

World Aero Markets: Looking Up, From The Bottom of a Pit

World Aircraft Overview

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Aircraft Markets, In Good And Bad Years

(last year was not good)

<u>World New Deliveries</u>	<u>CAGR</u>	<u>CAGR</u>	<u>CAGR</u>	<u>Change</u>
<u>In 2020 (2021 \$)</u>	<u>'03-'08</u>	<u>'08-'14</u>	<u>'14-'19</u>	<u>'19-'20</u>
Jetliners-SA (\$27 b)	9.7%	6.9%	-2.0%	-54.8%
Jetliners-TA (\$27.8 b)	5.0%	13.5%	2.1%	-49.1%
Regionals (\$3.4 b)	3.9%	-3.1%	-6.3%	-47.8%
Business Aircraft (\$18.2 b)	16.7%	-2.2%	-1.2%	-15.7%
Civil Rotorcraft (\$3.1 b)	18.5%	-2.5%	-7.2%	-11.4%
Military Rotorcraft (\$10.7 b)	10.6%	9.7%	-7.0%	-16.3%
Military Transports (\$4.1 b)	3.2%	-0.9%	0.0%	-27.0%
Fighters (\$18.3 b)	1.6%	0.8%	6.1%	-22.6%
<u>All Civil</u> (\$79.9 b)	<u>9.7%</u>	<u>5.6%</u>	<u>-0.5%</u>	<u>-40.0%</u>
<u>All Military</u> (\$36.9 b)	<u>3.9%</u>	<u>4.1%</u>	<u>0.0%</u>	<u>-18.4%</u>
<u>Total</u> (\$116.7 b)	<u>8.0%</u>	<u>5.2%</u>	<u>-0.4%</u>	<u>-34.5%</u>

Aviation Segments By Damage

Most to Least
**Annotated, 15
Months In**

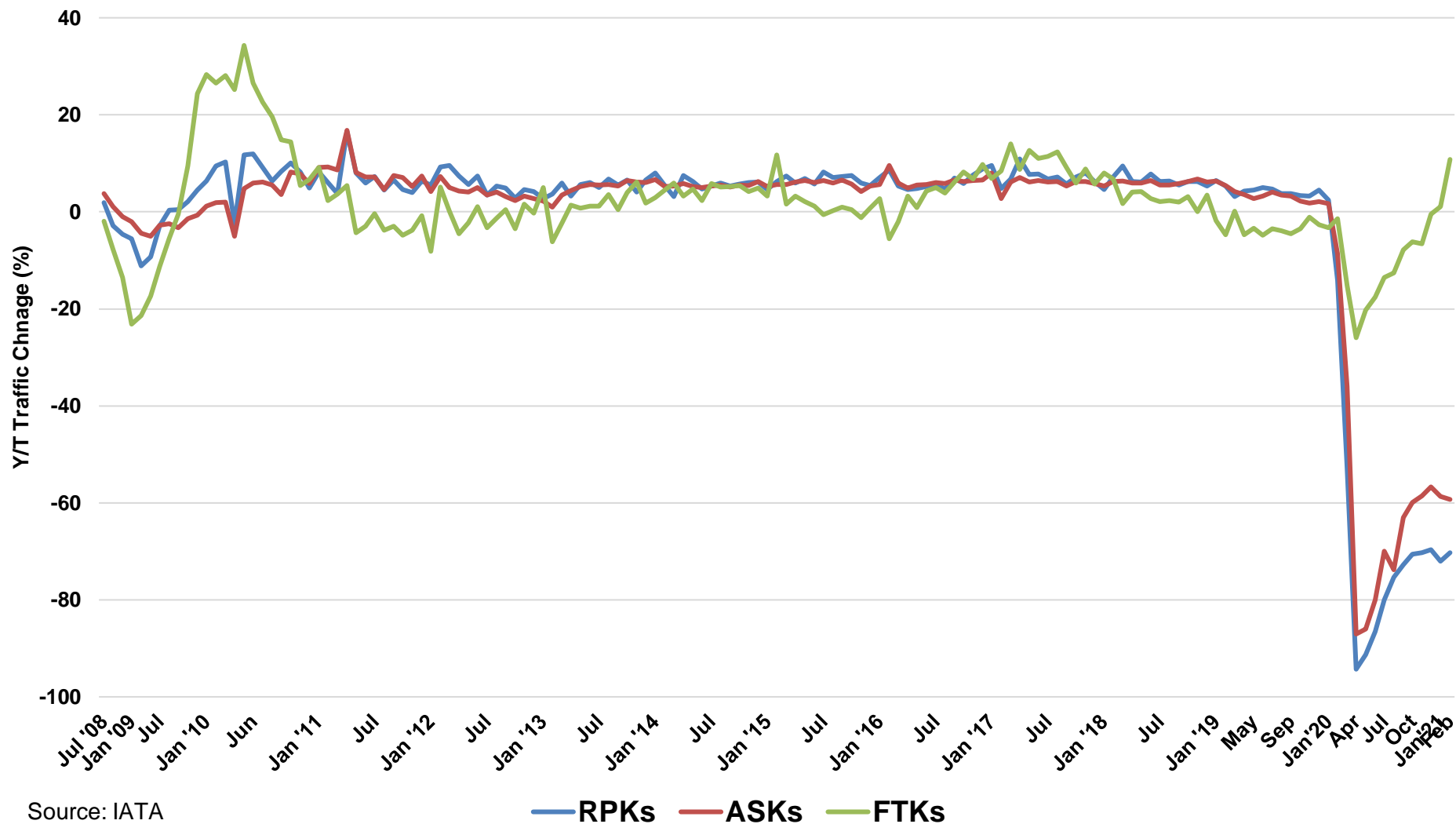
Twin aisle jetliners	<p>International traffic hit hardest and longest. Already an overcapacity situation. Secular shift towards single aisles already underway.</p> <p>It's just that bad.</p>
Single aisle jetliners	<p>Fuel prices a big problem. China comeback uncertain. Some relief due to deferred Airbus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

Traffic: Nothing We've Ever Seen Before

-65.9% RPKs in 2020 (-56.5% ASKs; -10.6 FTKs)

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%



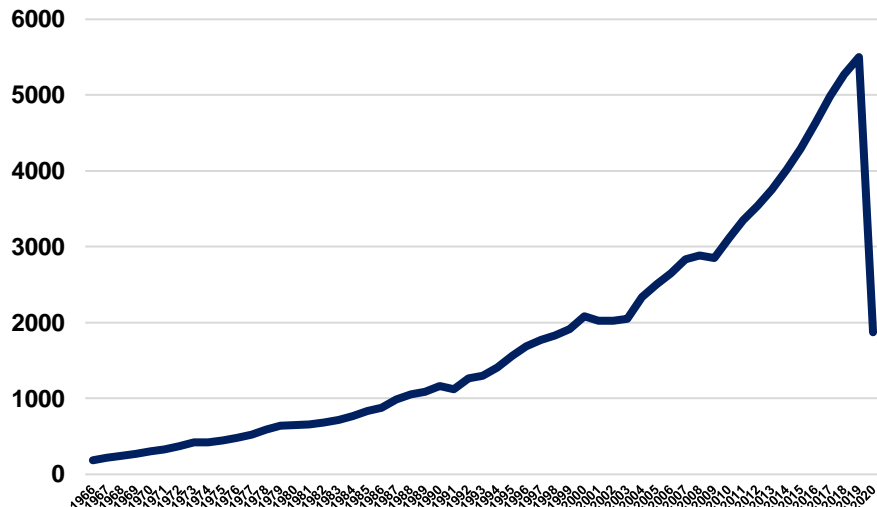
Source: IATA

— RPKs — ASKs — FTKs

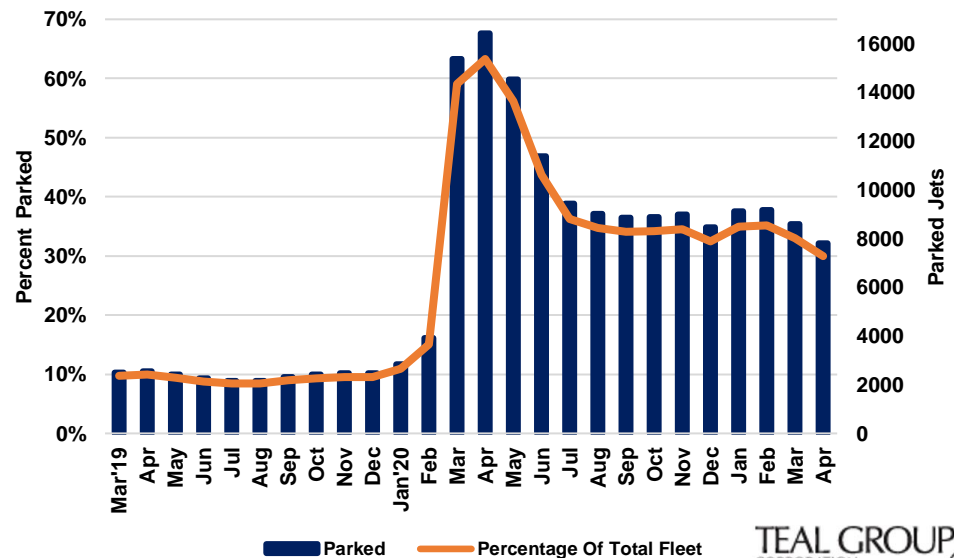
More Unprecedented Numbers

- **Traffic decline, parked fleet like no previous shock.**
 - Per Paul Krugman, reflect a world economy recovering from a “medically-induced coma.”
- **Backlogs holding up (MAX a concern), but meaningless in a downturn.**
- **Many early retirements coming, particularly twin aisles.**
 - Primarily twin aisles; A380 bloodbath.
- **Aftermarket catastrophe – ASK decline, plus de-stocking, deferred maintenance, early retirements, USM, engine swapping, etc.**

World Air Traffic (RPM Bns)



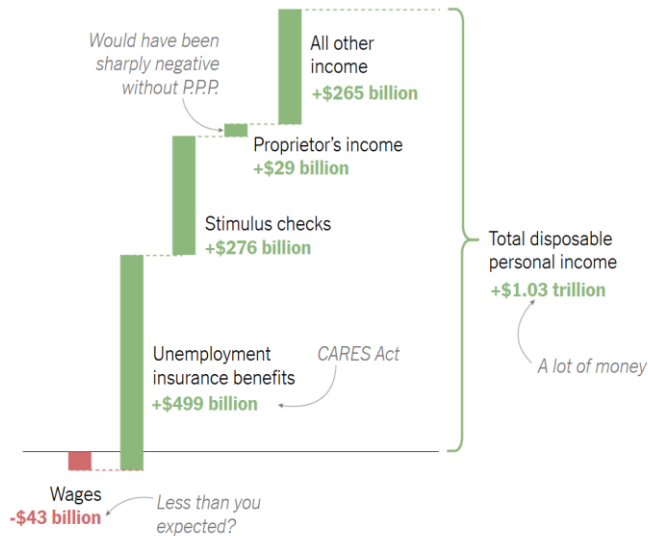
World Jet Fleet: Stuck At ~30% Unemployed



Traffic Peak Recovery By Late 2022. Why?

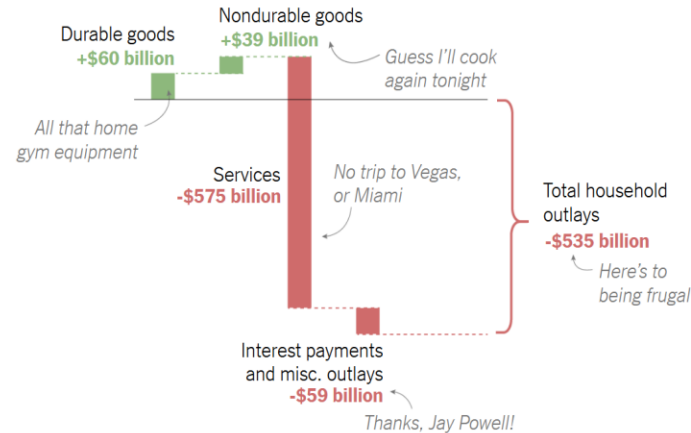
- **Better-than-expected vaccine efficacy.**
- **Better-than-expected economic outlook.**
- **The China domestic comeback.**
- **Business travel resurgence.**
- **Vacation travel resurgence, fueled by record savings rates.**

Personal income increased



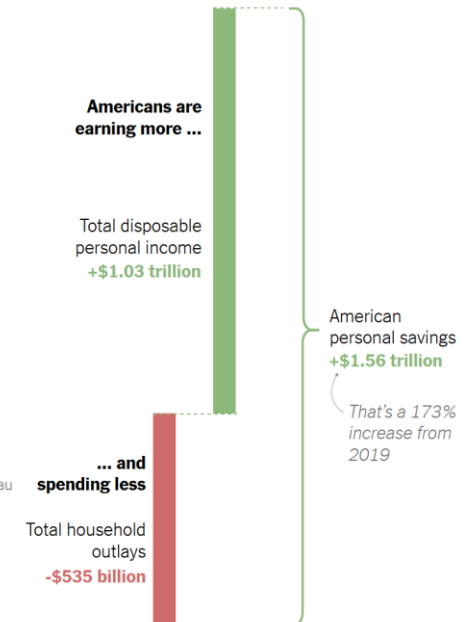
Note: Data from March to November 2020 compared with the same time period in 2019. Source: Bureau of Economic Analysis

Spending decreased



Note: Data from March to November 2020 compared with the same time period in 2019. Source: Bureau of Economic Analysis

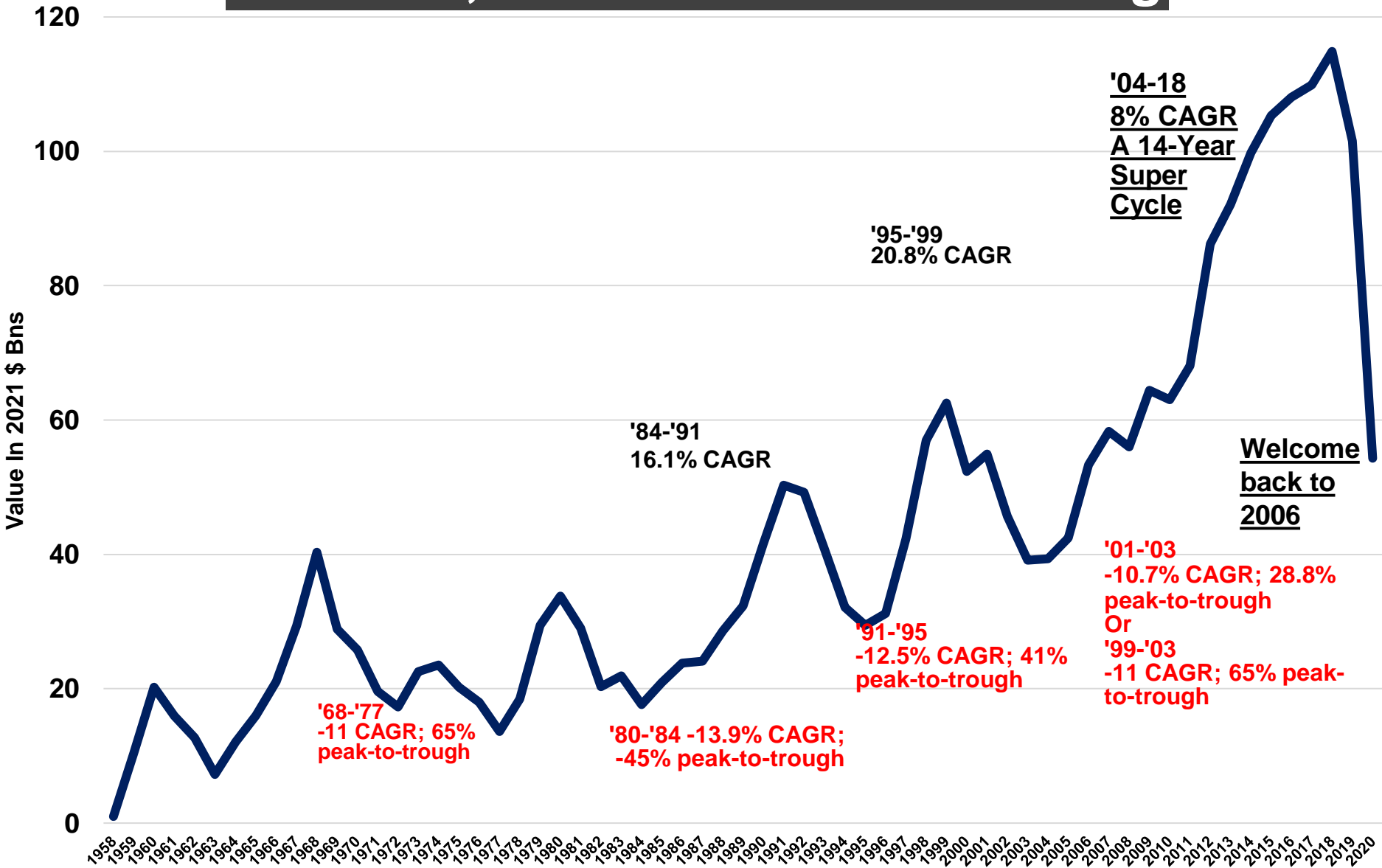
Americans are saving a lot of money



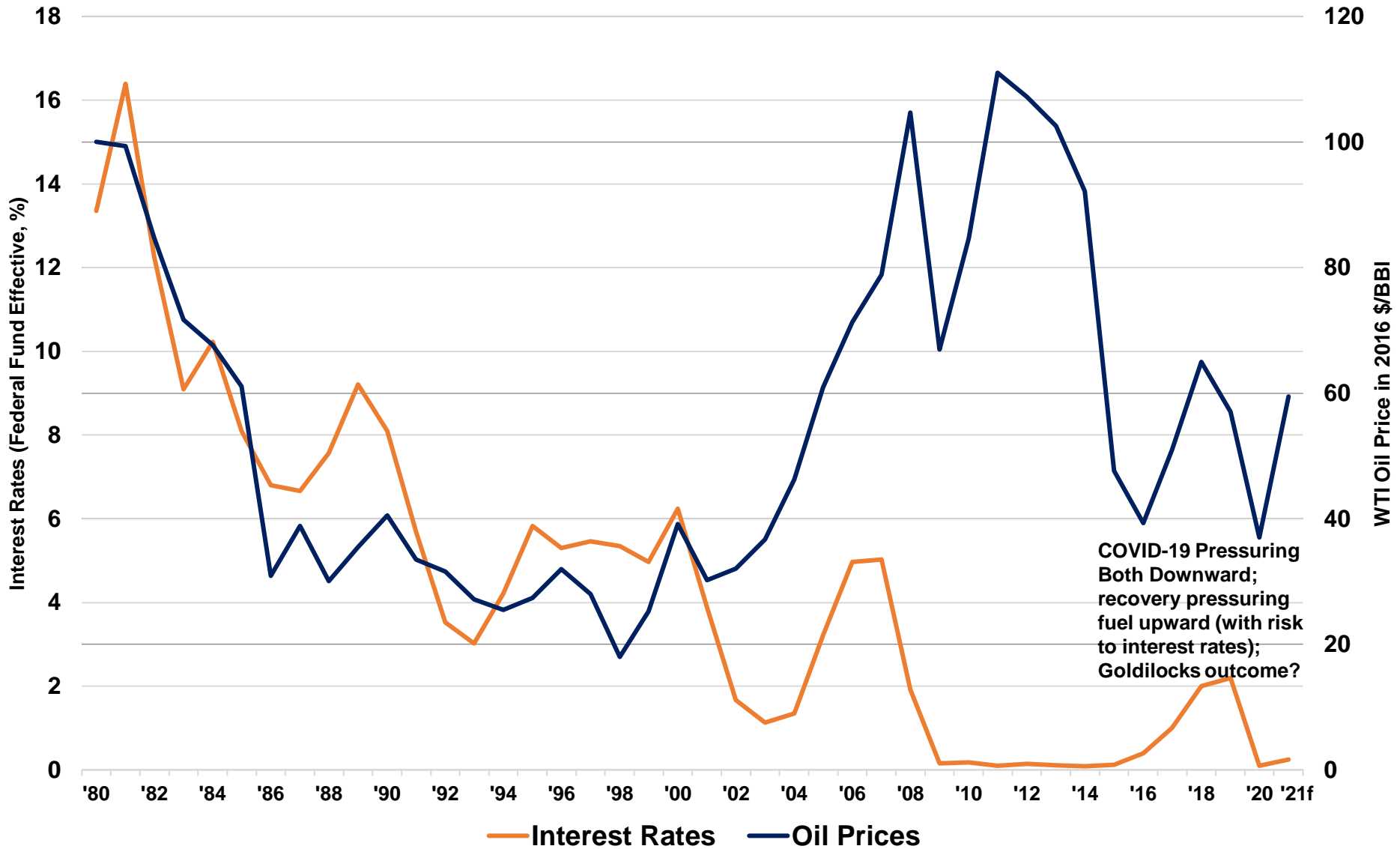
Note: Data from March to November 2020 compared with the same time period in 2019. Source: Bureau of Economic Analysis

<https://www.nytimes.com/2021/01/01/upshot/why-markets-boomed-2020.html>

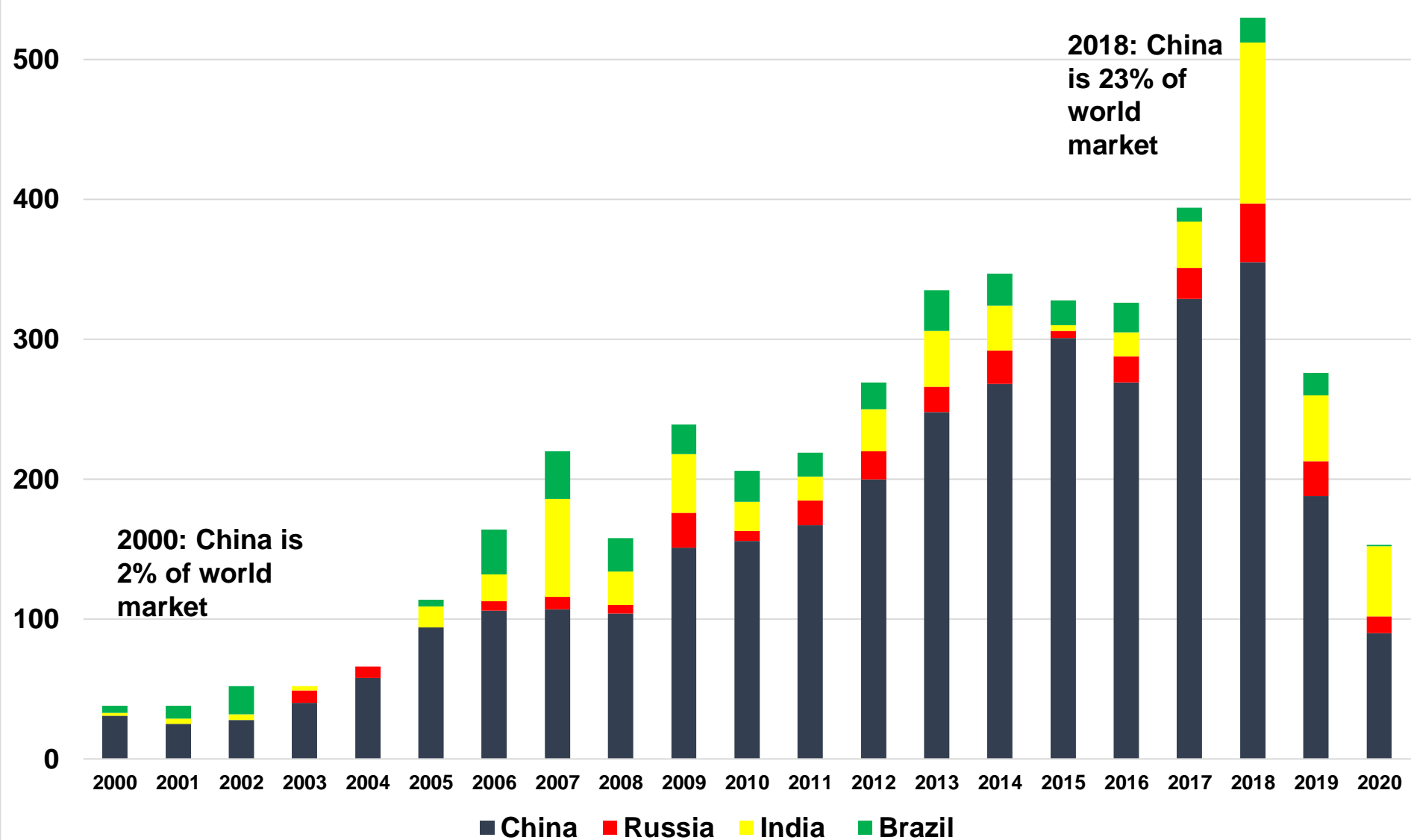
Here It Is, The Chart I Was Dreading



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

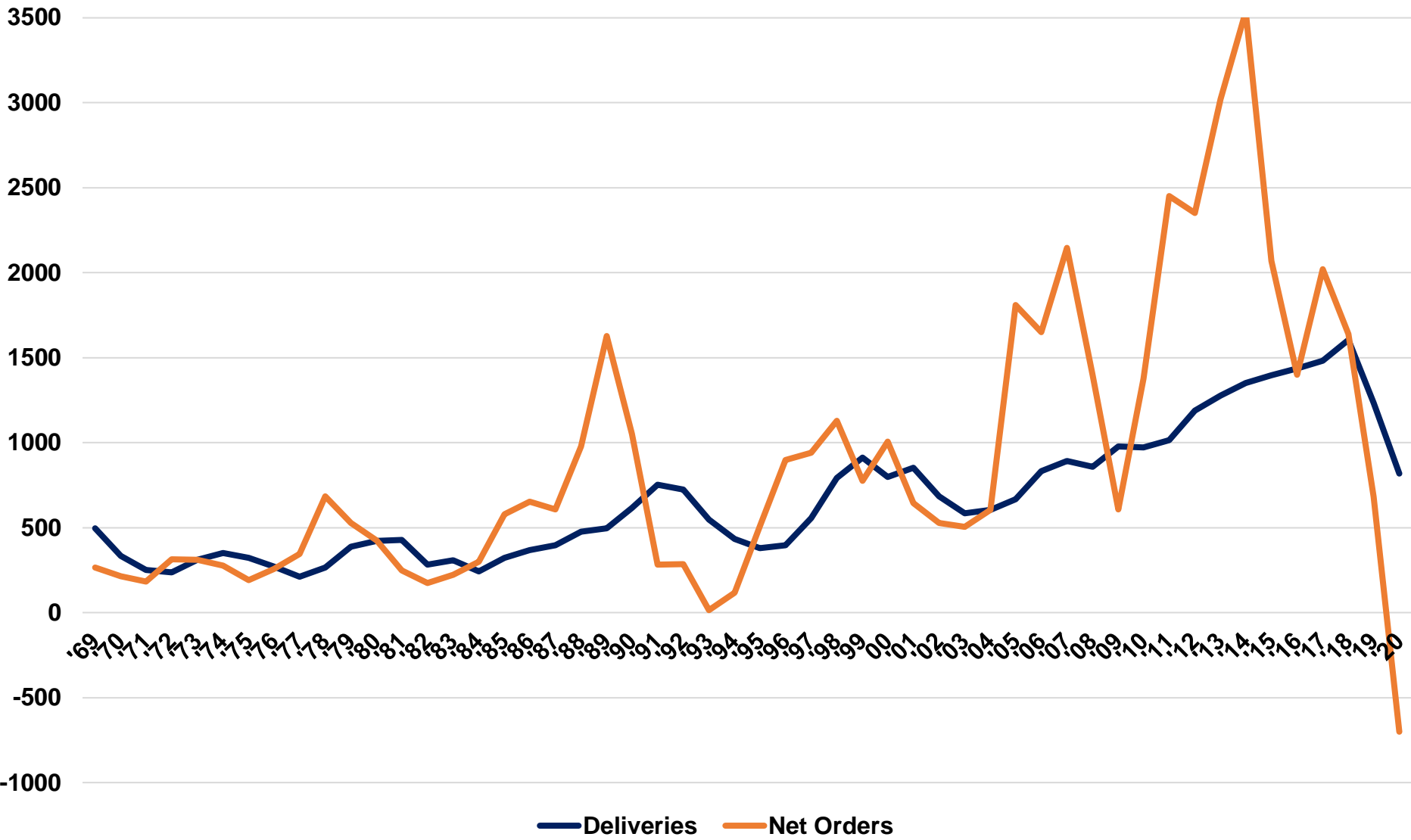


BRIC Deliveries: All About China

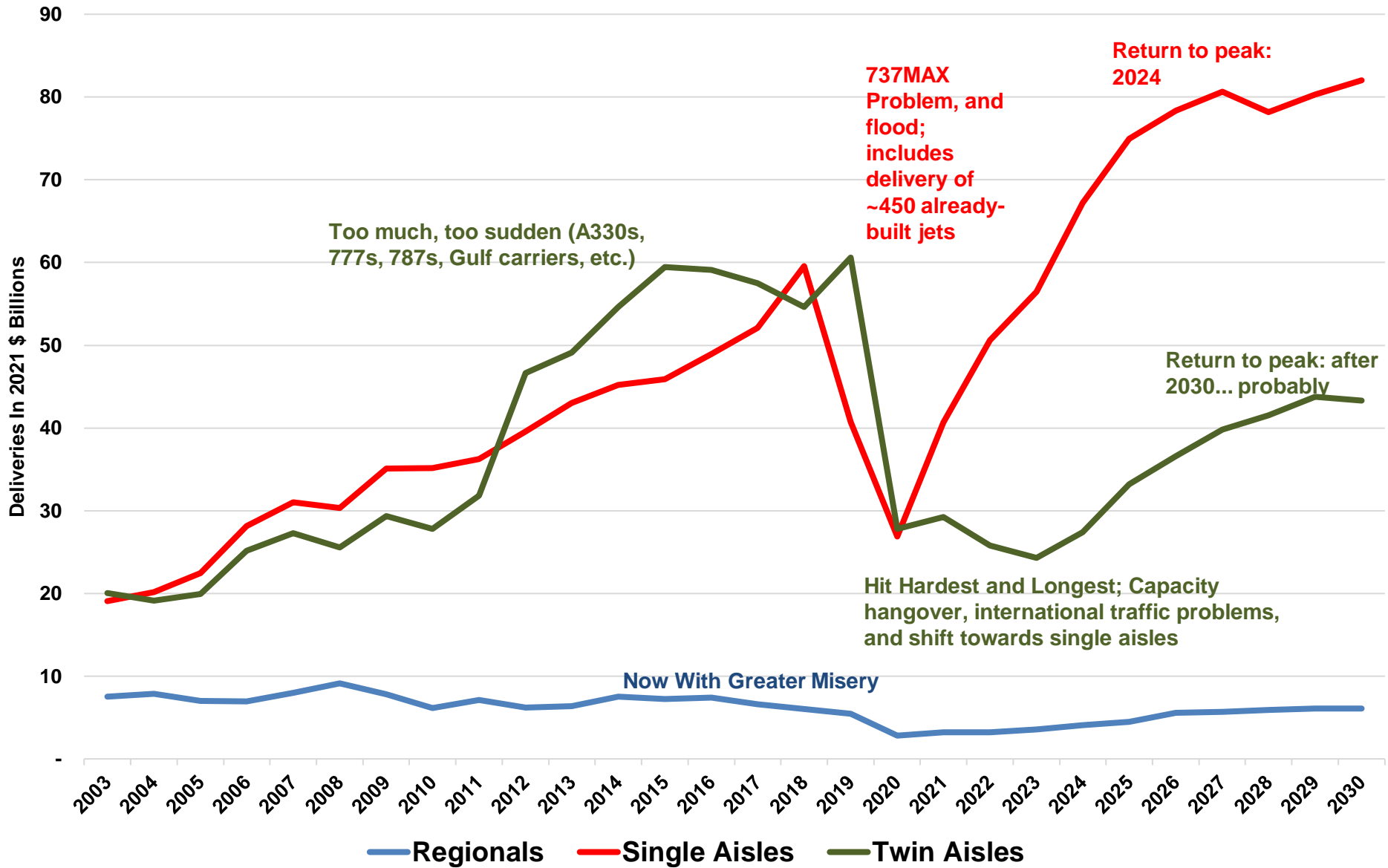


Large Jetliner Orders And Deliveries

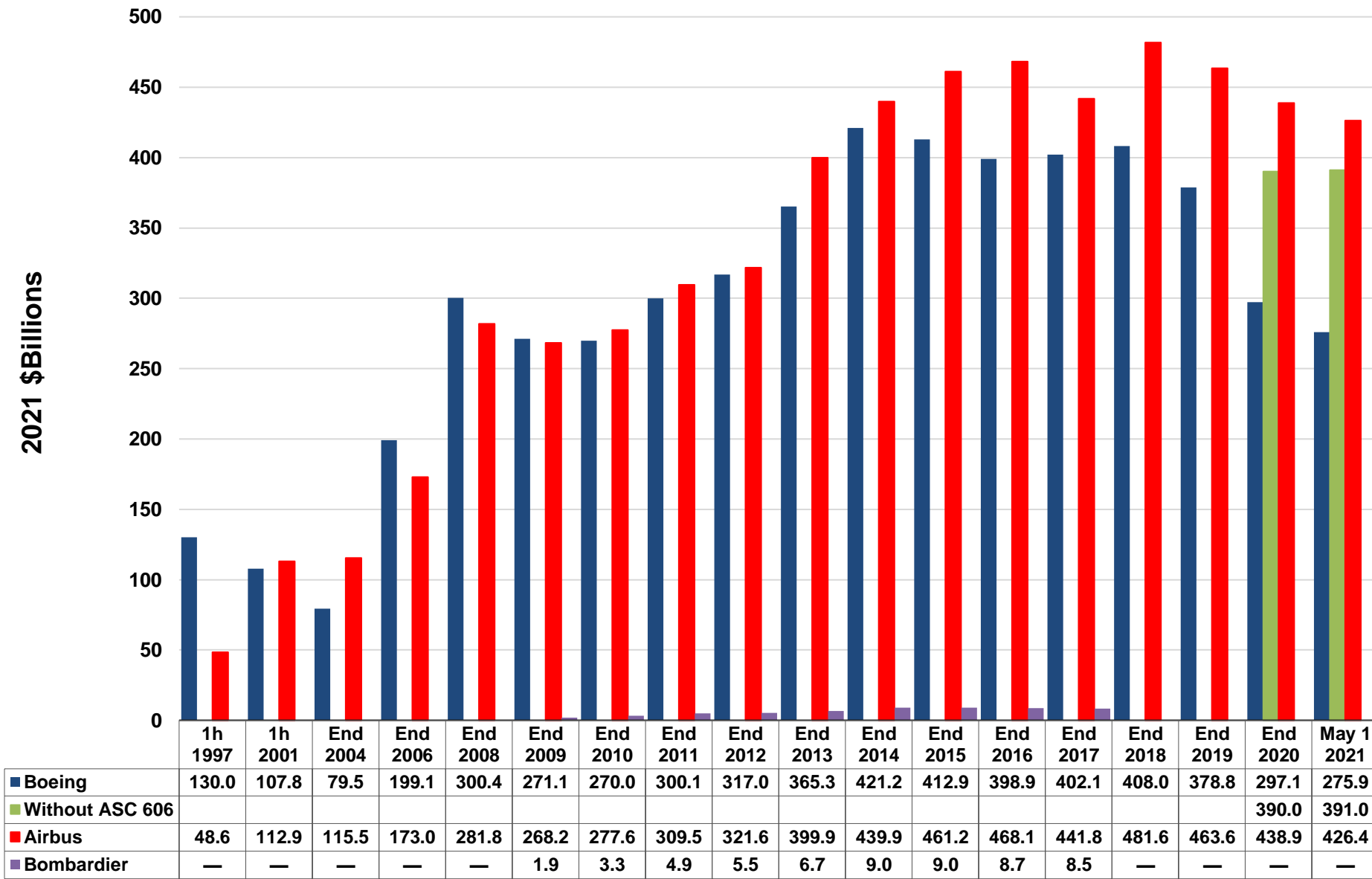
Book-To-Bill No Longer A Thing



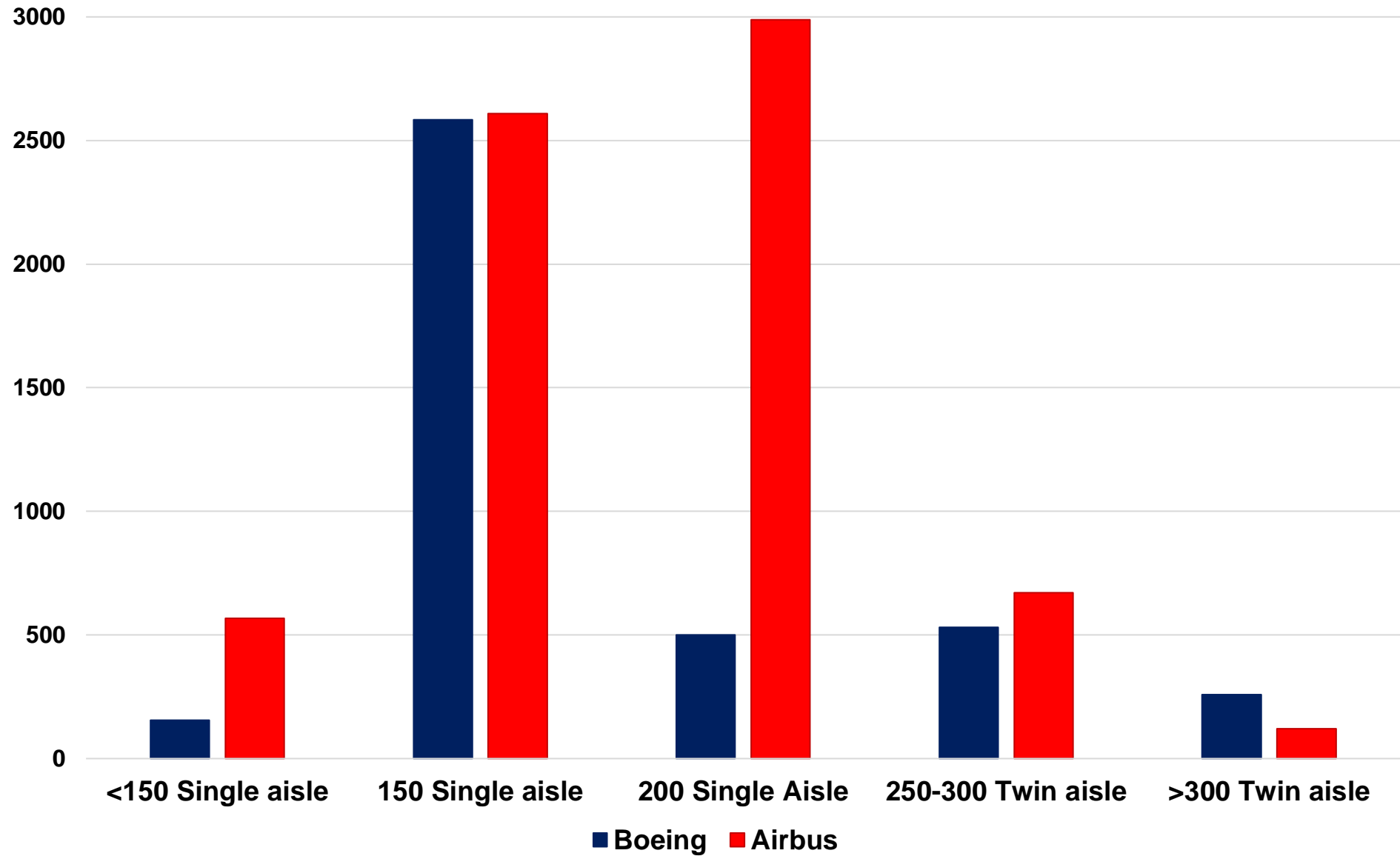
The Air Transport Market By Segment



Firm Order Backlog Values: Boeing Taking A Hit

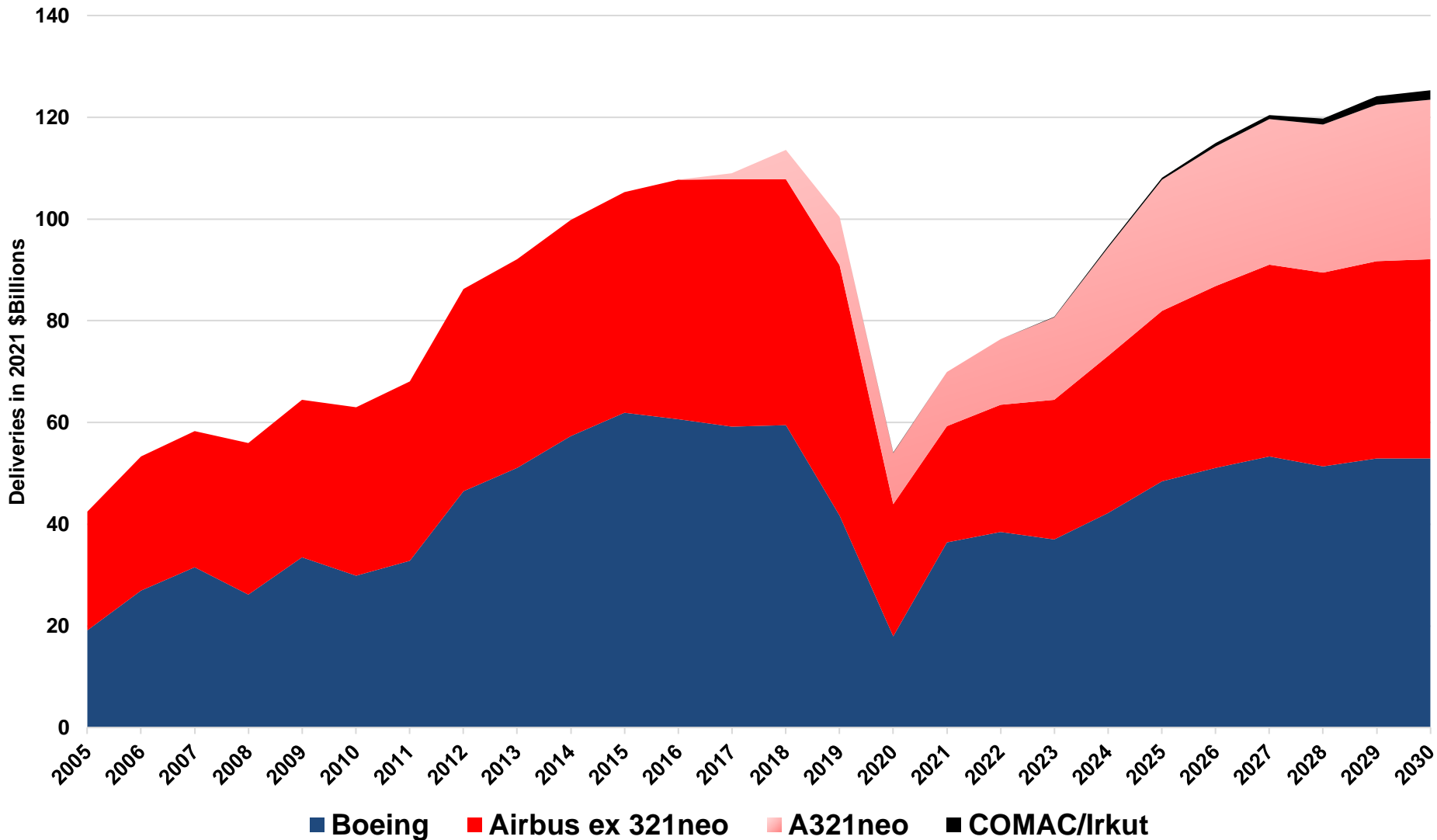


Airbus, Boeing Jetliner Backlogs (May, w/ ASC 606)

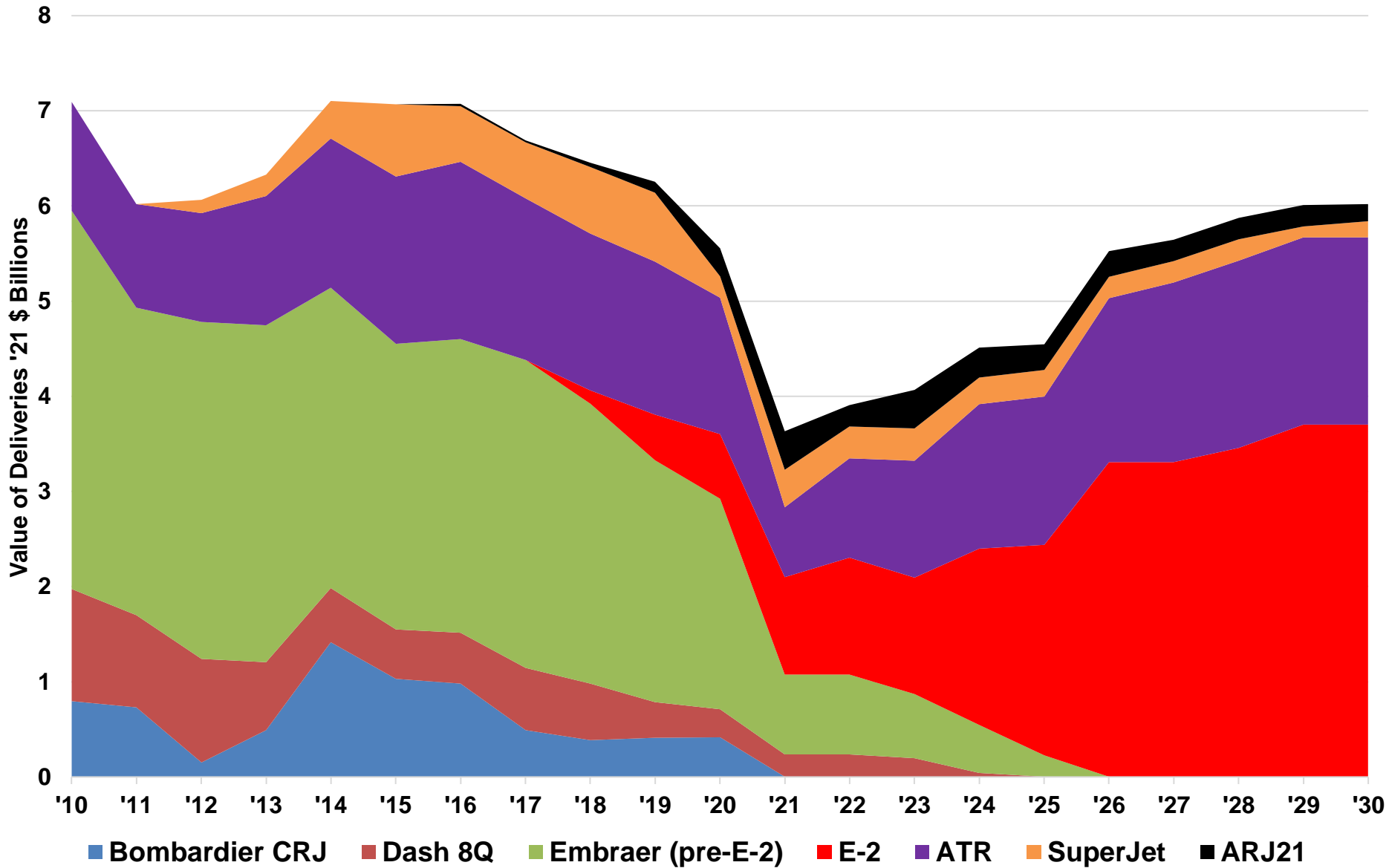


Jetliner Market Shares By Deliveries

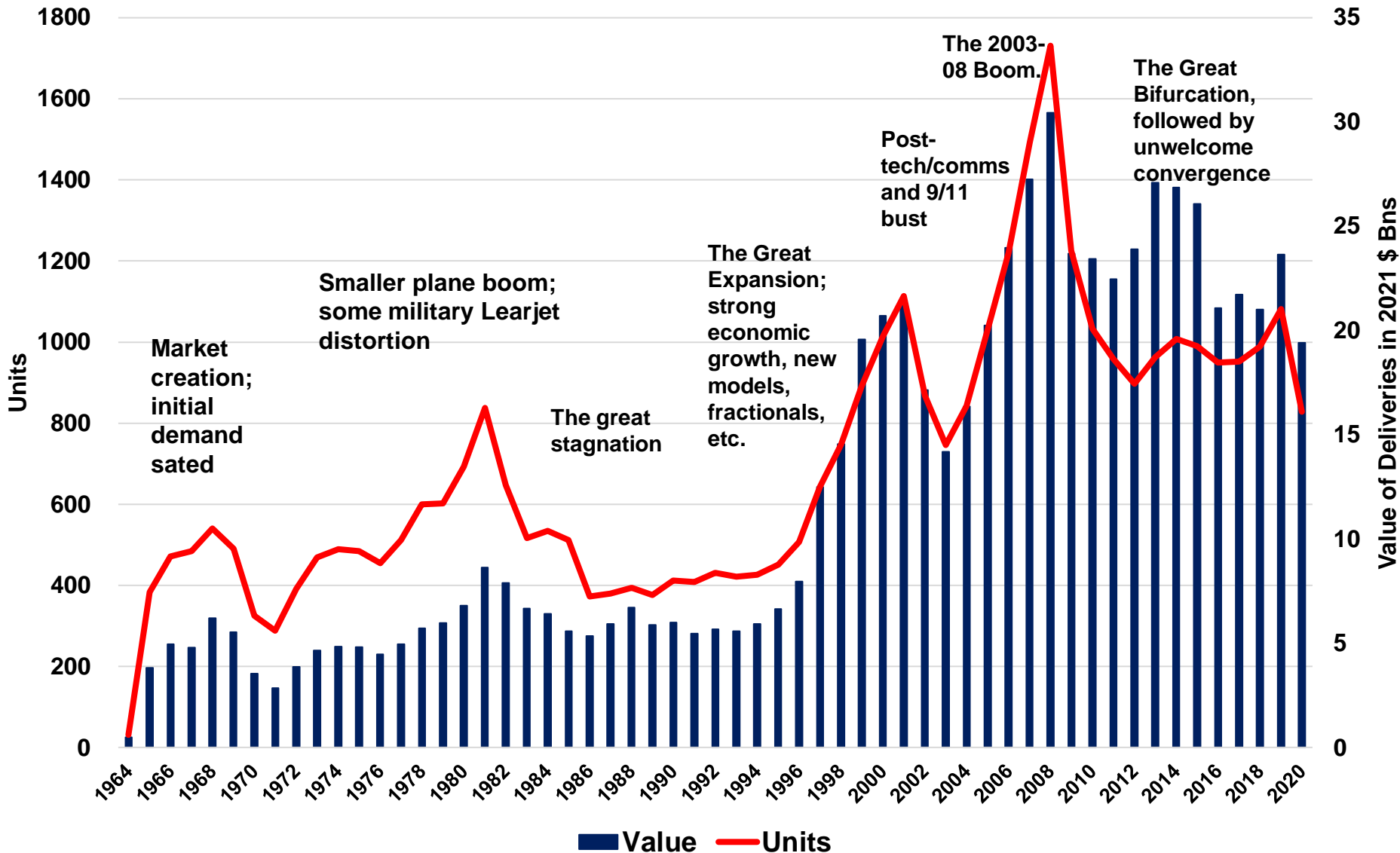
Airbus Seizes The Middle Market and First Place; Covid-19 Accelerates shift to Middle Market



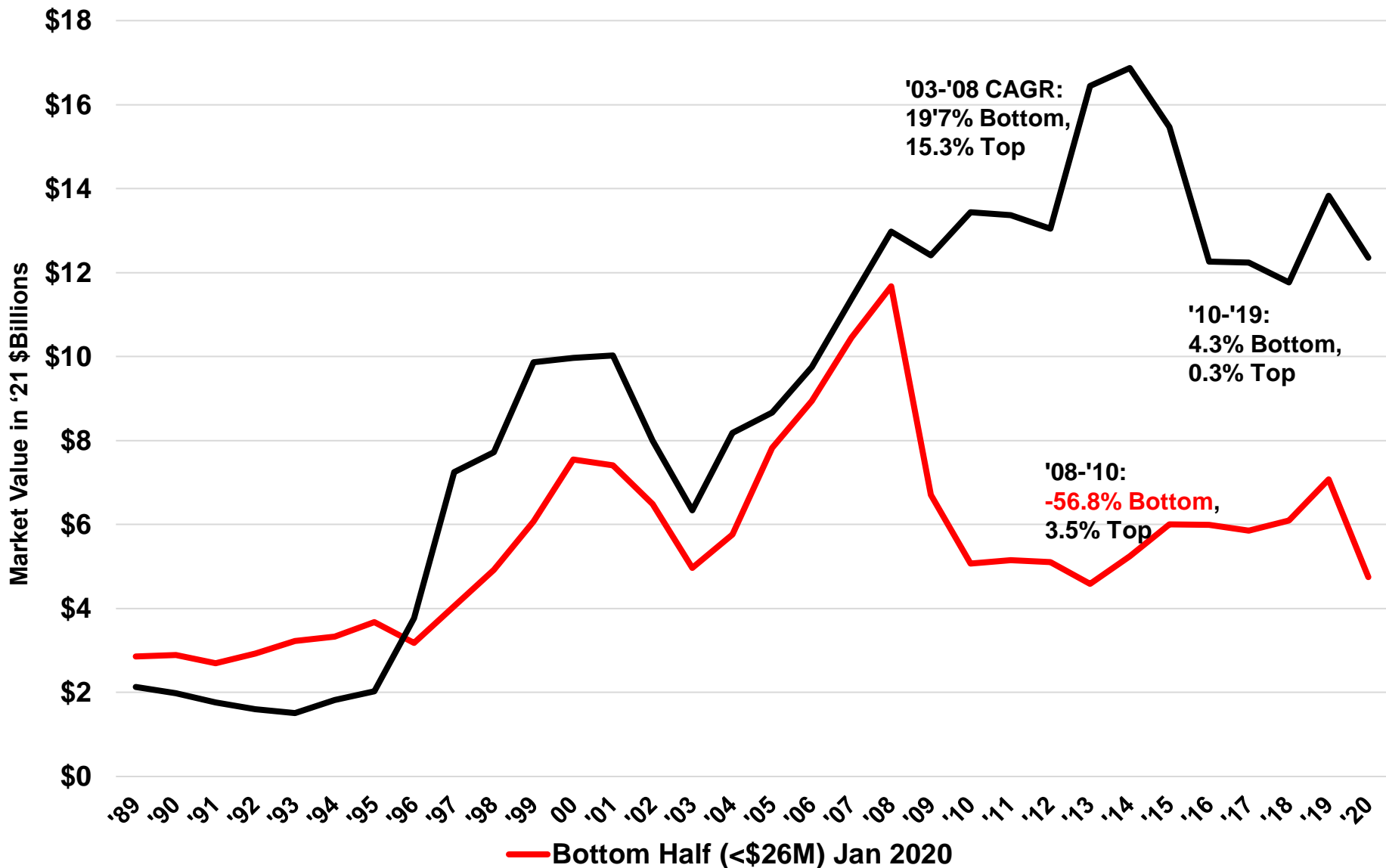
Regional Deliveries By OEM (Value)



Business Aircraft Market History (w/jetliners, RJs, turboprops)



Bottom Half Bizjet Segment vs. Top Half



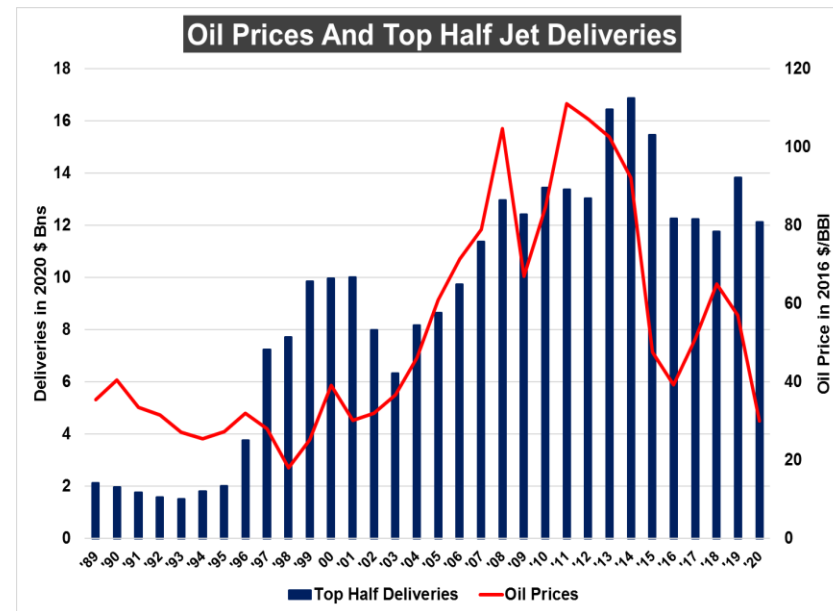
Eight Contradictory Bizav Indicators

- **Three Mixed Leading Market Indicators:**

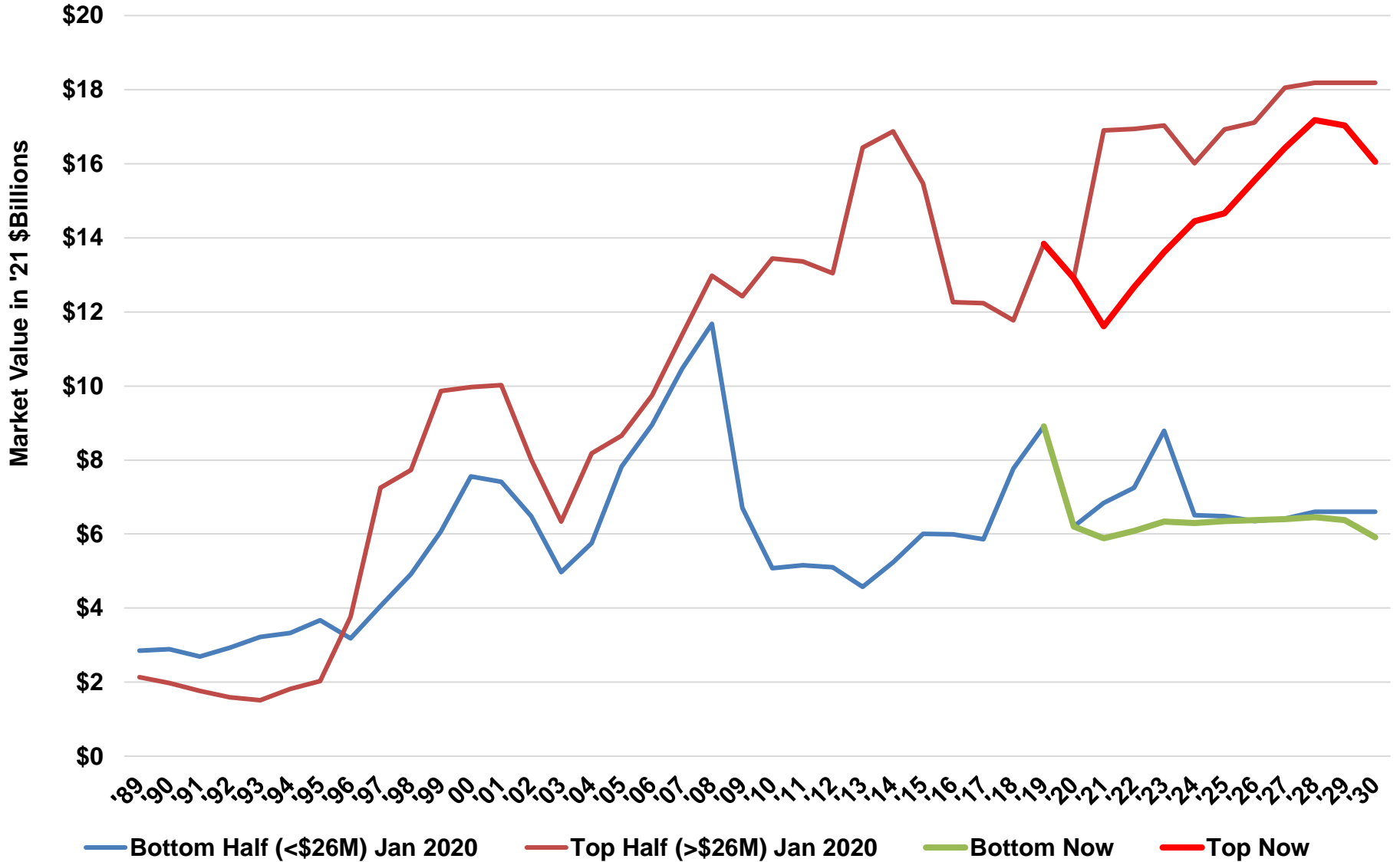
- Corporate profits (bad).
- Equities markets (good).
- Oil prices (bad, but improving).

- **Five Mixed Immediate Market Health Indicators:**

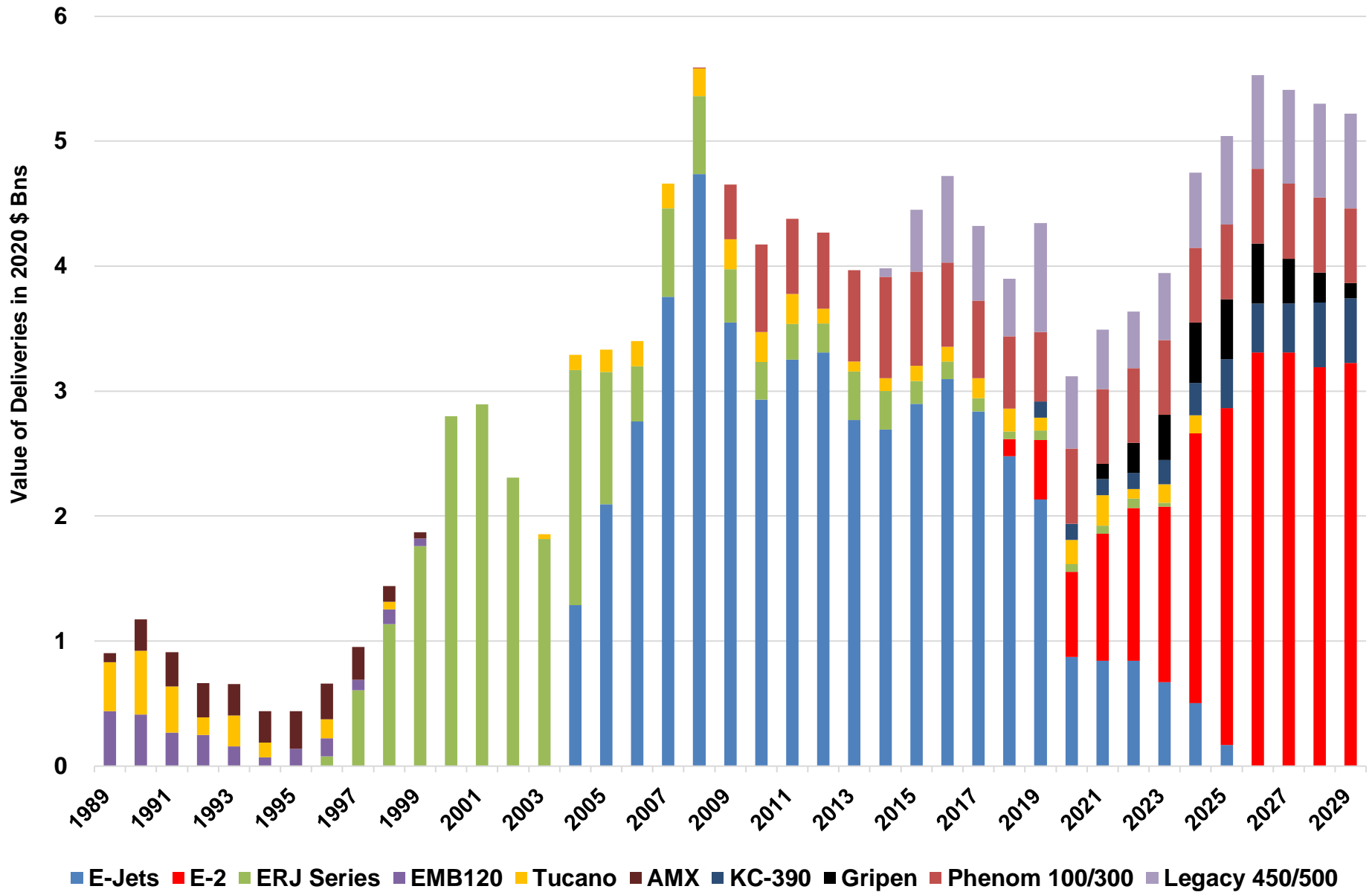
- Deliveries (bad)
- Aircraft available for sale (just modestly up...and improving).
- Aircraft prices (down somewhat).
- Company layoffs (GD, BBD, TXT).
- Utilization (down, but recovering much faster than airline travel, with charter and fractionals looking great).



Bottom Half Bizjet Segment vs. Top Half



Embraer: Searching For Growth After The E-Jet Revolution



Global Aircraft Market Outlook In One Page

(Deliveries, *not* Production)

<u>Segment</u>	<u>2021</u>	<u>'21-'22</u>	<u>Risk</u>	<u>Elevator Comment</u>
Jetliners-SA	51.2%	24.4%		Includes some already-built MAXs. Watch China, fuel, traffic.
Jetliners-TA	5.2%	-11.9%		Overcapacity, slow international recovery, secular shift to SAs; 787 inventory issue
Regionals	14.0%	-0.9%		No Boeing supply chain effect on E-2; Scope clause de-risked, but little growth.
Business Aircraft	-7.5%	7.6%		Another hit after many false starts over a disappointing decade.
Civil Rotorcraft	-0.9%	14.2%		Large civil hit again. Too many new models aimed at a weak segment (oil/gas).
Military Rotorcraft	0.5%	3.7%		Programs end/slow; no risk of accelerated downturn; FVL beyond forecast, exc FARA.
Military Transports	-2.8%	-1.8%		A seriously underperforming market.
Fighters	28.5%	19.4%		I like this market. F-35 (after COVID disruption), plus strong Gen 4.5
<u>All Civil</u>	<u>17.3%</u>	<u>8.8%</u>		SAJetliner snapback due to MAX, weakness in other segments; more overcapacity risk.
<u>All Military</u>	<u>14.4%</u>	<u>12.3%</u>		Global insecurity, Tension, Malice. Special mission (ISR, B-21) also boosts topline.
<u>Total Industry</u>	<u>16.4%</u>	<u>9.9%</u>		<u>Back to peak in 2024</u>

Covid-19 Impact: Nothing New; Just An Acceleration of Pre-existing Trends

- **Societal:** growing inequality, growth of e-commerce over stores, movie theaters decline, normalization of formerly fringe beliefs, rising ill-liberal “democracies.”
- **Macroeconomic:** lower interest rates, excess savings, few investment opportunities, cheaper fuel, China de-coupling.
- **Industry:**
 - More point-to-point international routes (fragmentation); related demand for smaller, mid-range jets.
 - End of quadjets, marginalization of all larger jets.
 - Growing reliance on third party jetliner finance.
 - Jetliner price deflation.
 - Supplier rationalization, particularly 3/4th tier.
 - New product funding drought.
 - China indigenous substitute product development
 - Boeing single aisle breadth concerns; Airbus mid-market dominance.
 - Rolls-Royce under pressure.
 - OEMs and airlines: strong get stronger, weak get weaker.
 - Uncertain search for various alternative propulsion/fuel concepts.
- **K-patterns everywhere:** Domestic/int’l traffic, single aisles/twins, developed/emerging, bizav/scheduled, etc.

Concluding Observations, and A Few Consolations

- **The jetliner market might get worse.**
 - This is a synthetic market, not an organic one.
 - Deliveries driven by exogenous factors: government aid, third-, first party finance. These may not hold (particularly government aid).
 - *But...a very steep decline will lead to record growth numbers in the recovery, with attendant exuberance.*
- **Boeing faces a very serious mid market challenge.**
- **Defense companies can 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 this time (“2008 was worse; you couldn’t print money.”).*
- **A relatively isolated (severe) jetliner-only downturn?**

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