

COVID-19 And Civil Aviation Markets

A Bit Like Falling Off A Cliff, Only Without the Nice View

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Last Week's Developments

Through April 3; still Trending Downward

- **Grim traffic news, with US airports down 95%**
 - **Signs of life in China.**
 - **Cargo holding up, as belly capacity vanishes.**
- **Limited production guidance from Airbus; none from Boeing.**
 - **Boeing insulated by MAX ramp requirement, and RTS process**
- **No clarity at all on government aid terms or acceptance, for airlines or manufacturers.**
 - **Airlines seem to be on a more aggressive path to seeking aid.**
 - **Airlines and Boeing uninterested in government equity stake; headcount retention an issue too.**
- **Boeing voluntary layoff/early retirement plan.**
 - **Maximizes headcount for political leverage while cutting costs; good for short-term very bad for long-term due to experienced worker loss.**
- **GE cuts half of engine manufacturing workers, a very bad sign.**
- **75 ac MAX cancellation from Avolon clearly market-related, not MAX-related.**
 - **Four A330neo cancellations too; risk of A330 collapse.**

Aircraft Markets, In Good And Bad Years

<u>World New Deliveries</u>	<u>CAGR</u>	<u>CAGR</u>	<u>CAGR</u>	<u>Change</u>
<u>In 2019 (2020 \$)</u>	<u>'03-'08</u>	<u>'08-'14</u>	<u>'14-18</u>	<u>'18-'19</u>
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%	-4.8%
Business Aircraft (\$22.4 b)	16.7%	-2.2%	-5.0%	16.5%
Civil Rotorcraft (\$3.9 b)	18.5%	-2.5%	-7.4%	-0.1%
Military Rotorcraft(\$13.3 b)	10.6%	9.6%	-11.8%	21.7%
Military Transports (\$4.9 b)	3.2%	-0.7%	0.6%	-19.1%
Fighters (\$24 b)	1.6%	0.8%	2.5%	25.5%
<u>All Civil</u> (\$133.8 b)	<u>9.7%</u>	<u>5.6%</u>	<u>1.4%</u>	<u>-7.3%</u>
<u>All Military</u> (\$45.5 b)	<u>3.9%</u>	<u>4.0%</u>	<u>-3.2%</u>	<u>15.3%</u>
<u>Total</u> (\$179.3 b)	<u>8.0%</u>	<u>5.2%</u>	<u>0.3%</u>	<u>-2.4%</u>

COVID-19 And Aero Markets

Issues And Impact

- **Apparently, these things come in pairs:**
 - The fuel price shock is as important as traffic.
 - Or trios. Recession too.
 - Also, traffic de-link from economics already in play.
 - Oh, and China.
- Traffic probably U. Really a disease question.
- **What's different this time:**
 - Airlines in better shape.
 - Government more aggressive about response.
 - No more interest rate stimulus; third party finance stimulus also unrepeatable.
 - Growth accelerated after 2008 due to a weird variety of factors, none of which are in play today.
- **Aftermarket catastrophe.**
 - 40% down ASMs, de-stocking, deferred maintenance/upgrades
- **The enormous state aid question, and strings attached.**
- **Assuming state aid, a “synthetic market” pulls demand forward.**

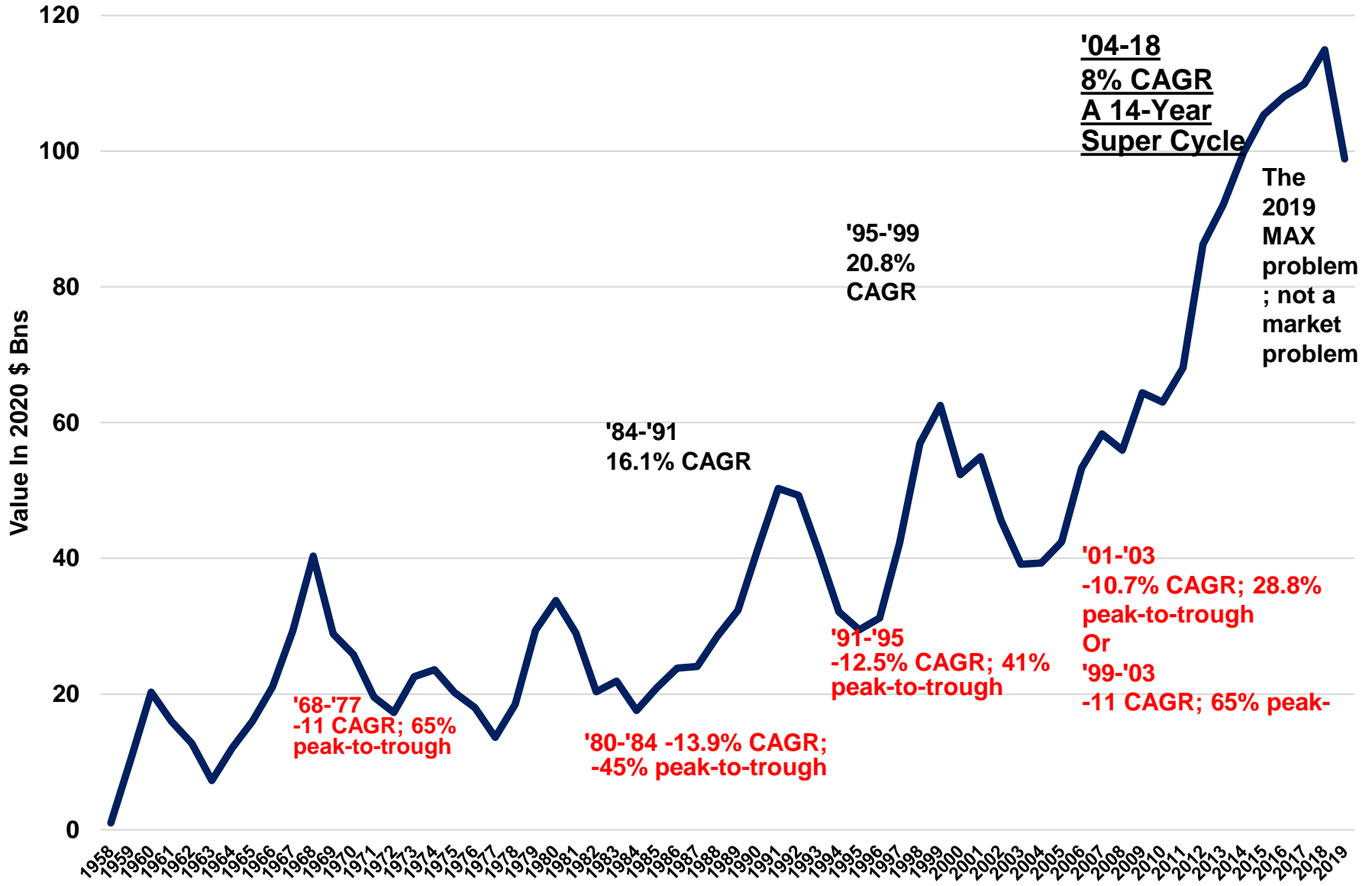


Aviation Segments By Damage

Most to Least

Twin aisle jetliners	International traffic hit hardest and longest. Already an overcapacity situation. Secular shift towards single aisles already underway.
Single aisle jetliners	Fuel prices a big problem. China comeback uncertain. Some relief due to deferred Airbus ramp, and MAX stop.
Business Jets	Large cabin strongly correlated with oil prices. Small/medium strongly correlated with corporate profits, equities indices.
Civil Rotorcraft	Oil and gas segment (large) hit again, before recovery even began.
Military Programs	Emphasis on “shovel-ready.” Advance development programs at greater risk.

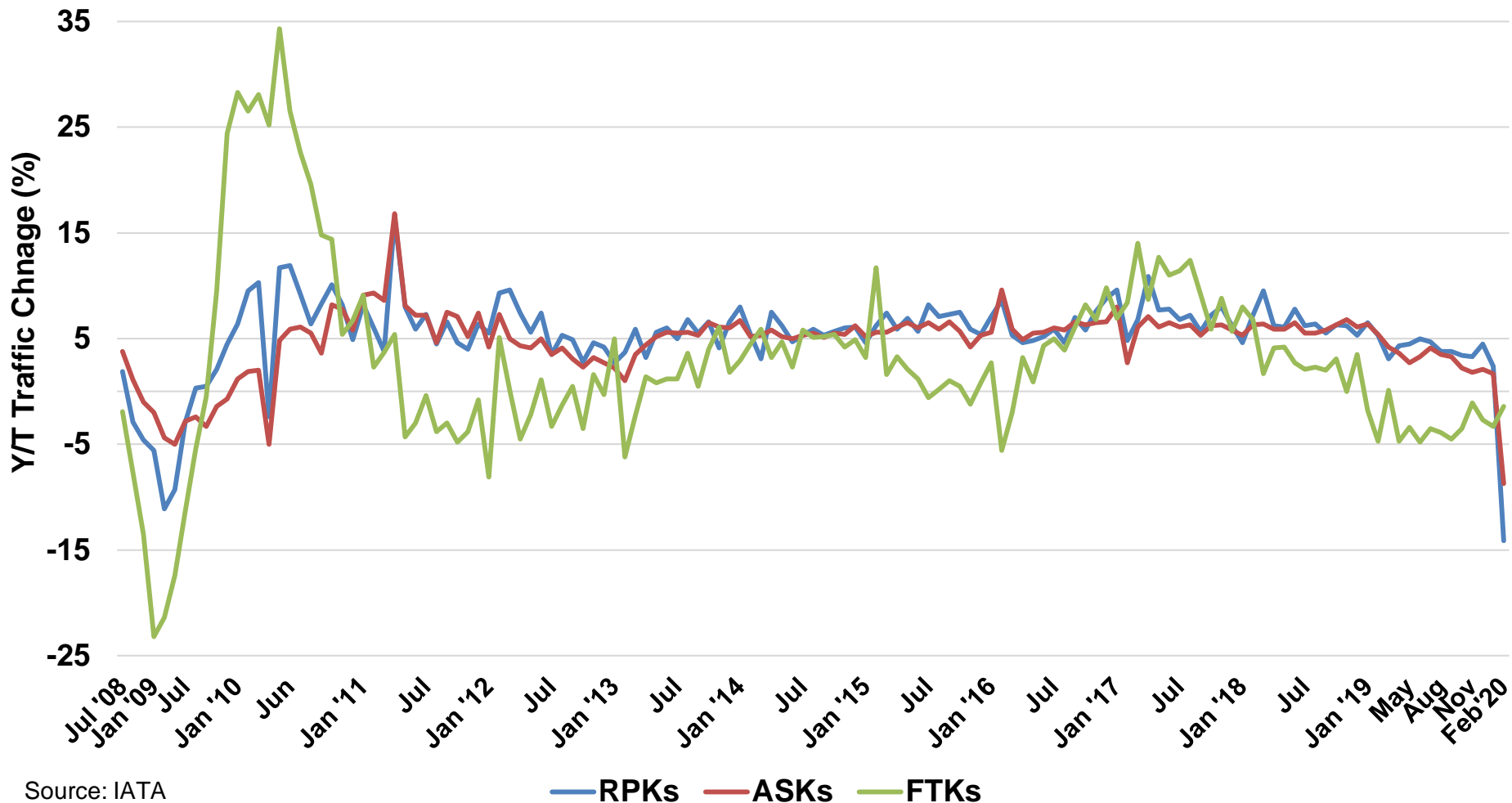
Cyclicality, Our Long-Forgotten Nemesis



Traffic: Way Above Trend...Until March 2019

40% 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%



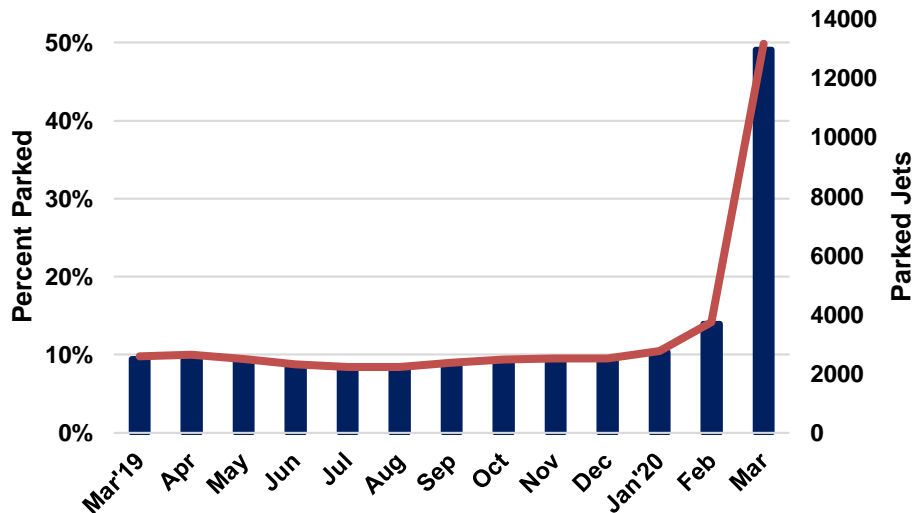
Source: IATA

— RPKs — ASKs — FTKs

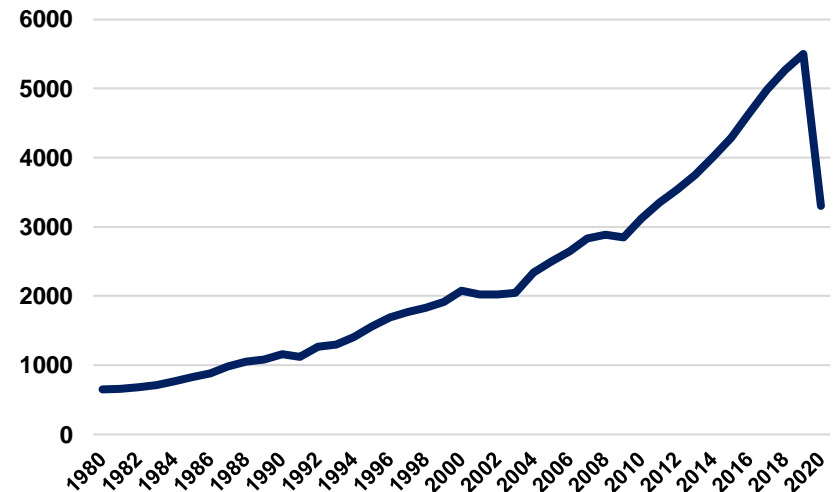
Unprecedented Numbers

- **Traffic decline, parked fleet like no previous shock.**
 - Per Paul Krugman, they reflect a world economy in a “medically-induced coma.”
- **Traffic probably U. Really a disease question.**
 - Limited recovery until vaccine, or effective post-infection drug, or herd immunity.
- **Many early retirements coming.**
 - Primarily twin aisles; A380 bloodbath.
- **Aftermarket catastrophe.**
 - 40% down ASMs, de-stocking, deferred maintenance/upgrades, plentiful USM with early retirements.

World Jet Fleet: Now 50% Unemployed



World Air Traffic (RPM Bns)

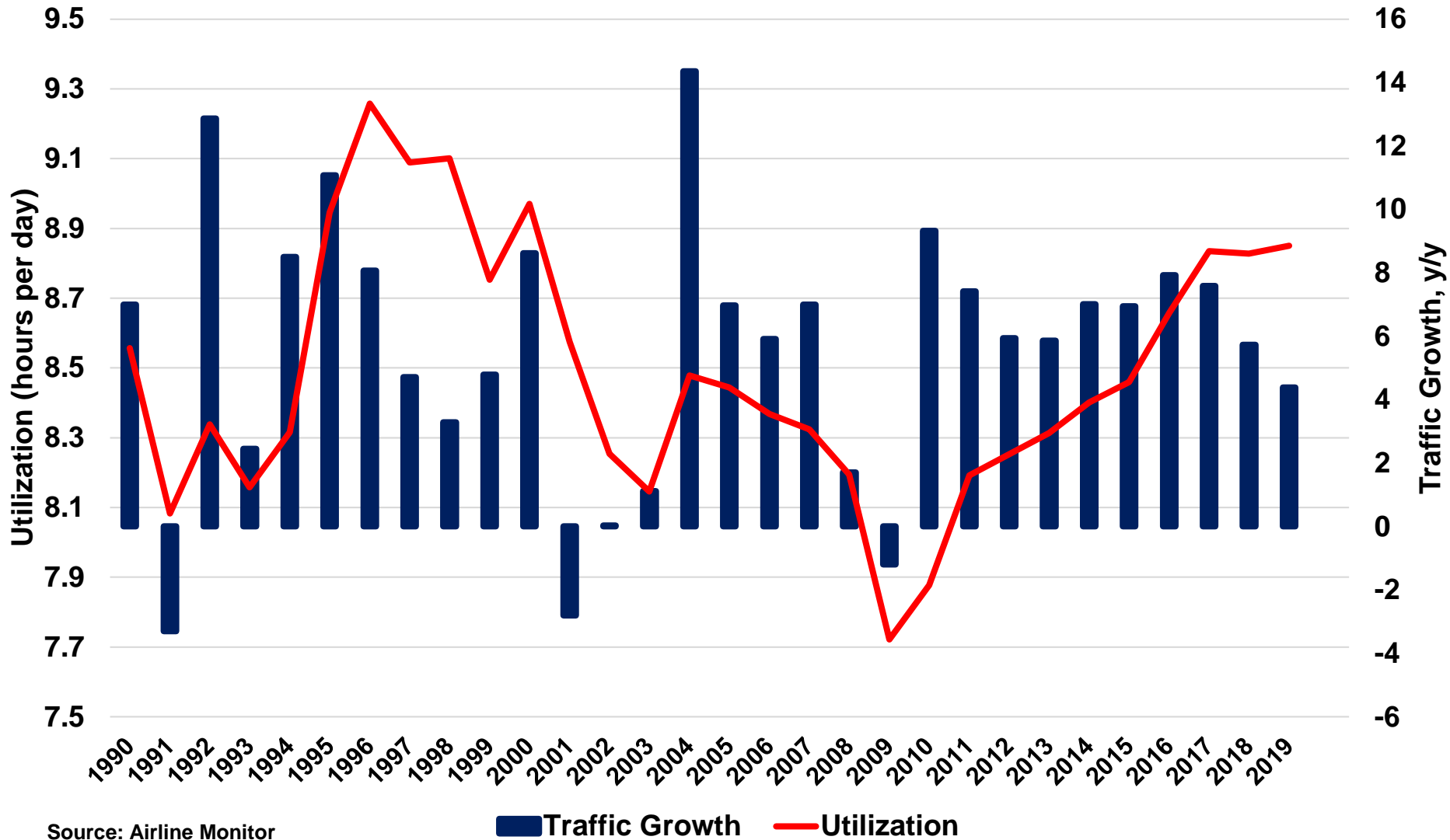


Source:
Ascend/Jeffries

■ Parked — Percentage Of Total Fleet

Lower Utilization Reflects Overcapacity, and Can Help Manage It

But A 40% Traffic Drop Is Another Story

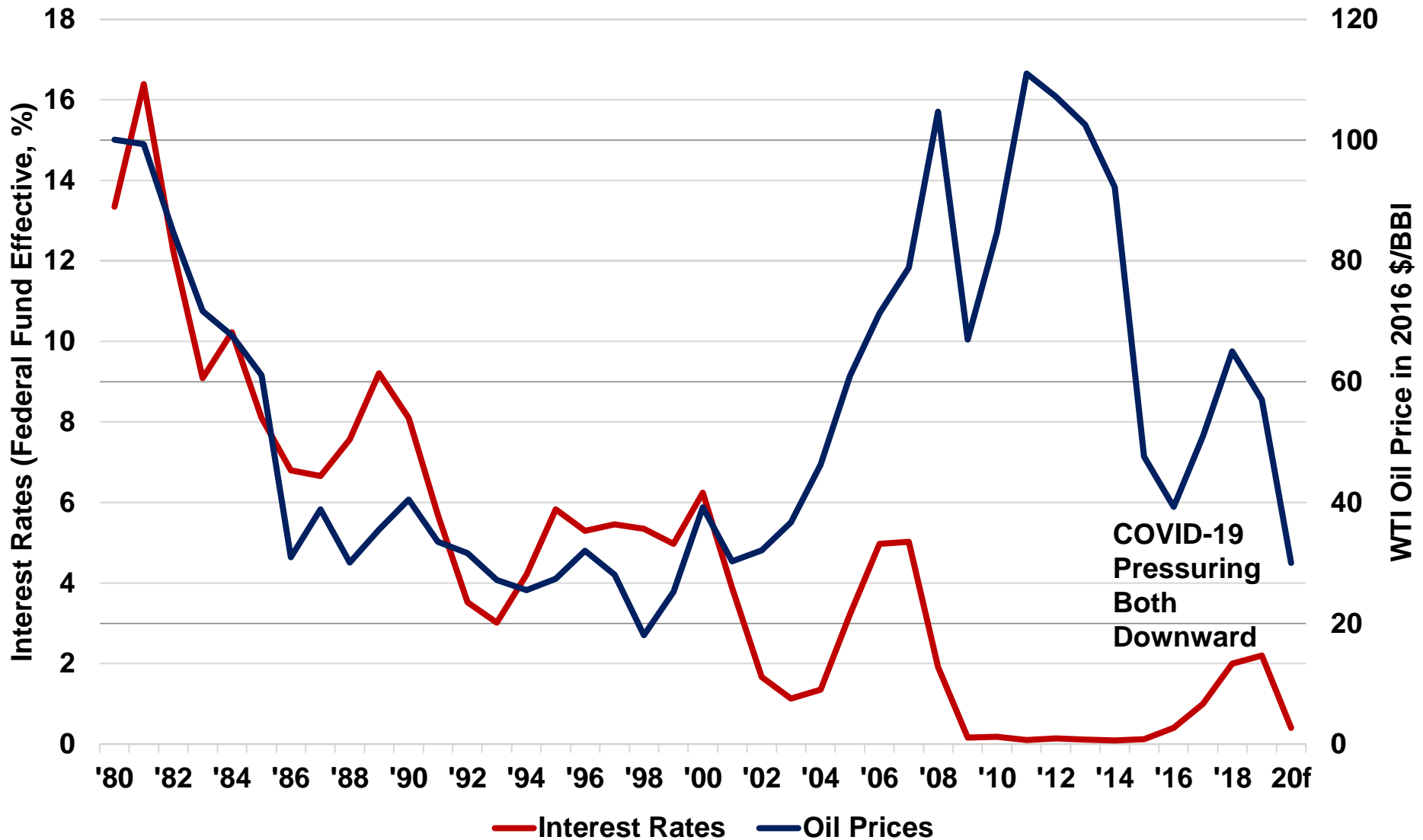


Source: Airline Monitor

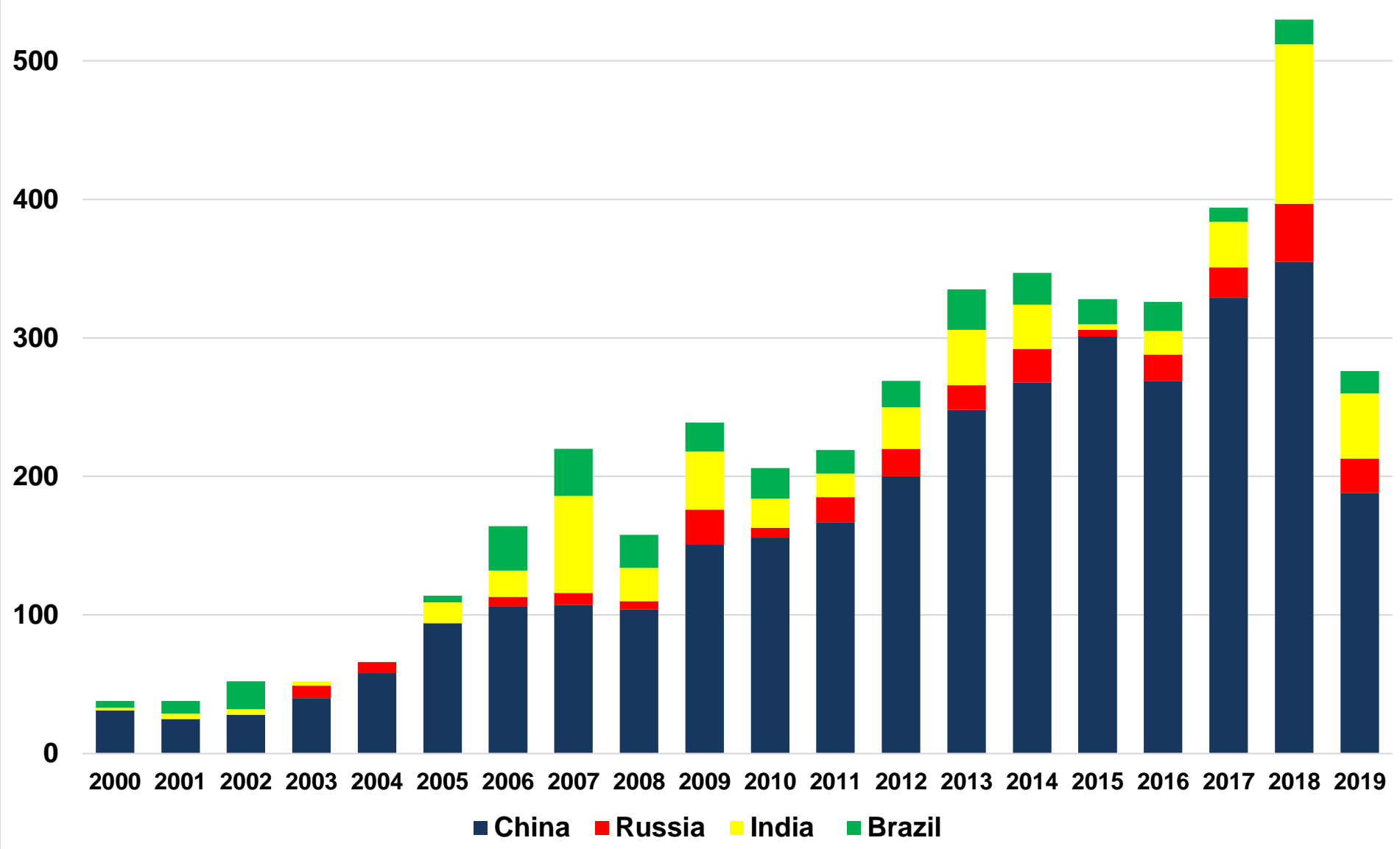
■ Traffic Growth — Utilization



Interest Rates And Oil Prices: Less Than 4%, And \$50-85/bbl, Ideally; But The Ratio Matters Most

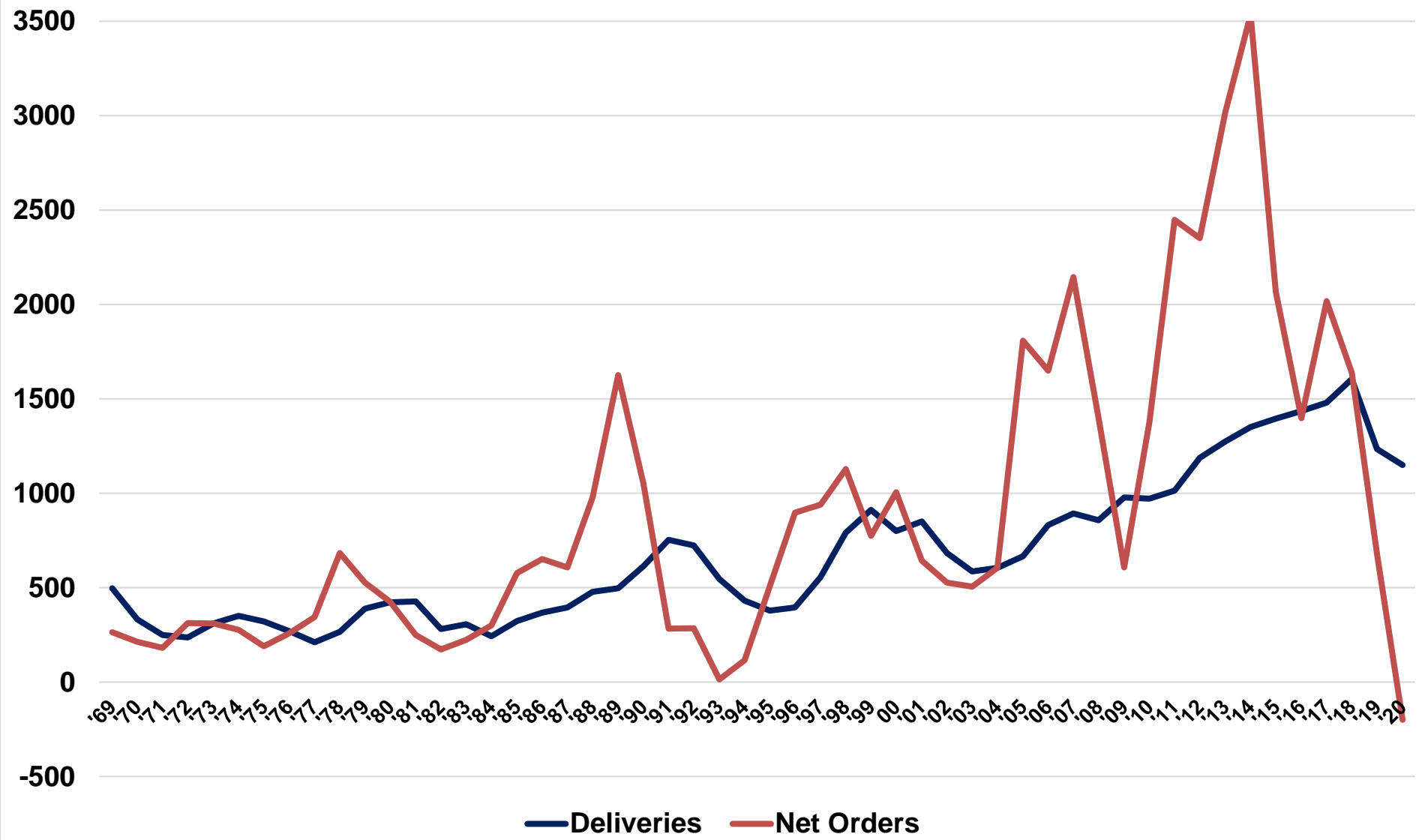


BRIC Deliveries: Peaked; Watch China



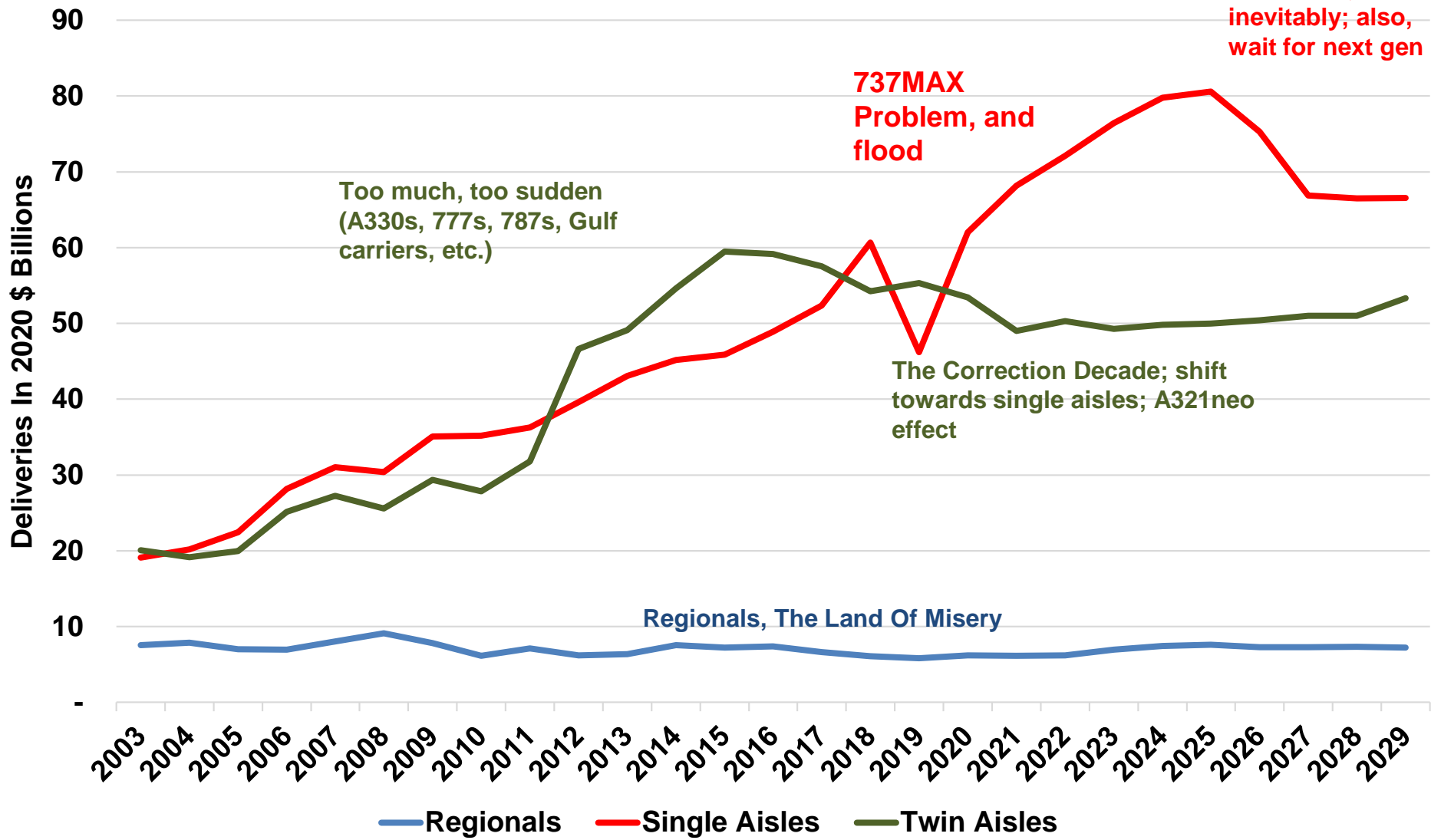
Large Jetliner Orders And Deliveries

Book-To-Bill No Longer A Thing; Maybe 1-1 in 2023?



The Air Transport Market By Segment (As of January)

Some kind of correction, inevitably; also, wait for next gen



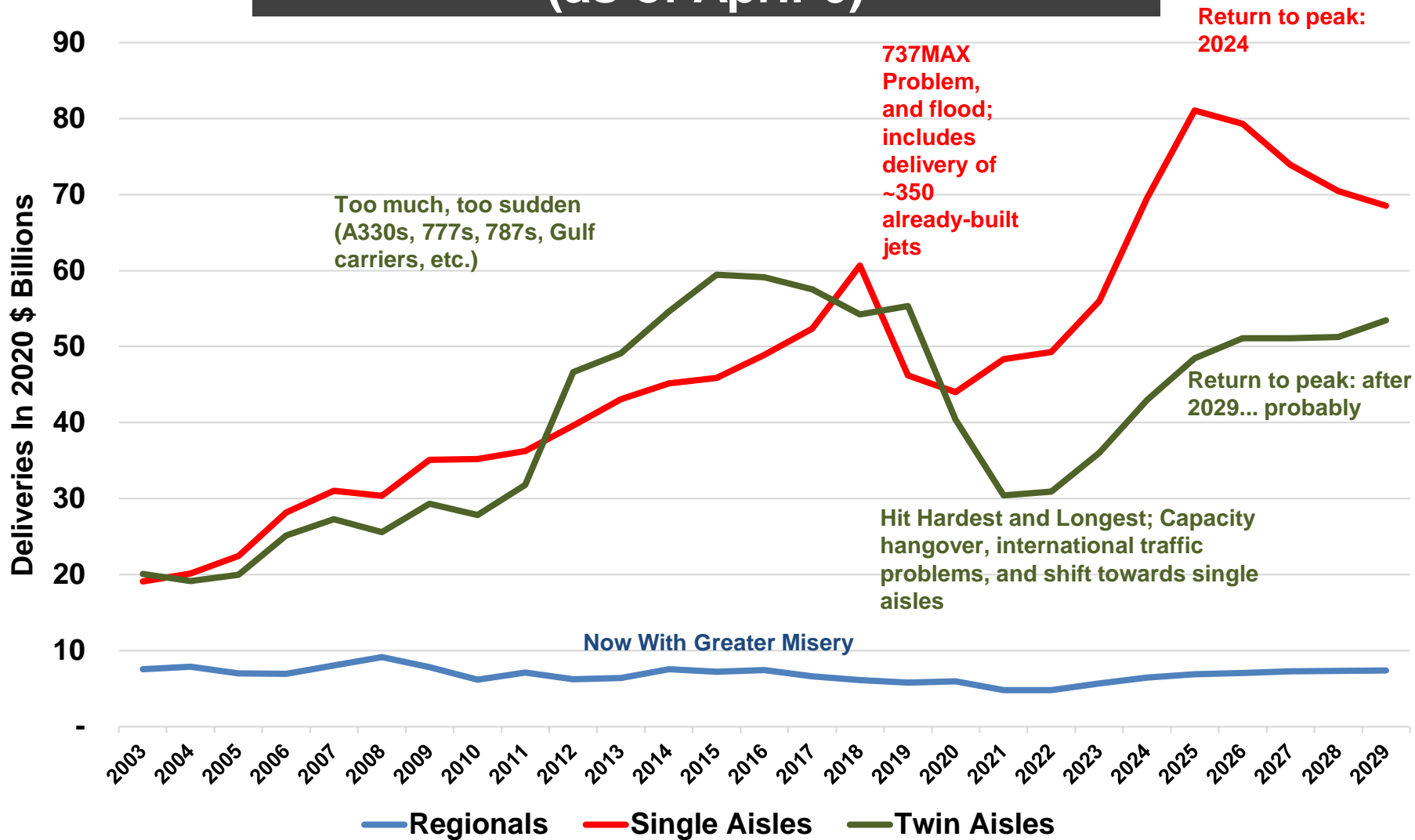
Too much, too sudden
(A330s, 777s, 787s, Gulf carriers, etc.)

737MAX
Problem, and
flood

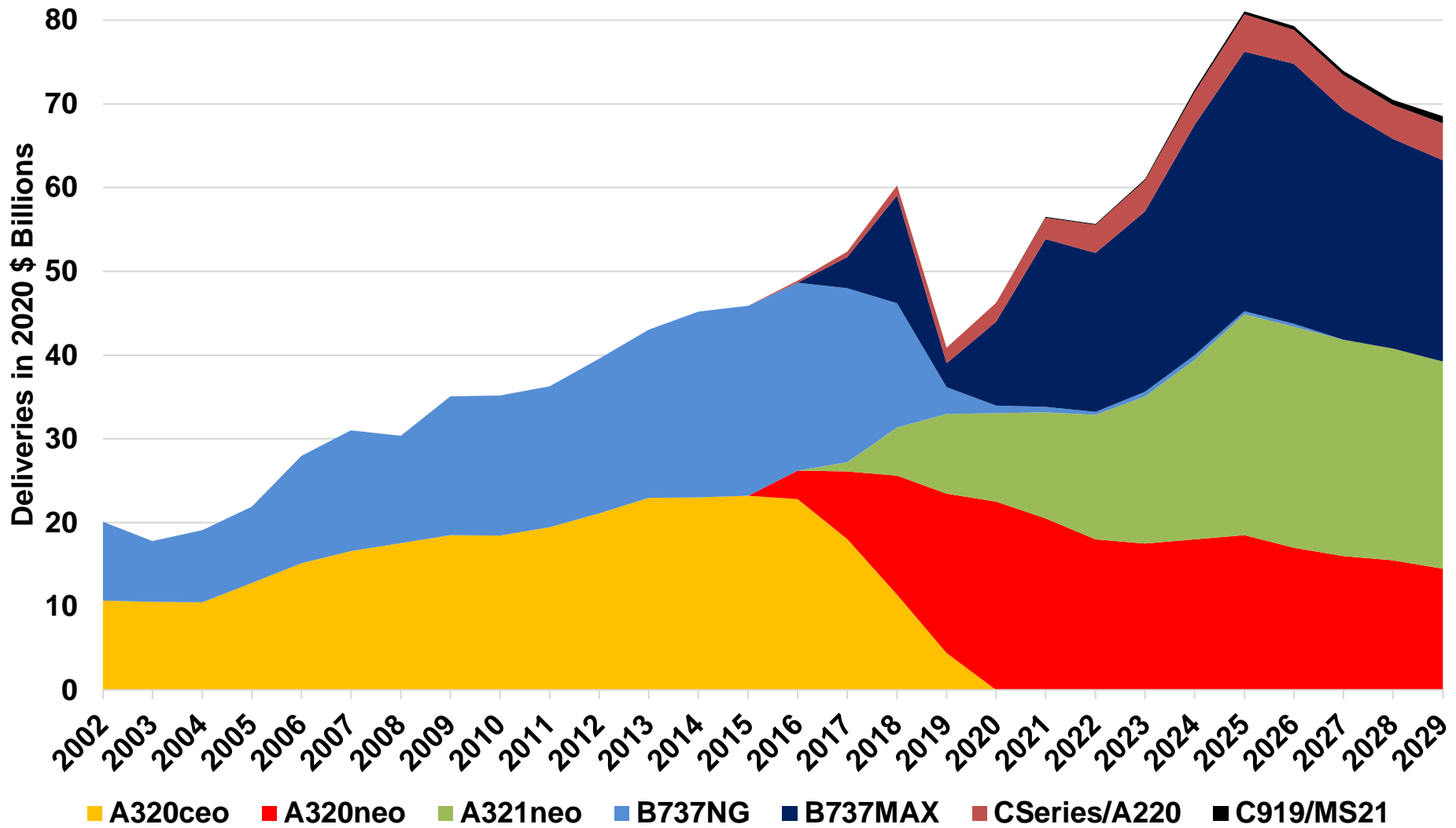
The Correction Decade; shift
towards single aisles; A321neo
effect

Regionals, The Land Of Misery

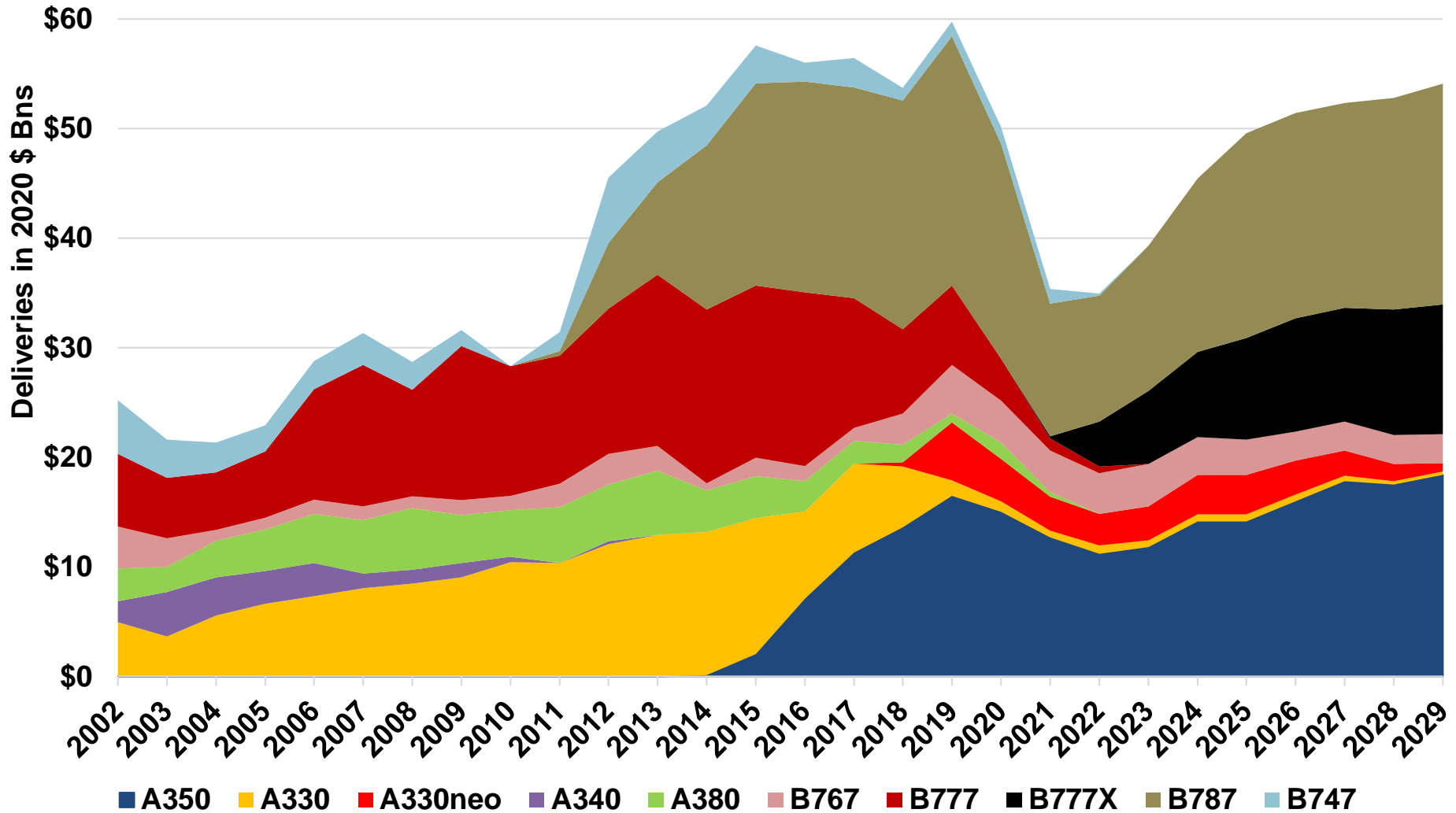
The Air Transport Market By Segment (as of April 6)



Single Aisle Deliveries: Not As Bad, Since Recent History Was Bad Too

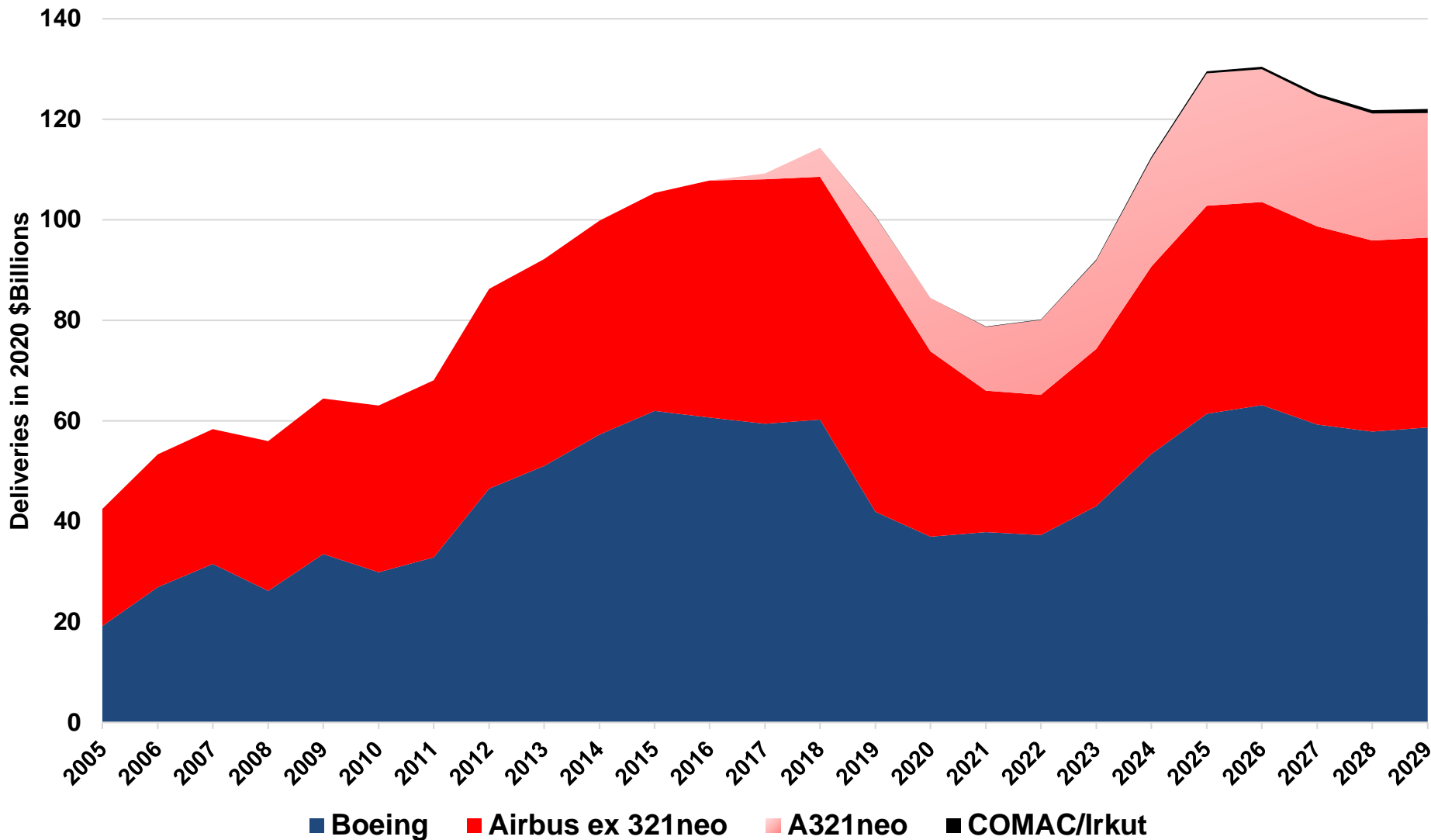


Twin Aisles: Formerly Hot; Now Seriously Depressed

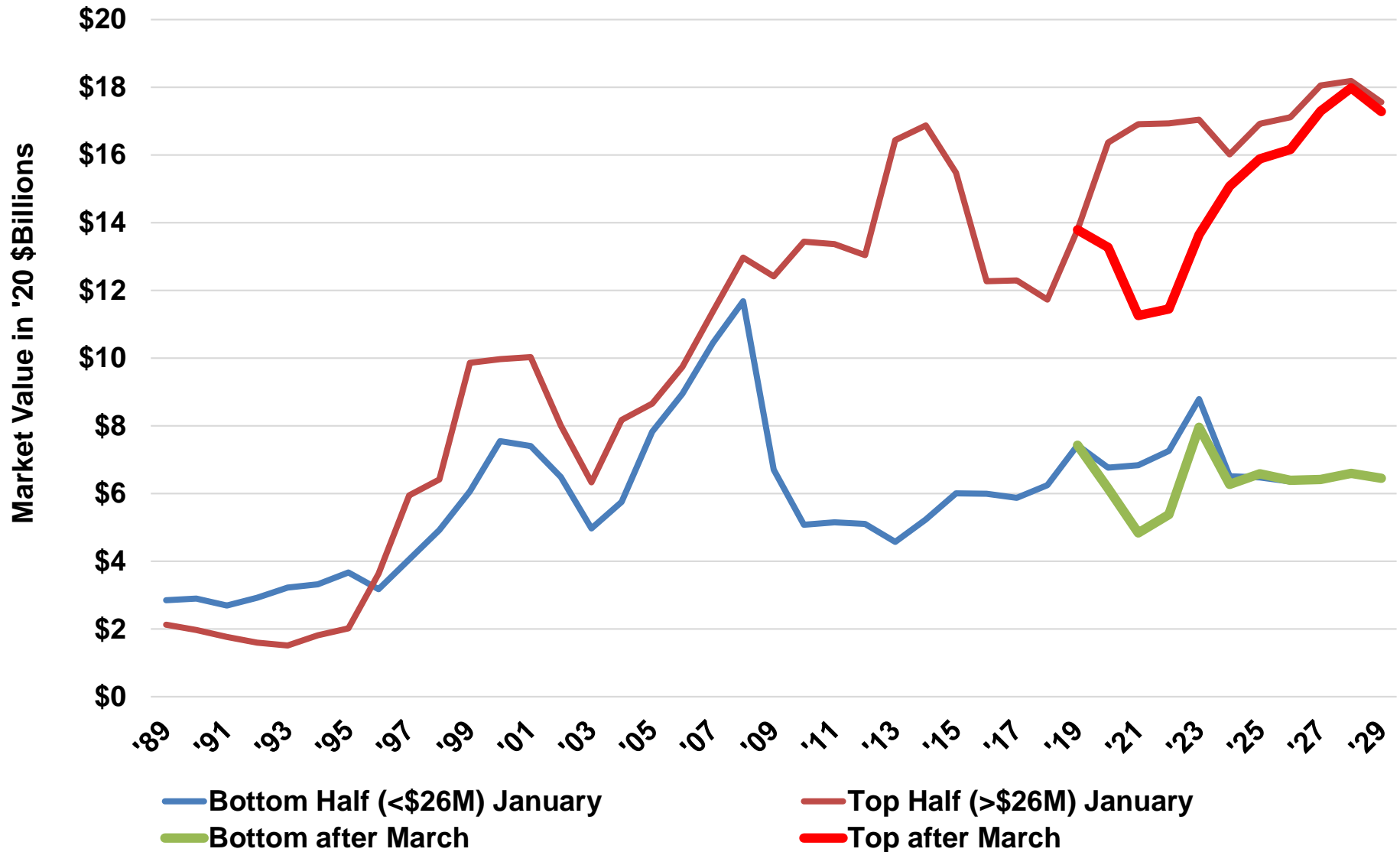


Jetliner Market Shares By Deliveries

Airbus Seizes The Middle Market and First Place;
Covid-19 Accelerates Shift to Middle Market



Bottom Half Bizjet Segment vs. Top Half



Summary: Where We're At

(And What's Changed)

• Tailwinds

- Interest rates. Ratio with fuel still holding. **(Watch fuel closely)**
- Investor cash for jetliners. **(Now a risk)**
- Traffic (long-term, until last March). **(Much worse)**
- Defense spending, and combat aircraft in particular. **(Still good)**
- **State aid (but again this just pulls demand forward).**

• Headwinds

- Traffic (short-term, we hope; why de-linked from GDP?). **(Worse)**
- Commodification: pricing pressure everywhere; fewer new models, even major derivatives. **(Worse)**
- Geopolitics/trade. **(Worse)**
- The large twin aisles that nobody seems to want. **(Worse)**
- Boeing MAX response – discounting, aftermarket deals, etc.
- China: market, politics/trade, FX, traffic. **(Much worse)**

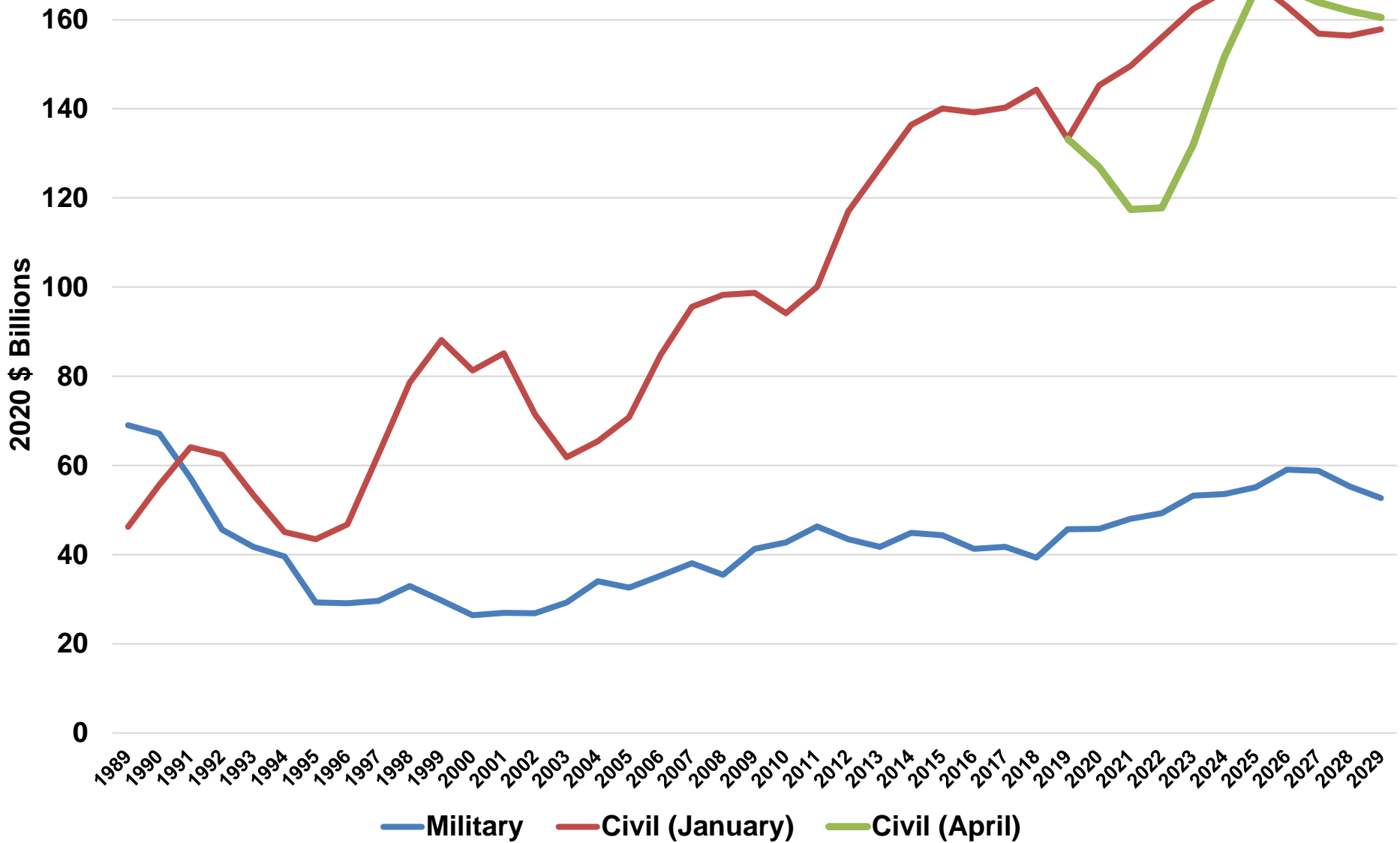
• Other Winds

- Responses to RayTech: Re-thinking pure-play defense? **(And thinking again; but counter-cyclical balancing best bet).**
- Supremacy of A321neo/XLR, Boeing's response. **(Boeing stuck)**

Global Aircraft Market Outlook In One Page

<u>Segment</u>	<u>2020</u>	<u>Risk</u>	<u>Elevator Comment</u>
Jetliners-SA	-4.7%		Includes some already-built MAXs. Watch China, fuel, traffic.
Jetliners-TA	-27.0%		Overcapacity an issue. Watch traffic, China. A330neo, A350-1000, 777X, 787 orders a concern
Regionals	-13.3%		Waiting for Boeing supply chain effect on E-2; Scope clause de-risked, but little growth.
Business Aircraft	-15.8%		Another hit after many false starts over a disappointing decade.
Civil Rotorcraft	-3.4%		Large civil hit again. Too many new models aimed at a weak segment (oil/gas).
Military Rotorcraft	-2.0%		AH-64 bounce ends; Programs end/slow; no risk of accelerated downturn; FVL beyond forecast, ex FARA.
Military Transports	-26.1%		A seriously underperforming market.
Fighters	2.9%		I like this market. F-35, plus strong Gen 4.5
<u>All Civil</u>	<u>-16.1%</u>		SAJetliner snapback due to MAX, weakness in other segments; more overcapacity risk.
<u>All Military</u>	<u>-0.2%</u>		Global insecurity, Tension, Malice. Special mission also boosts topline.
<u>Total Industry</u>	<u>-12.0%</u>		<u>Just the start of a serious downturn</u>

World Aircraft Deliveries By Value, 1989-2029



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