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Do You Know What You Own?

How Much Technology is Really in the S&P 500?

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At its heart, portfolio management involves managing risk. Random shocks often occur, affecting groups of companies that share the same business risks. For example, Technology companies, which can be found in many different sectors, sharply sold off at the start of this week (10.4.21). The sell-off was led by Interactive Media & Services (-3.08%), Semiconductors (-2.76%), Software (-2.29%) and Hardware (-2.22%), while the market was down 1.30% and the average stock down only 0.63%.[1] With technology companies spanning several sectors and trading as a thematic group, we question whether investors are aware of their total exposure to the technology theme.

How Much Technology is Really in the S&P 500?

This seemingly simple question is deceptively difficult to answer using the tools available to most investors. At first pass, the answer seems straightforward: as shown in Exhibit 1, the S&P 500 Index had 27.6% of its assets invested in the Information Technology Sector as of the end of last quarter. However, this approach misses significant cross-sector technology exposure. As we show in this note, a more accurate measure of technology exposure is 42%.

Exhibit 1a. GICS Sector Exposure in S&P 500

	Weight
Information Technology	27.6%
Health Care	13.3%
Consumer Discretionary	12.3%
Financials	11.4%
Communication Services	11.3%
Industrials	8.0%
Consumer Staples	5.8%
Energy	2.8%
Real Estate	2.6%
Materials	2.5%
Utilities	2.5%

Exhibit 1b. The actual technology exposure is 42%

	Weight
Technology	42.0%
Software	**19.0%**
Enterprise and Application Software	6.4%
Web-Based Retailing and Distribution Platforms	6.3%
Social & Search Networks	5.7%
Hardware	**16.5%**
Computers, Phones, and Consumer Electronics	6.5%
Electronic Components	5.7%
Network Equipment & Servers	2.3%
Automation, Robotics, and Industrial Hardware	1.2%
Electronic Systems for Transportation	0.6%
Commercial and Office Hardware	0.2%
Financial Technology and Payments	**4.1%**
Internet Infrastructure	**1.7%**
IT Services	**1.1%**

Source: S&P Dow Jones Indices, Syntax, Affinity™. Exposure by GICS sector (1a) and by the Affinity Technology Lens (1b) as of 9.30.2021. Affinity groups totals may differ from the sum of lower-level groups due to elimination of double-counting product lines that provide exposure to more than one lower-level group.

[1] Performance of the S&P 500 Index and selected GICS groups. Source: Bloomberg.

In practice, the single hierarchy approach (such as that used by GICS) is insufficient. There are challenges to estimating thematic exposures using the GICS industry classification system, one of the most widely used tools for answering questions like these. GICS, and other classification systems like it, suffers from three key issues:

1. Companies are assigned to a sector based on their primary line of business. Once this primary business is identified, it is treated as the *only* business a company is in. GICS does not look through to a company's underlying product lines, which may provide different thematic exposures than its primary business. As a result, it overcounts exposure due to companies that that have non-primary business that are *not* technology-oriented, and it undercounts exposure due to companies that are not primarily technology focused but have important secondary or tertiary product lines that are technological.

2. Sector and industry definitions are a one-size-fits-all solution that may not capture the nuances needed to answer a given question. There are technology companies in almost every sector, and GICS does not provide an easy way to find these. Most glaringly, Amazon, in the Consumer Discretionary Sector, is easy to overlook. As shown in Exhibit 2, almost all of Amazon's business carries technology exposure.

Exhibit 2. Amazon's Product Lines

Source: Syntax, Affinity™. Business exposure tags related to technology highlighted in blue. Classification data as of 9.30.2021. Excludes "Other" and intersegment revenues. For illustration purposes only.

3. Sector and industry definitions can shift over time, and classification systems like GICS can be slow to update. In September of 2018, GICS shows that the S&P 500 "reduced" its exposure to the Information Technology sector by creating a new Communication Services sector that holds internet-focused firms like Facebook, Netflix and Alphabet, and Media companies like Disney, Comcast, and Viacom CBS. These companies were added to the previous Telecommunication Sector, which included companies like AT&T and Verizon. But of course, an investor's actual exposure to the technology theme didn't change as a result of GICS's reorganization.

To better estimate the exposure to technology, you could make a strong case that the 11.3% allocation to Communication Services should be added to the 27.6% tech sector allocation to approximate total technology exposure at about 39%. This is a more accurate answer than only counting companies in the Information Technology sector, but it risks some overcounting: Disney, Comcast and other Media companies are not really tech-focused companies. And Amazon, the elephant in the room, is still not included in the count.

Syntax addressed the GICS problems above using its unique Affinity™ data. Affinity works by breaking each company down into its underlying product lines and assigning each a multitude of tags that describe its business exposures. These tags identify a company's business activities to provide insights into what it does, who it sells to, what resources it uses and more. For example, Exhibit 2 above shows Amazon's revenues by product line with a sample of the business exposure tags associated with each; while Amazon is a consumer-focused company, most of its business is driven by technology, as seen by the tags highlighted in blue.

As shown in Exhibit 3 below, using these granular product-line classifications, we can quickly aggregate the S&P 500 constituent exposures to arrive at a truer measure of technology exposure: 42.0% as of September 30, 2021.

Exhibit 3. S&P 500 Technology Exposure in Affinity™

	Weight	Largest Stock in Group	GICS Sector of Largest Stock
Technology	42.0%		
Software	**19.0%**		
Enterprise and Application Software	6.4%	Amazon.com	Consumer Discretionary
Web-Based Retailing and Distribution Platforms	6.3%	Microsoft	Information Technology
Social and Search Networks	5.7%		
Search Networks	3.3%	Alphabet	Communication Services
Social Networks	2.3%	Facebook	Communication Services
Hardware	**16.5%**		
Computers, Phones, and Consumer Electronics	6.5%	Apple	Information Technology
Electronic Components	5.7%		
Integrated Circuits	4.8%	NVIDIA	Information Technology
Semiconductor Manufacturing Equipment and Services	1.0%	Applied Materials	Information Technology
Network Equipment & Servers	2.3%	Cisco Systems	Information Technology
Automation, Robotics, and Industrial Hardware	1.2%	Emerson Electric	Industrials
Electronic Systems for Transportation	0.6%	NXP Semiconductors	Information Technology
Commercial and Office Hardware	0.2%	CDW	Information Technology
Financial Technology and Payments	**4.1%**		
Payments	3.5%	Visa	Information Technology
Investment	0.6%	CME Group	Financials
Internet Infrastructure	**1.7%**	Crown Castle Int.	Real Estate
IT Services	**1.1%**	IBM	Information Technology

Source: Syntax, Affinity™. Classification data as of 9.30.2021. Affinity groups totals may differ from the sum of lower-level groups due to elimination of double-counting product lines that provide exposure to more than one lower-level group.

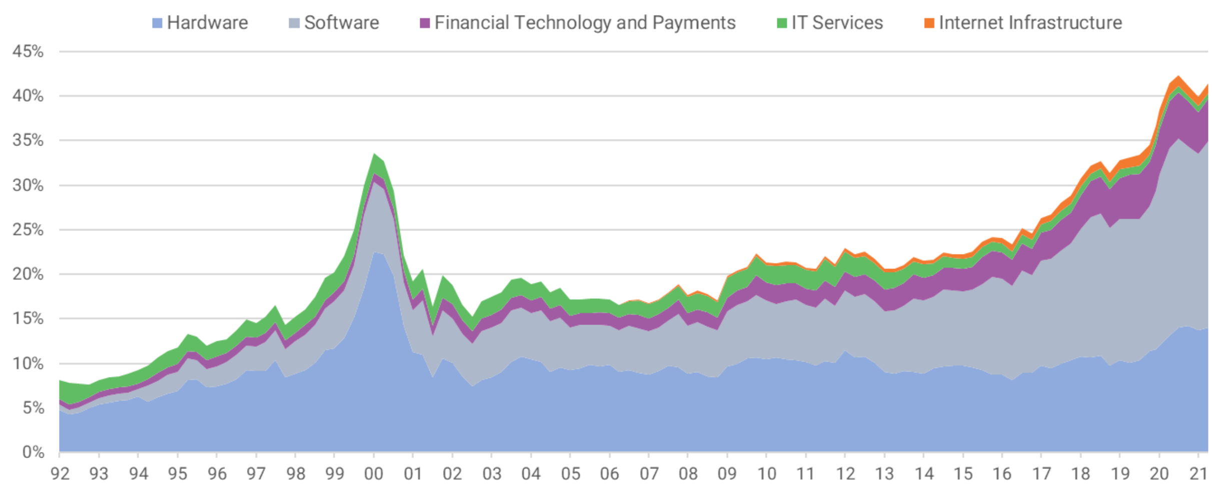
The Affinity™ approach solves all three issues with traditional classification systems: it uses product-line data to accurately assign companies to all relevant groups; it draws together companies that share technology-related tags regardless of what sector they belong to, and it can easily be updated to include new tags that don't yet exist today.

This approach also provides insights into the composition of the technology companies in the index: the software exposure is divided roughly equally between traditional enterprise software (primarily Microsoft); online distribution platforms like Amazon; search networks like Google; and social networks like Facebook. Hardware, meanwhile, is heavily tilted toward consumer electronics and components, with a relatively low allocation toward network equipment, automation and robotics, and other such businesses. Financial technology, payment processing, internet infrastructure, and IT services round out the S&P 500's technology exposure.

In GICS, these same exposures are spread across six different sectors: Information Technology, Communications, Consumer Discretionary, Industrials, Materials, and Real Estate.

The graph below shows how the S&P 500's technology exposure has changed over time. Much of the recent increase is driven by expanding valuations and the growing importance of online platforms and financial technology.

Exhibit 4. S&P 500 Technology Exposure in Affinity™ over time



Source: Syntax, Affinity™. Affinity™ Technology thematic exposure of the S&P 500 from 12.31.1992 – 9.30.2021.

The tech exposure in the S&P has surpassed levels last seen in the 2000 tech bubble, and accelerated sharply during the pandemic. While the tech industry has matured since the days of the tech bubble, with companies such of as the FAANG stocks (Facebook, Amazon, Apple, Netflix, and Google) and Microsoft becoming high margin, cash-rich, blue-chip companies, Monday's sell-off is a stark warning that technology companies are once again trading as a group.

The question remains, how long can this trend continue given that the S&P 500 is now more concentrated than ever before? While we may not have a crystal ball to answer that question, we *can* quantify exposure to the technology theme: an important first step.

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