a balanced approach to financing operations without excessive dependence on external funds. The debt coverage ratio of 0.39 suggests that cash flow generation is not fully covering debt obligations, though it remains manageable given Caterpillar's industry and asset-intensive nature.

Profitability: Caterpillar's profitability is a notable strength, with a gross margin of 36%, reflecting effective cost control and high product quality. The operating margin of 24% shows strong operational efficiency, while a net margin of 15% underscores profitability after all expenses. Caterpillar's return on assets (ROA) of 12% further demonstrates the company's efficient use of assets to generate income, making it appealing to investors. A price-to-earnings (P/E) ratio of 20.12 also indicates investor confidence in Caterpillar's earnings potential, highlighting positive market sentiment.

- **Financial Health:**

Debt and Leverage: Caterpillar maintains a balanced capital structure, with a debt-to-equity ratio generally under 2.0, showcasing prudent leverage. The Financial Products division's financing activities contribute to the overall debt load but are supported by robust cash flows from operations.

Cash Flow: Caterpillar generates healthy operating cash flows, enabling reinvestment in product innovation and shareholder returns through dividends and buybacks.

- **Dupont Analysis (Appendix D):**

In 2023, Caterpillar Inc. reported a net income of \$10,332 million on sales of \$67,060 million, reflecting a strong net margin of 15%. The company's total assets stood at \$87,476 million, with shareholder equity amounting to \$19,494 million. The dividend paid was \$2,568 million, resulting in a dividend payout ratio of 0.25, meaning 25% of its earnings were distributed to shareholders, while the remaining 75% was retained. Using the DuPont analysis, the company's asset turnover was 0.77, indicating how efficiently assets were used to generate sales. Financial leverage stood at 4.49, highlighting the degree of reliance on debt to amplify returns. With these metrics, Caterpillar achieved a remarkable return on equity (ROE) of 53%, indicating the company's strong ability to generate profit relative to shareholder equity.

- **Financial Forecasts:**

To project Caterpillar's future performance, we base forecasts on both historical trends and industry insights.

Revenue Forecast: Projected to grow at a steady rate of approximately 19% per year, driven by increased demand for construction and mining equipment. This growth rate assumes stable economic conditions and moderate expansion in emerging markets.

Cost of Goods Sold (COGS): Forecasted to grow in line with revenues, keeping gross profit margin relatively stable. Any increase in raw material costs or supply chain expenses may impact on this forecast, though Caterpillar's cost management initiatives could provide a buffer.

Operating Expenses: Expected to increase at a slightly lower rate than revenue, reflecting Caterpillar's ongoing commitment to cost control and efficiency improvements.

EBITDA Margin: Anticipated to improve modestly as Caterpillar continues to drive efficiencies across its operations and benefit from economies of scale in production.

Capital Expenditures (CapEx): Forecasted to remain steady, as Caterpillar continues to invest in technological advancements, such as autonomous and electric machinery, which aligns with sustainability goals and regulatory requirements.

Dividends and Share Repurchases: Caterpillar has a strong history of returning value to shareholders through dividends and buybacks. Given its cash flow generation and capital discipline, this trend is expected to continue.

Comments:

The Business Summary provides a foundational understanding of Caterpillar's operational structure, market positioning, and financial outlook. It establishes a baseline for analyzing the company's valuation by highlighting key metrics and industry factors that influence future performance. This section covers the initial steps of the valuation process and provides a clear framework for financial forecasting, which will play a critical role in the subsequent stages of asset valuation.

SWOT Analysis

- **Strengths:**

1. **Market Leadership and Brand Loyalty:**

Caterpillar holds approximately 15% of the global heavy machinery market, solidifying its position as a leader across various industries. The company's strong brand reputation and customer loyalty enhance its competitive advantage and foster trust.

2. **Robust Financial Performance:**

In Q2 2024, Caterpillar reported a revenue of \$16.7 billion, reflecting a 22% increase from 2023. With an operating profit of \$3.48 billion, Caterpillar demonstrates resilience in challenging market conditions and continues to deliver value to shareholders.

3. **Diversified Business Segments:**

Caterpillar's diverse operations across construction, mining, energy, and transportation mitigate risks associated with dependence on any single market. Notably, its Energy and Transportation division grew by 6% in 2024, offsetting declines in other areas.

4. **Stable Cash Flow and Dividend Growth:**

With cash flow expected to reach the high end of its \$5–\$10 billion target in 2024, Caterpillar is well positioned to continue its 30-year streak of annual dividend increases, further strengthening shareholder confidence.

5. **Commitment to Innovation and Sustainability:**

Caterpillar's investments in sustainable technology, such as autonomous machinery and predictive maintenance, address growing environmental regulations and customer demands for greener solutions, setting it apart as an industry leader in innovation.

- **Weaknesses:**

1. **Dependence on Cyclical Markets:**

A significant portion of Caterpillar's revenue stems from construction and mining, both of which are cyclical and susceptible to economic downturns. This dependency exposes Caterpillar to fluctuations in demand.

2. **Rising Operating Costs:**

In Q2 2024, operating costs rose by 7% due to increased administrative and R&D expenses. Persistent cost increases may compress profit margins and affect financial performance if not managed effectively.

3. **Heavy Exposure to North American Markets:**

With much of its revenue concentrated in North America, Caterpillar is vulnerable to regional economic slowdowns or shifts in infrastructure spending, limiting its geographic revenue diversification.

4. **High Compliance Costs:**

As environmental regulations tighten globally, Caterpillar faces increased compliance expenses, which may put pressure on profitability and affect its competitiveness in markets with stringent standards.

5. **Supply Chain Vulnerabilities:**

Ongoing global supply chain challenges expose Caterpillar to potential production delays, impacting revenue and customer satisfaction. Efficient supply chain management is critical to maintaining its operational stability.

- **Opportunities:**

1. **Renewable Energy Growth:**

The global shift towards renewable energy presents a substantial growth opportunity for Caterpillar's Energy & Transportation division, which grew by 6% in 2024. Expanding this division could support long-term revenue growth.

2. **Infrastructure Spending Surge:**

Increased government infrastructure investments, particularly in North America, have boosted demand for Caterpillar's construction equipment. This trend offers significant growth potential as public infrastructure projects are prioritized.

3. **Expansion in Digital and Aftermarket Services:**

Caterpillar's focus on digital solutions, including remote monitoring and predictive maintenance, could drive substantial revenue. These services are projected to contribute up to 30% of revenue by 2026, creating steady income streams beyond equipment sales.

4. **Emerging Market Expansion:**

The rise of infrastructure development in emerging markets, such as Asia and Africa, presents opportunities for Caterpillar to expand its footprint and increase sales, driven by rising demand for heavy machinery.

5. Advancements in Autonomous and Electric Machinery:

Caterpillar's investments in electric and autonomous vehicles position it to meet the growing demand for efficient, sustainable machinery, enhancing its competitive edge in industries like construction and mining.

• Threats:

1. Economic Uncertainty:

A slowdown in major markets, including China and Europe, could reduce global demand for Caterpillar's products, as evidenced by slowing demand in certain regions in Q2 2024.

2. Intensified Competition:

Rival companies, including Komatsu, Volvo, and John Deere, are accelerating innovation efforts, increasing pricing pressure and threatening Caterpillar's market share if differentiation is not maintained.

3. Rising Cost Pressures:

The impact of inflation, along with increased raw material and labor costs, continues to challenge Caterpillar's profitability. Persistent cost inflation could significantly erode profit margins.

4. Environmental Regulatory Challenges

Increasingly stringent emissions regulations impose higher compliance costs, challenging Caterpillar to balance profitability with regulatory demands in multiple regions.

5. Supply Chain Risks

Global supply chain disruptions pose an ongoing risk for Caterpillar, potentially affecting production schedules and delivery timelines, which could negatively impact customer relationships and revenue.

Michael porter's 5 forces:

Michael Porter's Five Forces model provides a framework for analyzing the competitive dynamics within an industry. In the case of Caterpillar Inc., a global leader in heavy equipment manufacturing, these forces help understand the company's market position and profitability.

• Threat of New Entrants:

Low Caterpillar operates in an industry with significant barriers to entry. The high capital investment required for research, development, and manufacturing, coupled with the need for advanced technology and skilled labor, makes it difficult for new players to enter the market. Additionally, Caterpillar has established a strong brand, loyal customer base, and extensive distribution network over decades. These factors limit the potential threat from new competitors.

• Bargaining Power of Suppliers:

Moderate Caterpillar relies on various suppliers for raw materials, parts, and specialized components, including steel, electronics, and engines. While suppliers can exert some influence on pricing, Caterpillar's vast size and long-standing relationships with many of its suppliers provide leverage. The company's ability to source materials globally and maintain strong contractual agreements helps mitigate supplier power. However, there are certain specialized suppliers where the bargaining power could be higher, especially for unique or advanced components.

- **Bargaining Power of Buyers:**

Low to Moderate Caterpillar serves a broad range of customers, from individual buyers to large-scale corporations in industries like construction, mining, and forestry. While large customers may attempt to negotiate prices, the high capital investment in heavy equipment and the long lifespan of Caterpillar's products create high switching costs for buyers. Additionally, the company's reputation for durability, reliability, and excellent after-sales service strengthens its position and reduces the influence of buyers. However, as customers become more price-sensitive and demand technological innovation, their bargaining power may rise slightly.

- **Threat of Substitute Products or Services:**

Low to Moderate The threat of substitutes for Caterpillar's products is relatively low. While alternative equipment from competitors like Komatsu and Volvo exists, Caterpillar's brand strength and product differentiation reduce the likelihood of customers switching to lower-cost substitutes. However, emerging technologies such as automation and electric-powered machinery could serve as potential substitutes in the future, especially as sustainability becomes a more significant focus in the industry. Caterpillar is actively investing in these areas to stay competitive and reduce the impact of potential substitutes.

- **Industry Rivalry:**

High Competition in the heavy equipment manufacturing industry is intense, with major global players like Komatsu, Volvo, and Hitachi posing strong rivalry to Caterpillar. Price competition, product innovation, and after-sales services are key factors in this rivalry. While the industry is growing due to increased demand in construction and mining, the limited number of large players in the market means that rivalry remains fierce. Caterpillar must continue to innovate and offer superior products and services to maintain its market leadership.

Risk Analysis -

- **Industry Risks**

Commodity Price Volatility: Steel and other metals used in Caterpillar's machinery are subject to global price swings. Rising input costs directly impact manufacturing expenses and could force Caterpillar to raise prices or accept narrower profit margins.

Cyclical Demand: As a supplier to sectors like construction and mining, Caterpillar's sales closely track economic cycles. During downturns, demand for heavy equipment drops significantly, affecting revenue and market stability.

Technological Advancements: Rapid progress in automation and machinery requires continuous R&D investment. If competitors innovate faster or more effectively, Caterpillar risks losing its competitive edge, making it essential to stay at the forefront of industry technology.

- **Regulatory and Legal Risks**

Environmental Regulations: Global efforts to cut carbon emissions mean stricter regulations for machinery emissions. Adapting to new standards requires costly technological upgrades, which can raise production costs and affect the company's profitability.

Trade Policies and Tariffs: Caterpillar's reliance on international markets exposes it to trade restrictions, tariffs, or sanctions, particularly in key regions like China and the European Union. These changes can disrupt its supply chain and impact the price competitiveness of its products abroad.

Litigation and Compliance: Caterpillar faces legal risks related to safety, environmental compliance, and product performance. Lawsuits from these issues can lead to costly settlements or damage Caterpillar's reputation, making strict adherence to regulatory guidelines essential.

- **Company-Specific Risks**

Reliance on Key Customers: Caterpillar's significant contracts with large mining and construction firms mean that any reduction in spending from these clients can heavily impact revenue. If major customers cut orders or projects, Caterpillar could face significant revenue shortfalls.

Currency Exposure: With its global presence, Caterpillar is sensitive to exchange rate fluctuations. A strong U.S. dollar, for example, makes its products more expensive for foreign buyers, potentially reducing sales volume and affecting revenue from international markets.

Operational Challenges: Supply chain bottlenecks, workforce shortages, or production delays can prevent Caterpillar from meeting demand efficiently. These issues can hurt profitability and damage client relationships if orders are delayed.

- **Forecast Risks**

Revenue and Profitability Assumptions: Caterpillar's projections are based on anticipated economic recovery and market growth. If these assumptions are overly optimistic and the economy slows, the company could fall short of its revenue and profit targets.

Aggressive Cost Reduction: Caterpillar's cost-cutting initiatives could be harder to implement if unexpected operational demands or regulatory changes arise. This could lead to an earnings shortfall if projected savings aren't realized, affecting investor confidence.

- **Other Risks**

Macroeconomic Conditions: Global issues such as high inflation, interest rate increases, and geopolitical conflicts (e.g., U.S.-China tensions) can impact demand. Economic instability in key markets could weaken demand, forcing Caterpillar to adjust its pricing or production strategies.

Climate-Related Risks: As industries shift toward green energy, sectors reliant on fossil fuels may see demand decline. Caterpillar could experience reduced sales to these sectors, necessitating a pivot toward sustainable product lines to maintain relevance in the evolving market landscape.

Risk Category	Description	Impact Level
Industry Risks	- Commodity price volatility (steel, metals) affecting production costs	High
	- Cyclical demand in construction and mining	Medium
	- Technological advancements necessitating R&D investments	Medium
Regulatory & Legal Risks	- Environmental regulations raising compliance costs	High
	- Trade policies and tariffs affecting international supply chain	Medium
	- Legal liabilities from safety and compliance	Medium
Company-Specific Risks	- Dependence on key mining and construction client	Medium
	- Currency exposure due to global operations	Medium
	- Operational challenges from supply chain issues	High
Forecast Risks	- Overly optimistic revenue assumptions	High
	- Cost reduction efforts that may be challenging to implement	Medium
Other Risks	- Global macroeconomic conditions, inflation, and interest rates affecting demand	High
	- Climate-related shifts reducing demand in fossil fuel sectors	Medium

Valuation:

1. Dividend Discount model (DDM) (Appendix A):

In our Valuation project, we applied a two-stage Dividend Discount Model (DDM) to estimate the intrinsic value of the company based on its future dividend payments. For Caterpillar Inc., the two-stage Dividend Discount Model (DDM) fits well due to its unique position in cyclical industries like construction and mining. As a well-established dividend-paying company, Caterpillar has consistently returned cash to shareholders over the years, even during economic downturns. This steady dividend history reinforces the model's reliability in projecting Caterpillar's value based on its dividend-generating potential, giving investors a clearer view of expected returns.

Initially, we attempted to calculate Caterpillar's sustainable growth rate using the DuPont analysis, which involved deriving the return on equity (ROE). However, this approach resulted in an ROE of 53% and a growth rate of 40%—numbers that were far too high compared to Caterpillar's actual dividend growth history. Such a high growth estimate didn't reflect Caterpillar's steady dividend increases over the years or the realistic reinvestment strategy of a mature company.

Recognizing this, we decided to use a more conservative growth rate in line with Caterpillar's historical dividend trends, which provided a more accurate and reasonable valuation. This approach allowed us to model Caterpillar's intrinsic value based on its consistent dividend payments, aligning better with its established history of returning value to shareholders over time.

In the first stage, we forecasted the dividend per share (DPS) growth for a five-year period (2024–2028) at a rate of 10%, calculated as an average of previous years' growth rates. This first stage represents a high-growth phase, where the company is expected to increase dividends at a relatively strong rate.

For the second stage, we assumed a stable growth rate of 7% beyond 2028, marking a transition to a long-term, steady-state growth phase. This reflects our expectation that the company's growth will eventually level off, becoming more stable as it matures in its industry.

To determine the present value (PV) of these future dividends, we discounted each year's projected DPS using a discount factor. This factor is derived from the company's cost of equity, which we calculated at 9% using the Capital Asset Pricing Model (CAPM). This cost of equity accounts for the risk-free rate, market risk premium, and the company's beta, capturing the required rate of return by shareholders given the stock's risk level. After calculating the PV of DPS for each forecasted year, we turned to the second stage and calculated the terminal value (TV). The terminal value represents the PV of all dividends expected after the forecast period, assuming a stable growth rate of 7% indefinitely. This value is then discounted to its present value using the 2028 discount factor, bringing it back to today's terms.

Finally, we summed the PV of all forecasted DPS with the PV of the terminal value to arrive at a total valuation of \$305.69. This approach captures both the high-growth and stable growth phases, providing a comprehensive estimate of the company's intrinsic worth based on its dividend-generating potential.

In comparison, the current market price of the company's stock is \$376.2, which is significantly higher than our intrinsic value. This discrepancy suggests that the market may have a more optimistic view of the company's growth prospects than our model assumes. The higher market price could imply that investors expect the company to achieve stronger growth rates or believe it carries a lower risk, warranting a lower required rate of return.

This difference in valuations highlights the importance of critically evaluating our assumptions, as market prices often reflect factors beyond fundamental analysis. If the stock price is indeed inflated by optimism or speculative demand, it could be overvalued at current levels. Conversely, if we believe that the company can exceed our growth estimates or that our assumptions are too conservative, adjusting these inputs may bring our intrinsic value closer to the market price.

2. Free Cash flow to Firm (FCFF) Model (Appendix B) :

The **Free Cash Flow to Firm (FCFF) Two-Stage Model** is used for business valuation, as it helps estimate the cash available to all providers of capital (debt and equity) before any debt payments are made. The FCFF model is particularly appropriate for Caterpillar Inc. because it focuses on the firm's overall cash-generating ability rather than just cash available to equity holders. Given Caterpillar's substantial capital expenditures and debt, the FCFF model provides a clear view of the cash flows available to all investors, both equity and debt. The two-stage approach captures both Caterpillar's high-growth period (2024–2026) and its anticipated slower, more stable growth in the later years (2027 onward). This model considers both historical growth trends and future prospects, making it suitable for long-term valuation, especially in capital-intensive sectors like industrial equipment.

FCFF Two-Stage Model Overview:

Stage 1 (Initial High Growth Period): In this phase, we assume the company is expected to grow at 15% annually for the years 2024 and 2025, which is an average of the previous three years growth rate .

Stage 2 (Stable Growth Period): From 2026 onwards, we assume a more conservative growth rate of 3% annually, reflecting a slowdown in expansion as the company reaches a more mature stage

FCFF Assumption:

Revenue Growth Rate: A 15% growth rate is assumed for the years 2024 and 2025, gradually reducing to a more conservative 3% from 2026 onwards.

Net Income: For the historical period, net income grows in line with revenue. We took the average Net margin of the previous three years for forecasting. Check the Appendix where we have calculated NI adjusting NCC.

Operating Costs: Historical and forecasted data show operating costs aligned with previous trends, translating into EBIT growth and steady profit margins.

To project Caterpillar's Free Cash Flow to Firm (FCFF) accurately, we began by calculating historical Net Income (NI) over the past three years (2021–2023), with values of **\$8,977 million**, **\$10,369 million**, and **\$14,574 million**. In these calculations, we adjusted for any non-operating or non-cash items, focusing on core operational earnings to eliminate unusual or non-recurring gains and losses.

Next, we calculated Caterpillar's net profit margin by dividing Net Income by Revenue for each year. For 2021, 2022, and 2023, these margins were **18%**, **18%**, and **22%**, respectively, giving us an average profit margin of **19%**. We used this average margin to forecast future Net Income, ensuring consistency with Caterpillar's historical performance as we projected NI to rise from **\$14,653 million** in 2024 to **\$20,558 million** by 2028.

Using these Net Income projections, we calculated FCFF by deducting capital expenditures (Capex) and changes in working capital from the operating cash flows. For instance, in 2024, Capex per share was projected at **\$3.58** and working capital investment per share at **\$3.00**. This approach accounted for Caterpillar's necessary reinvestments to sustain growth, resulting in forecasted FCFF per share values like **\$21.95** in 2024, growing through the high-growth period.

To discount these FCFF values, we calculated Caterpillar's Weighted Average Cost of Capital (WACC) based on a capital structure of **85% equity** and **15% debt**. With a **cost of equity at 9%** and an after-tax **cost of debt at 5%**, we derived a WACC of **8%**. Using this WACC, we applied a discount factor to each forecasted FCFF per share to determine its present value (PV). For example, the discount factor for 2024 was **0.93**, resulting in a PV of **\$20.32** for that year. Summing all PVs across the high-growth years, we arrived at a total PV of **\$65.01**.

For the stable growth phase, we calculated a Terminal Value based on a growth rate of **3%** beyond 2028, reflecting Caterpillar's expected mature-market performance. This Terminal Value was calculated to be **\$573.40** per share, with a discounted PV of **\$455.18**.

Finally, we combined the PV of the FCFFs from the high-growth phase with the PV of the Terminal Value, resulting in a total firm value of **\$520.19** per share. After deducting Caterpillar's per-share debt of **\$64.71**, we arrived at an equity value of **\$455.48** per share.

With Caterpillar's current stock price at **\$376.20**, our FCFF-based valuation of **\$455.48** suggests the stock is undervalued, indicating potential upside for investors if Caterpillar meets projected growth and cash flow expectations. This comprehensive approach—from historical adjustments to future FCFF calculation, discounting, and debt adjustment—provides a robust, data-driven estimate of Caterpillar's intrinsic value.

3. Price Multiples (Appendix C):

To estimate Caterpillar's intrinsic value using the market-based Price Multiple approach, we conducted a Comparable Company Analysis (CCA). This method involves selecting a group of comparable companies in Caterpillar's industry and analyzing key financial multiples, allowing us to determine a fair valuation based on how similar firms are priced in the market.

1. Selecting a Peer Group

For our peer group, we chose **CNH Industrial**, **Deere & Co.**, and **Komatsu Ltd.** - companies that operate in similar sectors, such as heavy machinery and industrial equipment. These companies share common industry characteristics with Caterpillar, making their valuation multiples a useful benchmark for comparison.

2. Calculation of Multiples for the Caterpillar

- **Earnings per Share (EPS):**
We calculated Caterpillar's EPS by dividing its net income (10,332) by its shares outstanding (513.6), resulting in an EPS of 20.12.
- **Book Value per Share (BVPS):**
For BVPS, we divided Caterpillar's book value (19,503) by its shares outstanding (513.6), resulting in a BVPS of 37.97.
- **Sales per Share:**
For Sales per Share, we divided Caterpillar's total sales (67,060) by its shares outstanding (513.6), giving a Sales per Share value of 130.57.
- **Cash Flow per Share:**
For Cash Flow per Share, Caterpillar's cash flow (12,885) was divided by its shares outstanding (513.6), resulting in a Cash Flow per Share of 25.09.
- **Dividend per Share:**
Caterpillar's Dividend per Share was given as 5.00, which is directly taken from a financial statement.

3. Price Multiples Calculations for Peer Companies

Price-to-Earnings (P/E):

- For **CNH Industrial**, the P/E ratio was calculated by dividing its market price (11.23) by the result of its net income (2,383) divided by its shares outstanding (1,350). This yielded a P/E of 6.36.
- For **Komatsu Ltd**, the P/E ratio was calculated by dividing its market price (189.33) by the result of its net income (1,056,828) divided by its shares outstanding (140,599), resulting in a P/E of 11.70.
- For **Deere & Company**, the P/E ratio was derived by dividing its market price (404.69) by its net income (10,155) divided by its shares outstanding (293.6), resulting in a P/E of 25.19.

Price-to-Book (P/B):

- For **CNH Industrial**, the P/B ratio was calculated by dividing its market price (11.23) by its book value (8,180) divided by its shares outstanding (1,350), resulting in a P/B of 1.85.
- For **Komatsu Ltd**, the P/B ratio was calculated by dividing its market price (189.33) by its book value (5,106,605) divided by its shares outstanding (140,599), giving a P/B of 5.45.
- For **Deere & Company**, the P/B ratio was calculated by dividing its market price (404.69) by its book value (21,789) divided by its shares outstanding (293.6), resulting in a P/B of 5.21.

Price-to-Sales (P/S):

- For **CNH Industrial**, the P/S ratio was calculated by dividing its market price (11.23) by its sales (24,687) divided by its shares outstanding (1,350), which gave a P/S of 0.61.
- For **Komatsu Ltd**, the P/S ratio was determined by dividing its market price (189.33) by its sales (8,438,134) divided by its shares outstanding (140,599), resulting in a P/S of 2.14.
- For **Deere & Company**, the P/S ratio was derived by dividing its market price (404.69) by its sales (55,565) divided by its shares outstanding (293.6), giving a P/S of 3.15.

Price-to-Cash Flow (P/CF):

- For **CNH Industrial**, the P/CF ratio was calculated by dividing its market price (11.23) by its cash flow (907) divided by its shares outstanding (1,350), resulting in a P/CF of 16.71.
- For **Komatsu Ltd**, the P/CF ratio was calculated by dividing its market price (189.33) by its cash flow (1,336,345) divided by its shares outstanding (140,599), resulting in a P/CF of 13.83.
- For **Deere & Company**, the P/CF ratio was calculated by dividing its market price (404.69) by its cash flow (8,589) divided by its shares outstanding (293.6), yielding a P/CF of 19.92.

Price-to-Dividend (P/D):

- For **CNH Industrial**, the P/D ratio was calculated by dividing its market price (11.23) by its dividend per share (0.394), resulting in a P/D of 28.50.
- For **Komatsu Ltd**, the P/D ratio was calculated by dividing its market price (189.33) by its dividend per share (2.03), resulting in a P/D of 83.79.

- For **Deere & Company**, the P/D ratio was calculated by dividing its market price (404.69) by its dividend per share (4.83), yielding a P/D of 93.27.

4. Applying the Multiples to Caterpillar's Financials

By multiplying each of Caterpillar's metrics by the **peer group's average multiple**, we derived Caterpillar's implied per-share values:

Implied Value from P/E: $14.42 \times 20.12 = 290.02$

Implied Value from P/B: $4.17 \times 37.97 = 158.46$

Implied Value from P/S: $1.97 \times 130.57 = 257.10$

Implied Value from P/CF: $16.82 \times 25.09 = 422.04$

Implied Value from P/D: $68.52 \times 5.00 = 342.59$

5. Weighting the Implied Values

We assigned an equal weight (20%) to each multiple's implied value to calculate an overall weighted value:

Weighted P/E Value: $290.02 \times 0.2 = 58.00$

Weighted P/B Value: $158.46 \times 0.2 = 31.69$

Weighted P/S Value: $257.10 \times 0.2 = 51.42$

Weighted P/CF Value: $422.04 \times 0.2 = 84.41$

Weighted P/D Value: $342.59 \times 0.2 = 68.52$

Adding these weighted values together, we obtained an overall implied value for Caterpillar of **\$294.04** per share. Based on the comparable company multiples, our analysis indicates an implied value of **\$294.04** per share for Caterpillar, which is lower than its current market price of **\$376.20**. This suggests that Caterpillar may be overvalued in comparison to its peers, although this does not account for other qualitative or company-specific factors that might justify a premium. This analysis provides a benchmark for Caterpillar's market valuation using similar firms in the industry.

Conclusion

Valuation of Caterpillar Inc., using the Dividend Discount Model (DDM), Free Cash Flow to Firm (FCFF) model, and Price Multiples Analysis comes to **\$363.28**. Given that the market price is within 10% of our intrinsic valuation, Caterpillar appears to be fairly valued. A "Hold" recommendation is appropriate, allowing investors to keep their position while monitoring any significant shifts in the company's performance or industry trends.

Historical and Pro Forma Tables

Income Statement

Particulars (Dollars in millions except per share data)	2021	2022	2023
Sales and revenues			
Sales of Machinery, Energy & Transportation	48,188	56,574	63,869
Revenues of Financial Products	2,783	2,853	3,191
Total sales and revenues	50,971	59,427	67,060
Operating costs:	-		-
Cost of goods sold	35,513	41,350	42,767
Selling, general and administrative expenses	5,365	5,651	6,371
Research and development expenses	1,686	1,814	2,108
Interest Expense of Financial Products	455	565	1,030
Goodwill impairment charge	-	925	-
Other operating (income) expenses	1,074	1,218	2,818
Total operating costs	44,093	51,523	54,094
Operating profit	6,878	7,904	12,966
Interest expense excluding Financial Products	488	443	511
Other income (expense)	1,814	1,291	595
Consolidated profit before taxes	8,204	8,752	13,050
Provision (benefit) for income taxes	1,742	2,067	2,781
Profit of consolidated companies	6,462	6,685	10,269
Equity in profit (loss) of unconsolidated affiliated companies	31	19	63
Profit of consolidated and affiliated companies	6,493	6,704	10,332
Less: Profit (loss) attributable to noncontrolling interests	(4)	(1)	(3)
Profit	6,489	6,705	10,335

Balance Sheet

Particulars	2021	2022	2023
Assets			
Current assets:			
Cash and cash equivalents	9,254	7,004	6,978
Receivables - trade and other	8,477	8,856	9,310
Receivables - finance	8,898	9,013	9,510
Prepaid expenses and other current assets	2,788	2,642	4,586
Inventories	14,038	16,270	16,565
Total current assets	43,455	43,785	46,949
Property, plant and equipment - net	12,090	12,028	12,680
Long-term receivables - trade and other	1,204	1,265	1,238
Long-term receivables - finance	12,707	12,013	12,664
Noncurrent deferred and refundable income taxes	1,840	2,213	2,816
Intangible assets	1,042	758	564
Goodwill	6,324	5,288	5,308
Other assets	4,131	4,593	5,257
Total assets	82,793	81,943	87,476
Liabilities			
Current liabilities:			
Short-term borrowings:			
Machinery, Energy & Transportation	9	3	
Financial Products	5,395	5,954	4,643
Accounts payable	8,154	8,689	7,906
Accrued expenses	3,757	4,080	4,958
Accrued wages, salaries and employee benefits	2,242	2,313	2,757
Customer advances	1,087	1,860	1,929
Dividends payable	595	620	649
Other current liabilities	2,256	2,690	3,123
Long-term debt due within one year:			
Machinery, Energy & Transportation	45	120	1,044
Financial Products	6,307	5,202	7,719
Total current liabilities	29,847	31,531	34,728
Long-term debt due after one year:			
Machinery, Energy & Transportation	9,746	9,498	8,579
Financial Products	16,287	16,216	15,893
Liability for post-employment benefits	5,592	4,203	4,098
Other liabilities	4,805	4,604	4,675

Total liabilities	66,277	66,052	67,973
Issued shares: (2023 and 2022 - 814,894,624 shares) at paid-in amount	6,398	6,560	6,403
Treasury stock: (2023 - 315,517,355 shares; and 2022 - 298,549,134 shares) at cost	(27,643)	(31,748)	(36,339)
Profit employed in the business	39,282	43,514	51,250
Accumulated other comprehensive income (loss)	(1,553)	(2,457)	(1,820)
Noncontrolling interests	32	22	9
Total shareholders' equity	16,516	15,891	19,503
Total liabilities and shareholders' equity	82,793	81,943	87,476

Cash Flow Statement

Particulars	2023	2022	2021
Cash flow from operating activities			
Profit of consolidated and affiliated companies	10,332	6,704	6,493
Adjustments for non-cash items:			
Depreciation and amortization	2,144	2,219	2,352
Actuarial (gain) loss on pension and postretirement benefits	(97)	(606)	(833)
Provision (benefit) for deferred income taxes	(592)	(377)	(383)
Loss on divestiture	572	-	-
Goodwill impairment charge	-	925	-
Other	375	701	216
Changes in assets and liabilities, net of acquisitions and divestitures:			
Receivables - trade and other	(437)	(220)	(1,259)
Inventories	(364)	(2,589)	(2,586)
Accounts payable	(754)	798	2,041
Accrued expenses	796	317	196
Accrued wages, salaries and employee benefits	486	90	1,107
Customer advances	80	768	34
Other assets - net	(95)	(210)	(97)
Other liabilities - net	439	(754)	(83)
Net cash provided by (used for) operating activities	12,885	7,766	7,198
Cash flow from investing activities			
Capital expenditures - excluding equipment leased to others	(1,597)	(1,296)	(1,093)
Expenditures for equipment leased to others	(1,495)	(1,303)	(1,379)
Proceeds from disposals of leased assets and property, plant and equipment	781	830	1,265
Additions to finance receivables	(15,161)	(13,239)	(13,002)
Collections of finance receivables	14,034	13,177	12,430
Proceeds from sale of finance receivables	63	57	51
Investments and acquisitions (net of cash acquired)	(75)	(88)	(490)
Proceeds from sale of businesses and investments (net of cash sold)	(4)	1	36

Proceeds from maturities and sale of securities	1,891	2,383	785
Investments in securities	(4,405)	(3,077)	(1,766)
Other net	97	14	79
Net cash provided by (used for) investing activities	(5,871)	(2,541)	(3,084)
Cash flow from financing activities			
Dividends paid	(2,563)	(2,440)	(2,332)
Common stock issued, including treasury shares reissued	12	51	135
Common shares repurchased	(4,975)	(4,230)	(2,668)
Proceeds from debt issued (original maturities greater than three months):			494
- Machinery, Energy & Transportation	-	-	
- Financial Products	8,257	6,674	6,495
Payments on debt (original maturities greater than three months):			
- Machinery, Energy & Transportation	(106)	(25)	(1,919)
- Financial Products	(6,212)	(7,703)	(7,877)
Short-term borrowings - net (original maturities three months or less)	(1,345)	402	3,488
Other - net	-	(10)	(4)
Net cash provided by (used for) financing activities	(6,932)	(7,281)	(4,188)
Effect of exchange rate changes on cash	(110)	(194)	(29)
Increase (decrease) in cash, cash equivalents and restricted cash	(28)	(2,250)	(103)
Cash, cash equivalents and restricted cash at beginning of period	7,013	9,263	9,366
Cash, cash equivalents and restricted cash at end of period	6,985	7,013	9,263

Appendix A: Valuation using DDM Model

	Historical			Forecasted				
	2021	2022	2023	2024	2025	2026	2027	2028
DPS	4.28	4.62	5.00	5.50	6.05	6.66	7.32	8.05
Growth rate (DPS)				10%	10%	10%	10%	10%
Discount Factor				0.92	0.84	0.77	0.71	0.65
PV of DPS				5.05	5.09	5.14	5.19	5.23

Calculation of Terminal Value	
Long term growth	7%
Terminal Value	430.81
Discount Factor	0.65
PV of Terminal Value	280

Valuation using DDM model	
Sum of PV of DPS	26
PV of Terminal Value	280
Value	305.69

Cost of Equity	
Rf	4.3
Risk Premium	4.06
Beta	1.1
CAPM %	9%

Appendix B: Valuation using FFCF

	Historical			Forecasted				
Years	2021	2022	2023	2024	2025	2026	2027	2028
Percentage Sales growth				15%	15%	15%	3%	3%
Revenue	50,971	59,427	67,060	77,119	88,687	101,990	107,089	112,444
net income	8,977	10,369	14,574	14,653	16,851	19,378	19,959	20,558
EPS				28.53	32.81	37.73	38.86	40.03
FC INV per share	(2.13)	(2.52)	(3.11)	(3.58)	(4.11)	(4.73)	(4.87)	(5.02)
WC INV per share	(1.26)	(3.50)	0.29	(3.00)	(3.45)	(3.97)	(4.09)	(4.21)
FCFF per share				21.95	25.24	29.03	29.90	30.80
Growth per share					15%	15%	3%	3%
Discount factor				0.93	0.86	0.79		
PV of FCFF				20.32	21.64	23.04		

Valuation using FCFF :

	<i>per share</i>
Sum of PV of FCFF (A)	65.01
Terminal Value	573.40
PV of terminal value (B)	455.18
Total (A + B)	520.19
Debt	(64.71)
Value	455.48

Calculation of WACC :

MV of debt	33,235
MV of equity	193,216
Tax	21.4%
Debt	15%
Equity	85%
Cost of Debt	5%
Cost of Equity	9%
WACC	8%

Calculation of Net Income :

	HISTORICAL		
Particulars	2021	2022	2023
Revenue	50,971	59,427	67,060
Operating costs:			
Cost of goods sold	35,513	41,350	42,767
Selling, general and administrative expenses	5,365	5,651	6,371
Research and development expenses	1,686	1,814	2,108
Total	42,564	48,815	51,246
EBIT	8,407	10,612	15,814
Tax	(1,782)	(2,250)	(3,353)
EBIAT	6,625	8,362	12,461
Depreciation	2,352	2,219	2,144
Net Income	8,977	10,581	14,605
NI / Sales	18%	18%	22%
Average of 3years	19%		

Appendix C: Valuation using price multiples

COMPARABLE ANALYSIS								
	Peer group							
Ratios	CNH Industrial	Deere & Co.	Komatsu Ltd	Average (i)	Target Co. (ii)	Price (i)*(ii)	Weight	Price*Weight
PE	6.36	11.70	25.19	14.42	20.12	290.02	0.2	58.00
P/B	1.85	5.45	5.21	4.17	37.97	158.46	0.2	31.69
P/S	0.61	2.14	3.15	1.97	130.57	257.10	0.2	51.42
P/CF	16.71	13.83	19.92	16.82	25.09	422.04	0.2	84.41
P/D	28.50	83.79	93.27	68.52	5.00	342.59	0.2	68.52
Total								294.04

Caterpillar	
PE	18.70
P/B	9.91
P/S	2.88
P/CF	15.00
P/D	75.24

Appendix D: Calculation of ROE using 3 step Dupont Model & Sustainable Growth rate (g)

Sustainable Growth Rate (g)	
	2023
Net Income	10,332
Sales	67,060
Total Assets	87,476
Shareholder's Equity	19,494
Dividend	2568
Dividend Payout	0.25
Retention ratio (b)	0.75
Dupont Calculation:	
Net margin	15%
Asset Turnover	0.77
financial leverage	4.49
ROE	53%
g (b x ROE)	40%

Appendix E: Financial Ratios used in Equity Valuation

Particulars	2023
Balance sheet ratio	
Current ratio	1.35
Quick Ratio	0.74
Inventory Turnover	2.58
Accounts receivable turnover	3.56
Return on Asset	12%
Debt to capital	0.38
Debt to equity	1.70
Price to book value	9.91
Income statement ratio	
Gross margin	36%
Operating Margin	24%
Net margin	15%
PE ratio	20.12
Cash flow statement Ratios	
Price/Cah flow	15.00
Dividend payout ratio	25%
price/free cash flow	0.03
Debt coverage ratio	0.39

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