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Quantifying the S&P 500's Exposure to Artificial Intelligence

- To understand the embedded exposure to Artificial Intelligence (AI) in an index or portfolio, you must understand product line detail.

- The S&P 500 has roughly 8% of its weight tied to AI-related product lines. NVIDIA and Alphabet are by far the two largest sources of exposure.

- There are just two companies that have a majority of their revenue tied to AI Hardware, and six tied to AI Software. Overall, 16 companies have product lines with reported AI revenue.

- There are roughly 25 companies that have AI-related product lines with no attributed revenue; these often represent areas of R&D like quantum computing and software for autonomous driving vehicles.

Introduction

We have all heard, seen, and read about the potential of AI, including its ability to usher in a modern-day industrial revolution. There is no shortage of headlines and quotes

about its transformative potential for business and healthcare, and many analysts project impressive forecasts for AI's growth over the next five and ten years and its expected impact on the U.S. GDP. However, one important data component that most investors are unaware of is: how much AI-related business exposure is embedded in public equity markets? The answer to this question is tied to access to company product line detail.

Syntax created its FIS Industry Classification (FIS®) system to provide investors with greater transparency and understanding of what they own, and to do so with enhanced levels of precision and timeliness. FIS goes beyond traditional industry classification; it codifies a company's business down to the product line level and tags companies by a wide variety of attributes specific to their business (e.g., recurring revenue stream, use of precious metals, involved in the agricultural supply chain). This allows investors to move beyond sector exposures by creating "lenses" to quantify exposures to themes that can be found across sectors, like AI.

Breaking Down the S&P 500's AI Exposure

Our AI Lens divides the AI landscape into three pieces: Hardware, Software, and Services. Hardware is inclusive of semiconductors and processors that are AI-specific, as well as AI-related hardware systems, such as for autonomous vehicles. Our Software category captures companies that use AI in a variety of capabilities, including search engines, visualization and design, cybersecurity, and diversified development. Services is focused on AI applications related to data training and data analytics. Exhibit 1 highlights the AI exposure of the S&P 500 by primary business line, i.e,. companies that earn a majority of their revenue from AI-related activities.

Exhibit 1: S&P 500 Exposure to AI by Primary Business Line

Category	By Primary Business	
	# Companies	% S&P 500
AI Hardware	2	6.8%
AI Software	6	5.3%
AI Services	0	0.0%
Total	8	12.2%

Source: Syntax, data as of June 30, 2024

A company's primary business line for this analysis represents a business line that is responsible for more than 50% of a company's revenue. By this metric, only eight firms in the S&P 500 have a majority of their revenue tied to AI. Exhibit 2 shows the two companies that make up the 6.8% of the index allocated to Hardware are NVIDIA (6.63%) and Arista Networks (0.19%). In Exhibit 2 we estimate each firm's AI exposure in the S&P 500 by taking their market cap weight (% of S&P 500) times their AI product line revenue (% AI Revenue) to estimate their AI exposure.

Exhibit 2: S&P 500 Companies with Majority of Revenue Tied to AI Hardware

Company	% of S&P 500	% AI Revenue	Est. AI Expsoure	Product Line
NVIDIA	6.63%	78%	5.17%	Data center processors for analytics
Arista Networks	0.19%	85%	0.16%	AI-enabled network equipment for data centers

Source: Syntax, data as of June 30, 2024

There are six companies that have a majority of their reported revenue tied to AI Software as shown below.

Exhibit 3: S&P 500 Companies with Majority of Revenue Tied to AI Hardware

Company	% of S&P 500	% AI Revenue	Est. AI Expsoure	Product Line
Alphabet	4.29%	57%	2.45%	AI-enabled search engine ad revenue
ServiceNow	0.35%	86%	0.30%	AI-enabled cloud IT software for businesses
Palo Alto Networks	0.24%	77%	0.18%	AI-enabled cloud security
Synopsys	0.20%	89%	0.18%	Perpetual license semiconductor design software
Cadence Design Systems	0.18%	88%	0.16%	Perpetual license diagnostic validation software for semiconductor design software
Fortinet	0.08%	64%	0.05%	AI-enabled cloud security software

Source: Syntax, data as of June 30, 2024

The company detail above shows that NVIDIA (6.6%, Exhibit 2) and Alphabet (4.3%, Exhibit 3) comprise about 90% of the 12.2% weight to AI when companies are classified based on their primary business line. The index's weight to AI changes meaningfully when the index's exposure to AI is measured at the product line level.

S&P 500 AI Exposure by Product Line

The first notable observation when you move to the more precise product line view is the overstatement of the primary business exposure estimate. Exhibit 2 shows, at the product line level, that the S&P 500's weight to AI is 7.9%, considerably less than the 12.2% shown above. Hardware is overstated by 2.8 percentage points, as NVIDIA has other product lines not associated with AI, such as graphics cards for consumer PCs. Software is overstated by 1.4 percentage points, reflecting most companies have diverse product lines, including in this case products not associated with AI.

Exhibit 4: S&P 500 Exposure to AI by Primary Business Line and Product Line

Category	Primary Business % S&P 500	Product Line % S&P 500	Product Line O(U) Primary Business
AI Hardware	2	19	17
AI Software	6	21	15
AI Services	0	3	3
Total	8	38	30

Source: Syntax, data as of June 30, 2024

Since AI-related businesses can represent secondary and tertiary product lines for many companies, analyzing exposures at the product line level increases the number of companies with exposure within the index as shown below (Exhibit 5)

Exhibit 5: S&P 500 Company Exposure to AI by Product Line

Category	Primary Business % S&P 500	Product Line % S&P 500	Product Line O(U) Primary Business
AI Hardware	6.8%	4.0%	-2.8%
AI Software	5.3%	3.9%	-1.4%
AI Services	0.0%	0.0%	0.0%
Total	12.2%	7.9%	-4.2%

Source: Syntax, data as of June 30, 2024; the columns "Product Line % of S&P 500" and "Product Line O(U) Primary Business" do not add to the total as some companies are found in multiple categories

The more granular product line view shows a substantial increase to 38 companies with AI-related product lines, which compares to the eight companies where AI is their primary business classification. While this comparison looks favorable, there is a nuance associated with how companies report product lines that is important to understand.

It is relatively common for companies to include product lines to which they do not attribute specific revenues in their financial statements. In February 2024, we published a report titled See The S&P 500 From A New Lens that identified 124 companies in the S&P 500 that had one or more product lines with no attributable revenue. Alphabet, for example, is engaged in nine product lines with two having no reported revenue – autonomous driving (Waymo) and quantum computing.

In Exhibit 6, we break out the 38 companies with AI product lines to show the split for those with revenue and where there is no attributed revenue.

Exhibit 6: Number of Companies in S&P 500 with Reported and Non-Attributed AI Revenue

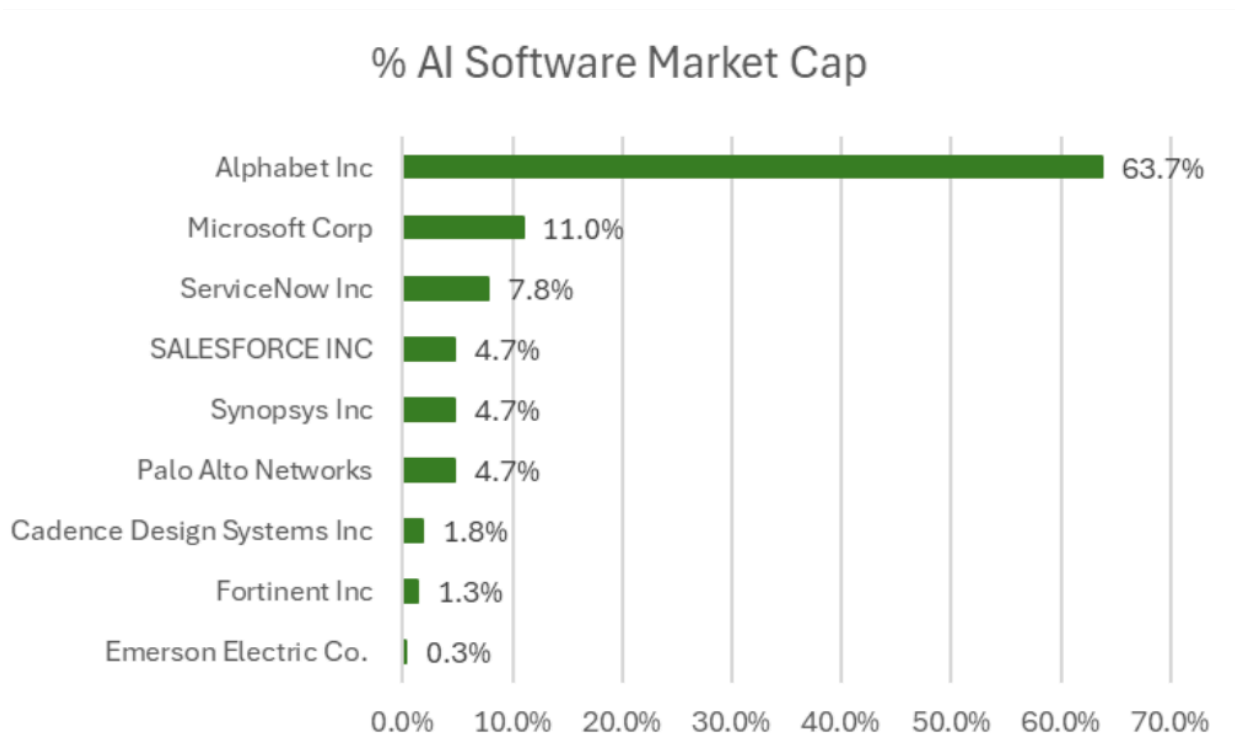| Category	AI Reported Revenue	Non-Attributed AI Revenue	Total # of Companies
AI Hardware	7	12	19
AI Software	9	12	21
AI Services	0	3	3
Total	16	27	38

Source: Syntax, data as of June 30, 2024; the columns "Non-Attributed AI Revenue" and "Total # of Companies" do not add to the total as some companies are found in multiple categories

The table shows 16 companies that have AI-related revenue product lines, which compares to 27 with no attributed AI revenue. Below we take a deeper dive into the AI Software companies.

AI Software Companies

Exhibit 7 provides some insights into companies involved in AI Software and their market cap as a percentage of the S&P 500. As discussed above, for this calculation we took the company's percentage of AI-related revenues and applied that to the firm's total market capitalization as of June 30, 2024. The results show that Alphabet is the clear leader, driven by the dominance of its Google search engine, while Microsoft is a distant second. This highlights that the majority of AI Software revenue today is associated with internet search engines.
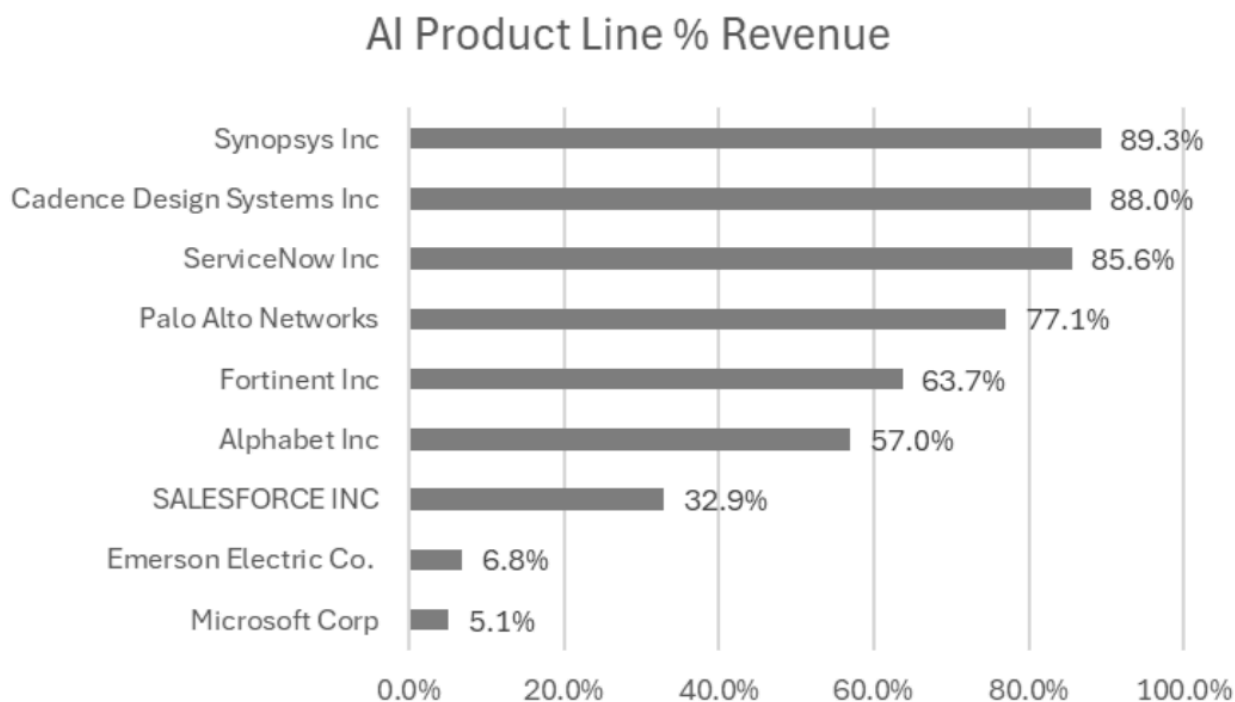
Exhibit 7: Estimate Percentage of S&P 500 Market Cap Tied To AI Software By Company

% AI Software Market Cap

Company	%
Alphabet Inc	63.7%
Microsoft Corp	11.0%
ServiceNow Inc	7.8%
SALESFORCE INC	4.7%
Synopsys Inc	4.7%
Palo Alto Networks	4.7%
Cadence Design Systems Inc	1.8%
Fortinent Inc	1.3%
Emerson Electric Co.	0.3%

Exhibit 8 takes the nine companies in the S&P 500 above and ranks their AI revenue as a percentage of their total revenue. The results show that six of the nine companies have a majority of revenue tied to AI, meaning there are relatively few companies at this point that can be considered "pure plays" for those seeking dedicated AI software exposure in the S&P 500 universe.

Exhibit 8: % of AI Product Line Revenue for Companies in S&P 500

AI Product Line % Revenue

Company	%
Synopsys Inc	89.3%
Cadence Design Systems Inc	88.0%
ServiceNow Inc	85.6%
Palo Alto Networks	77.1%
Fortinent Inc	63.7%
Alphabet Inc	57.0%
SALESFORCE INC	32.9%
Emerson Electric Co.	6.8%
Microsoft Corp	5.1%

Companies with Non-Attributed AI-Related Revenue

Company product lines with non-attributable revenue can be associated with the organization's R&D efforts. For example, within our AI Hardware category, the majority of these are associated with quantum computing initiatives and include firms such as IBM, Intel, Microsoft, Alphabet, and Qualcomm. Within the AI Software space, GM, Ford, Tesla, and Alphabet all have product lines tied to autonomous driving software. There are also niche applications, like IBM's worker automation software or Hologic's diagnostic medical equipment.

AI Services

There are three companies in the AI Services category: Meta Platforms, Amazon and Microsoft.Their services in this category are focused primarily on data analytics, for which they presently do not attribute any revenue. We expect this to change over the next few years, as companies enhance their disclosures and new revenue sources tied to AI emerge.

Growth in AI Over Time

While AI took off in 2023, it has been around for a while. Exhibit 9 tracks the exposure of AI at the product line level in the S&P 500 over the past 10 years.

Exhibit 9: AI as a Percentage of S&P 500: 2014 to 2024
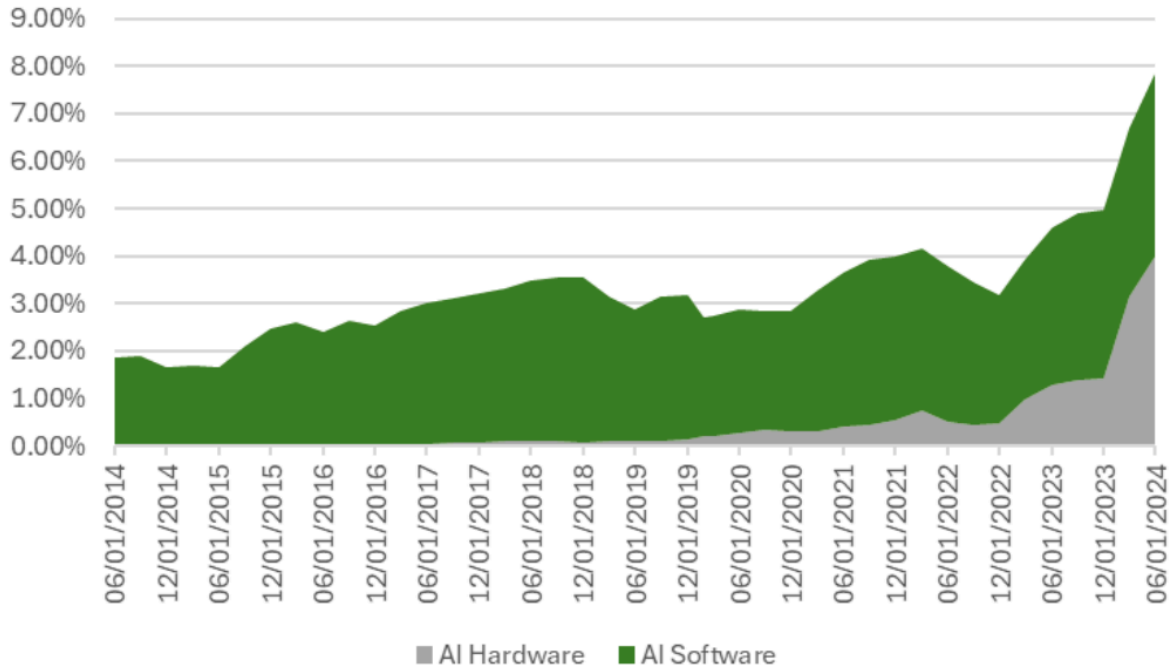
Source: Syntax, data as of June 30, 2024

The graph shows that AI Software has been around for more than 10 years, and was consistently around 2% to 3% of the index until 2020. From 2021 to 2024, AI Software has generally been between 3% to 4% of the S&P 500. The index began to change in early 2023, when AI Hardware started to take off. This was largely due to NVIDIA, which grew from 1.13% of the index as of year end 2022 to 6.6% as of June 30, 2024.

Conclusion

The emergence of AI has been well documented but not well understood when it comes to grasping its embedded exposure in the companies found in the S&P 500. While most investors are aware of NVIDIA's, Alphabet's, and Microsoft's involvement in AI, it is not as clear for lesser-known companies and the index as a whole. To quantify the S&P 500's exposure to AI, we utilized our AI Lens to look at companies in the index at the product line level. Our analysis showed:

- Only eight companies in the S&P 500 had a majority of their revenue tied to AI; NVIDIA and Alphabet are by far the biggest AI names in the S&P 500.
- Measuring exposure to AI at the product line level offers a much greater degree of precision when compared to categorizing companies by their primary business line, which meaningfully overstated the index's AI exposure.
- Many companies identified have AI product lines with non-attributable review, these can represent R&D-related initiatives like quantum computing.

While AI has been around for the last decade, it really caught the imagination of investors in early 2023 – and this has continued. The information captured by our AI Lens is based on how companies describe their business lines in their financial statements, which provides a high level of objectivity. Looking forward, we will continue to evolve our classification system to reflect increasing levels of nuance to capture companies like Meta Platforms (formerly Facebook) that use AI as an input into their business processes but do not call out AI revenue in their financial statements.

One of the major benefits of Syntax's FIS classification system is that it can power flexible thematic definitions tailored to each user's views on where to draw the boundaries of the theme. If you have an idea or a vision for what you would like to see incorporated into an AI lens, or to create a precise lens to express your investment views, please reach out to us at syntaxdata.com.