



CASE STUDY

# Reading Between The Lines:

Comparing Tonal & Textual Sentiment  
In The Semiconductor Sector

**August 24, 2021**

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## Abstract

This case study identifies how Aiera users can leverage textual sentiment analysis in concert with proprietary tonal sentiment, provided by Helios, to empirically demonstrate when the text and tone are incongruous, revealing potentially misleading information.

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## Key Findings

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- Chip shortages were referenced by semiconductor manufacturers (the Information Technology sector) several quarters before the shortages were determined to be a significant supply chain problem impacting other sectors.
- Initial references to chip shortages by semiconductor executives in late 2020 included largely positive or neutral textual sentiment, suggesting executives were either unconcerned with the risks associated with these shortages, or downplaying the risks.
- Tonal analysis by Helios suggests that IT executives exhibited high levels of uncertainty when providing positive remarks regarding chip shortages, highlighting an important inconsistency between textual sentiment and tonal sentiment.
- Once Information Technology (IT) executives began referencing chip shortages in early 2021, textual sentiment among executives in other sectors/subsectors (such as consumer discretionary, specifically automotive) was significantly more negative than the sentiment expressed by their IT sector counterparts.
- The comparison between text-based sentiment and tonal sentiment indicates that IT sector executives' tone of voice was incongruous with their positive statements about chip shortages, but consumer discretionary executives exhibited far more consistency between their tone and their language when expressing their largely negative views on chip shortages.

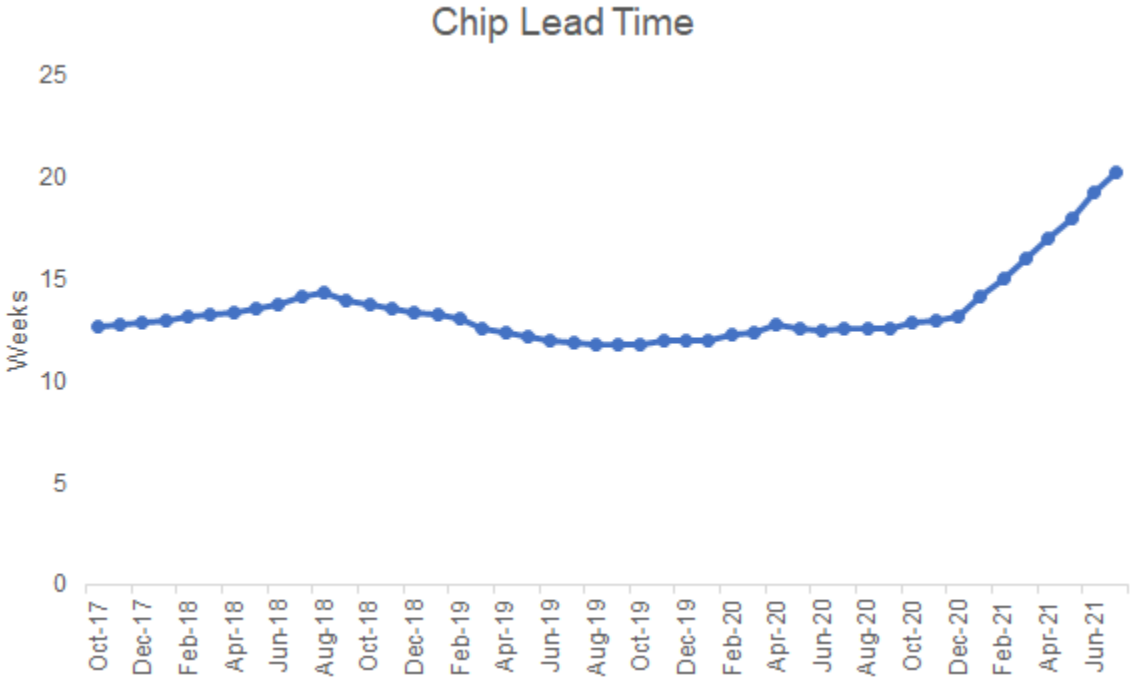
## Introduction

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Aiera's live transcription and event monitoring platform gives investors a massive information advantage in tracking and analyzing market moving corporate communications. This case study examines language around one of the most impactful and market moving supply chain disruptions in recent memory, microchip shortages. In order to fully understand the impact of the language around these shortages, Aiera has partnered with Helios to provide cutting edge tonal analysis. Psychology and neuroscience studies indicate that tone of voice represents nearly 40% of the impact of a spoken message, meaning that how something is said can be almost as important as the textual content itself. Aiera now captures this meaning with both textual sentiment analysis and tonal sentiment analysis. The case study proceeds by identifying how Aiera users can leverage textual sentiment analysis in concert with proprietary tonal sentiment, provided by Helios, to empirically demonstrate when the text and tone are incongruous, revealing potentially inconsistent communication.

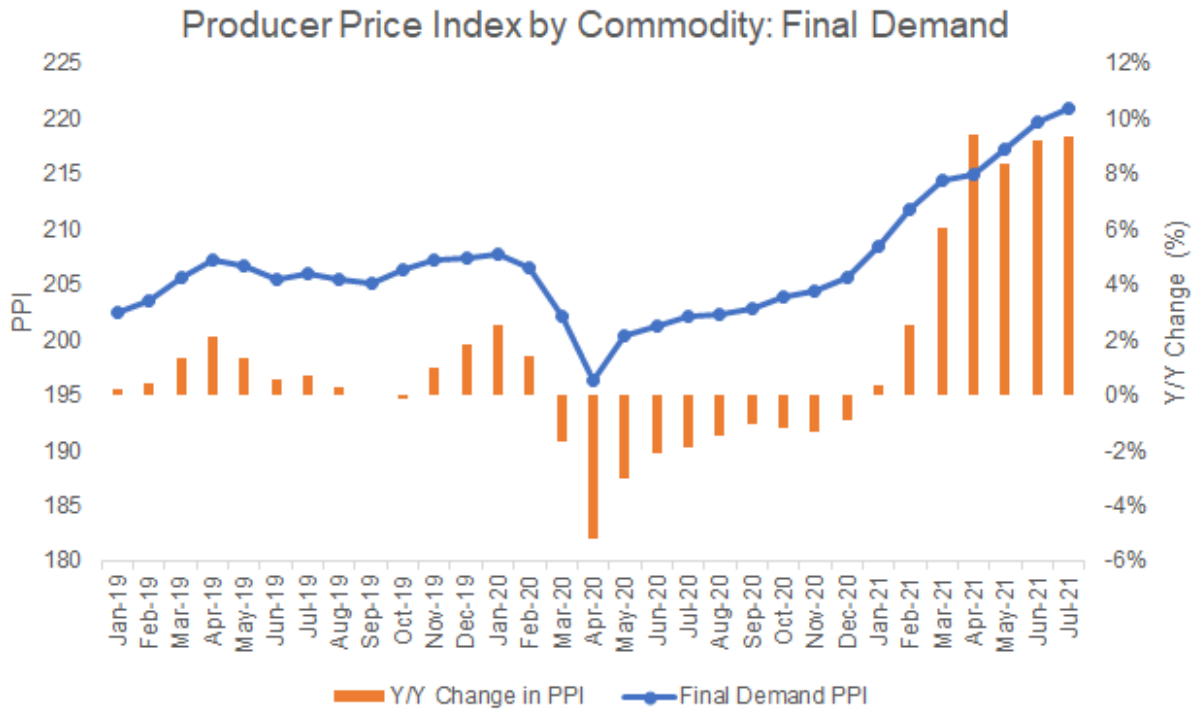
# Discussion

Throughout 2020-2021, COVID has had a profound impact on economic growth and corporate financial metrics. One area in which COVID has been particularly problematic has been corporate supply chains, especially semiconductors. As demand for products across numerous sectors softened in the early stages of the pandemic, companies cut production, thereby reducing their own demand for necessary parts like semiconductors. As global demand has recovered or even strengthened relative to “pre-COVID” levels over the past year, this drove a supply shortage for semiconductors as chip wait times have surged in recent months (implying delayed delivery times).



Source: [Bloomberg](#), Susquehanna Financial Group

Shortages of semiconductors has created a ripple effect throughout the economy, delaying production times of goods like cars, household appliances, and video game consoles, and leading to higher costs for manufacturers (causing either margin compression or price inflation if the increases are passed on to consumers) as exhibited by the acceleration in PPI.



Source: Bureau of Labor Statistics

This story became extremely prominent in Q1-2021 when several automotive companies announced that chip shortages would impact auto production just as demand was spiking due to the economic recovery. This forced automakers to adjust, but in many cases, bear the brunt of lighter vehicle production and compressed margins.

*However, the global semiconductor shortage is creating uncertainty across multiple industries and will influence our operating results this year. The situation is changing constantly. So it's premature to size what the shortage will mean for our full year results. However, right now, our current estimates from suppliers support a scenario where we could lose 10% to 20% of our planned first quarter production.*

- John T. Lawler, CFO, Ford Motor Company | Q4-2020 Earnings Call, February 10, 2021

In this case study we identify how Aiera users can track references to chip shortages (and related terminology) as well as the sentiment associated with these references over time, broken down by company and sector. The case study also highlights how Aiera users can access data from Helios to determine if the text-based sentiment is consistent with the vocal tone used by corporate executives.

## Semiconductor Companies Signaled Potential Shortages First

Semiconductor companies began mentioning chip shortages (and related terminology) as early as Q3-2020, but the frequency of these mentions did not escalate until Q1-2021. Nearly all mentions of chip shortages in 2020 are attributed to companies in the IT sector (semiconductor industry), but beginning in February 2021 the relative number of references to chip shortages by the semiconductor and automotive sectors are approximately equal.

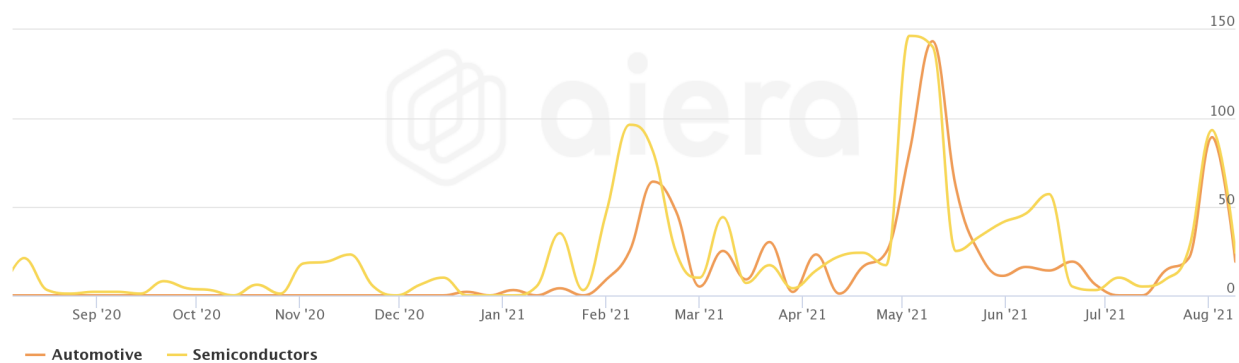


Figure 1: Mentions of Chip Shortages by Semiconductor Companies vs. Automotive Companies

*If you go back pre-pandemic, the second half of 2019, many of our industrial customers were destocking as they expected 2020 to be a lighter year for them. It turned out that the supply chain had been shocked with the pandemic. So their inventory levels dropped even further. And so now we're in this phase of feeding the demand that's off of that sort of 2019 industrial low and no one has capacity to build inventory.*

- Prashanth Mahendra-Rajah, Senior VP of Finance & CFO, Analog Devices |  
Raymond James Institutional Investors Conference, March 2, 2021

## Semiconductor Commentary More Positive Than Other Sectors

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Although the relative number of mentions has equalized between the semiconductor and automotive sectors, the sentiment associated with these mentions widely diverges. Initial rhetoric about chip shortages by semiconductor companies was largely positive through mid 2020 (as shown in Figure 2 below). And, although average sentiment fell in Q4-2020, through the first half of 2021 average sentiment has remained generally more positive than what Aiera detected in other sectors.

*...[O]ur increase in gross margin is not based on either increasing prices because of shortages or decreasing gross margins because of costs from our supply chain. But I think it's possible that in the future, the increasing cost may happen, but we have no evidence of it. It's just that we are careful that we are in new territory here. Because I think this is not a quarter or 2 quarter 1 year shortage, I think this is sort of a secular shortage because people forget that semiconductors are desperately needed for all the ADAS, all the automotive, the 5G, the health care, the computing, all of that. And I think this is a wonderful renaissance time, a wonderful golden period for semiconductors in general.*

- Rajesh Vashist, CEO, SiTime | Q4-2020 Earnings Call, February 3, 2020

*In principle, when semiconductors are in shortage, as for the process to vendor, there are no negative impacts on us. That provides us big business opportunity. So though we can increase the sales of the process too, which is good for us, very good for us. And legacy tools not only the new demand for legacy tools. But even for the leading-edge device, the customer purchases the leading-edge process tools for the leading-edge devices.*

- Q3-2021 Tokyo Electron Earnings Call, January 28, 2021

Unlike the more positive average textual sentiment expressed by semiconductor companies regarding chip shortages, consumer discretionary companies (primarily skewed towards automotive companies) expressed negative average sentiment regarding chip shortages throughout Q1 and Q2 of 2021. Nevertheless, the sentiment regarding chip shortages expressed in both the consumer discretionary and semiconductor sectors has significantly improved since late Q2-2021, with both sectors now expressing positive average sentiment.

### Average Textual Sentiment on Mentions of Chip Shortages for Semiconductor vs. Consumer Discretionary Companies

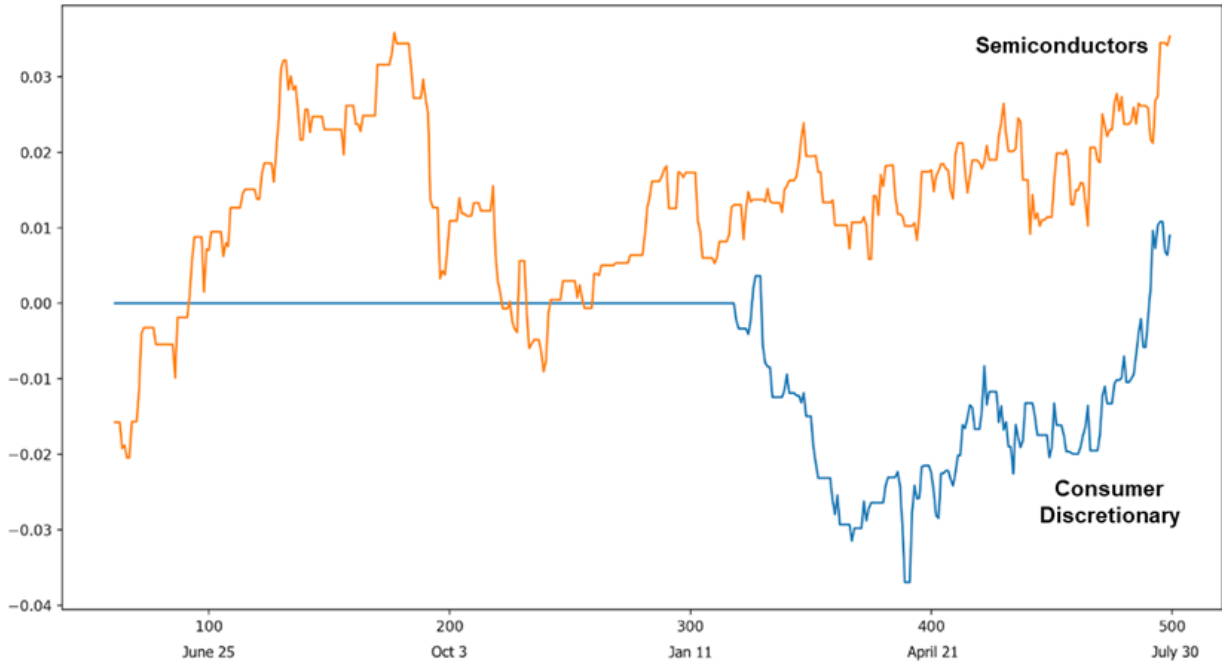


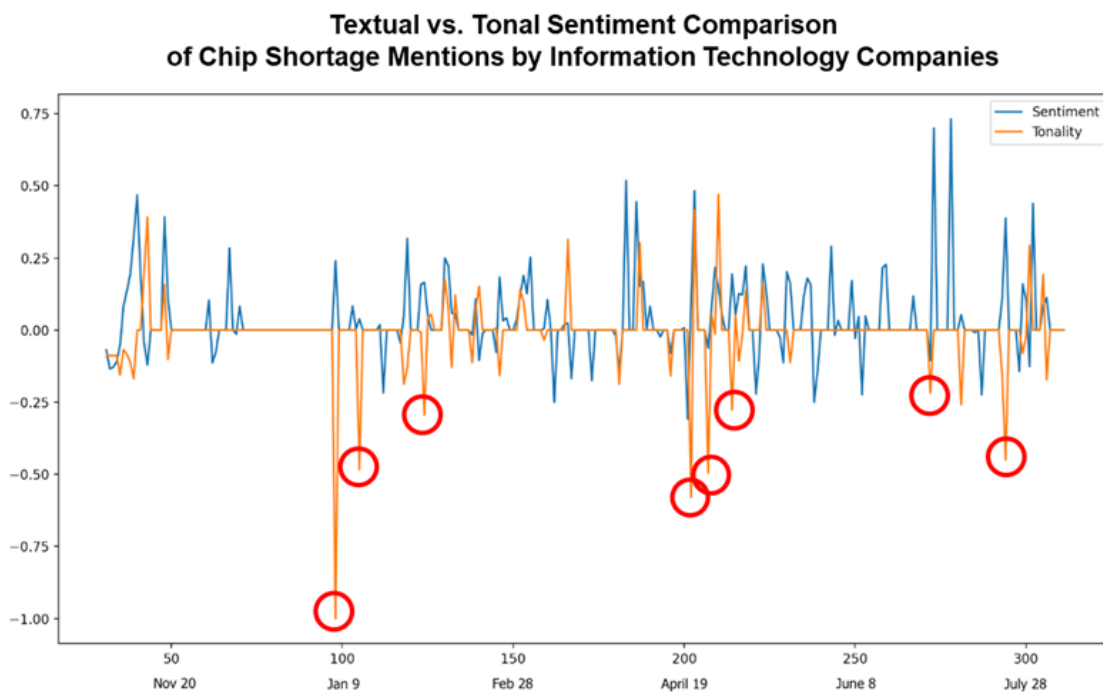
Figure 2: Average sentiment of chip shortage mentions by Semiconductor companies (orange) vs. Consumer Discretionary companies (blue)

*As Mary mentioned at the outset of this call, the industry-wide semiconductor supply shortage will also impact us this year, as it does many other industries. Included in the guidance I just provided is an estimated \$1.5 billion to \$2 billion in EBIT-adjusted full year impact driven by loss contribution margin, partially offset by mitigation efforts through cost and go-to-market actions. We expect the shortage to be temporary, and we'll look to focus on protecting supply of our highest demand products such as full-size trucks and SUVs as well as EVs.*

- Paul A. Jacobson, Executive VP & CFO, General Motors | Q4-2020 Earnings Call, February 10, 2021

## Tonal Analysis Suggests Risks Were Downplayed

The generally positive sentiment regarding chip shortages by semiconductor company executives throughout 2020-2021 suggests that these companies were actively downplaying risks associated with their supply chain problems. To determine the extent to which these executives may have been artificially positive in their remarks, we leveraged tonal analysis (in partnership with Helios). This analysis indicates that the tone of voice associated with chip shortages by executives in the IT sector exhibited extreme outliers in their tonal sentiment score, suggesting the positive language used by these executives was incongruous with their true beliefs about the state of their business, further supporting the notion that IT sector executives were downplaying these associated risks.



*Figure 3: Average text sentiment vs. tonal sentiment of chip shortage mentions by Information Technology companies*

In contrast to the negative tonal sentiment coupled with positive textual sentiment expressed by IT sector executives, executives in the consumer discretionary sector (namely automotive companies) show far fewer markers of distress when referencing chip shortages (as shown in Figure 4 below). However, it is worth reiterating that these consumer discretionary executives were also expressing far more negative textual sentiment, and thus did not need to obfuscate the true meaning of their statements.



### Textual vs. Tonal Sentiment Comparison of Chip Shortage Mentions by Consumer Discretionary Companies

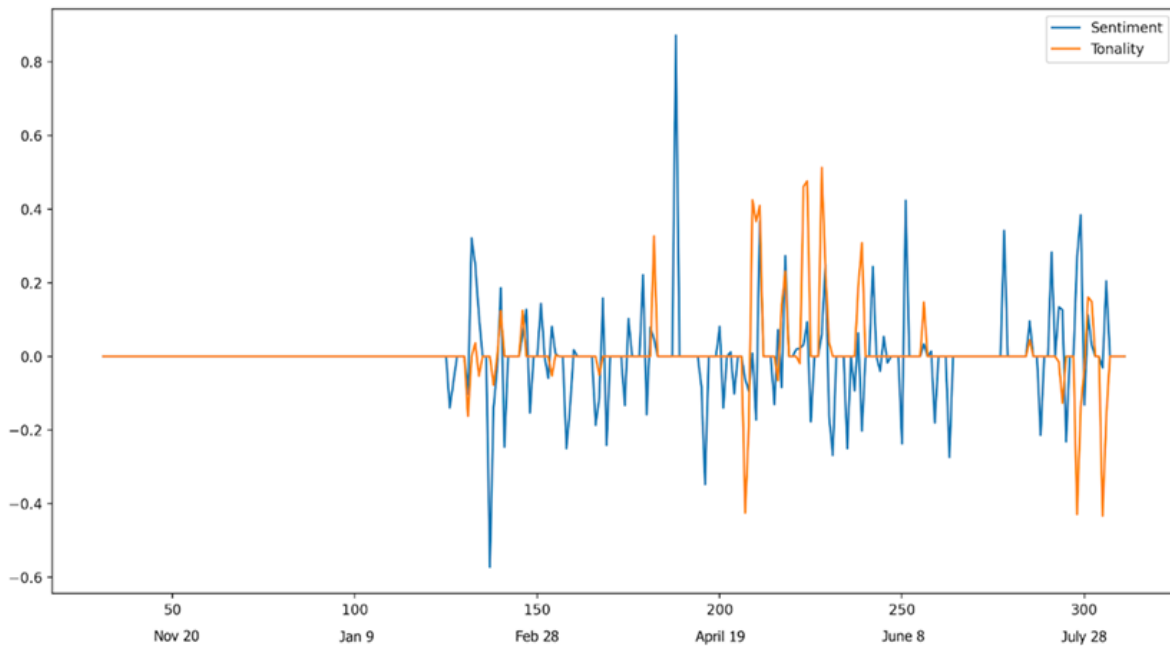


Figure 4: Average text sentiment vs. tonal sentiment of chip shortage mentions by Consumer Discretionary companies

## Conclusion

In a year filled with supply chain disruptions, microchip shortages have been one of the most disruptive and persistent supply chain problems impacting investors and the real economy. Using Aiera, investors can analyze textual sentiment scoring remarks made by semiconductor executives, empirically uncovering that these executives were positive in the face of supply chain problems. This positivity is incongruous with not only the breadth and depth of the supply chain problems, but also with the more negative sentiment expressed by executives in related industries, like automotive, when referencing chip shortages. This disconnect in text-based sentiment between industries coupled with clear empirical evidence from the Helios tonal sentiment analysis suggests that IT sector executives may have been deliberately attempting to downplay the significance of the problem.

**This case study on chip shortages indicates that the combination of Aiera text-based sentiment and Helios tonal analysis can help investors diagnose the precise implications of corporate communications in near real time, even when corporate officers are deliberately obfuscating.**

