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The Difference is Weighting™

Supply Chain Disruption and Portfolio Construction

Quantifying Supply Chain exposure using Affinity™

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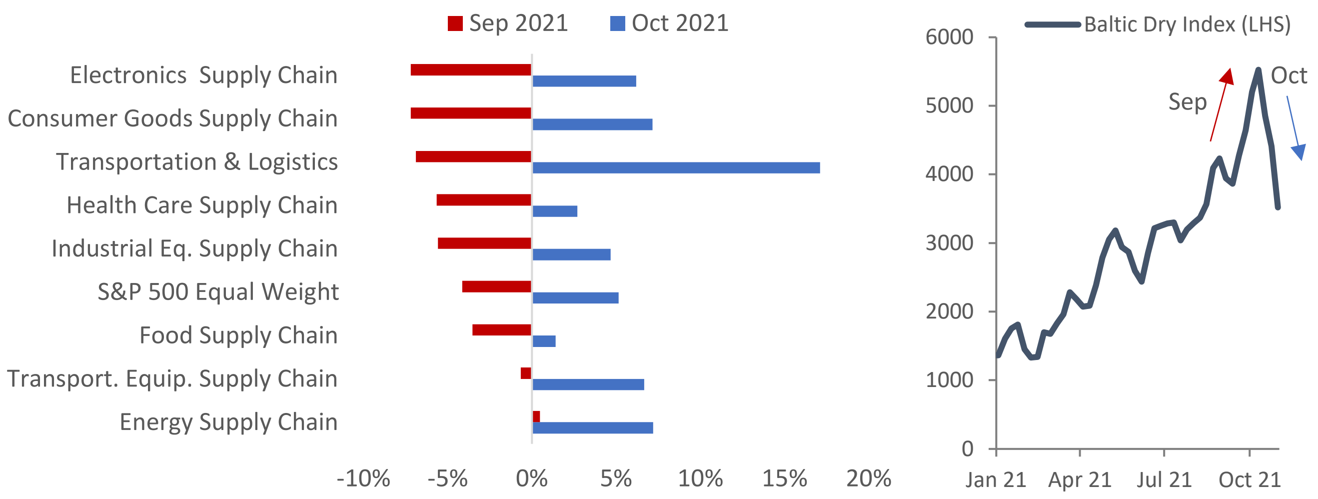
Supply chain shock in September reverses course in October

The crippling supply chain problems, which were widely reported in September and early October, are now being discounted as a transitory hiccup, rather than a more troubling symptom of the Pandemic. Shipping prices fell 32% in October as ports stayed open 24/7 to meet record demand. As cargo ships changed course, so too did stock prices. Companies exposed to the Consumer Goods and Electronics supply chains, the hardest hit in September, reversed their losses, while Transportation & Logistics was the best performing group in the S&P 500 in October, rising 17.1% (Exhibit 1).

Affinity™ quantifies the market impact of a supply chain shock

It is difficult to predict how the economic instability stemming from the Pandemic will manifest. However, it is important to **know what you own** and decide whether you are comfortable with the different risks that are embedded in your portfolio. Using Syntax's Affinity data, we calculate the supply chain exposures of a wide range of benchmarks and show the impact of the supply chain volatility in September and October.

Exhibit 1. Shipping costs and the performance of Supply Chain Baskets in September and October 2021

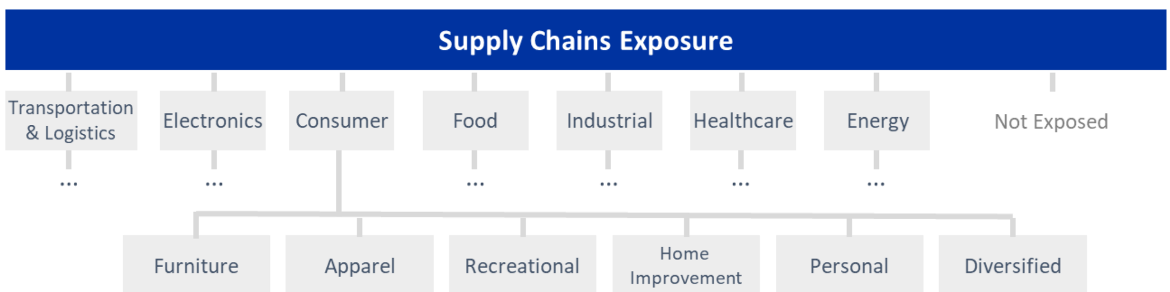


Source: Syntax Affinity™, Bloomberg. Total return performance does not reflect fees or implementation costs as an investor cannot directly invest in an index.

Measuring Supply Chain Exposure with Affinity™

Affinity tags companies with their exposure to several different supply chains, which span every major sector and comprise primary goods suppliers as well as transportation stocks, distribution centers, and retailers. From this information, we can measure portfolio exposures to particular supply chains. For example, the Home Improvement grouping of the Consumer category in the Supply Chain Theme comprises both lumber producers (e.g. timberland stocks like Weyerhaeuser) as well as lumber retailers (e.g. Home Depot). The structure of this thematic risk group is shown in Exhibit 2 below.

Exhibit 2. Structure of the Affinity Supply Chain Theme



Source: Syntax, Affinity™

Affinity then uses a set of rules to sort all companies within a specified universe, index, or portfolio into the groups above. Aggregate portfolio and index exposure can then be calculated, as shown for several major indices below (Exhibit 3).

Exhibit 3. Differences in Supply Chain Exposure for Major Indices

	S&P 500	S&P 400	S&P 600	MSCI EAFE	MSCI EM
Supply Chains	**50.7%**	**47.7%**	**48.45%**	**54.8%**	**42.6%**
Energy Supply Chain	6.1%	8.8%	6.7%	7.8%	8.8%
Food Supply Chain	6.4%	5.6%	7.2%	9.4%	7.0%
Consumer Goods Supply Chain	7.4%	9.9%	9.6%	8.9%	3.9%
Health Care Supply Chain	11.1%	7.9%	8.1%	11.4%	4.6%
Electronics Supply Chain	11.3%	2.6%	3.6%	3.1%	7.8%
Transportation Equip. Supply Chain	4.2%	5.3%	3.7%	6.2%	4.1%
Industrial Equipment Supply Chain	2.7%	5.4%	7.0%	6.6%	5.3%
Transportation and Logistics	1.8%	2.4%	2.8%	2.0%	1.3%
Other	49.3%	52.3%	51.6%	45.2%	57.4%

Source: Syntax Affinity™, S&P Dow Jones Indices, MSCI. Exposures as of 9.30.2021. Affinity groups totals may differ from the sum of lower-level groups due to rounding and the elimination of double-counting product lines that provide exposure to more than one lower-level group.

The S&P 500 has approximately half of its weight allocated to companies with significant supply chain exposure. Electronics is the most dominant supply chain within the index, accounting for 11.3% of its weight (due to its large weights in Apple, Nvidia and Intel). Companies exposed to Industrial products and transportation (the bottom three groups in Exhibit 3) comprise 8.7% of the index. In contrast, the SmallCap index (S&P 600) has a relatively diverse exposure to different supply chains, though gives a higher weight to the Consumer goods supply chain than the S&P 500 (>9.5% vs 7.6%).

Internationally, MSCI EAFE has a larger aggregate supply chain exposure than the US LargeCap (55.3% vs 51%); however, it is more concentrated in Industrial products than electronic goods. While the Emerging Markets asset class, known for its export-driven economies, has a relatively low exposure to companies with supply chain dependent products (42.8%). This is mostly due to its high weight in Financial stocks, which are not supply chain dependent.

Weighting Methodology and Supply Chain Exposure

The S&P 500 has significant exposure to the Electronics, Health Care and Consumer goods supply chains. It is important to understand how changing the weighting strategy or factor focus affects these exposures. In Exhibit 4 we dissect four other S&P 500 universe indices by their Supply Chain exposures.

Exhibit 4. Supply Chain Exposure of S&P 500 universe indices

	S&P 500	S&P 500 Eq. Weight	S&P 500 Value	S&P 500 Growth	Stratified LargeCap
Supply Chains	**50.7%**	**54.4%**	**53.3%**	**51.7**	**60.5%**
Energy Supply Chain	6.1%	11.3%	11.7%	0.7%	12.4%
Food Supply Chain	6.4%	9.1%	9.0%	3.5%	13.2%
Consumer Goods Supply Chain	7.4%	7.3%	5.9%	12.2%	9.5%
Health Care Supply Chain	11.1%	10.4%	12.5%	10.6%	9.2%
Electronics Supply Chain	11.3%	6.0%	5.1%	17.0%	7.1%
Transportation Equip. Supply Chain	4.2%	4.7%	4.2%	3.8%	5.1%
Industrial Equipment Supply Chain	2.7%	3.7%	2.7%	2.3%	2.9%
Transportation and Logistics	1.8%	2.1%	2.3%	1.6%	1.0%
Other	49.3%	45.5%	46.7%	48.3%	39.5%

Source: Syntax, S&P Dow Jones Indices, MSCI. Exposures as of 9.30.2021. Affinity groups totals may differ from the sum of lower-level groups due to rounding and the elimination of double-counting product lines that provide exposure to more than one lower-level group.

Market cap weighting has the lowest aggregate supply chain exposure of the five methodologies compared in Exhibit 4. Its high concentration in mega-cap software companies (Google, Facebook, Microsoft) has limited supply chain dependencies and reduces the overall index supply chain exposure versus alternative weighting strategies. The Equal and Stratified Weight methodologies have a significantly higher exposure to the Food & Energy supply chains (though lower exposure to Electronics), thereby raising their aggregate supply chain weightings to 54.8% and 60.3% respectively. The Stratified LargeCap Index has a significantly higher weight in companies exposed to the Food supply chain than the other indices (13.2%).

Alternative weight and factor indices typically carry higher exposure to the Consumer supply chain than cap weight

Though their total supply chain weightings are similar, the S&P 500 Value and S&P 500 Growth indices are exposed to very different underlying supply chains. The S&P 500 Value index has a large exposure to Food & Energy, whereas the S&P 500 Growth index is more exposed to Consumer goods and Electronics products.

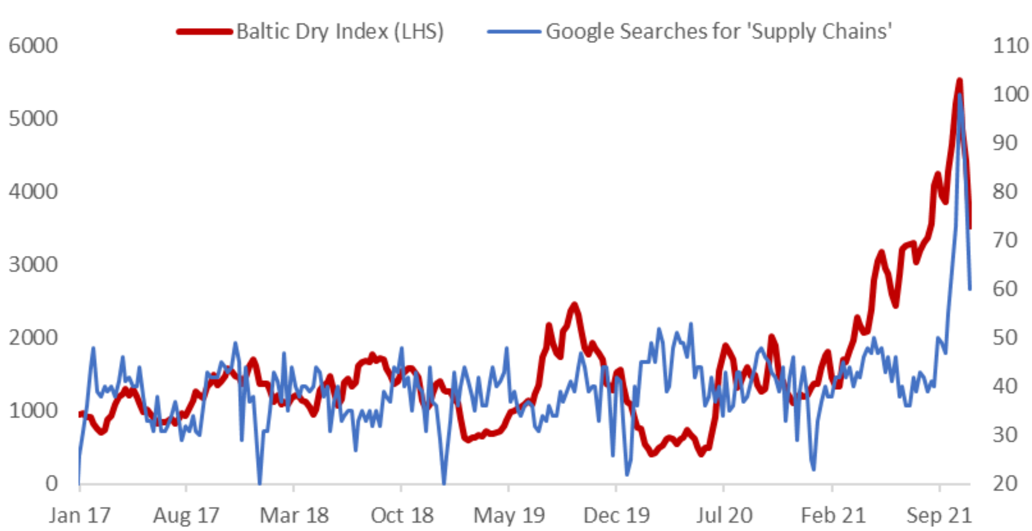
These differences in weightings help explain the difference in performance of the various S&P 500 variants during the supply chain volatility that we observed in September and October.

Measuring the performance impact of a Supply Chain shock

Cargo prices fell precipitously in October following their sharp rise in September

The Baltic Dry Index (BDI) is an index of average prices paid for the transport of dry bulk materials such as grains, coal, ore, steel coils and cement, across the world using more than 20 routes. Stresses in the supply chain became apparent by the end of May 2021, when the index had doubled from 1366 at the start of the year to 2596. By the start of October, hundreds of cargo ships were unable to unload due to staffing shortages at their ports and prices had doubled once again with the BDIY Index above 5200. The public and media attention was reflected by the number of searches for “Supply Chain” on Google (Exhibit 5).

Exhibit 5. Baltic Dry Index vs Google Search Popularity



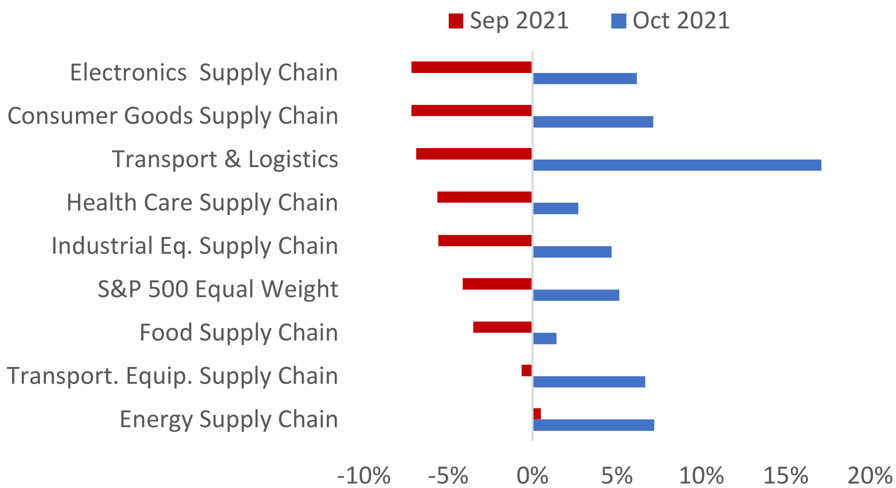
Source: Syntax, Bloomberg.

Since then, prices have normalized. From its high of 5650 on October 7th, the Baltic Dry Index was down 38% at 3519. Google searches, which have been a lagging indicator to the BDI also declined significantly by the end of the month, suggesting that public interested waned as the supply chain unstuck.

To understand the impact of the supply shock, we analyze the relative performance of our supply chain groupings in September (negative supply chain shock) and October (positive supply chain shock).

October saw a sharp reversal of the September supply chain performance

Exhibit 6. Performance of Different Supply Chain Portfolios



Source: Syntax, Affinity™. Total return performance does not reflect fees or implementation costs as an investor cannot directly invest in an index.

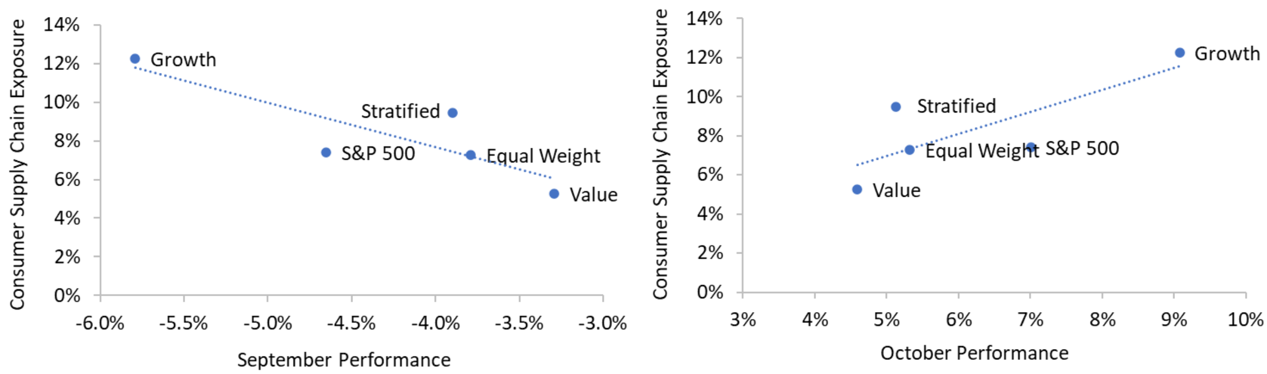
The supply chain shock in September dominated equity markets and saw the average stock in the S&P 500 decline 4.1%. Electronic goods were affected the most (-7.2%) and companies such as Apple (-6.8% in September) were forced to slash their production targets. The disruption was widespread across the Consumer goods segment with higher costs and long lead times impacting investor sentiment (stocks exposed to the Consumer Goods supply chain fell 7.2%). Transport and Logistic stocks fell 6.9% on average as bottlenecks at key ports caused container ships to anchor off-coast and wait several days for processing.

Other supply chains, such as Food (-3.5%) or Energy (+0.5%) were viewed more favorably during the September disruption as producers and retailers managed to pass off price increases to consumers.

As the supply chain opened up in October, the market rebounded and stocks exposed to the Consumer goods and Electronics supply chains recovered the majority of their losses. Transport & Logistics companies (e.g. CSX, Fedex, Prologis) gained 17.1% on average as investors focused on the demand shock caused by companies overordering to avoid running out of critical components and the backlog caused by the supply chain disruption.

The divergent performance of different supply chain groups highlights the importance of measuring exposure to different themes. In September, those indices that had a high exposure to the Consumer goods supply chain (e.g. S&P 500 Growth) fared poorly relative to those with lower exposure (S&P 500 Value). In October, as supply chain pressure declined, this theme reversed (Exhibit 7).

Exhibit 7. Index Performance and Consumer Supply Chain Exposure



Source: Syntax, Affinity™. Total return performance does not reflect fees or implementation costs as an investor cannot directly invest in an index. "Stratified", "Equal Weight", "Value", and "Growth" refer to the Stratified LargeCap, S&P 500 Equal Weight, S&P 500 Value, and S&P 500 Growth Indices, respectively.

The Syntax Affinity™ suite dissects a portfolio or index into its component themes and monitors the performance of the relevant business risks. As the global economy attempts to reopen, secondary effects of the pandemic are emerging. It is difficult to predict how these shocks will manifest, but given the right toolset we can measure and, as appropriate, help diversify this risk.

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