About As Bad As We Feared. Maybe Worse.

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Fifth Update; September 17, 2020

Aviation Segments By Damage

Most to Least

Annotated, Six Months In

Twin aisle jetliners	International traffic hit hardest and longest. Already an overcapacity situation. Secular shift towards single aisles already underway. It's just that bad.
Single aisle jetliners	Fuel prices a big problem. China comeback uncertain. Some relief due to deferred Airbus ramp, and MAX stop. Same.
Business Jets	Large cabin strongly correlated with oil prices. Small/medium strongly correlated with corporate profits, equities indices. Might recover quickly; still a 2020/21 downturn
Civil Rotorcraft	Oil and gas segment (large) hit again, before recovery even began. About right…wait and see.
Military Programs	Emphasis on "shovel-ready." Advance development programs at greater risk. Pure-play contractors in best shape; suppliers with most defense in best shape. All good. In fact, better.

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Aircraft Markets, In Good And Bad Years

World New Deliveries In 2019 (2020 $)	CAGR ’03-‘08	CAGR ’08-‘14	CAGR ’14-18	Change ’18-‘19
Jetliners-SA ($46.2 b)	9.7%	6.9%	5.0%	-23.9%
Jetliners-TA ($55.3 b)	5.0%	13.5%	1.7%	2.0%
Regionals ($5.8 b)	3.9%	-3.1%	-5.2%	-5.1%
Business Aircraft ($22.4 b)	16.7%	-2.2%	-5.0%	15.6%
Civil Rotorcraft ($3.9 b)	18.5%	-2.5%	-7.4%	-6.6%
Military Rotorcraft($13.3 b)	10.6%	9.6%	-11.8%	16.9%
Military Transports ($4.9 b)	3.2%	-0.9%	0.2%	-1.2%
Fighters ($24 b)	1.6%	0.8%	2.5%	25.5%
All Civil ($133.8 b)	9.7%	5.6%	1.4%	-7.6%
All Military ($45.5 b)	3.9%	4.0%	-3.3%	16.6%
Total ($179.3 b)	8.0%	5.2%	0.3%	-2.4%

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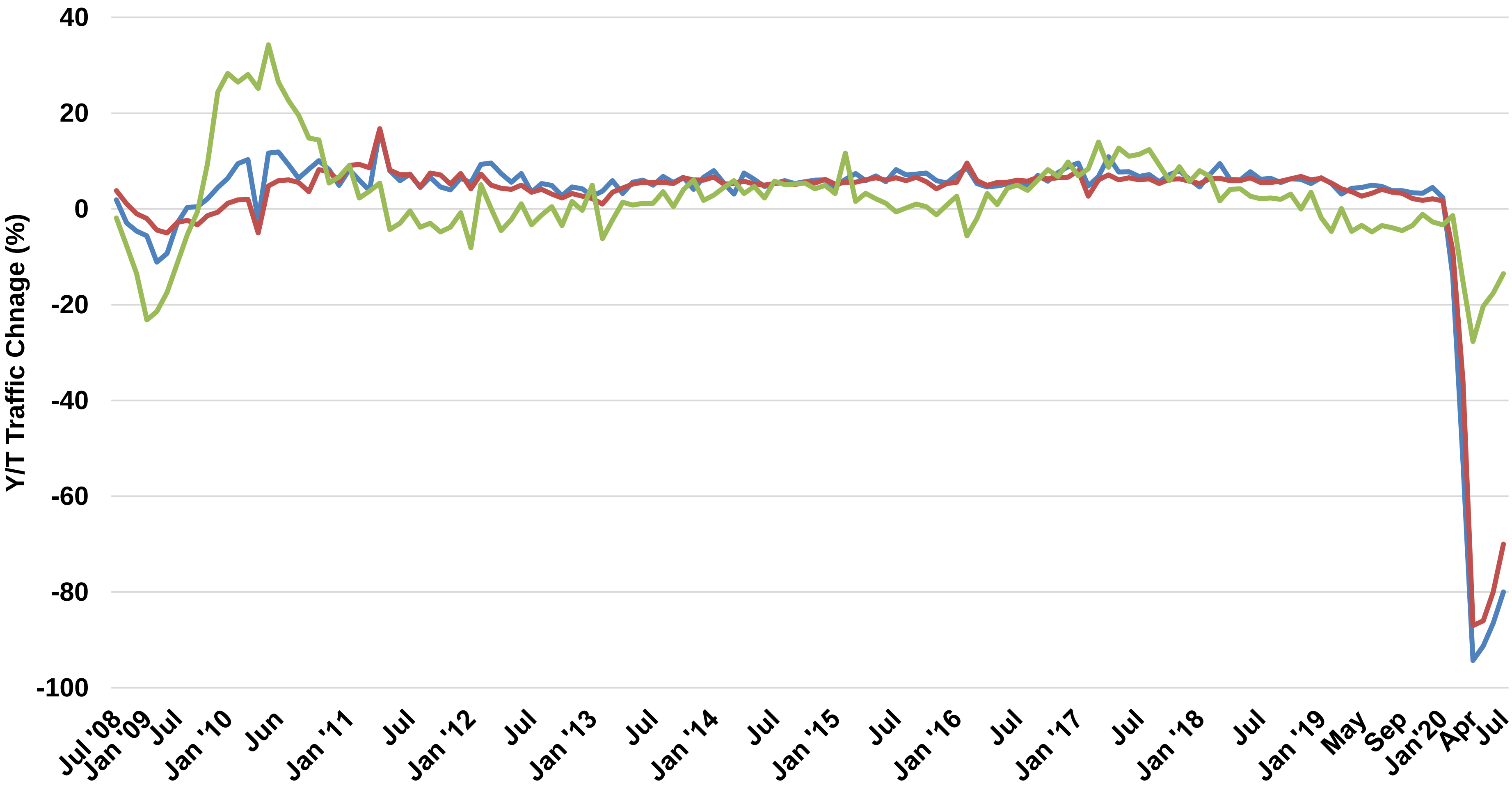
Traffic: Like Nothing We've Ever Seen Before

63% Decline in 2020?

2019 Totals: RPKs 4.2%, ASKs 3.4%, FTKs -3.3%

2018 Totals: RPKs 6.5%, FTKs 5.4%; 2017: RPKs 7.6%, FTKs 9%



Source: IATA

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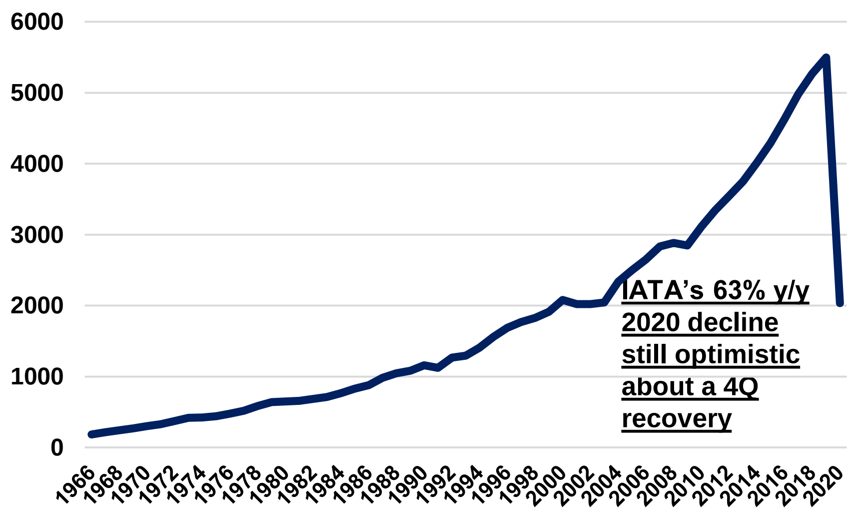
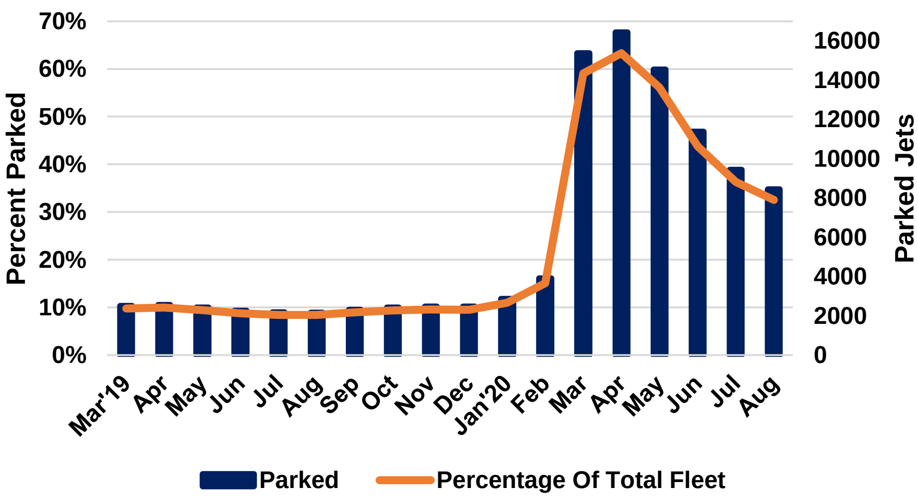
More Unprecedented Numbers

- **Traffic decline, parked fleet like no previous shock.**
  - **Per Paul Krugman, reflect a world economy in a “medically-induced coma.”**
  - **Traffic recovery is determined by the virus, not politicians or economics.**
  - **Back to peak in late 2023.**
- **Backlogs holding up (MAX a concern), but meaningless in a downturn.**
  - **Just 1% of January backlog has cancelled; nearly half deferred.**
- **Many early retirements coming, particularly twin aisles.**
  - **Primarily twin aisles; A380 bloodbath.**
- **Aftermarket catastrophe.**

World Air Traffic (RPM Bns)



World Jet Fleet: Now ~33% Unemployed



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Two Metrics To Watch

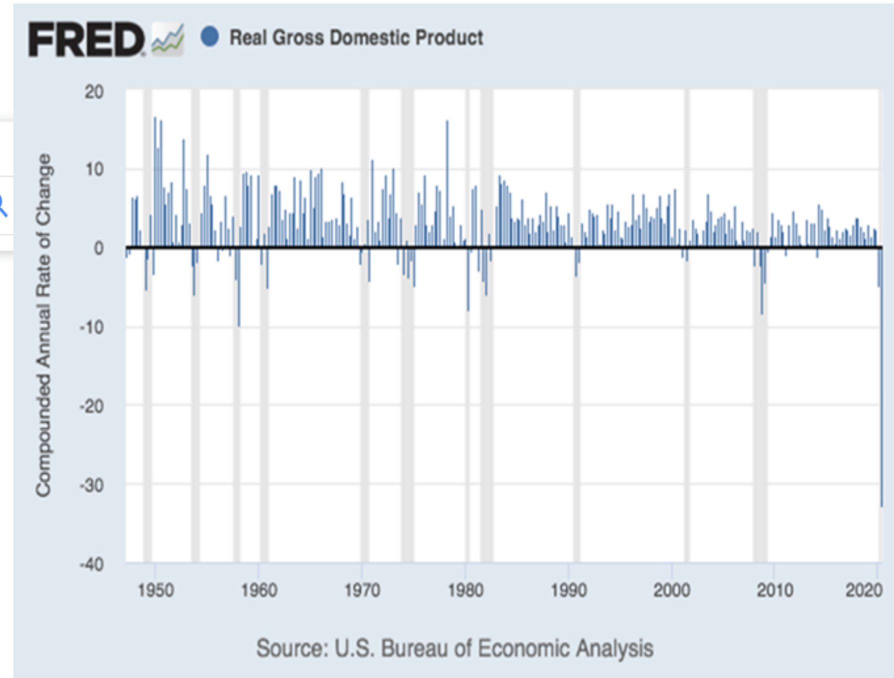
One Crisis May Be Peaking; The Next Might Be Starting

Market Summary > Zoom Video Communications Inc
NASDAQ: ZM

253.91 USD +3.91 (1.56%) ↑
Jul 31, 4:00 PM EDT · Disclaimer

zoom stock

Open	253.50	Div yield	-
High	255.20	Prev close	250.00
Low	248.36	52-wk high	281.00
Mkt cap	71.63B	52-wk low	60.97
P/E ratio	1,403.83		



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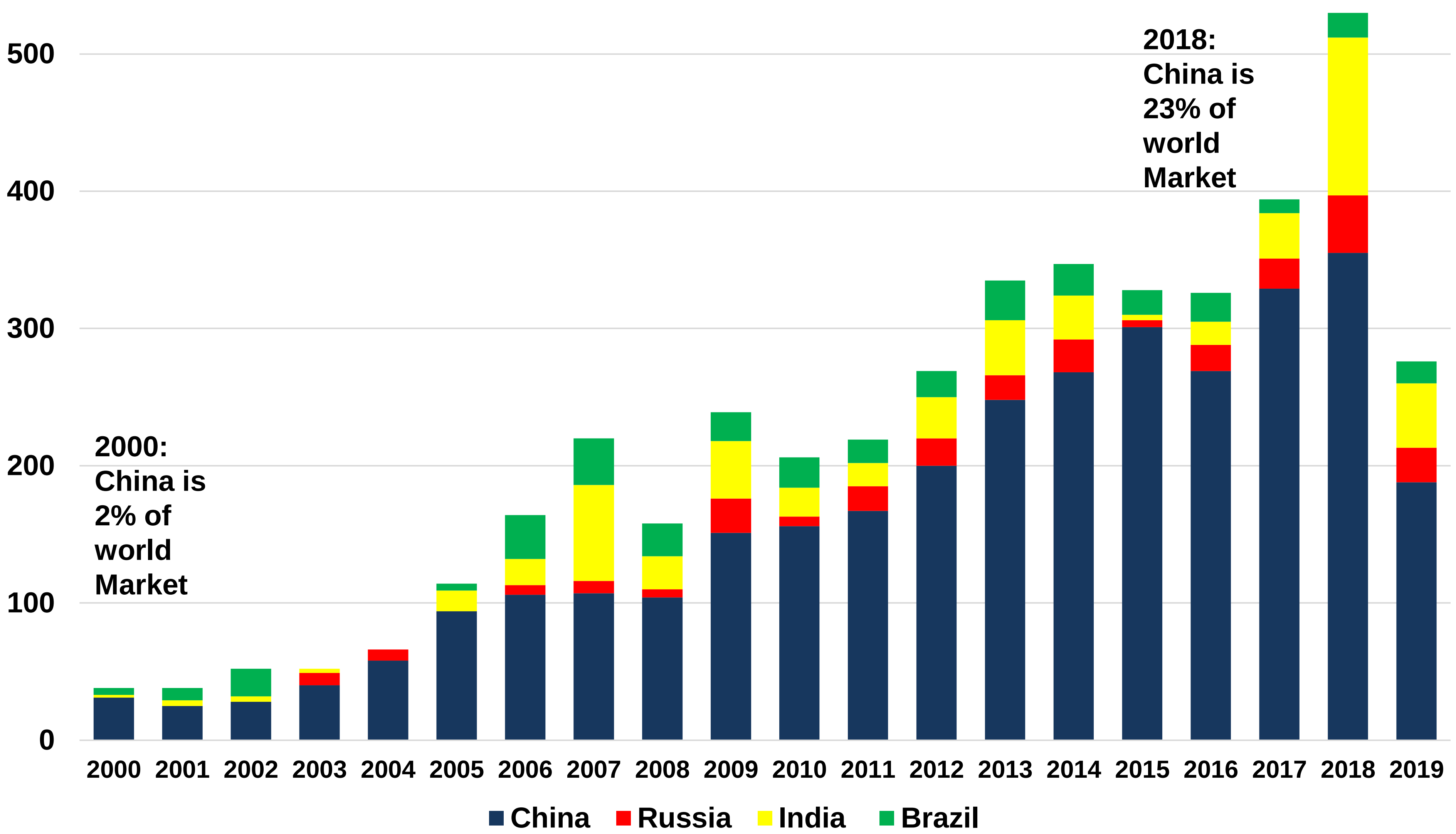
BRIC Deliveries: Peaked; Watch China

Growth May Not Resume For A Few Years



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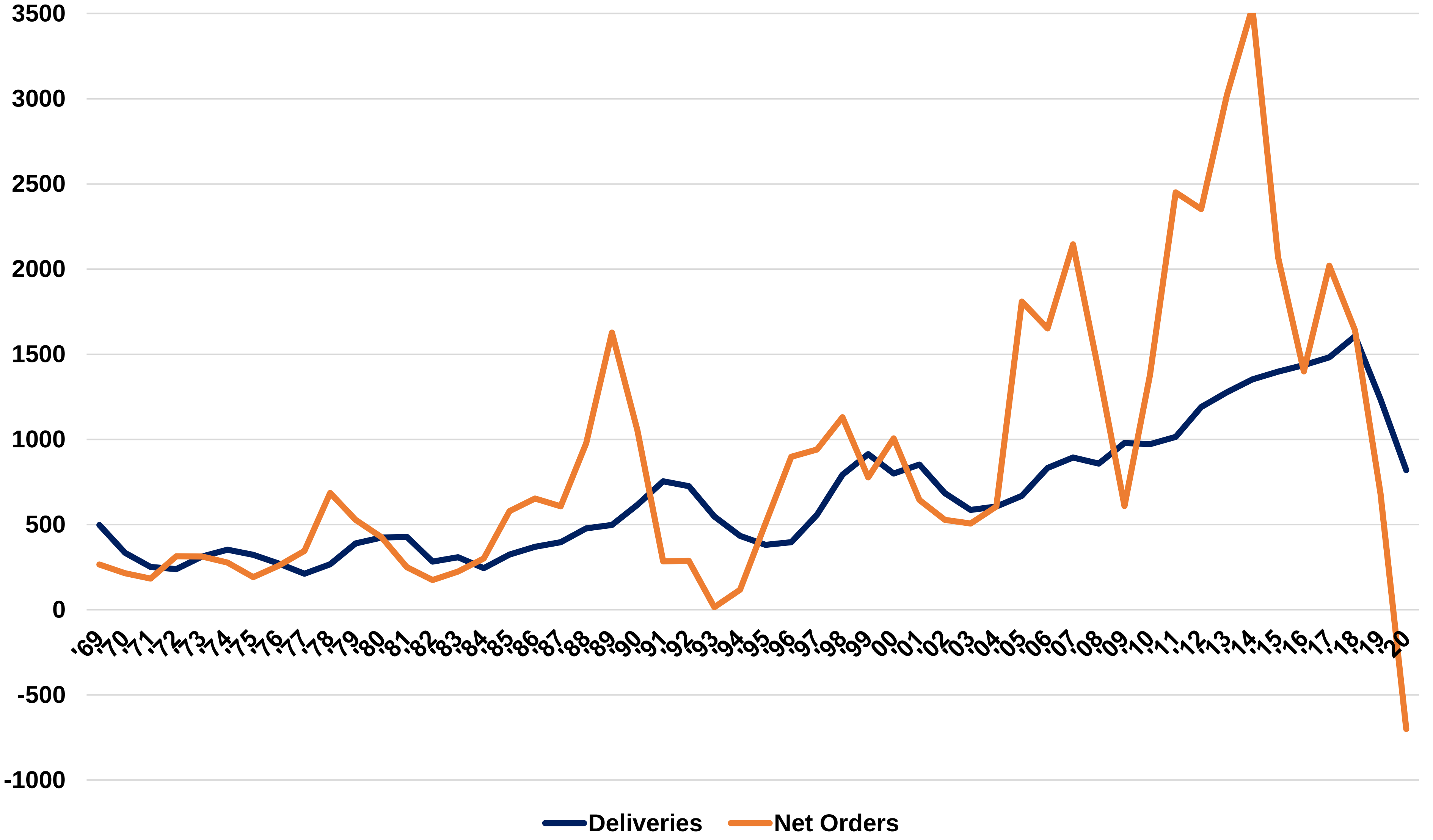
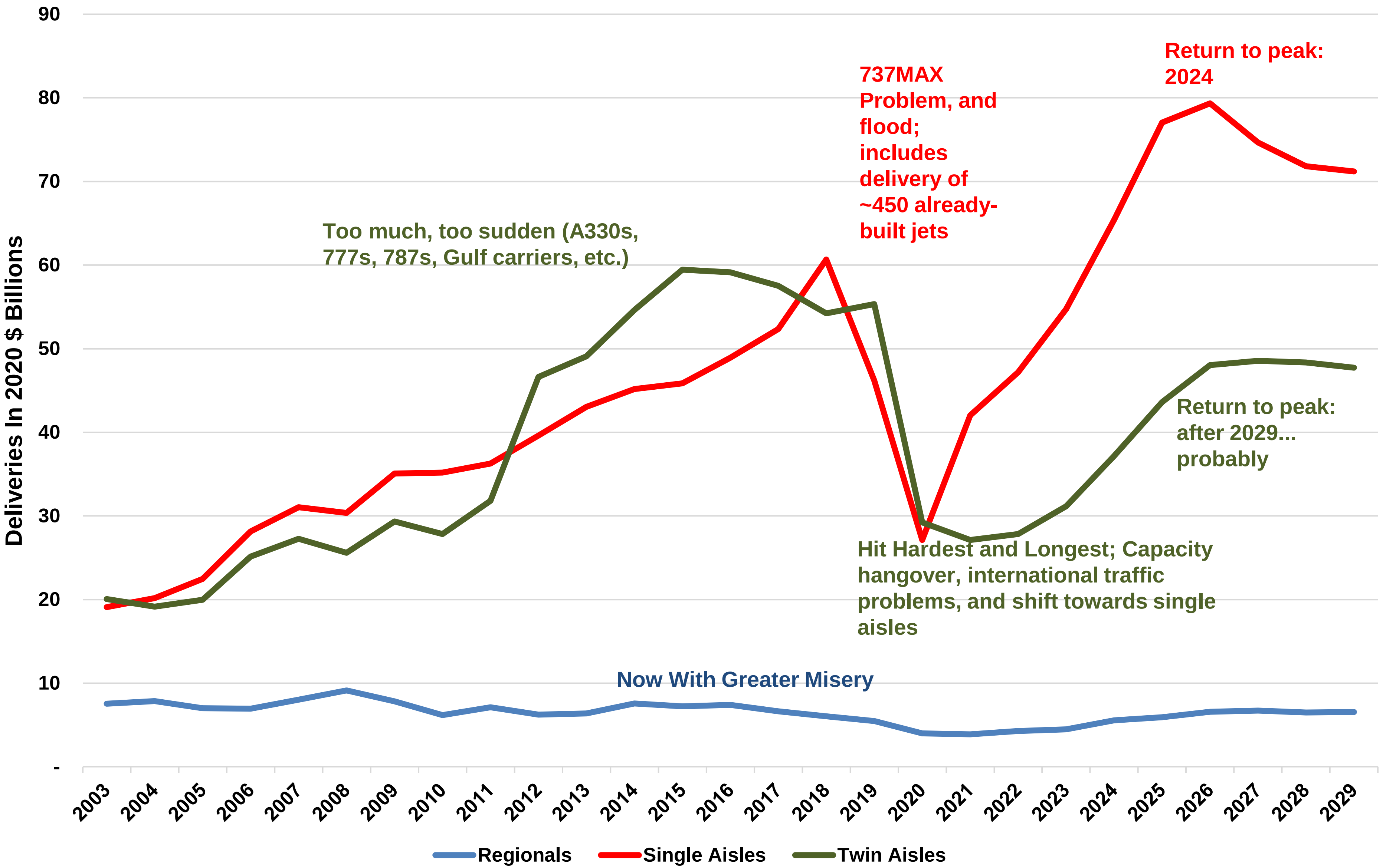
Large Jetliner Orders And Deliveries
Book-To-Bill No Longer A Thing



The Air Transport Market By Segment



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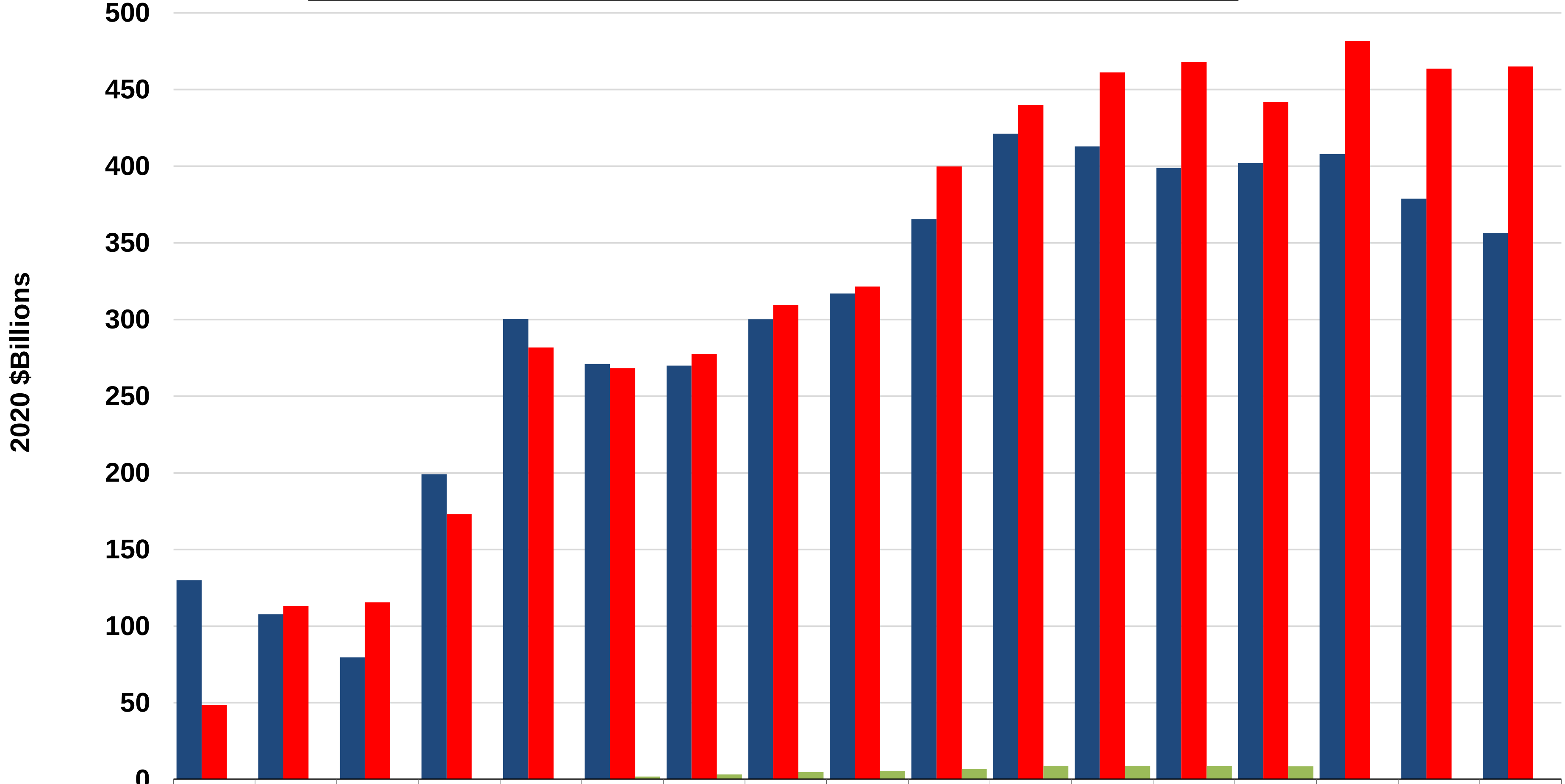
Firm Order Backlog Values (July 1): Boeing Taking A Hit



	1h 1997	1h 2001	End 2004	End 2006	End 2008	End 2009	End 2010	End 2011	End 2012	End 2013	End 2014	End 2015	End 2016	End 2017	End 2018	End 2019	1H 2020
Boeing	130.0	107.8	79.5	199.1	300.4	271.1	270.0	300.1	317.0	365.3	421.2	412.9	398.9	402.1	408.0	378.8	356.5
Airbus	48.6	112.9	115.5	173.0	281.8	268.2	277.6	309.5	321.6	399.9	439.9	461.2	468.1	441.8	481.6	463.6	465.1
Bombardier	—	—	—	—	—	1.9	3.3	4.9	5.5	6.7	9.0	9.0	8.7	8.5	—	—	—

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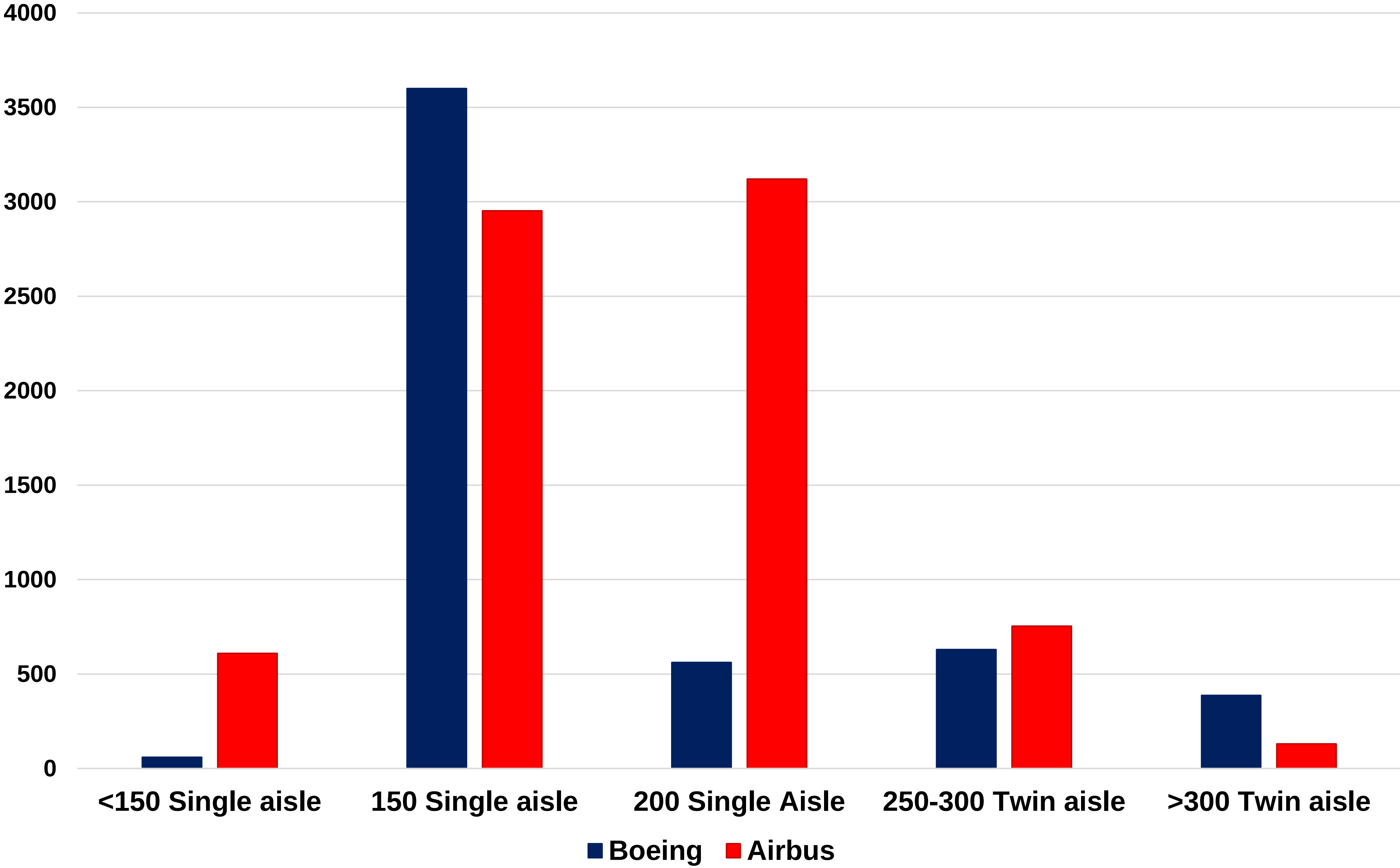
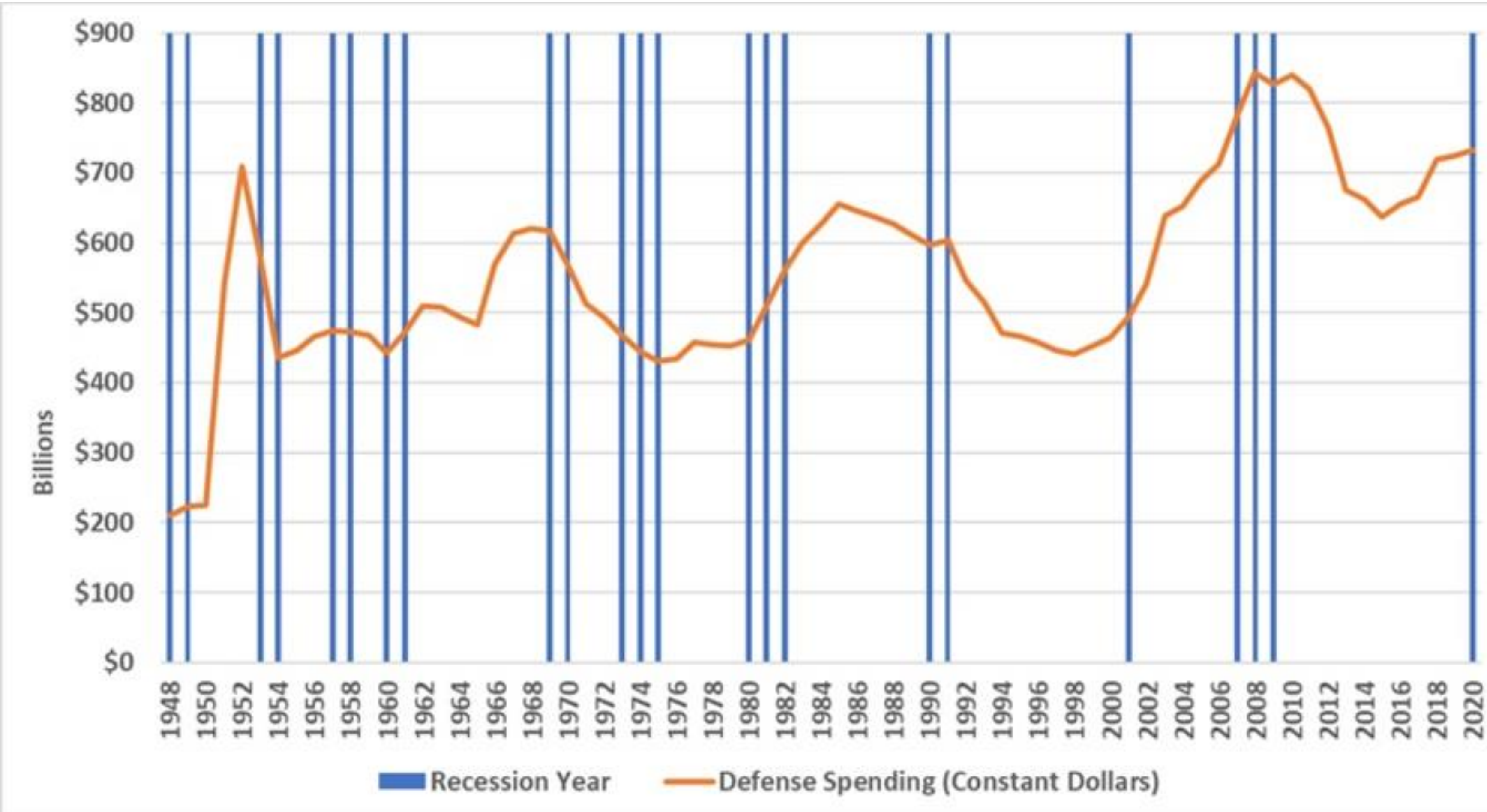
Jetliner Types And Fleets
Trends And Themes

- **Downsizing trend: demand for jets offering equivalent functionality and equal/better economics, fewer seats, than older models.**
  - **Thus, A321neo will do well as replacement for older, mid-range twin aisles; A220 will do well as replacement for older 737s and A319/320s.**
- **Boeing single aisle product line now boxed in; MAX8 fine, but outflanked from above and below.**
  - **A321neo increasingly dominant in 180/220-seat segment; CDB MAX10 order conversion further indication that larger MAXs uncompetitive.**
  - **Embraer JV termination means Boeing abandoning 100/130-seat segment.**
  - **BA 25% R&D cut announced in 1Q call not a good sign for product development.**
  - **MAX8 lease rates, orders (particularly lessor orders) also taking a hit.**
  - **<u>Boeing, in short, is therefore at risk of losing out due to airline downsizing.</u>**
- **E-Jets will lose market share and/or profit without a large partner against A220, but E175 might control its segment.**
- **A330neo increasingly at risk of MD-11-like fate.**
- **Almost all remaining quadjet fleets look set to retire young (1/3 of 380 fleet so far).**
- **Large twins (777X, A350-1000) look marginal for most of decade.**

Airbus, Boeing Jetliner Backlogs (July 1)



No Clear Relationship Between US Defense Spending, Economy



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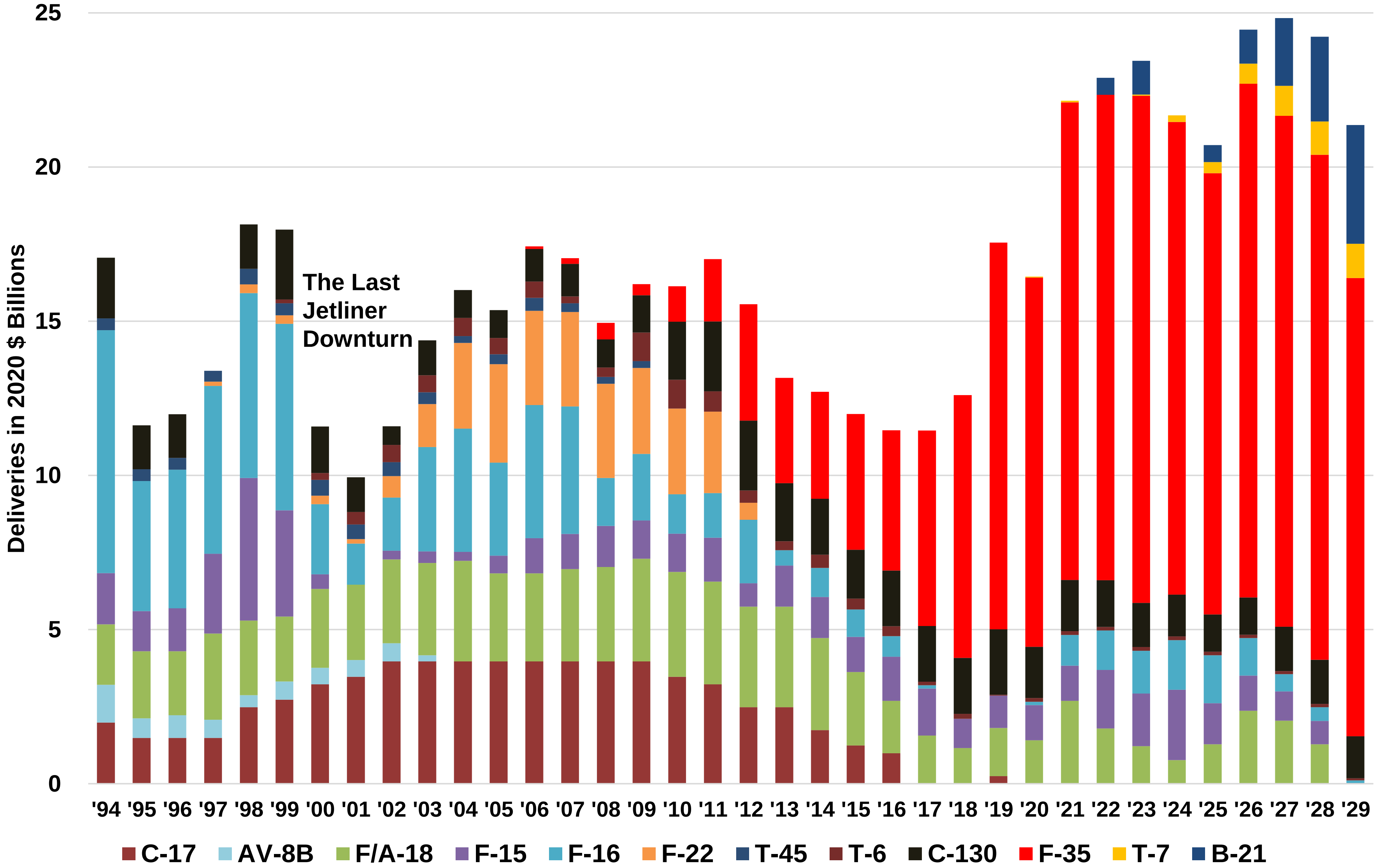
US Military Fixed Wing Aircraft Deliveries



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Global Aircraft Market Outlook In One Page

Segment	2020	'20-'21	Risk	Elevator Comment
Jetliners-SA	-41.3%	55.0%		Includes some already-built MAXs. Watch China, fuel, traffic.
Jetliners-TA	-47.2%	-7.2%		Overcapacity, slow international recovery, secular shift to SAs
Regionals	-27.0%	-2.5%		No Boeing supply chain effect on E-2; Scope clause de-risked, but little growth.
Business Aircraft	-20.3%	-8.9%		Another hit after many false starts over a disappointing decade.
Civil Rotorcraft	-11.4%	-6.2%		Large civil hit again. Too many new models aimed at a weak segment (oil/gas).
Military Rotorcraft	-5.2%	2.6%		Programs end/slow; no risk of accelerated downturn; FVL beyond forecast, exc FARA.
Military Transports	-29.5%	4.7%		A seriously underperforming market.
Fighters	-22.0%	46.0%		I like this market. F-35 (after COVID disruption), plus strong Gen 4.5
All Civil	**-38.7%**	**13.3%**		SAJetliner snapback due to MAX, weakness in other segments; more overcapacity risk.
All Military	**-17.4%**	**23.5%**		Global insecurity, Tension, Malice. Special mission also boosts topline.
Total Industry	**-33.3%**	**16.6%**		**No strong recovery until 2024**

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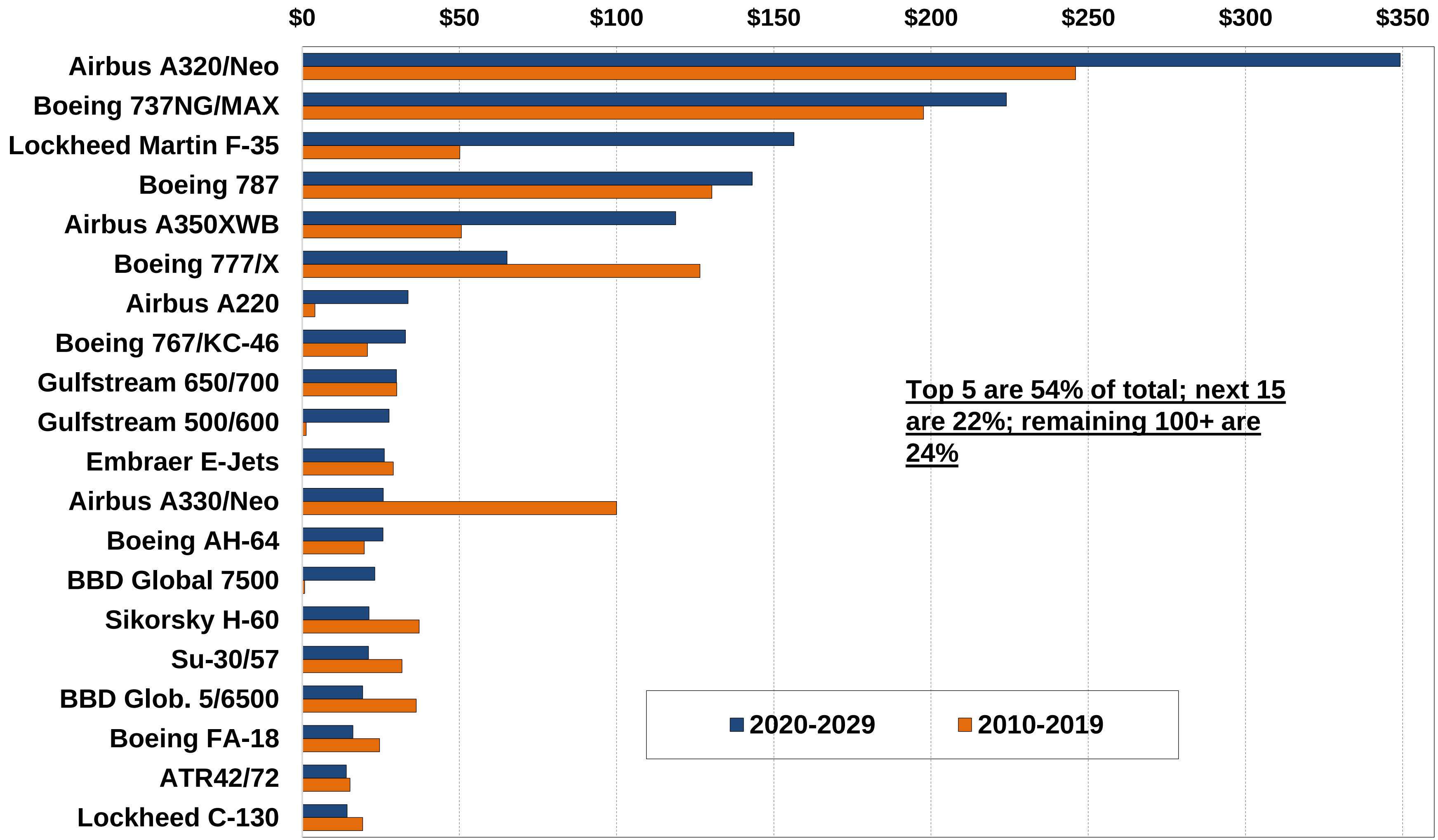
Top 20 Aviation Programs; Volume Matters

Cumulative Deliveries Value in '20 $ Bns



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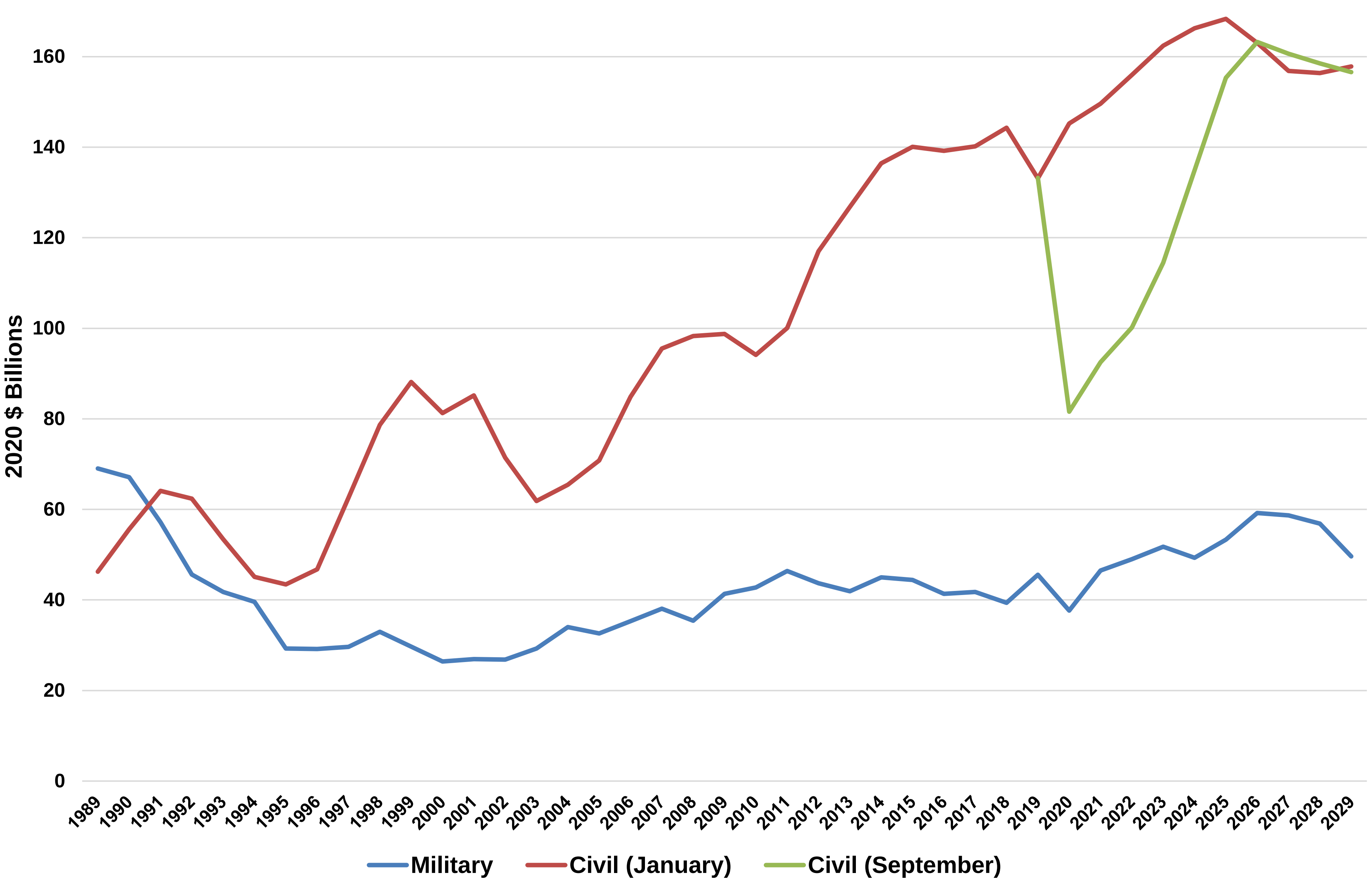
World Aircraft Deliveries By Value, 1989-2029



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Concluding Observations, and a Few Consolations

- This situation might get worse.
- This is a synthetic market, not an organic one.
  - Deliveries mostly driven by exogenous factors: government aid, third-party and first party finance. These may not hold.
- Boeing faces a very serious mid market challenge.
- Defense companies have an opportunity to grow their civil side. Will they?
- There is some good news:
  - An airline paradise, except for the traffic.
    - Fuel, Jet costs, Crew costs, interest rates, government support (for most, and for now); Stimulate traffic, or restore profit?
  - Defense: budgets, export demand, industrial support.
  - Less business jet frothiness.
  - Financial sector stronger going into this crisis.

COVID-19 And Civil Aviation Markets

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