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The Impact of Nvidia's AI Hardware Dominance on Valuations across AI-related Semiconductor Stocks

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ABSTRACT

The rapid emergence of artificial intelligence has shown influences in the market involving semiconductor companies as society walks through a new technological era, with Nvidia emerging as the dominant supplier of AI hardware. Between 2023 and 2025, Nvidia's market capitalization surged past $4.5 trillion while its revenue growth largely outpaced all its competitors. This dominance has raised concerns about valuation volatility not only for Nvidia but for the Ai semiconductor sector of the market. This study investigates how Nvidia's near-monopolistic position in the AI sector contributes to inflated valuations across AI-related semiconductor stocks. A quantitative analysis was conducted using recent stock data from January 2023 to December 2025 for five AI-exposed firms (Nvidia, AMD, Broadcom, TSMC, ASML) and a control group of non-AI semiconductor companies. Valuation metrics including price-to-earnings ratios, market capitalization, and revenue figures were analyzed alongside correlation analysis of daily closing prices. The results reveal that AI-exposed semiconductor firms trade at significantly higher valuation multiples compared to non-AI-exposed firms, with a mean P/E ratio of 55.80 compared to 43.54. Correlation coefficients between Nvidia and its AI semiconductor firms ranged from 0.5 to 0.69, indicating a co-movement of pricing within the industry. These findings provide empirical evidence that Nvidia acts as a central valuation anchor for the AI semiconductor sector, suggesting that AI-related firms' valuations are inflated through exposure to the trend rather than independent performance. This study contributes to the literature on market behavior regarding AI exposure and highlights the existing systematic risks in AI focused technology markets.

Keywords: Nvidia, AI semiconductor stocks, Stock valuation, Valuation correlation, Technology

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1. Introduction

The emergence of artificial intelligence has set semiconductor companies as the fundamental producer of a new technological generation. At the center stage of this shift is Nvidia, whose graphics processing units have become an irreplaceable platform for training and deploying advanced AI models. Nvidia's strategic approach in developing its GPU and software ecosystem has gained a major monopolistic position in the AI hardware market with a market capitalization of over $3 trillion and revenue growth that has outpaced all its competitors (Yahoo Finance, 2026). This dominance, however, has raised concerns about the sustainability of valuations not only for Nvidia but also many other companies that surround Nvidia ultimately creating an ecosystem (Ahmed, 2025). Understanding how this single company's influence affects the market is essential for assessing the current risks that are deep within the technological sector of the market.

Existing research has explored technology bubbles through past structural change examining valuation metrics such as price-to-earnings and price-to-sales ratios, often drawing calculated assumptions to historical epidemics in the past like the dot-com era (Florid, 2024). According to Batesele et al. (2025), speculative bubbles emerged in six of the "Magnificent Seven" stocks, including Nvidia, between December 2022 and January 2025. Research on the semiconductor industry has indicated the supply chain relationships between designers, the middle salesman, and equipment suppliers within the AI field. However, while Nvidia's leadership is acknowledged, existing research lacks a focused up to date examination of how its near-monopolistic position functions as the key mechanism that fluctuates valuations across its competitors, suppliers and ecosystem partners.

This absence of research is significant because the existing interdependence within the AI semiconductor supply chain creates a new form of risk which remains unexplored. A change in Nvidia's stock price – triggered by fundamentals such as demand, geopolitical crisis, or a reevaluation of future expectations – could not only affect Nvidia, but ripple through other companies like AMD, TSMC, Broadcom, and ASML, leaving them significantly dependent within the bubble.

This study aims to directly investigate how Nvidia's dominance in AI hardware contributes to inflated valuations across the AI-related semiconductor stocks. This research addresses this gap by shifting from broad valuation trends to a comparative analysis of Nvidia's valuation performance alongside its competitors, to assess the correlations and interdependencies among AI-focused semiconductor firms.

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2. Research Design

This research focuses on the question: How does Nvidia's dominance in AI hardware contribute to inflated valuations across AI-related semiconductor stocks? In order to assess this question, a quantitative analysis was conducted using historical data from 2023 to 2025 for Nvidia, AMD, TSMC, Broadcom, and ASML. Valuation metrics included price-to-earnings and price-to-sales ratios, as well as market capitalization in relation to revenue alongside correlation analysis of stock price changes. Adapting from the valuation metrics and methodology used by Ma et al. (2015), this approach is best because it will clarify the extent to which Nvidia's market performance often influences broader valuations in its sector and support analyzing the risks inherent within the gap.

This study exploited quantitative past stock data collected from financial databases that are accessible to the public. The primary data sources include Yahoo Finance (2026) and NASDAQ (2026), which provided reliable past valuations and key information for publicly traded companies. The primary companies used to compare the different sets of data consisted of five semiconductor firms that lie on the core of the AI hardware ecosystem: Nvidia, Advanced Micro Devices, Broadcom, Taiwan Semiconductor Manufacturing Company, and ASML Holding. To provide a comparative view for the research, a control group of non AI-related semiconductor companies including Texas Instruments Inc. (TXN), Analog Devices Inc. (ADI), NXP Semiconductors NV (NXPI), Micron Technology Inc. (MU) was also evaluated. The time range of data used in this research spans from January 2023 to December 2025, which captured the period of expansion on AI investments and the corresponding valuations of semiconductor firms, a period during which the theorized bubbles were identified among AI related companies. For each firm, daily closing prices were collected in order to analyze price movements that occurred in accordance with events. Additionally, quarterly valuation metrics were collected, including price-to-earnings (P/E) ratios, price-to-sales (P/S) ratios, enterprise value (EV), earnings before interest, taxes, depreciation and amortization (EBITDA), market capitalization, and revenue figures. Sales per share was included as a valuation tool because it is often more meaningful than earnings during periods of economic fluctuations and provides a more stable version of the valuation when earnings are negative.

Following data collection, this research conducted numerical analysis to compare Nvidia's influence on its AI-related semiconductor peers. Accordingly, mean and median P/E ratios, EV/EBITDA multiples, and P/S ratios were computed for each firm from 2023-2025 time range to establish the baseline to use to evaluate and to identify deviations. These calculations provided insights into whether AI exposure alone can indicate correlated movements. Daily stock returns for each firm and market index returns (Yahoo Finance, 2026) were calculated. Returns that indicated irregularities for Nvidia – more than 50% price swing within three months – were

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flagged and cumulative abnormal returns (CARs) were calculated for its AI-related semiconductor peers. This provided additional insights on whether Nvidia has a greater impact on its AI peers during a specific time frame due to special events such as GTC, earning announcements, new product releases, etc. All calculations and data organization were performed using Microsoft Excel, with formulas applied to automate percentage change computations, descriptive statistics, correlation matrices, and abnormal return calculations.

3. Results

To find indications of Nvidia's potential influence on valuations within the AI market, its market capitalization was compared with its primary AI-semiconductors as of January 2026. According to Table 1, Nvidia's market capitalization of $4.5 trillion was more than double that of its next largest competitor, Broadcom at 1.7 trillion, and approximately thirteen times larger than ASML at $497 billion. This distribution in market value reflects Nvidia's central position within the AI hardware ecosystem and the theory that they are the primary beneficiary of the AI investment bubble. This dominance justifies examining whether Nvidia's performance and valuation serve as a base for other firms in the sector.

Table 1. Comparison of market cap data

	Market cap (Billion) 01/2026
NVDA	4500
AMD	338
AVGO	1700
TSMC	1700
ASML	497

The analysis next compared valuation multiples to determine whether AI-related semiconductor firms trade at higher levels than non-AI counterparts. Price-to-earnings (P/E) ratios as of February 2026 were calculated for all firms. As shown in Figure 2, the mean P/E ratio including the five AI-exposed semiconductors was 55.80, compared to a mean of 43.54 for the four other non-AI groups of firms.

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Table 2. Mean and median PE ratios for AI-exposed vs. non-AI semiconductor firms

	Mean	Median
AI-exposed semiconductor peers	55.80	53.23
Non-AI semiconductor firms	43.54	40.19

Nvidia's own P/E of 47.44 places near the median of its own sector group, while AMD (74.19) and Broadcom (69.32) exhibit significantly higher multiples (Table 3).

Table 3. PE ratios of AI-exposed vs. Non-AI semiconductor firms

	STOCK	PE ratio 02/2026
AI-exposed semiconductor peers	NVDA	47.44
	AMD	74.19
	AVGO	69.32
	TSMC	34.81
	ASML	53.23
Non-AI semiconductor firms	TXN	40.36
	ADI	64.87
	NXPI	28.9
	MU	40.02

The median values further support the theory, with AI-exposed firms showing a median P/E of 53.23 versus 40.19 for the non-AI group (Table 2). These results indicate that AI-related semiconductor companies consistently set higher valuation premiums, suggesting inflated expectations being the sum of their stock prices. However, while this inflation is evident from the data, it does not confirm that Nvidia is the source of this premium.

To test whether Nvidia's market performance influences its AI-focused peers, a correlation analysis was conducted using daily closing prices from January 2023 to December 2025 (Fig. 1).

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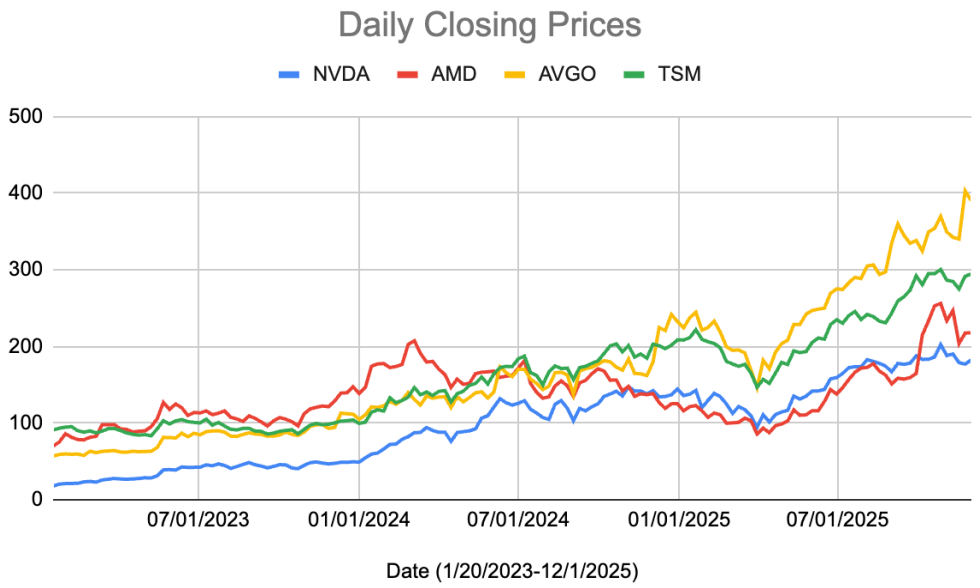
Fig. 1. Daily closing prices of NVDA, AMD, AVGO and TSM



The correlation matrix consistently reveals strong positive relationships between Nvidia and the four other AI-semiconductor firms. As indicated in Table 4, TSMC exhibited the highest correlation with Nvidia of 0.69, followed by Broadcom of 0.66, AMD: 0.61, and ASML: 0.55. All figures exceed 0.55, indicating that a majority portion of daily price variation in these firms is shared with Nvidia.

Table 4. Correlation matrix of NVDA and other semiconductor peers

Correlation Matrix	AMD	AVGO	TSM	ASML
NVDA	0.61	0.66	0.69	0.55

The indexed price chart (Fig. 1) further illustrates this co-movement, showing that all AI-exposed firms followed a similar upward trend beginning in early 2023, with notable acceleration in 2024. This pattern is consistent within the bubble as Nvidia acts as a pacesetter for the entire supply chain. The strong correlations suggest that Nvidia's market performance is closely related to that of its AI-focused semiconductors, though it cannot be inferred from correlation alone.

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4. Discussion and Conclusion

This study investigated how Nvidia's dominance in AI hardware correlates to inflated valuations across AI-related semiconductor stocks. The results provided clear evidence supporting this relationship. First, while Nvidia holds a market capitalization of $4.5 trillion – which showcases its dominance in the AI sector as they set their line by double in capitalization to its next closest competitor – its price-to-earnings ratio of 47.44 is lower than those of AMD (74.19) and Broadcom (69.32), which is an indication that investors are assigning even higher valuation premiums to less dominant firms. Second, AI-exposed semiconductor companies showed consistently higher valuation metrics than firms without relation to AI, with a mean P/E ratio of 55.80 compared to 43.54 for non-AI semiconductor companies. Third, calculation regarding the correlation revealed strong positive relationships between the dominating firm (Nvidia) and its AI-related peers, with coefficients ranging from 0.55 (ASML) to 0.69 (TSMC), indicating that price movements across these firms are related. These findings suggest that Nvidia's market dominance contributes to elevated and influenced valuations within the AI semiconductor sector, with peer valuations rising as Nvidia's performance rather than their own contributions.

The findings by this study reinforce several claims established by other existing literature. Florid (2024) argued that technology bubbles can be identified through valuation metrics such as price-to-earnings and price-to-sales ratios, and the elevated multiples observed among AI-exposed firms in comparison to non-AI firms align with this framework. Batesele et al. (2025) identified speculative bubbles in six of the "Magnificent Seven" stocks, including Nvidia, between December 2022 and January 2025, the present study expands this finding by demonstrating that the rise in valuation has also spread to smaller AI-related semiconductors. The strong correlation between Nvidia and its contributors who all are involved in the supply chain in various ways supports Ahmed's (2025) concern that Nvidia's dominance creates an ecosystem where risks are shared across these firms. This study's results provide specificity to existing claims about AI-driven investor optimism and the influence of dominant AI-related firms.

These findings carry important implications for investors, analysts, and researchers. For investors, the results demonstrate that stock valuation movements in the AI semiconductor sector are not determined solely by company fundamentals. AMD and Broadcom, for example, trade at higher P/E ratios than Nvidia despite generating lower revenue, suggesting that their valuations are inflated through association with Nvidia rather than by independent performance. For analysts, this indicates that success of a dominant company can significantly affect movements of valuations across related firms, meaning that traditional firm-specific models may underprice risk, as correlations prove the vulnerability of the existing bubble. For researchers, the strong correlation coefficient confirms that Nvidia functions as the leader within its sector; its earnings announcements and product releases appear to move the entire sector. Market participants should

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therefore consider the whole sector dynamics – particularly the near-monopolistic position of Nvidia – when evaluating semiconductor stocks, rather than relying solely on individual financial statements. A correction in Nvidia could follow with devaluation across the entire AI hardware ecosystem.

This study makes several contributions to the literature on AI-driven market behavior. It provides empirical evidence of Nvidia's influence on its peer firms, moving beyond general terms often described as "the bubble" to a specific causal mechanism: the dominant firm as valuation anchor. It adds to research on semiconductor-sector dynamics by producing numerical metrics to show correlation strengths between Nvidia and its suppliers (TSMC), competitors (AMD), and equipment partners (ASML). Additionally, it demonstrates how valuation metrics (P/E ratios, market capitalization comparisons) and price correlations can be used to examine sector influence. However, several limitations must be acknowledged. This study focused primarily on Nvidia, leaving open the question of whether other AI-exposed semiconductors, and the time period was only able to cover three years (2023-2025), which captures the AI boom but does not allow analysis of longer-term patterns. Finally, these results should not be interpreted as investment advice, nor should they be generalized to all industries without further research.

Future research should expand upon this study in different directions. The sample can be broadened to include additional semiconductor companies to further validate the findings documented in this research. Researchers should also extend this analytical list of examples to other technology sectors affected by AI, including software providers, cloud service platforms, and robotics firms, to determine whether similar dominance-driven valuation exists beyond hardware. A longer historical period exceeding ten years would allow examination of whether the patterns observed from 2023 to 2025 proceed to consist across various market cycles and if it would persist to showcase its results before and after the focus on AI. Finally, alternative valuation metrics and market performance measures, such as free cash flow multiples and enterprise value-to-sales ratios, could provide substitutional perspectives to the findings.

In conclusion, this study demonstrates that Nvidia's dominance in the AI sector of the market has a measurable impact on valuation patterns within AI-related semiconductor firms. The collection of evidence confirms that AI-exposed firms trade at significantly higher valuation multiples than non-AI-exposed firms, and their stock prices move in strong correlation with Nvidia, not with their own independent performance. While broader market forces, including the AI boom and recent economic conditions, contribute as a factor to the results, the data indicate that Nvidia influences the AI sector as the central valuation anchor for the ecosystem, a role that carries significant ramifications for market stability and systematic risk.

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