

2020 Business Outlook in The Composites Sector

IACMI Fall 2020 Members Meeting

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Chief Economist & Director of Analytics

Who is Gardner Intelligence

2 Economists / Business Market SMEs

2 Market Research SMEs

1 Data Scientist

1 Visualization Specialist

- 75 years of combined experience
- Serving international and domestic clients
- Serving all company sizes



Understanding COVID's Impact on Manufacturing

“It’s a Pandemic, Not *Just* a Recession”

Economic Distortions:

- Impacts are less uniformly distributed than in past recessions
 - Bifurcation of the economy (Haves & Have-nots)
- Changes in Demand
- Changes in Production – some changes are unique to COVID

Manifestations:

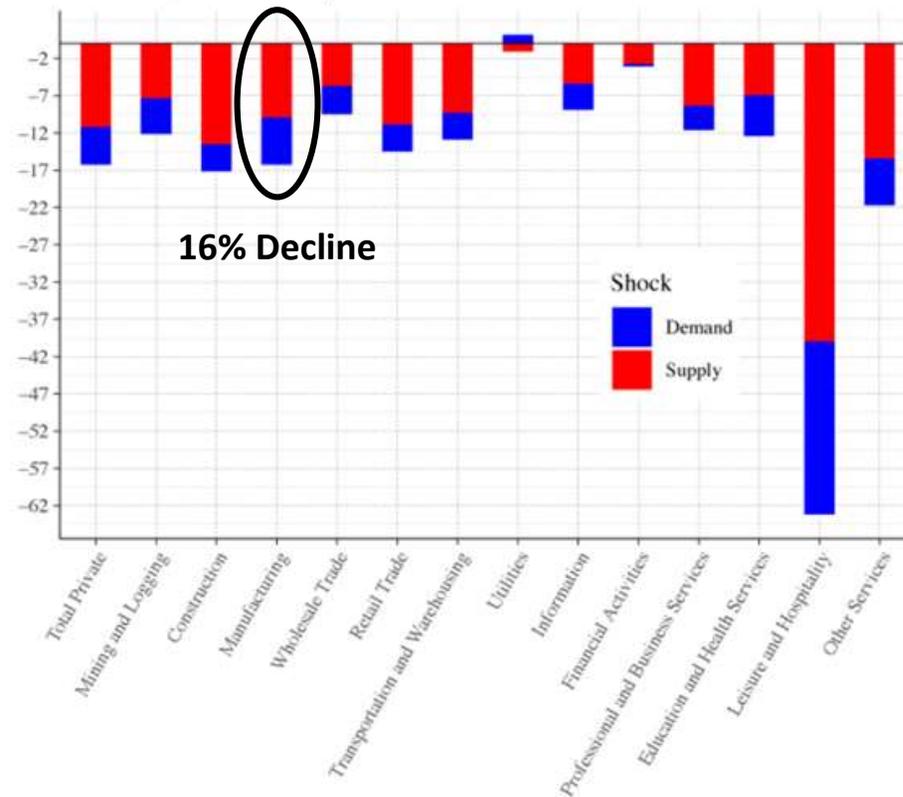
- Asset Bubbles
- Product unavailability from frozen supply chains
- Targeted Inflation

Labor Supply & Demand: On the Way Down...

Supply Shocks: Workers not being able to work due to lockdown measures. *(These are largely driven by public policy)*

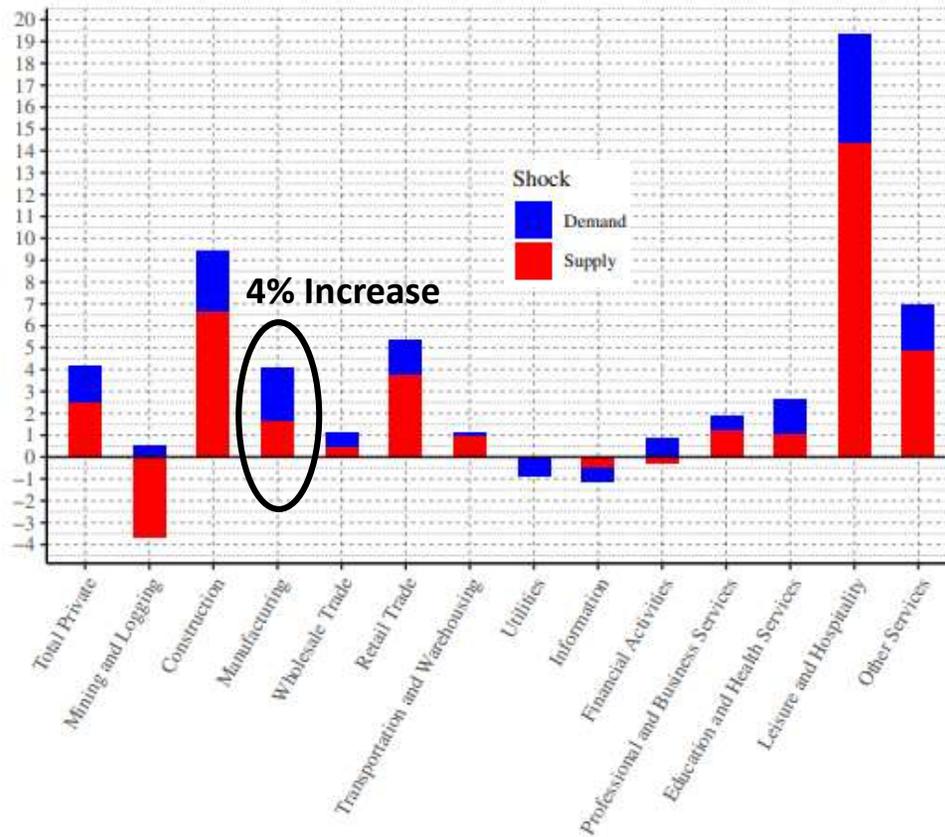
Demand Shocks: Firms not being able to produce due to supply chain disruptions and changing customer demand. *(Driven by economic forces)*

Shock Decomposition for April 2020



Source: St. Louis Federal Reserve: <https://research.stlouisfed.org/resources/covid-19/preliminary/is-covid-19-pandemic-supply-or-demand-shock>

Labor Supply & Demand: On The Reopening... (May)



Source: St. Louis Federal Reserve: <https://research.stlouisfed.org/wp/more/2020-011>

Points Reminder About The GBI and Other Diffusion Indices

Supplier Deliveries Doesn't Mean What You Think

- Slowing supplier deliveries is **NOT** asking about the volume of number of deliveries. It is asking about the speed of deliveries.

Business Index Survey

How many employees work at your location?

[Select one ...] ▼

How do your new orders compare to one month ago?

More Same Less

How does your production compare to one month ago?

More Same Less

How does your number of employees compare to one month ago?

More Same Less

How does your backlog compare to one month ago?

Longer Same Shorter

How do your export orders (outside of NAFTA) compare to one month ago?

More Same Less

How do your supplier deliveries compare to one month ago?

Slower Same Faster

How do your material prices compare to one month ago?

More Same Less

How do prices received for your products compare to one month ago?

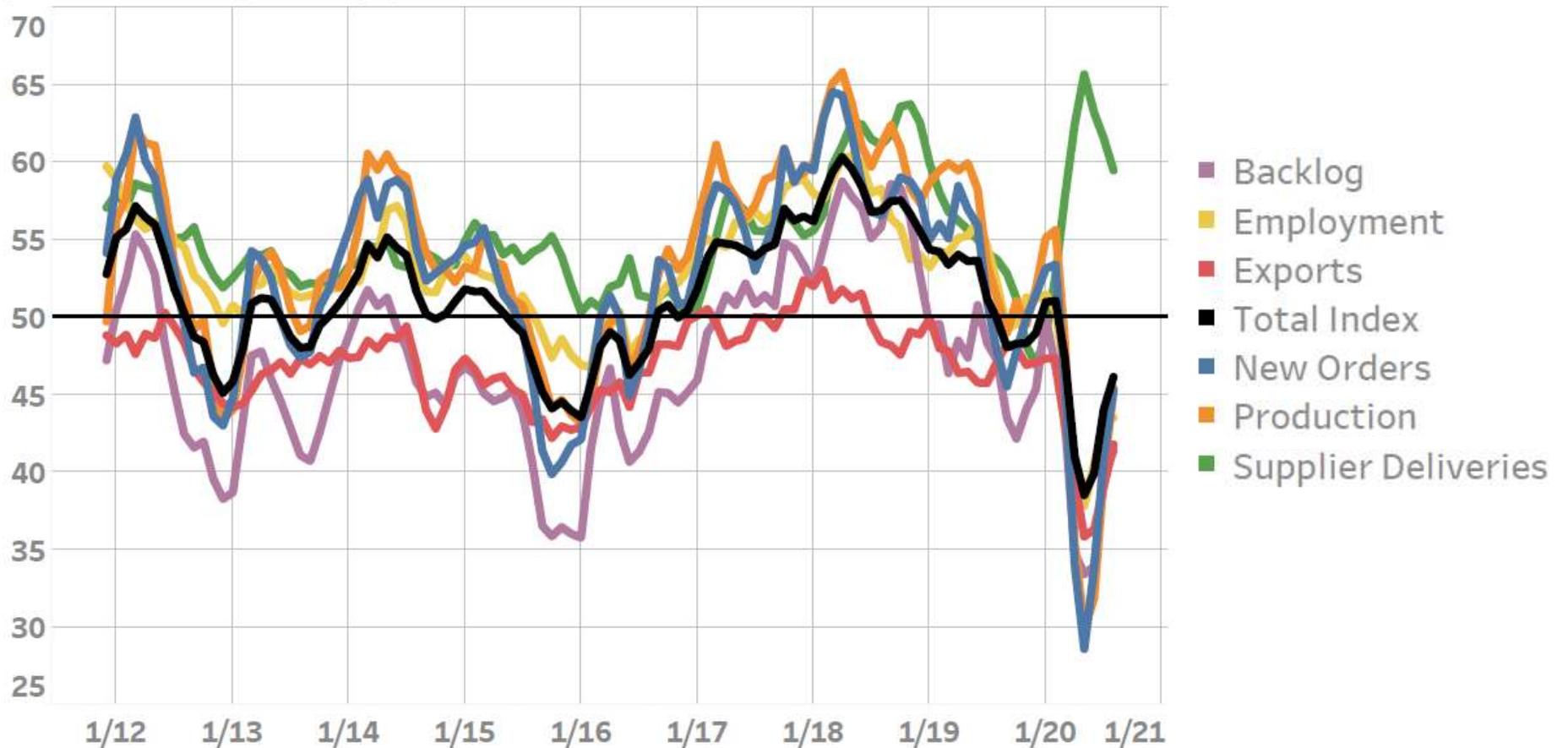
More Same Less

How do you expect your business to be in the next 12 months?

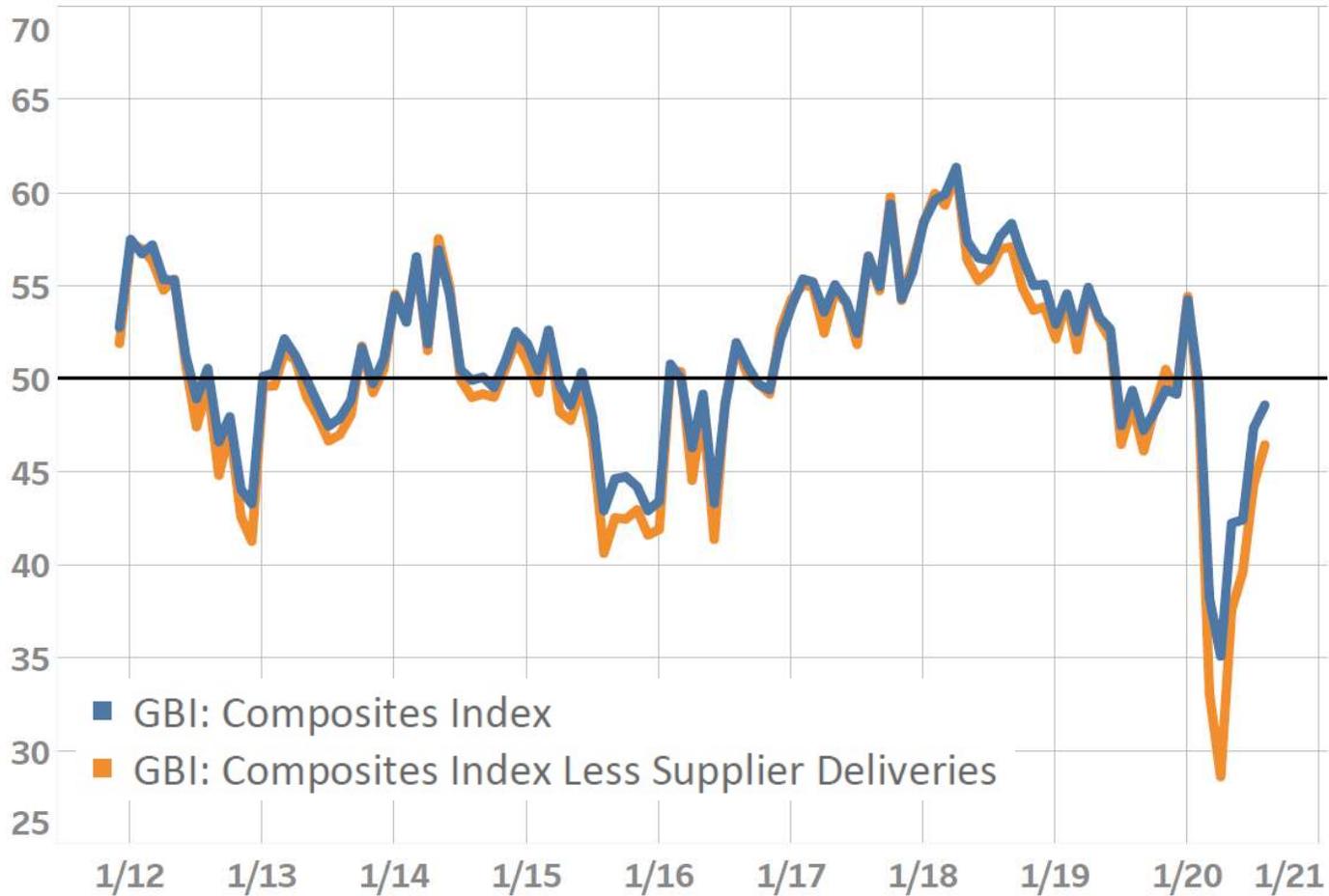
Better Same Worse

Market Conditions as Reported by North American Composites Fabricators Responding to the GBI

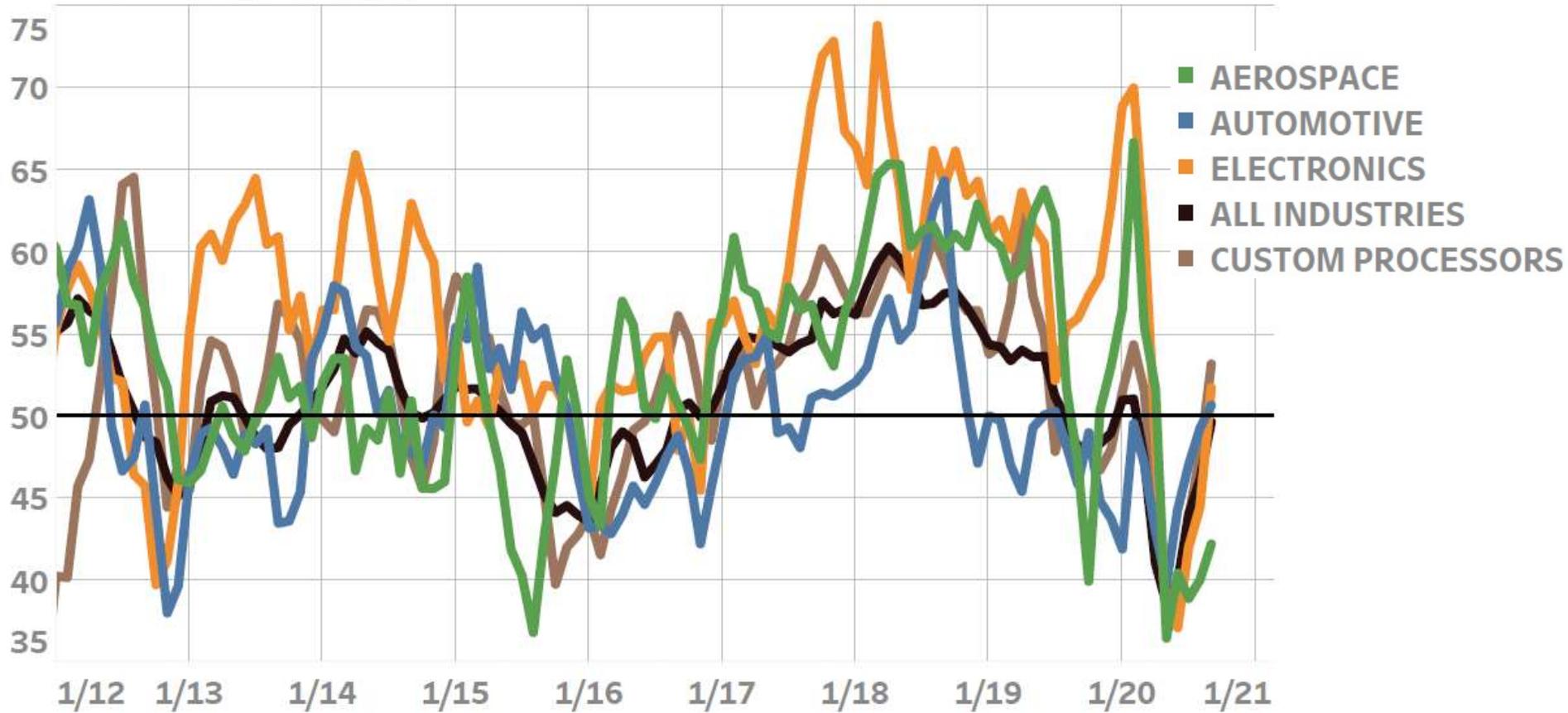
GBI: Composites Fabricating Components (3-Month Moving Average)



GBI: Composites - Total Index and Less Supplier Deliveries

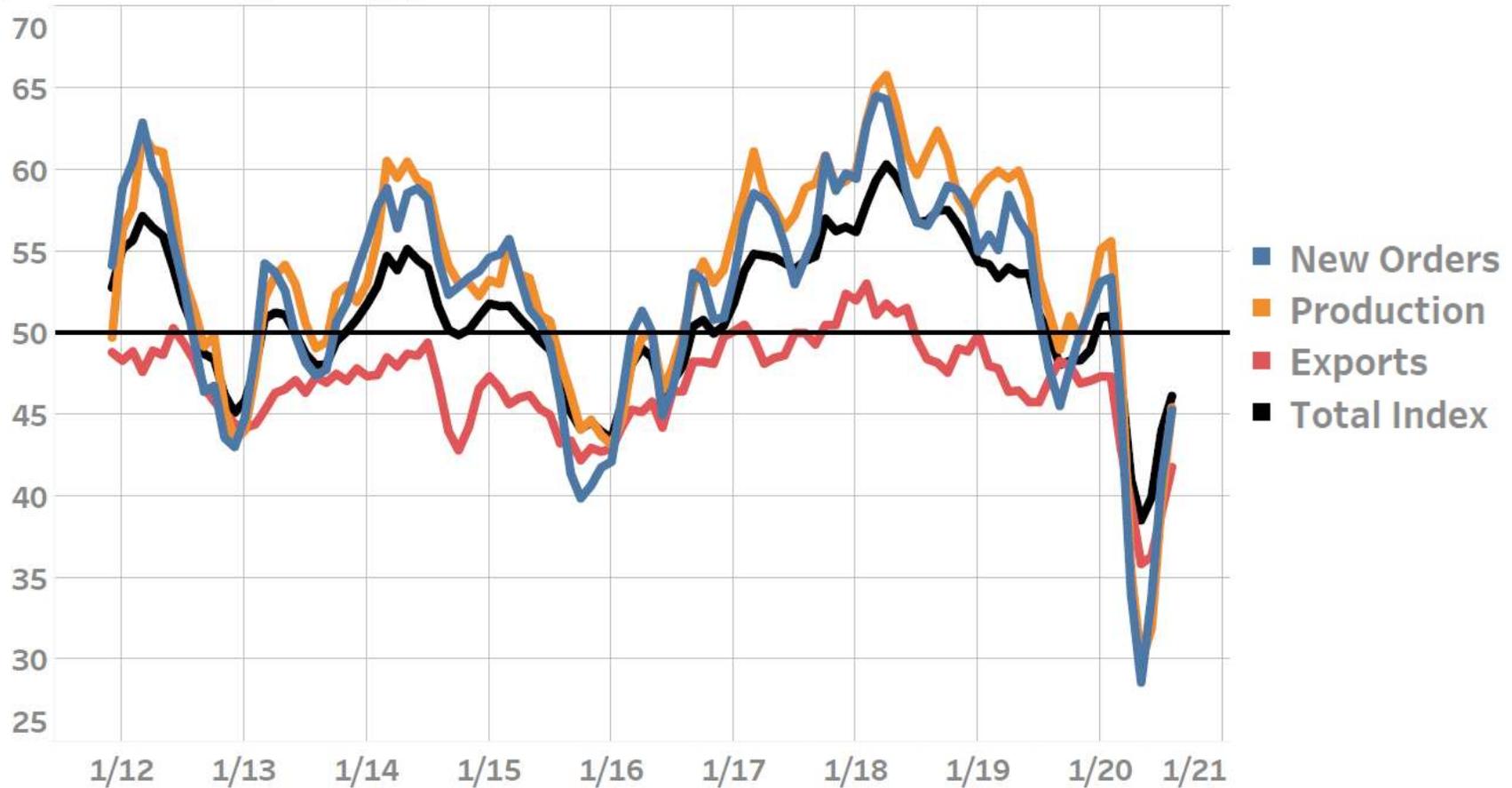


GBI: Composites - Total Index, By End Market (3-Month Moving Average)

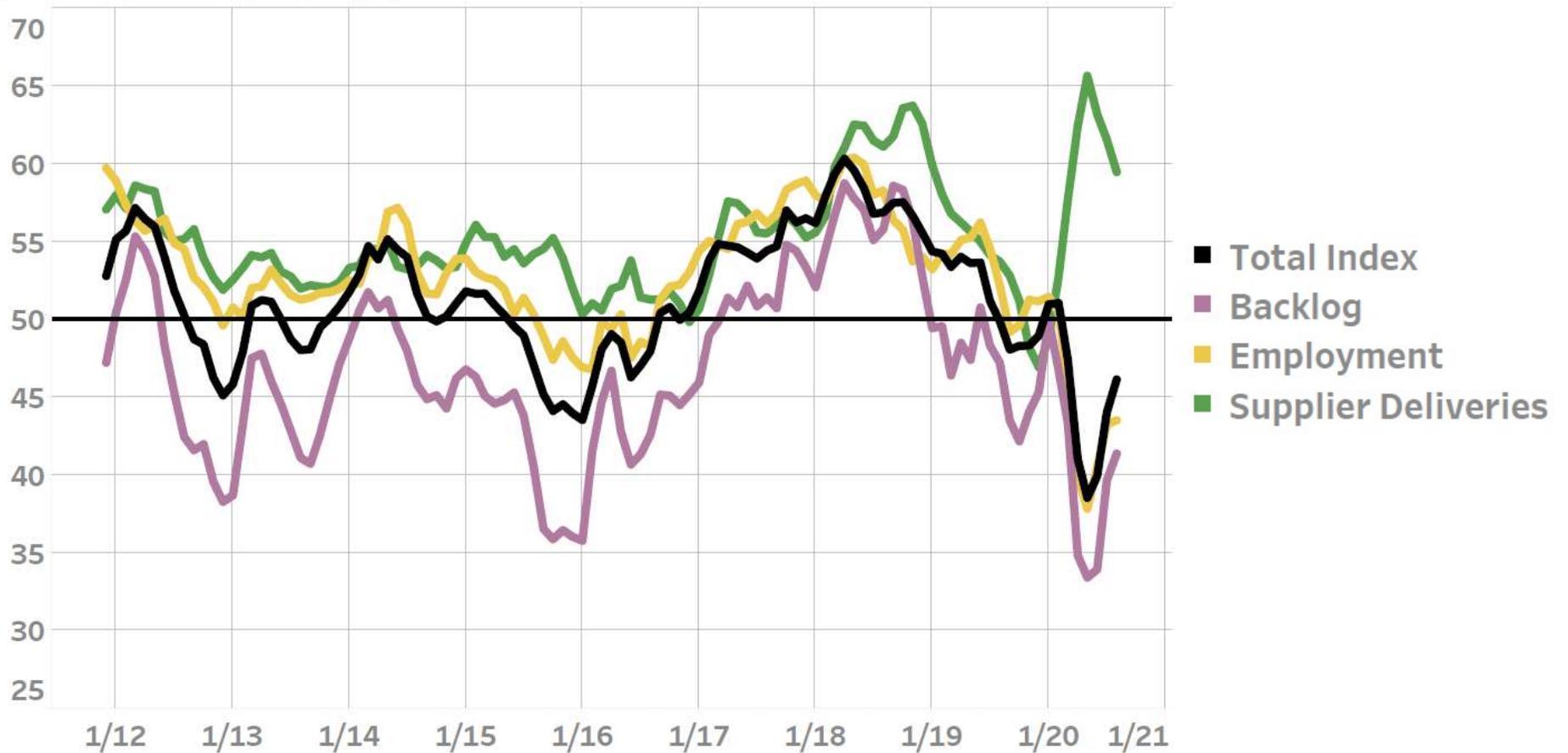


Aerospace Through The Lens of the GBI

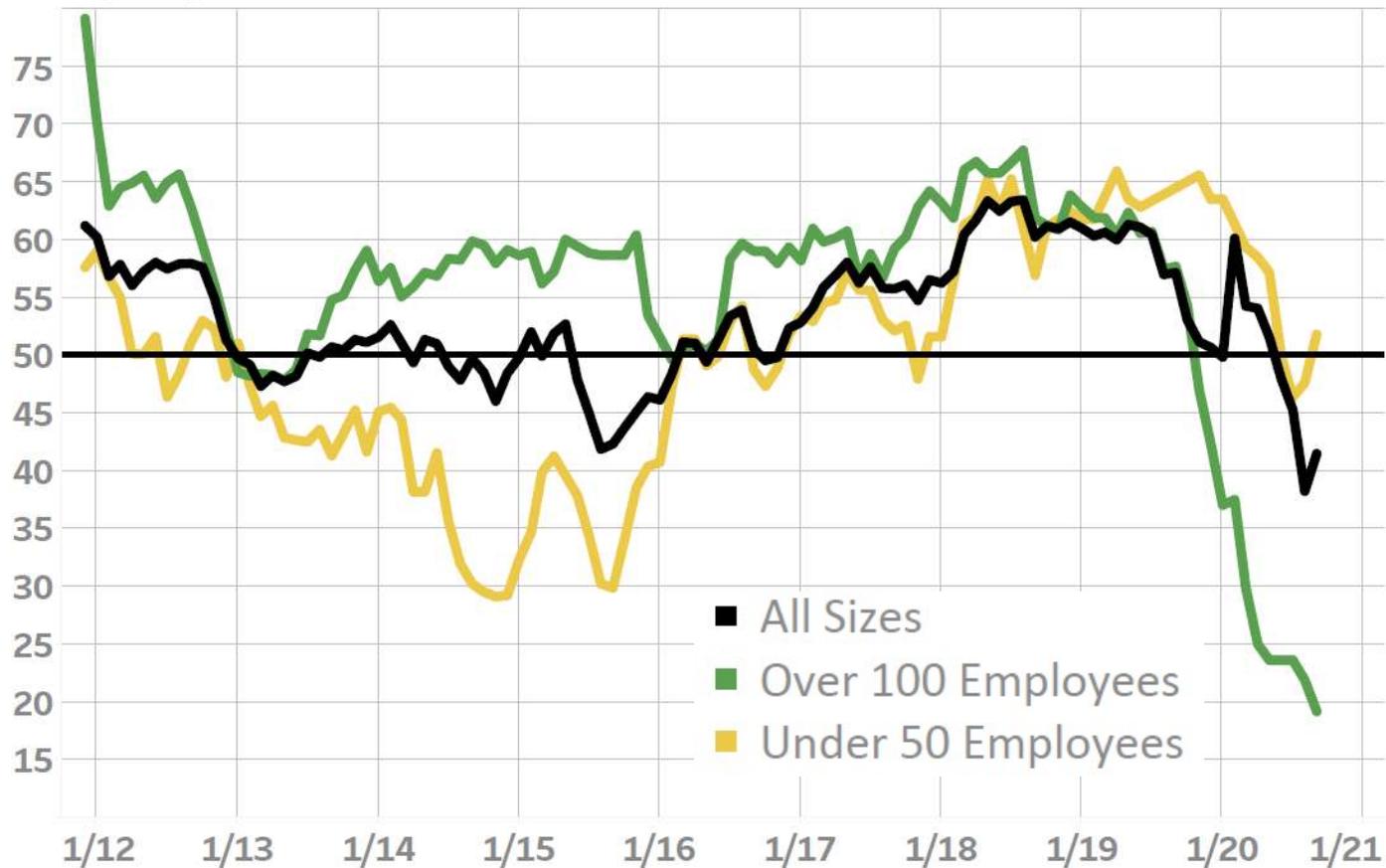
GBI: Aerospace Composites Components (3-Month Moving Average)



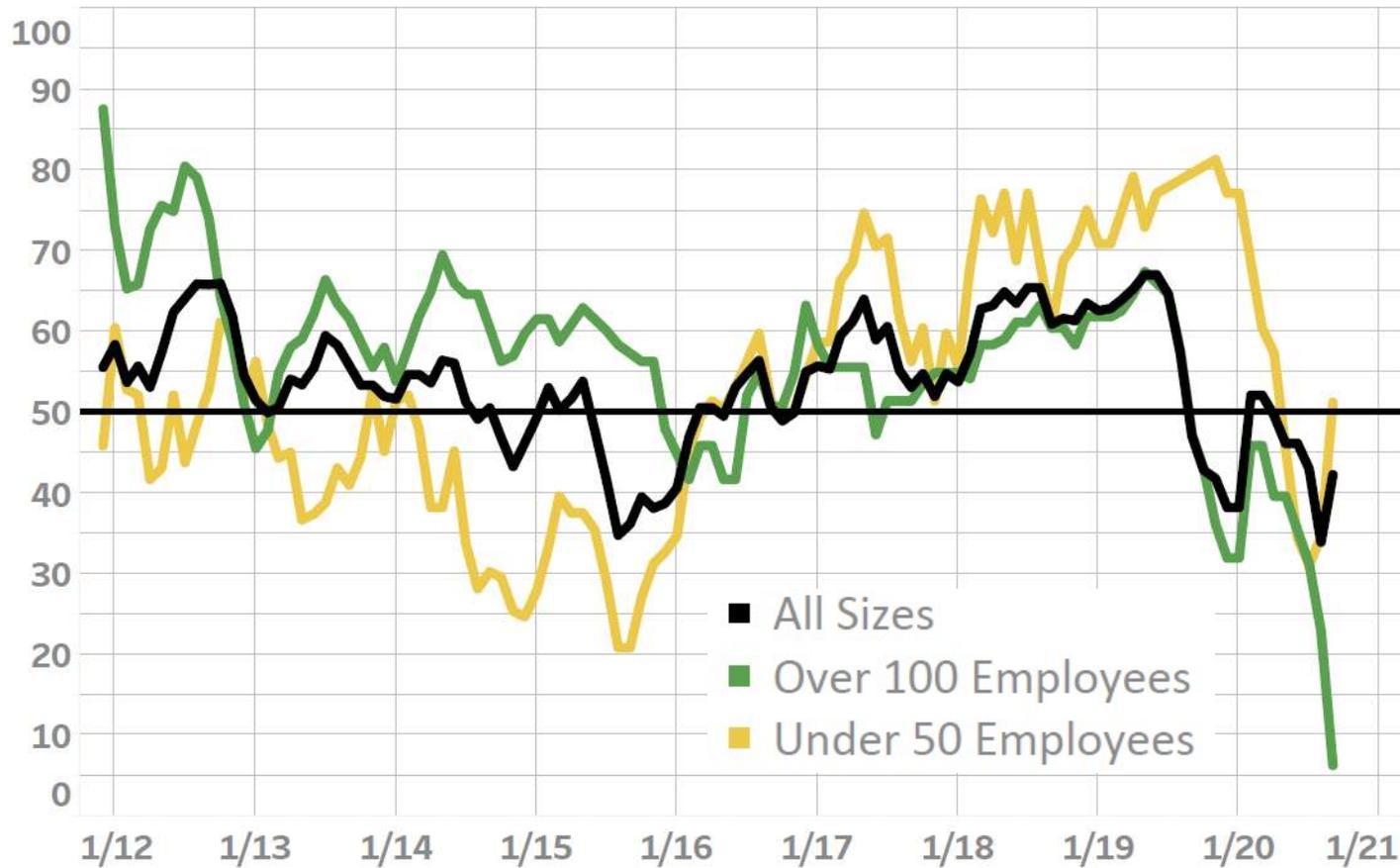
GBI: Aerospace Composites Components (3-Month Moving Average)



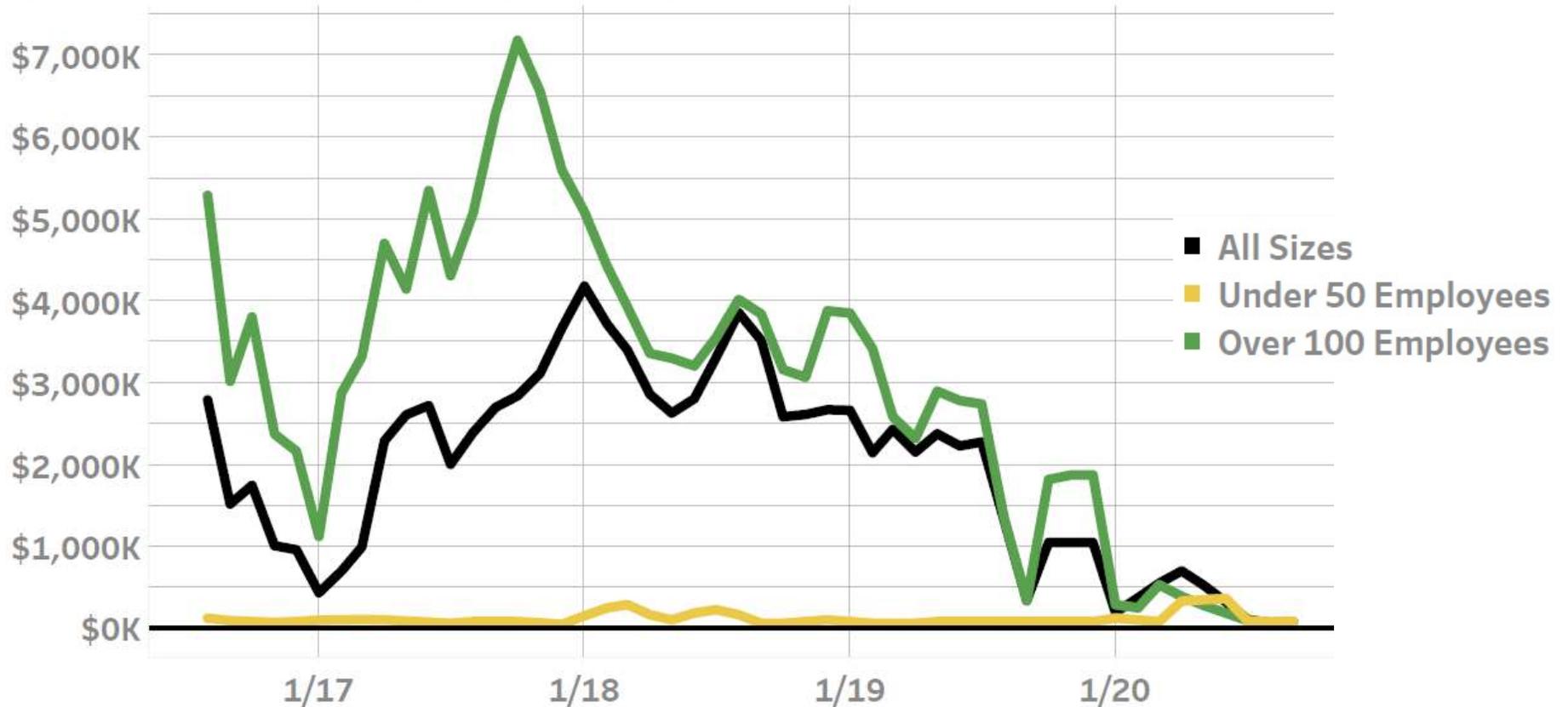
GBI Snapshot: Composites - Aerospace Total Index, By Company Size (6-Month Moving Average)



GBI Snapshot: Composites - Aerospace New Orders, By Company Size (6-Month Moving Average)



GBI: Aerospace Composites - Per Plant Expected Spending, By Company Size, (3-Month Moving Average)



Aerospace Through The Lens of Macroeconomic Data

Industry Forecast Outlook (IATA)

- Enduring weak demand for passenger air transportation
 - Global Passenger traffic remains below 2019 levels through 2024.
 - 14-day quarantines upon arrival/return
 - Load factor in the 50's.

JUNE 2020 (% YEAR-ON-YEAR)	WORLD SHARE ¹	RPK	ASK	PLF (%-PT) ²	PLF (LEVEL) ₃
Domestic	36.2%	-67.6%	-55.9%	-22.8%	62.9%
Australia	0.8%	-93.8%	-89.1%	-33.8%	44.4%
Brazil	1.1%	-84.7%	-83.3%	-7.1%	74.7%
China P.R.	9.8%	-35.5%	-21.3%	-15.2%	69.5%
Japan	1.1%	-74.9%	-63.4%	-22.4%	48.8%
Russian Fed.	1.5%	-58.0%	-36.4%	-28.9%	56.4%
US	14.0%	-80.1%	-67.4%	-34.9%	54.7%

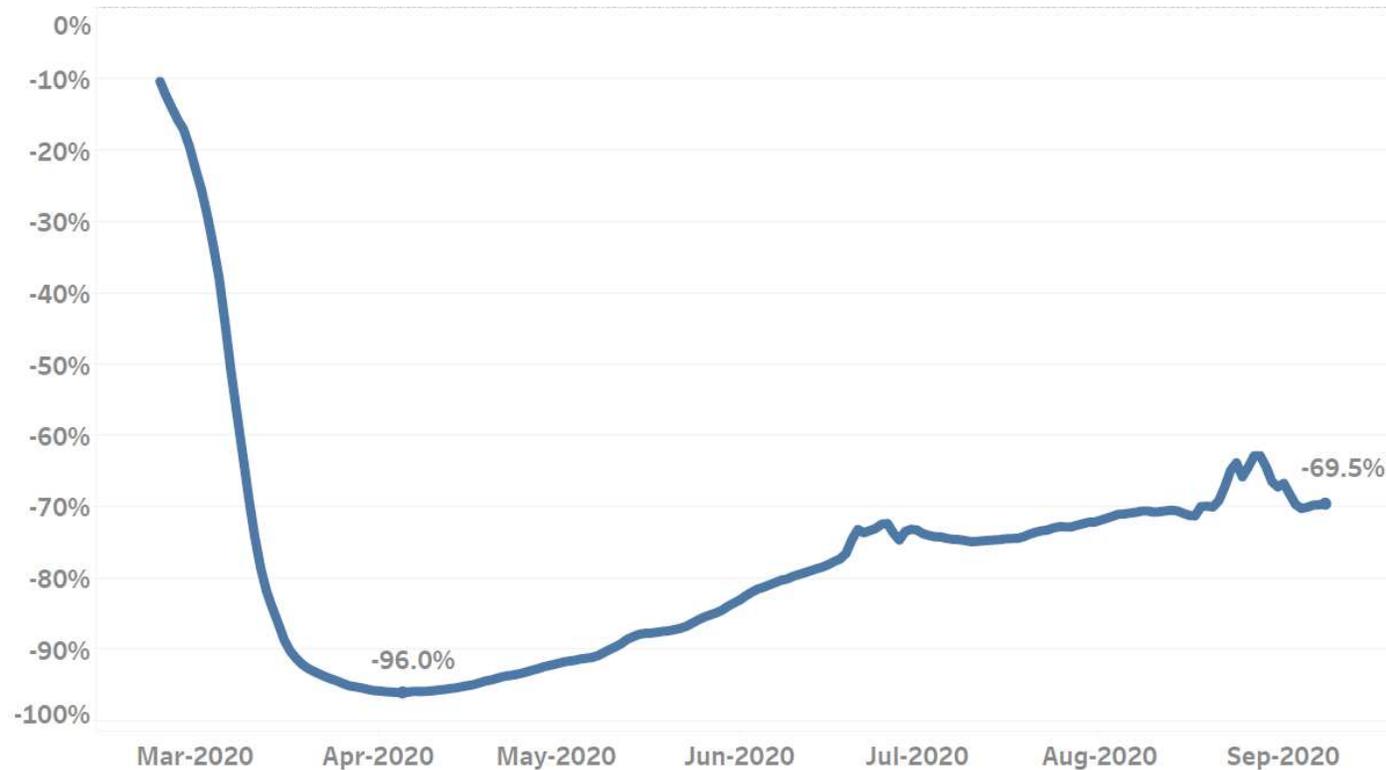
1) % of industry RPKs in 2019 2) Year-on-year change in load factor 3) Load Factor Level

Source: <https://www.iata.org/en/pressroom/pr/2020-07-28-02/>

Market Distortions: Demand Changes

TSA Throughput

(% Change from 1-Year Ago, 7-Day Moving Average)

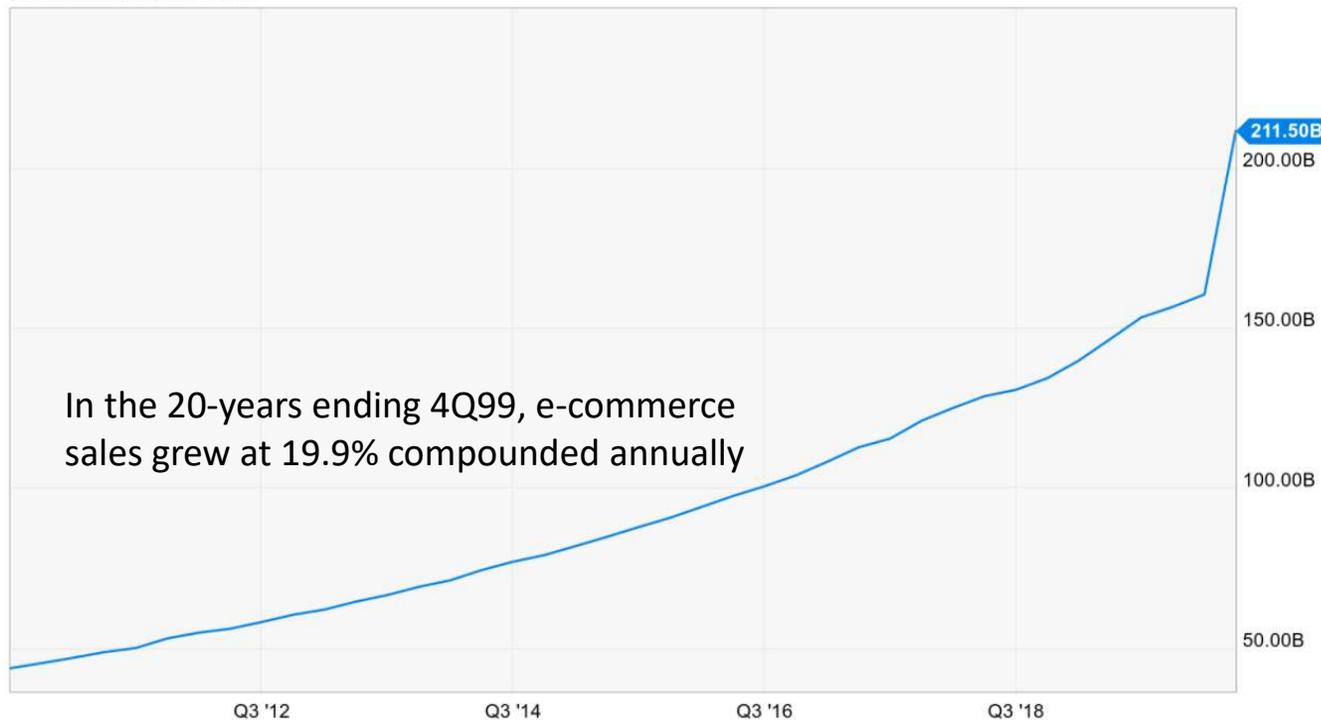


Is the Entire Outlook Awful?

- Is there a silver lining on the freight side?
 - Global demand for freight is down ~17%, but reduced passenger plane schedules have reduced capacity by 34%
 - COVID-19 Vaccine Transport Bump in near-term?
- Does a multi-year decline in demand make sense IF...
 - There is a vaccine in 2021
 - Recalling that the economic hardship created by the pandemic is **NOT** uniformly distributed?
 - How much of the bottom 20% or 40% of the world population is helping the airline industry in both revenue and profitability?

Freight Demand Driven by E-Commerce

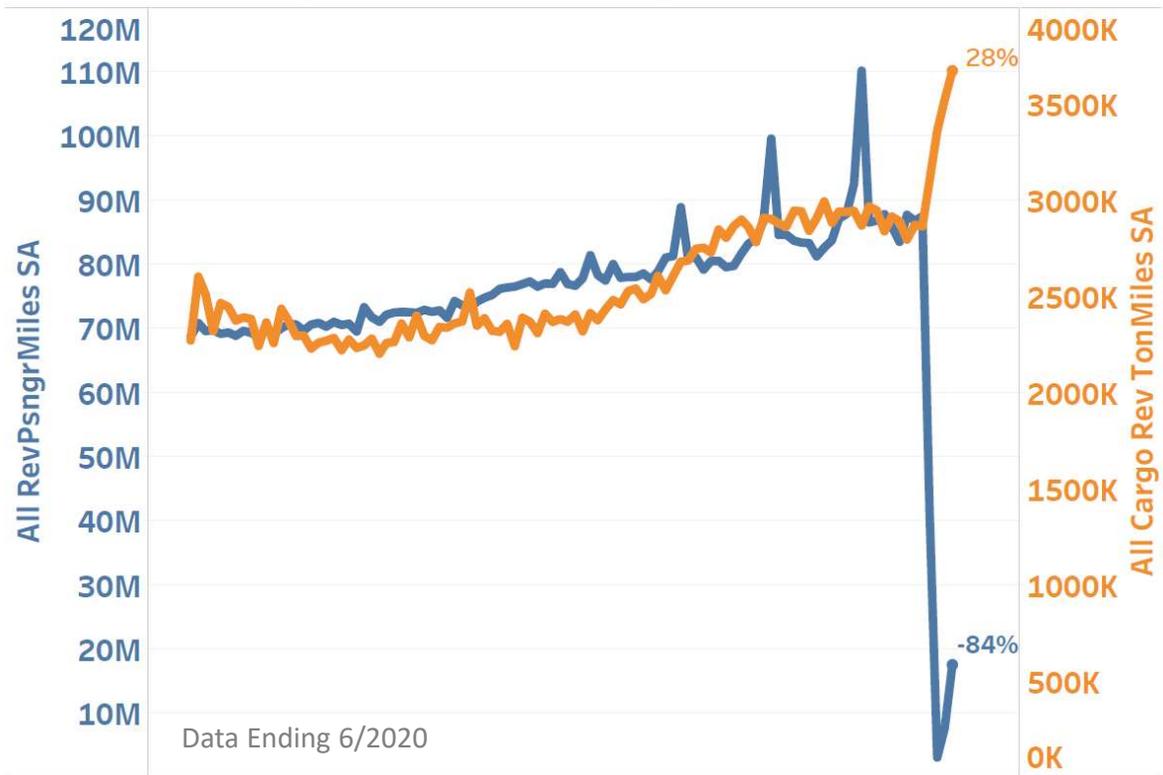
US E-Commerce Sales



At the historical rate, e-commerce growth would have reached \$211.5B at the end of 3Q2021. Yet this growth was accomplished in a single quarter

Source: Census Bureau – Quarterly E-Commerce Report

U.S. Air Transportation Activity

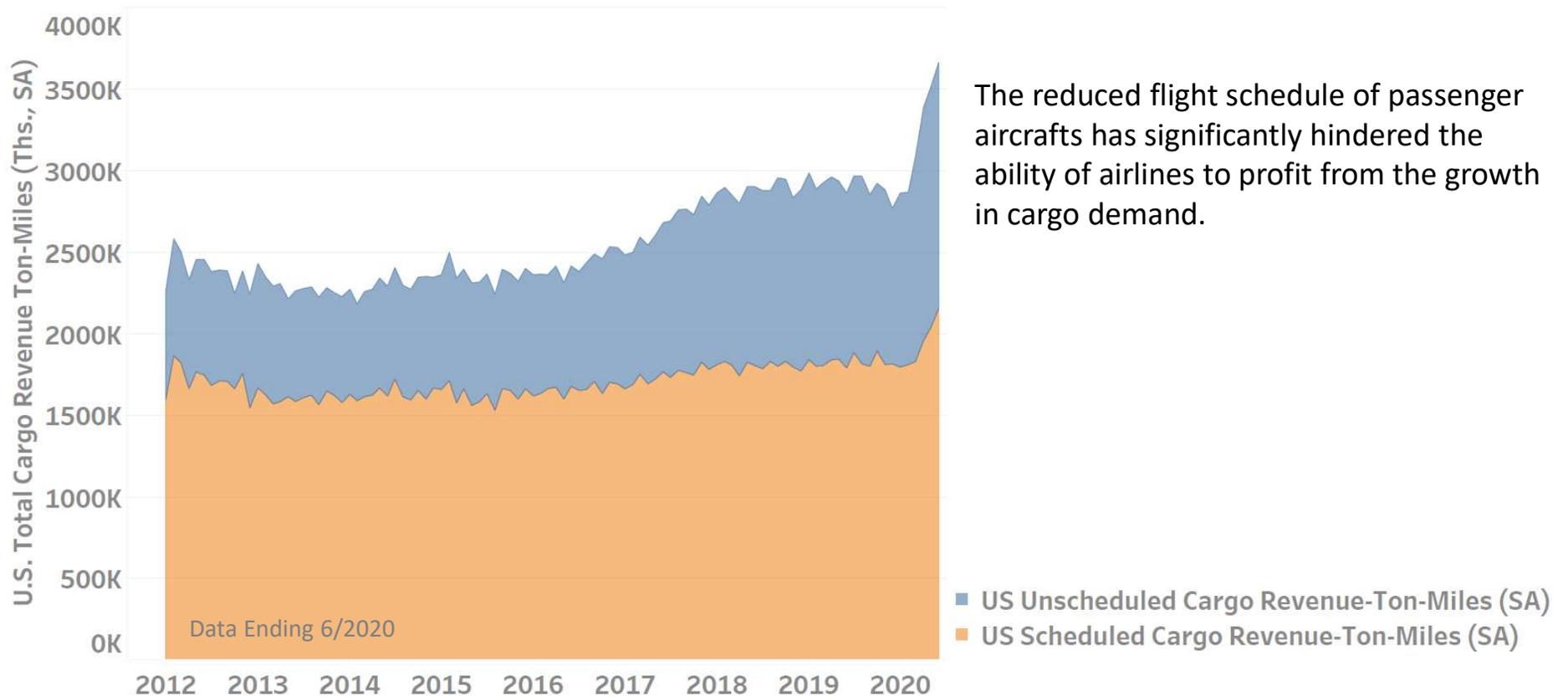


	2012	2013	2014	2015	2016	2017	2018	2019	2020
Year	YTD2020	2019	2018	2017	2016	2015	2014		
Passenger	-27%	4.6%	4.7%	3.1%	3.4%	4.3%	2.5%		
Freight	5.15%	1.0%	7.8%	9.6%	2.6%	2.4%	0.9%		

Table represents seasonally adjusted annual figures, 12/12 ROC, SA

Aerospace Outlook – U.S.

U.S. Air Freight Activity by Schedule Type



The reduced flight schedule of passenger aircrafts has significantly hindered the ability of airlines to profit from the growth in cargo demand.

Freight Rates Show Constrained Supply and Strong Demand

- Worldwide chargeable freight weight is -17% while the rates increased 65%.*

Continental Region	Chargeable Weight	USD – Yield/Rate
North America	-20%	+22%
Europe	-25%	+66%
Asia Pacific	-10%	+77%
Middle East & South Asia	-22%	+103%

*Figures represent YoY Change in Volume and yield/rate from Aug2019 – Aug2020 – per origin region.
Source: WorldACD

Aerospace Outlook – U.S.



Source: Delta.com, United.com, AA.com

Vaccine Distribution:

Operation Warp Speed: Goal of being able to supply and distribute 300M vaccines throughout the USA by Jan2021.

Logistic Hurdles for World-Wide Distribution: The IATA forecasts it would take 8,000 fully loaded 747 freights to provide 1-dose for every person on earth (7.8B). Contingency plans for as many as 20B doses. Further, the timing comes on top of the seasonal peak.

“We’re planning for the mother of all peaks”

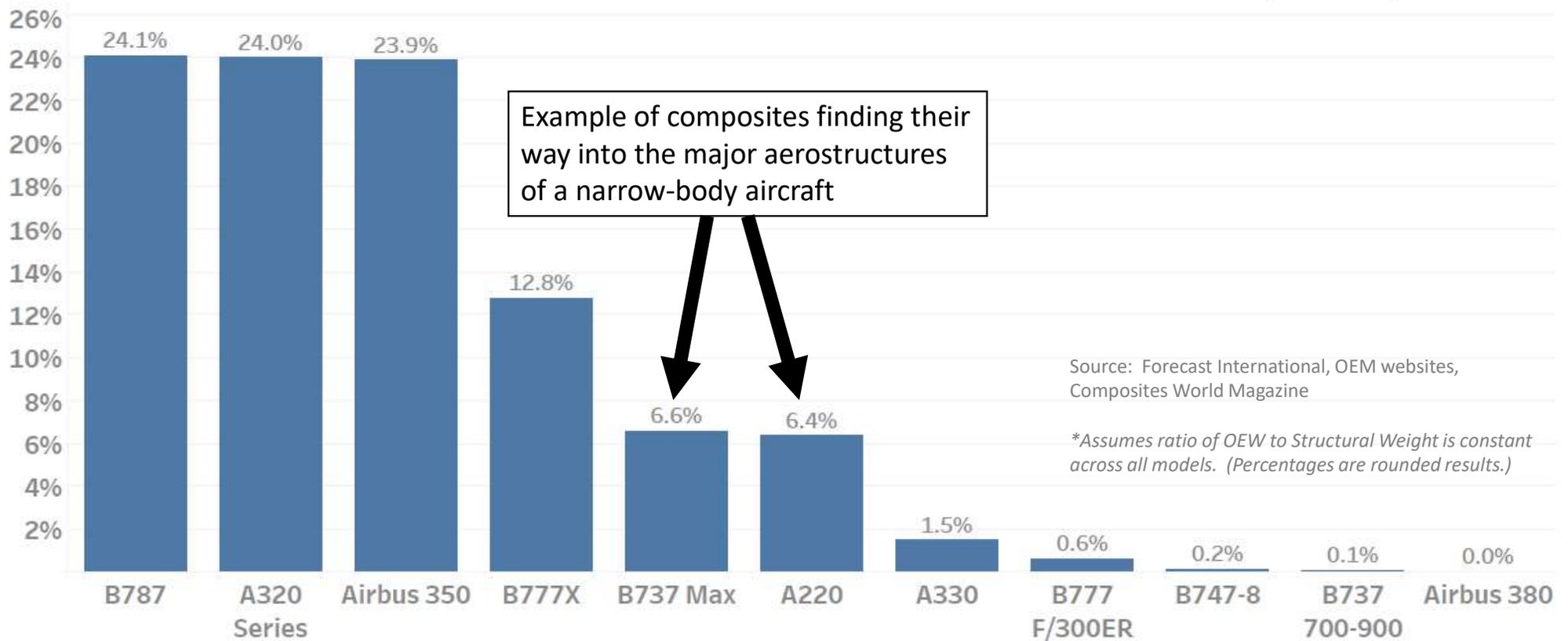
- Don Colleran - President, FedEx (WSJ, 10/5/2020)



Photo: Korea Air

Aug-2020 Aircraft Composites Market Share*

Aug2020 - Market Share of Composite Material by Model Family and Backlog Volume (% of lbs)



Regional Market Transformation?

Will the cost competitiveness of the Max 8 & A220 force a new standard in the industry?

Model	Per Seat Fuel Burn L/100KM*
A220-100	3.1
A220-300	2.8
Bombardier CRJ700	4.4
Bombardier CRJ900	4.0
Bombardier CRJ1000	3.3
Boeing 737 Max 7	2.9
Boeing 737 Max 8	2.3

BOEING'S 797 SHOULD BE BASED ON 787-3 SAYS QATAR AIRWAYS



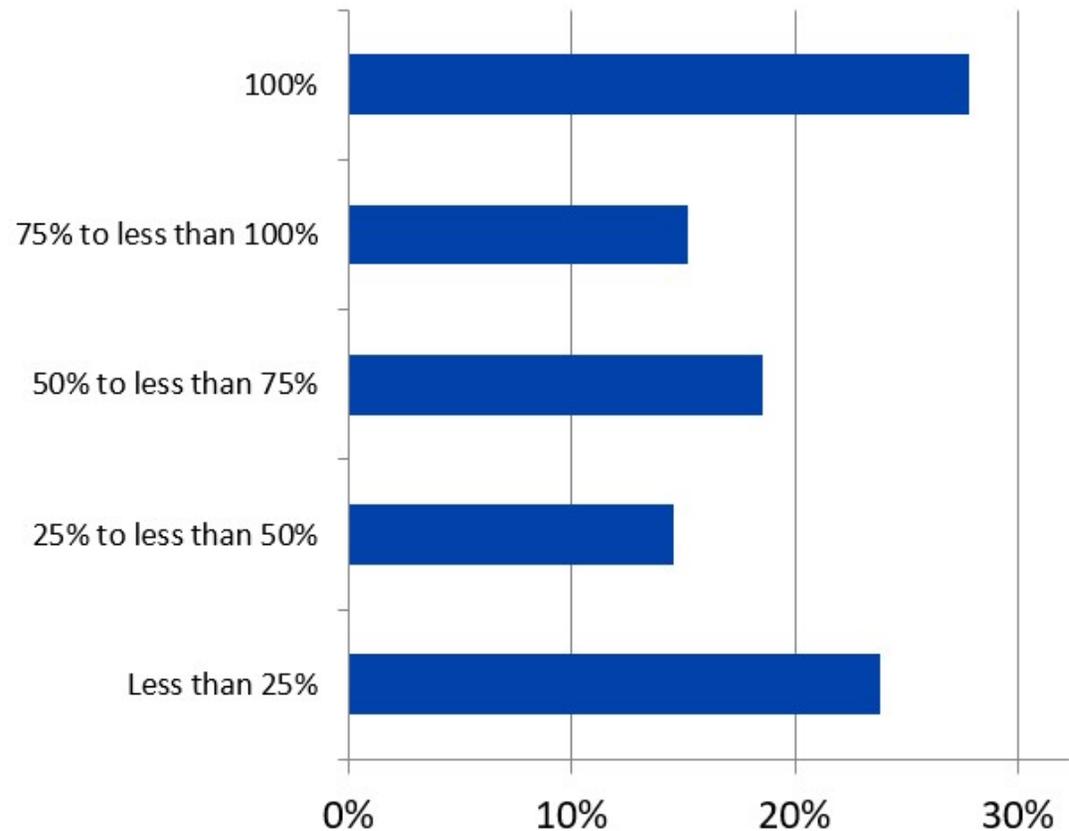
<https://www.airlinerratings.com/news/boeings-797-based-787-3-says-qatar-airways/>

*Figures based on a 600km flight, or flight data for as near to that distance as possible with. Results rounded to 0.1

Gardner Intelligence Customized Survey

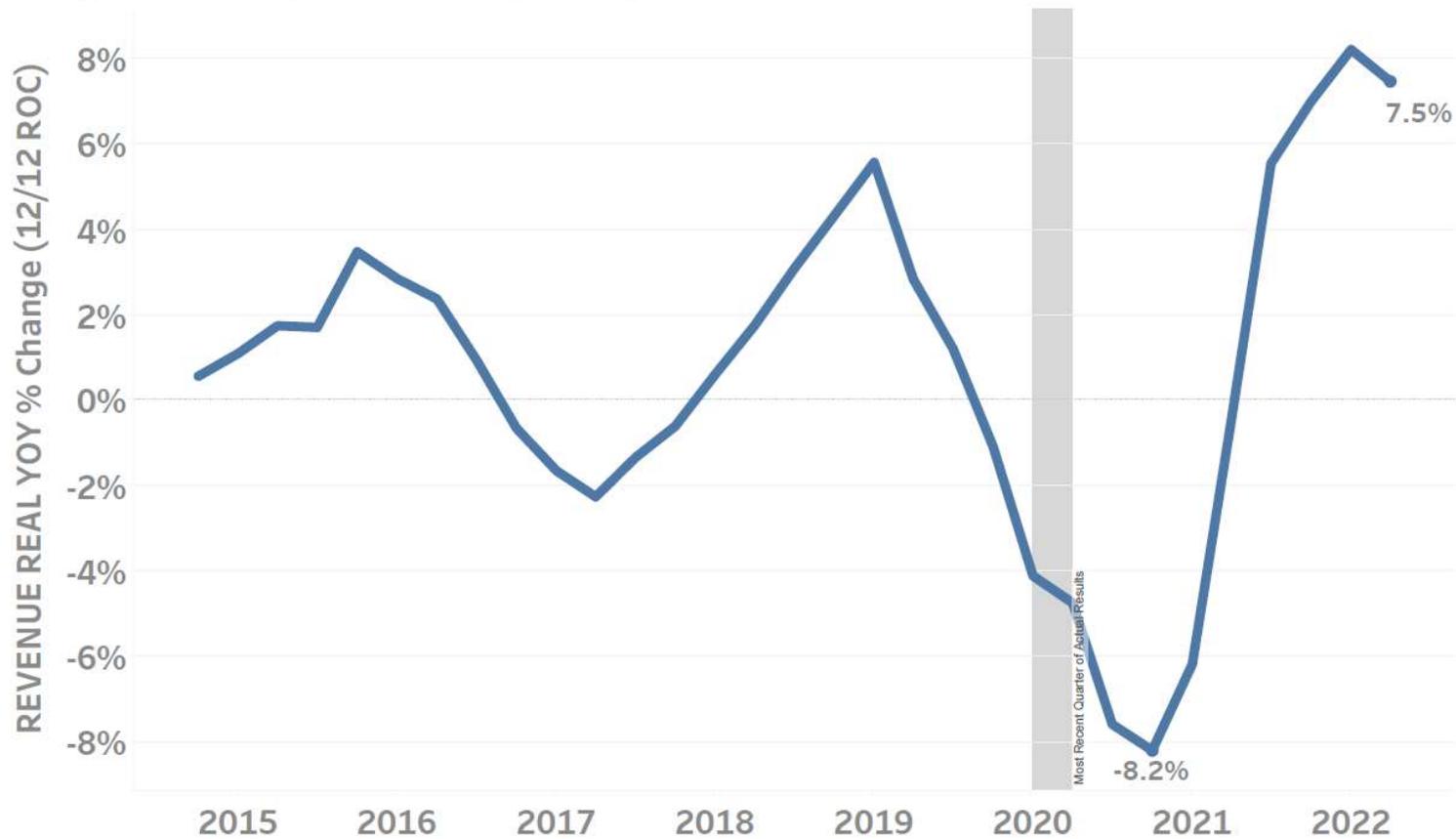
“If by Jan 1, 2020, it is proven there is zero risk of contracting COVID-19... How much air travel would you do in 2021 compared to if there had never been a pandemic”?

(Paraphrased)

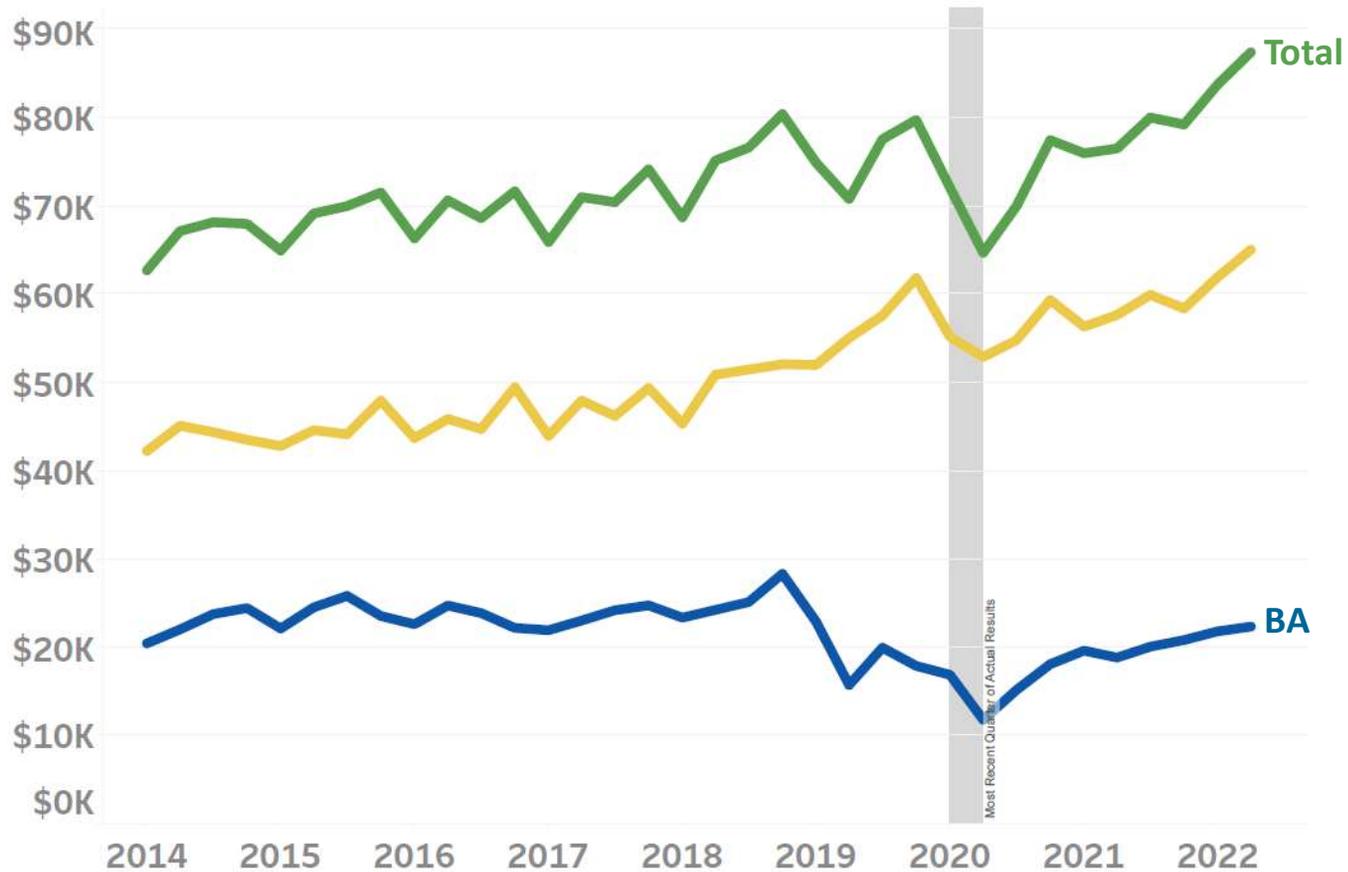


Aerospace Equities Outlook

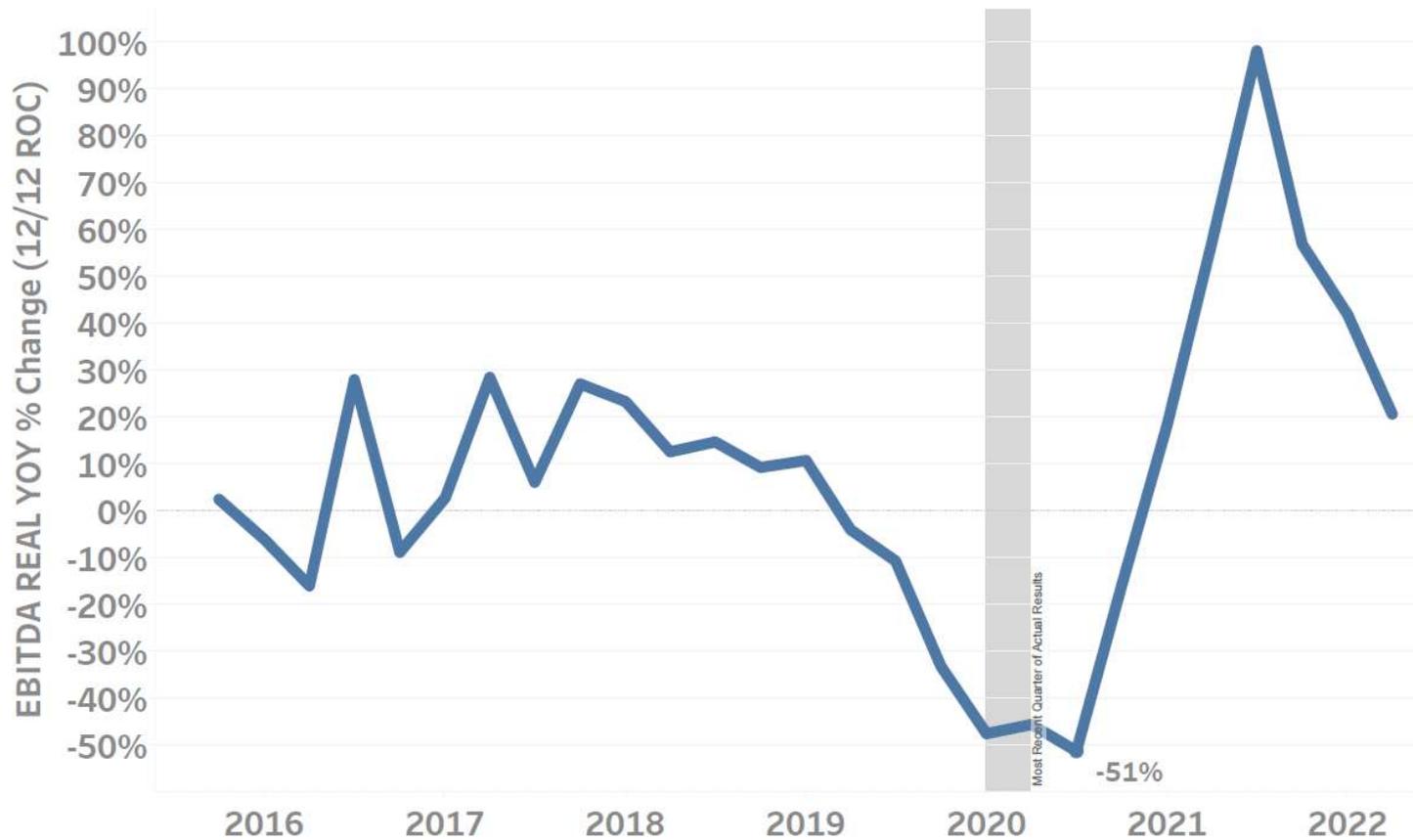
Aerospace Industry - Collectively Reported Revenue & Projections (Inflation-Adjusted)



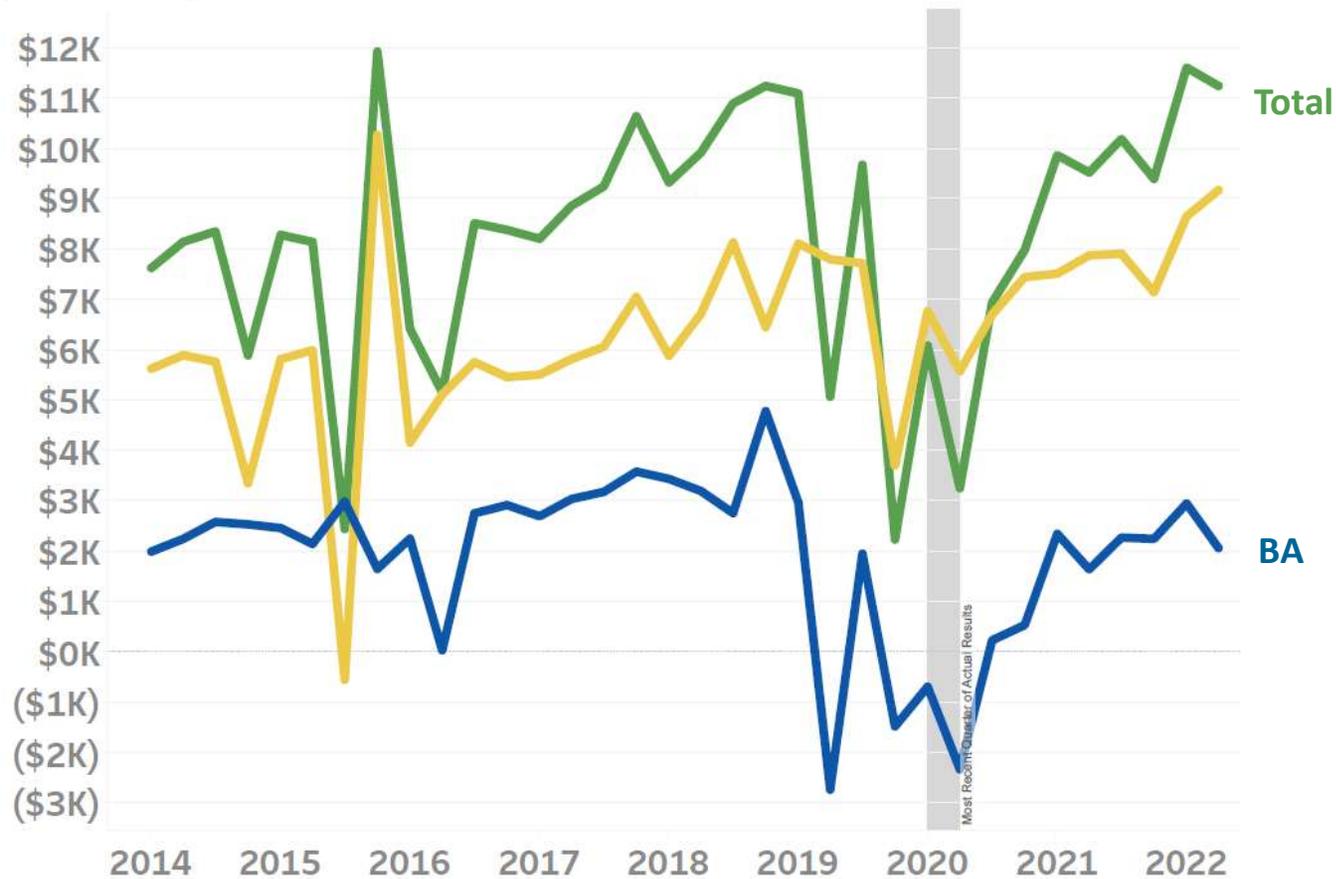
Aerospace & Defense - Collectively Reported Revenues (Millions \$)



Aerospace Manufacturers - Collective Reported EBITDA with Projections (Inflation-Adjusted)



Aerospace Industry - Collectively Reported EBITDA (Millions \$)



Aerospace Industry - Collectively Reported Capital Expenditures (Inflation-Adjusted)

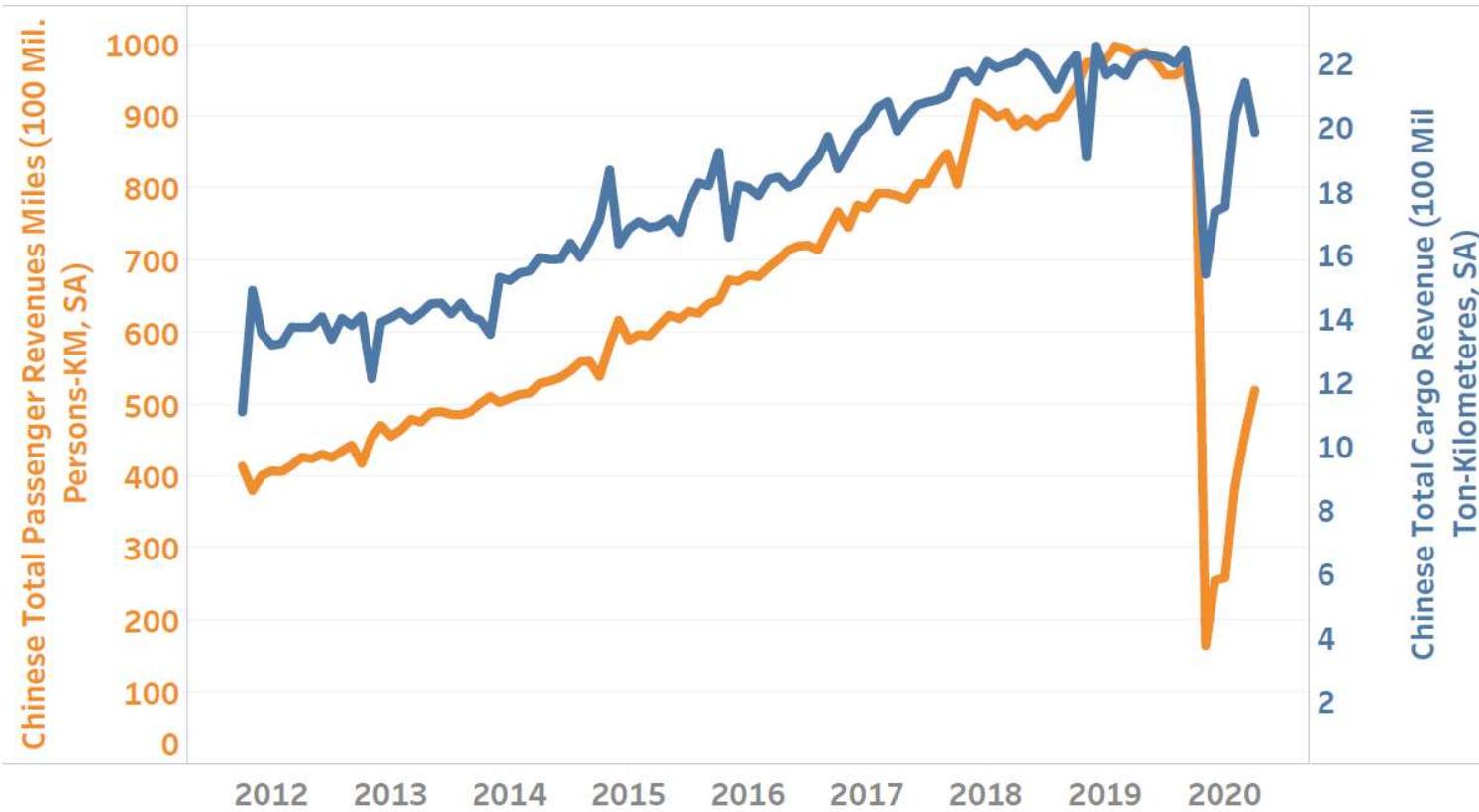


Profit Margin: Aerospace vs. Rocketry



Global Aerospace Perspective

Chinese Air Transportation Activity



Year	YTD2020	2019	2018	2017	2016	2015	2014
Passenger	-25.3%	9.4%	12.3%	13.9%	15.0%	15.1%	11.6%
Freight	-5.2%	0.4%	7.7%	10.0%	6.7%	11.5%	10.2%

Table represents seasonally adjusted annual figures, 12/12 ROC, SA

View From On The Horizon: Aerospace

Military Industry – Evolving Threats

- *Faster, deadlier, harder to detect*



Military Superiority Through Advanced Mfg.

The Air Force Secretly Designed, Built, and Flew a Brand-New Fighter Jet

And it all happened in just one year. Yes, that's mind-blowing.



// BY [KYLE MIZOKAMI](#) SEP 16, 2020

<https://www.defensenews.com/breaking-news/2020/09/15/the-us-air-force-has-built-and-flown-a-mysterious-full-scale-prototype-of-its-future-fighter-jet/>

Why use 'spiral development':

"There is also a strategic benefit to continuous fighter production and development... It puts China on the defense, having to respond to U.S. technical advances as new capabilities — whether they're hypersonic missiles or drone wingmen — are matured and spiraled into the fighter's production"

Will Roper, USAF – Head of Acquisition

If you remember nothing else...

“Okay, you have overwhelmed me with charts, graphs and numbers. What am I supposed to do with all of this stuff?!”



Thank you for your time

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