

# Case Study

## Objective

The objective of this case study is to analyze and compare the **financial performance, growth quality, risk profile, and efficiency** of two major semiconductor companies—**NVIDIA** and **Advanced Micro Devices (AMD)**—using audited SEC 10-K financial data.

The analysis aims to distinguish:

- **Cyclical fluctuations** from **structural business changes**
- **Growth driven by demand quality** versus **growth driven by scale**
- Differences in **profitability, cash discipline, and balance-sheet risk**

## Data & Methodology

- **Data Source:** SEC EDGAR 10-K filings
- **Time Period:** FY2015–FY2024
- **Tools Used:** Python (data extraction & cleaning), MySQL (storage & querying), Power BI (analysis & visualization)

## Key Metrics Analyzed

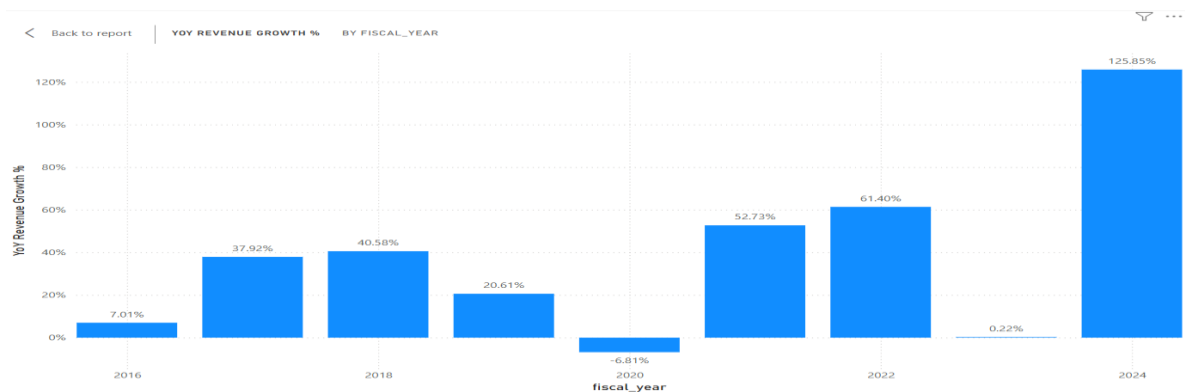
- Revenue & YoY Revenue Growth
- Net Income & YoY Net Income Growth
- Cash Conversion (Operating Cash Flow / Net Income)
- Leverage Ratio (Total Liabilities / Total Assets)
- Return on Assets (ROA)

## Descriptive Analysis

### 1. Revenue Growth Trends

#### NVIDIA

- Revenue growth was strong but cyclical until FY2019.
- FY2020 showed a **mild contraction (~-6.8%)**, reflecting the crypto crash and demand correction.
- From FY2021 onward, revenue rebounded sharply, culminating in **~126% YoY growth in FY2024**.

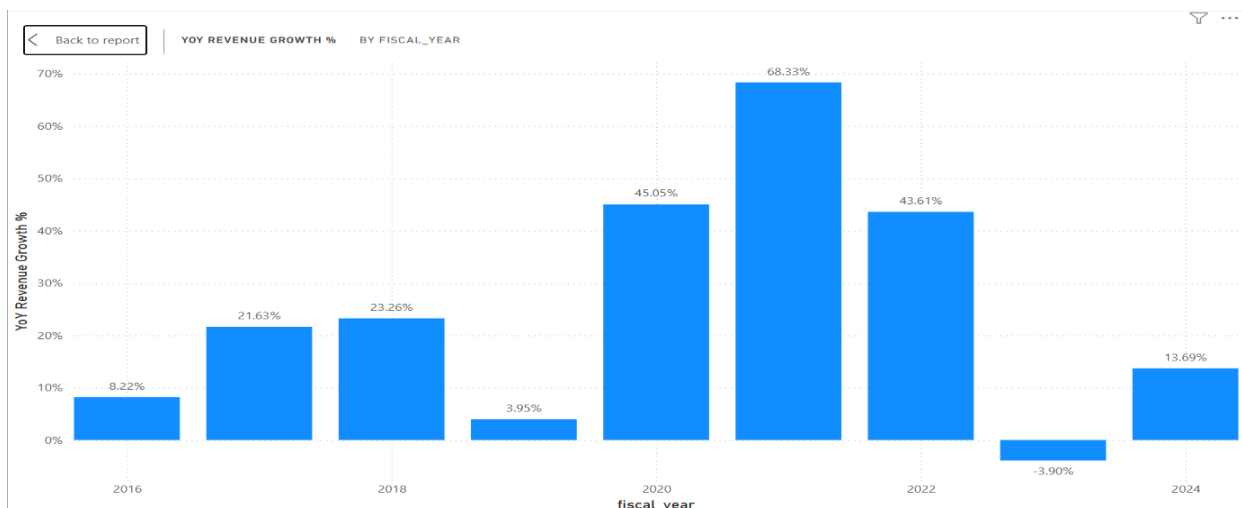


#### AMD

- Revenue growth was **steadier and more gradual**, with consistent expansion from FY2016 onward.
- Strong acceleration occurred during FY2020–FY2022, followed by a mild contraction in FY2023 and recovery in FY2024.

#### Descriptive Insight:

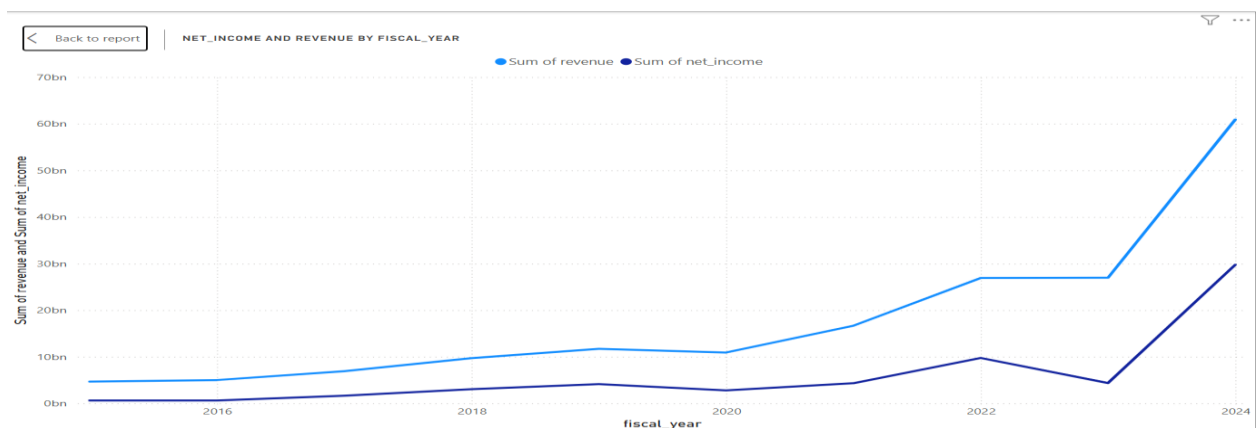
NVIDIA exhibits **higher volatility but stronger upside**, while AMD shows **more stable but moderate growth**.



## 2. Net Income Trends

### NVIDIA

- Net income mirrored revenue trends but with **greater amplitude**, reflecting strong operating leverage.
- FY2023 saw a sharp decline (~-55%) due to a demand reset.
- FY2024 experienced an exceptional rebound (~**580% YoY**), driven by margin expansion.

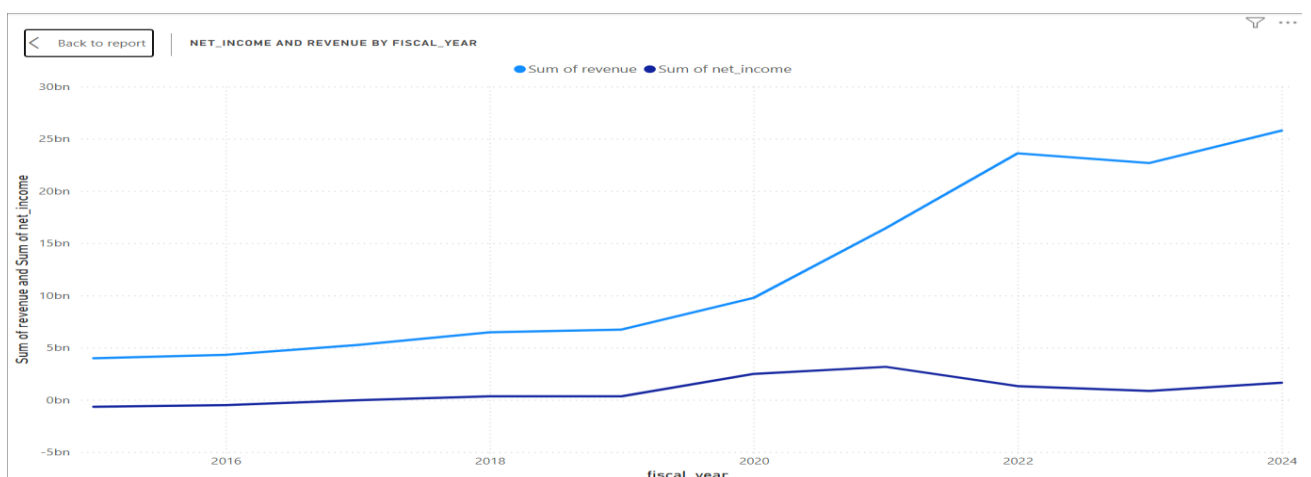


### AMD

- Net income growth was **highly volatile**, especially in earlier years due to a small profit base.
- Post-2019 profitability improved but remained less consistent than revenue.

#### Descriptive Insight:

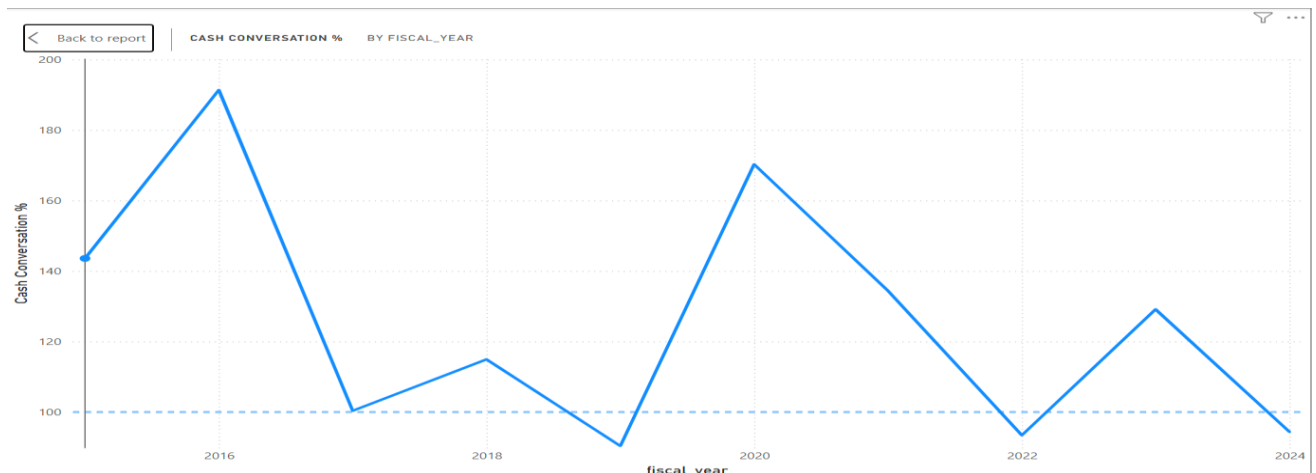
NVIDIA's profitability scales rapidly during demand upcycles, while AMD's profits fluctuate more due to thinner margins.



### 3. Cash Conversion (Earnings Quality)

#### NVIDIA

- Cash conversion remained consistently high, generally **within 95–110%**, even during high-growth years.
- Temporary dips (FY2019, FY2022, FY2024) stayed within a **5–10% range**, indicating working-capital effects rather than weak earnings quality.

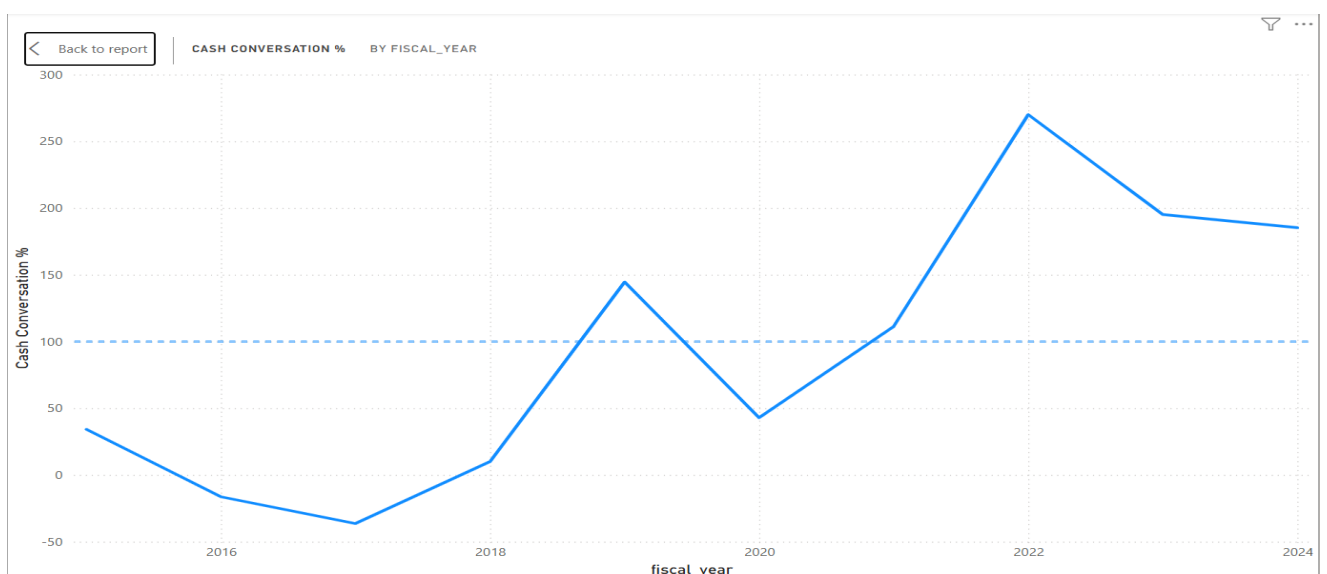


#### AMD

- Early years with negative profits make cash conversion ratios non-interpretable.
- From FY2019 onward, cash conversion frequently exceeded **100%**, reaching as high as **~270% in FY2022**.

#### Descriptive Insight:

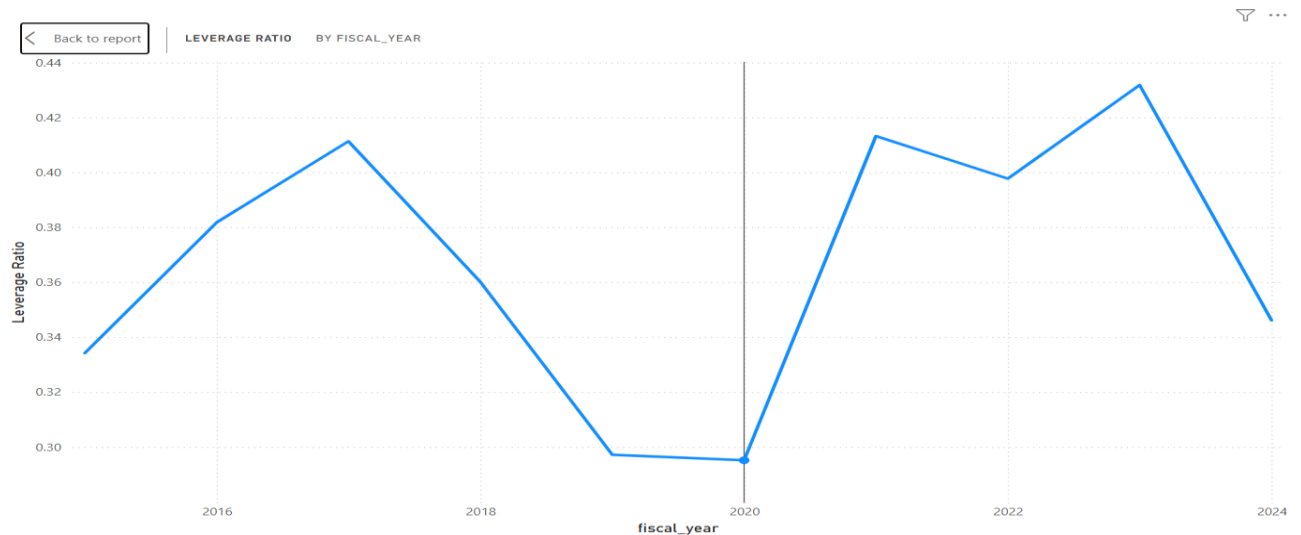
Both companies demonstrate strong earnings quality once profitable, with NVIDIA showing **greater consistency at scale**.



## 4. Leverage (Risk Profile)

### NVIDIA

- Leverage remained stable between **~30–45%** across the entire period.
- No meaningful increase in leverage during high-growth years.

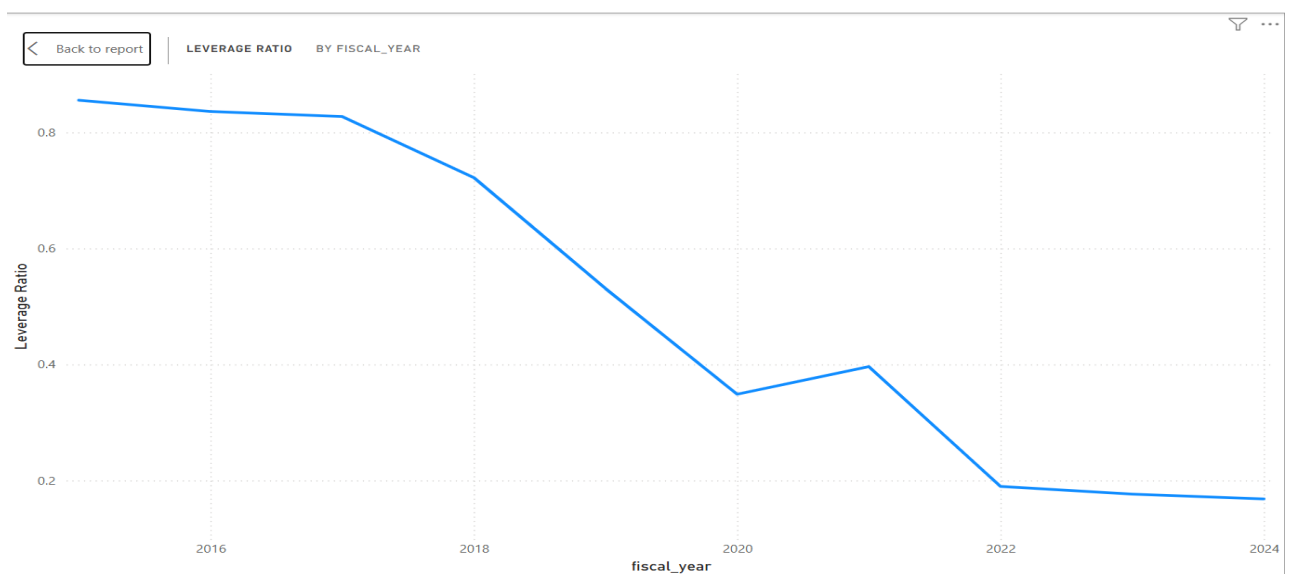


### AMD

- Leverage was high in early years (**~80%+**), reflecting prior financial stress.
- Significant deleveraging occurred post-2019, reaching **~17–19% by FY2024**.

#### Descriptive Insight:

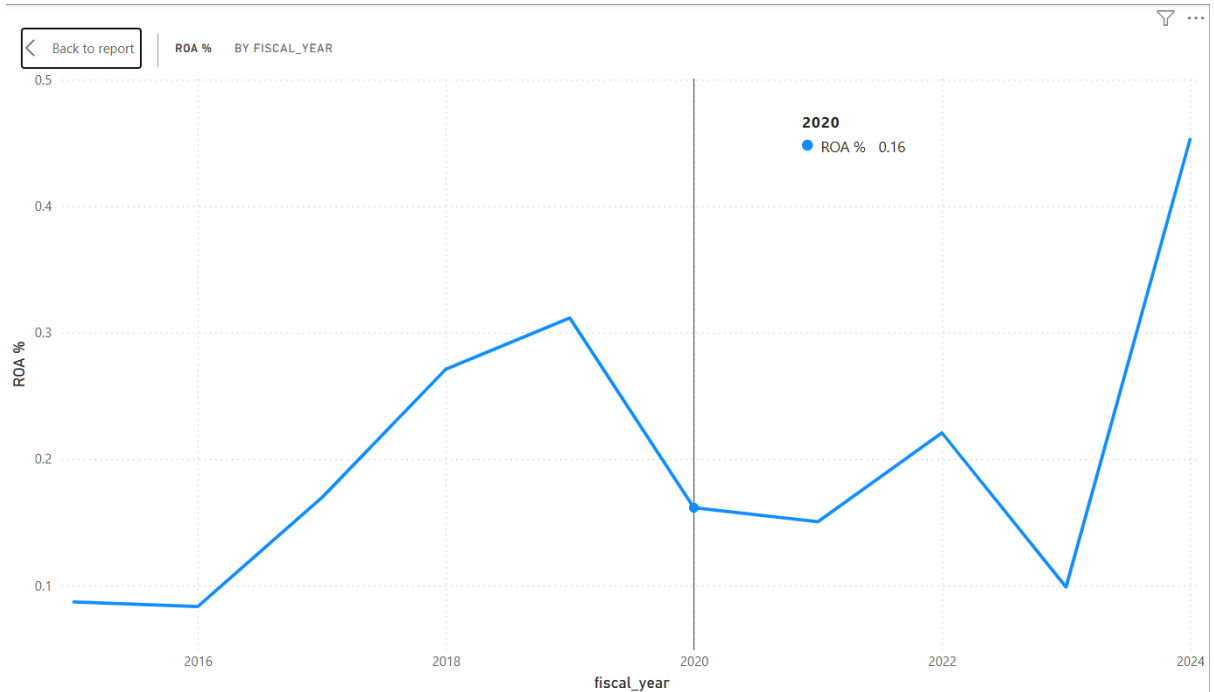
AMD shows a clear **de-risking story**, while NVIDIA maintains **long-term balance-sheet discipline**.



## 5. Return on Assets (Efficiency)

### NVIDIA

- ROA increased from ~8% in early years to ~45% in FY2024, indicating a major efficiency inflection.

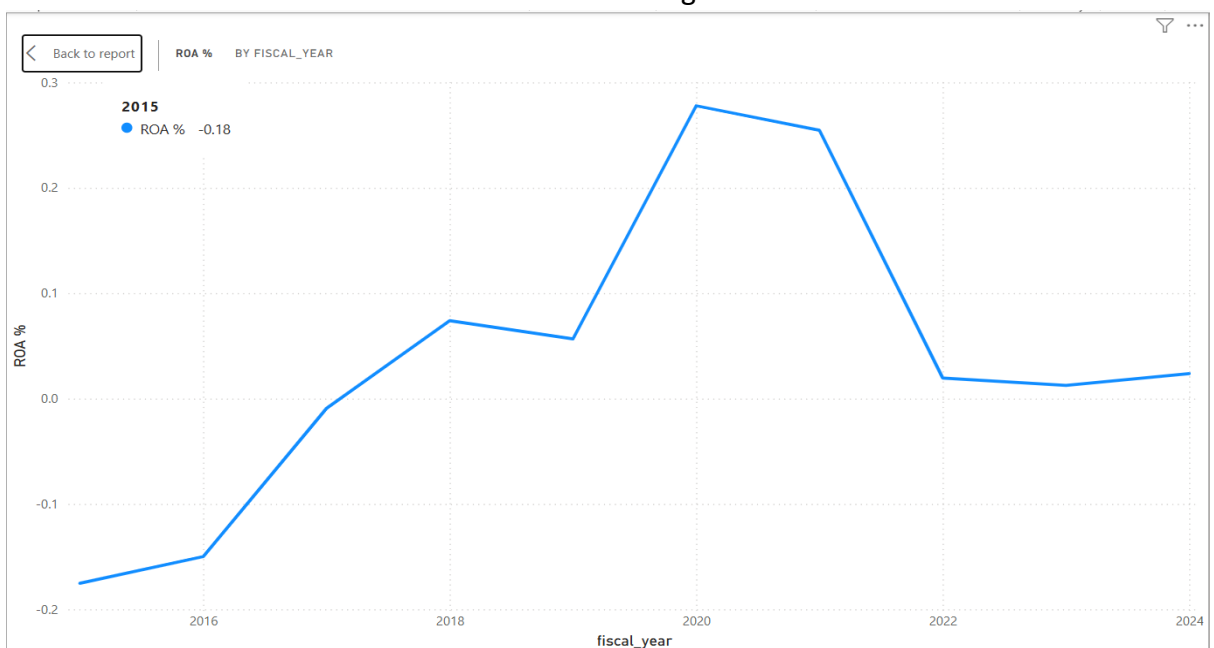


### AMD

- ROA improved modestly but remained significantly lower than NVIDIA's.

#### Descriptive Insight:

NVIDIA's asset base generates substantially higher profits, suggesting **platform-level economics** versus AMD's hardware-constrained margins.



## Diagnostic Analysis

### 1. Growth Drivers

NVIDIA's post-2022 growth is driven by AI data-center demand, pricing power, and operating leverage—not merely product launches.

AMD's growth reflects competitive execution and market share gains but operates in a more price-competitive environment.

### 2. Profit Volatility Explanation

NVIDIA's profit volatility is primarily a result of operating leverage—small changes in revenue translate into large profit swings.

AMD's volatility stems from thin margins and a smaller profit base, making YoY percentage changes appear extreme.

### 3. Risk & Capital Discipline

NVIDIA did not rely on debt to fuel expansion, maintaining stable leverage through cycles.

AMD's sharp leverage reduction reflects balance-sheet repair, not aggressive expansion.

### 4. Efficiency Gap (Key Differentiator)

The most significant structural difference is **ROA**:

- NVIDIA converts assets into profits far more efficiently, especially post-2022.
- This efficiency gap explains why NVIDIA's revenue growth translates into outsized profitability compared to AMD.

## Final Comparative Conclusion

NVIDIA has transitioned from a cyclical hardware-driven company into a high-efficiency, platform-oriented business with strong operating leverage and stable financial risk. AMD, while financially disciplined and steadily growing, operates with thinner margins and lower asset efficiency, resulting in more volatile profitability. Both companies are healthy, but NVIDIA demonstrates superior monetization efficiency and scalability.

## Why This Case Study Matters

- Demonstrates **end-to-end analytical thinking**
- Separates **what happened** from **why it happened**
- Uses **normalized metrics** for fair comparison
- Aligns with **Research Analyst and Business Analyst expectations**