

Aviation Risk Assessment

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Business Context



Stakeholder considering purchasing and operating commercial & private airplanes.



Primary concern is finding lowest-risk airplanes.



Risk can be evaluated in terms of safety and cost.



This project prioritizes safety first and then categorizes planes by investment size.

Project Goals

Evaluate

Evaluate data for aircraft safety records

- fix duplicate or missing data
- designate relevant & insightful measurement methods

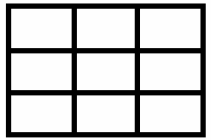
Recommend

Recommend aircraft that are low-risk in terms of number and severity of incidents.

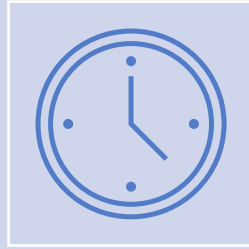
Categorize

Categorize recommended planes in terms of size and cost.

Data Overview



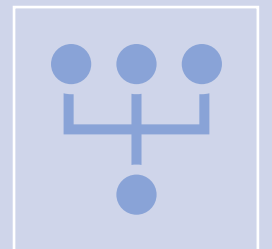
Data records show every NTSB-documented incident since 1962



We'll focus on airplanes that are still made or were only recently discontinued.



Passenger capacity and operational costs differ widely among these planes.



Subsequently, we split them into three size-based tiers.

Method Overview

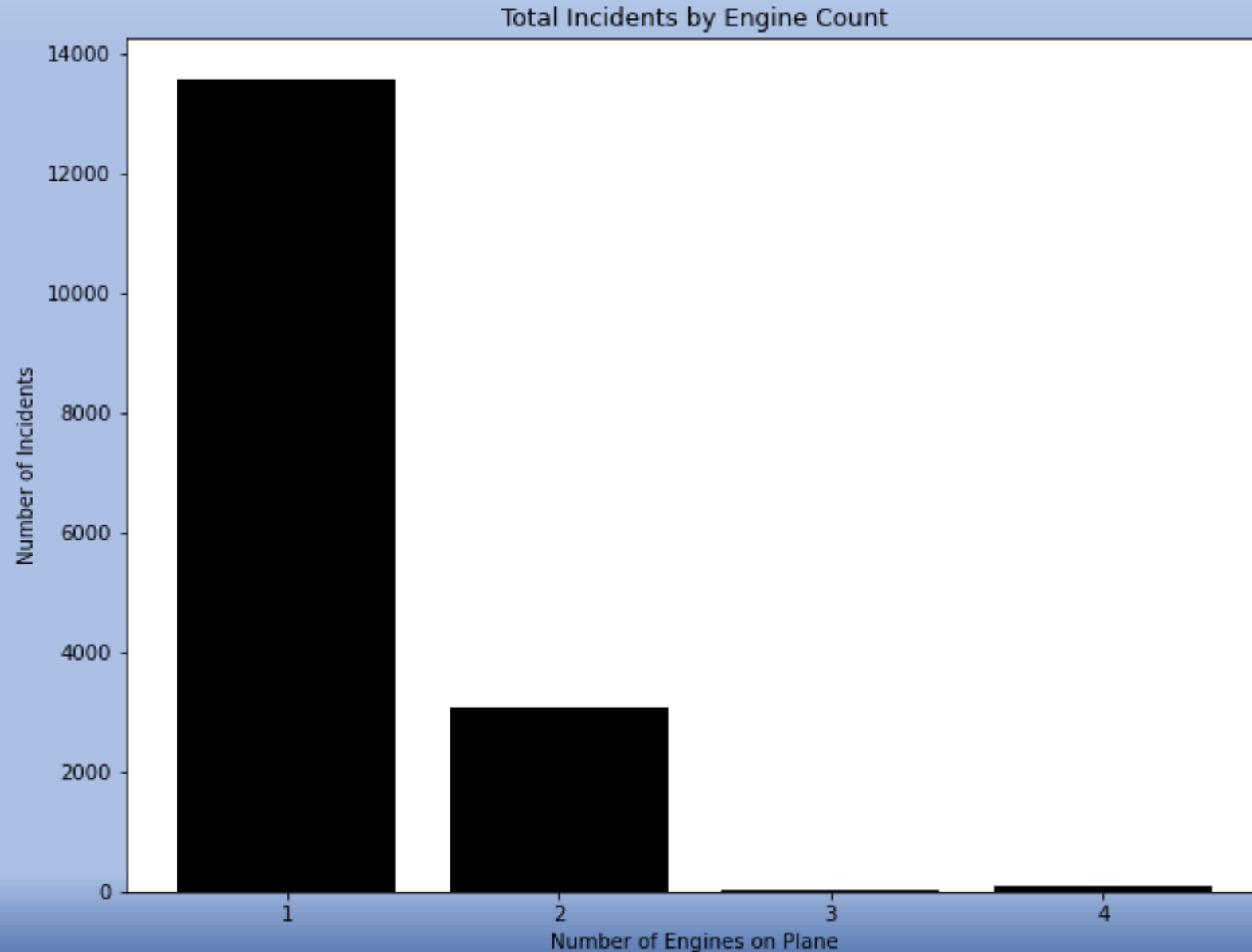
- General analysis of low-risk planes
 - lighter, single-engine aircraft are higher risk
 - larger, multi-engine aircraft are lower risk
- Compiling more specific findings:
 - certain manufacturers make lower-risk planes
 - we split those aircraft into three tiers:
 1. private planes
 2. regional airliners
 3. large airliners
 - we determine which aircraft per size are the lowest-risk

Results Overview

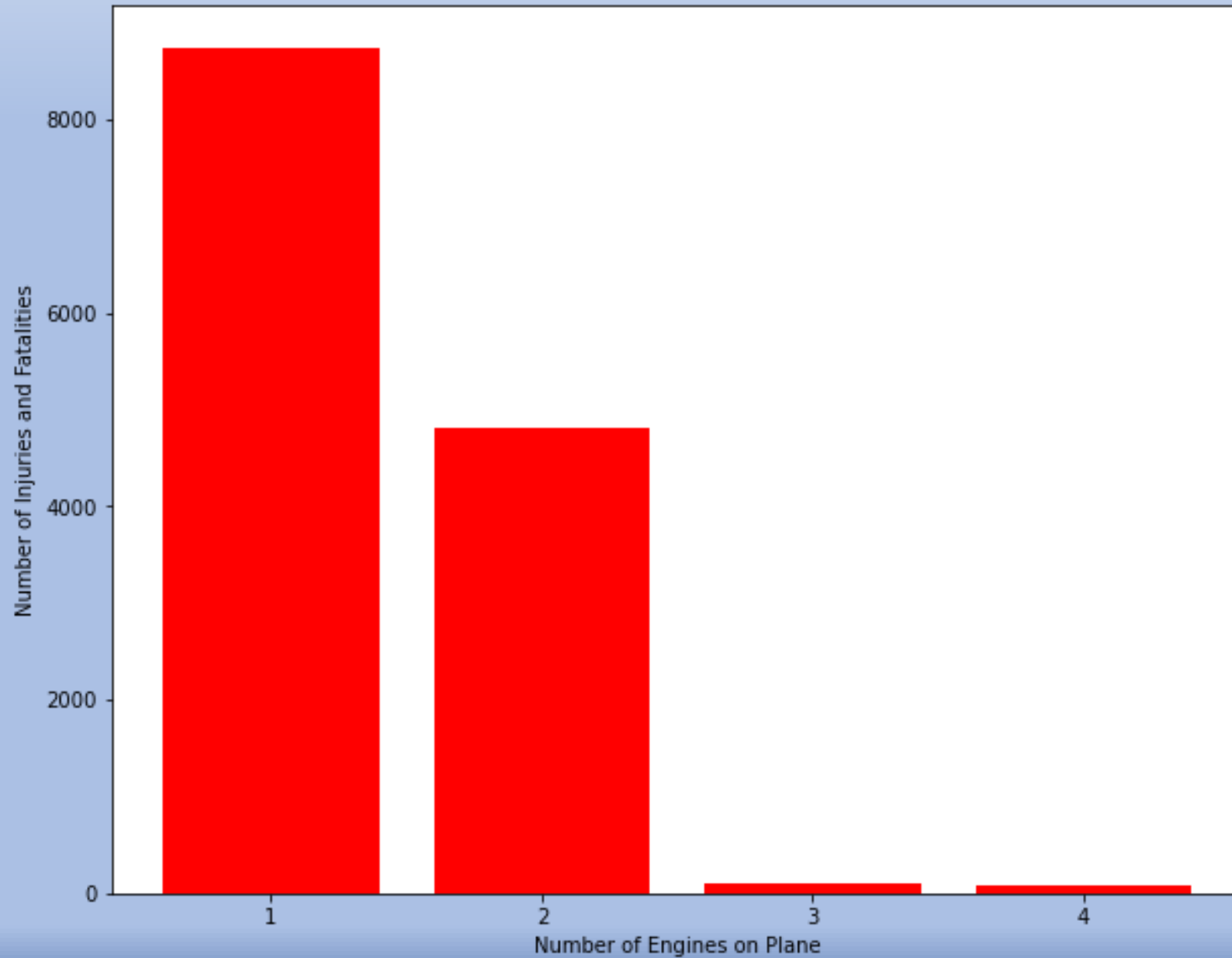
avoid single-engine and light aircraft
&
consider these recommended manufacturers:

- large airliners:
 - Boeing
 - Airbus
- regional airliners:
 - Bombardier
 - Embraer
- private planes:
 - Gulfstream
 - Learjet
 - Cessna
 - Piper
 - Beech

why eliminate single-engine planes?



Total Injuries and Fatalities by Engine Count



categorizing planes by size

private planes seat 15 or fewer people



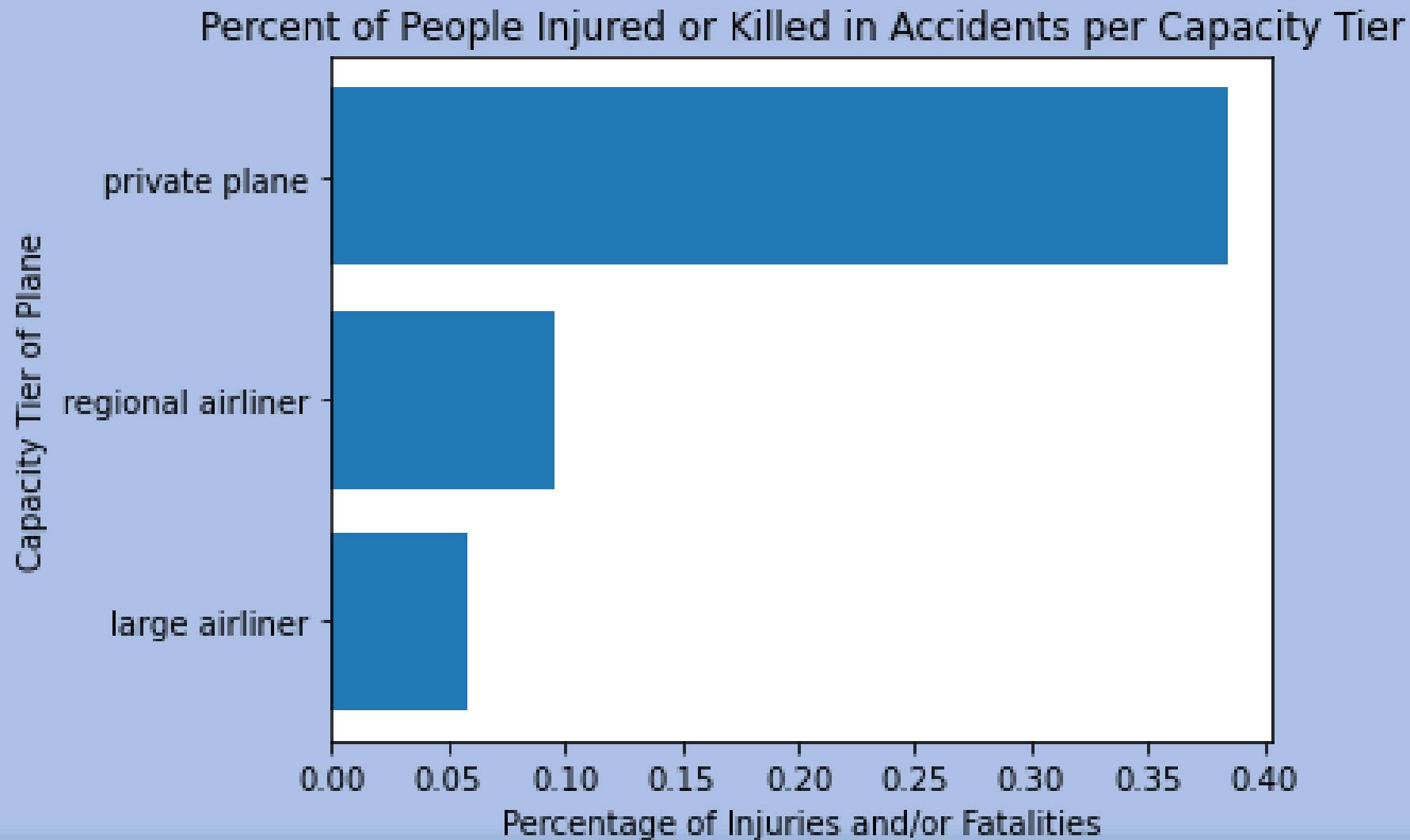
regional airliners seat 16-100



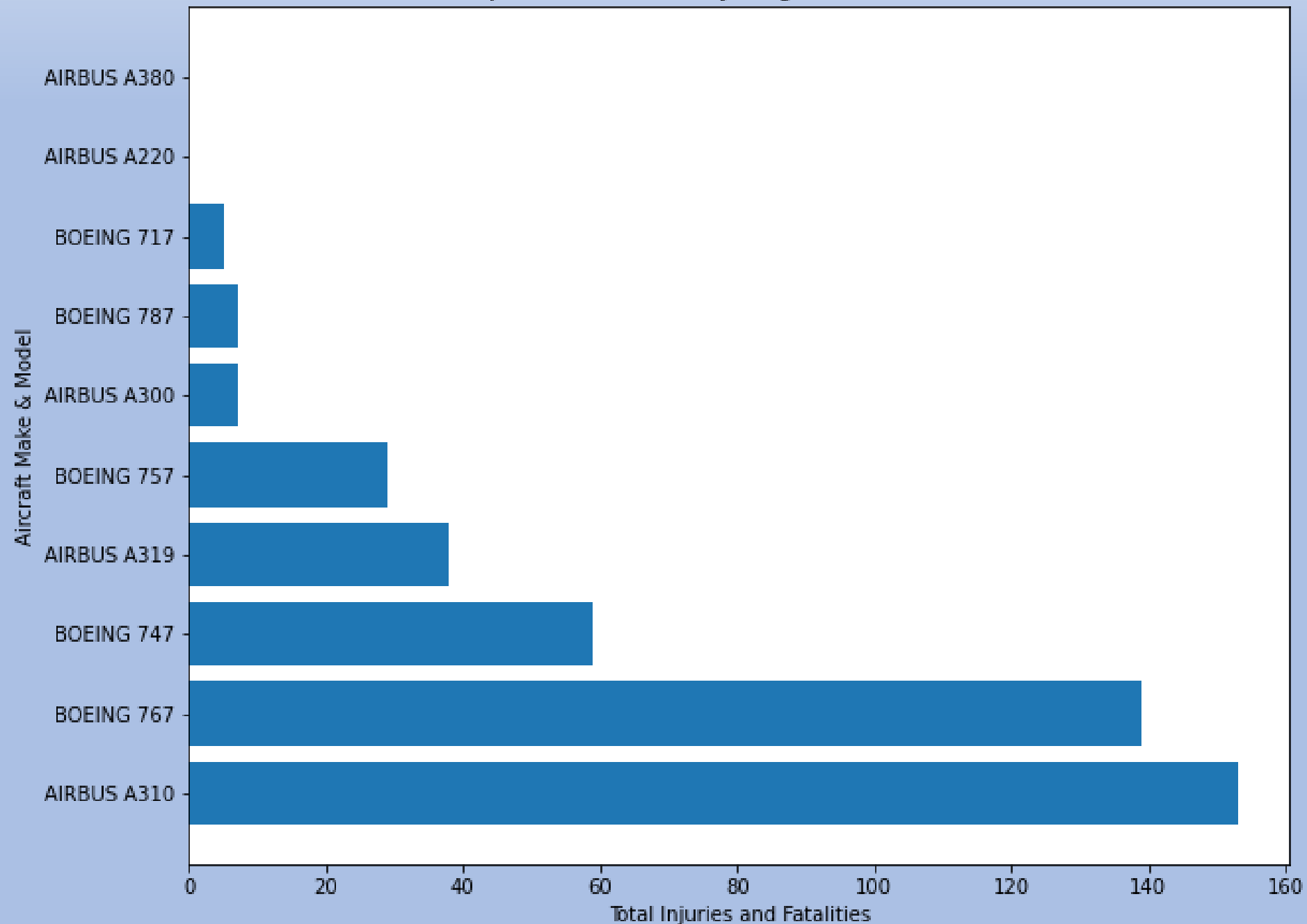
large airliners seat more than 100



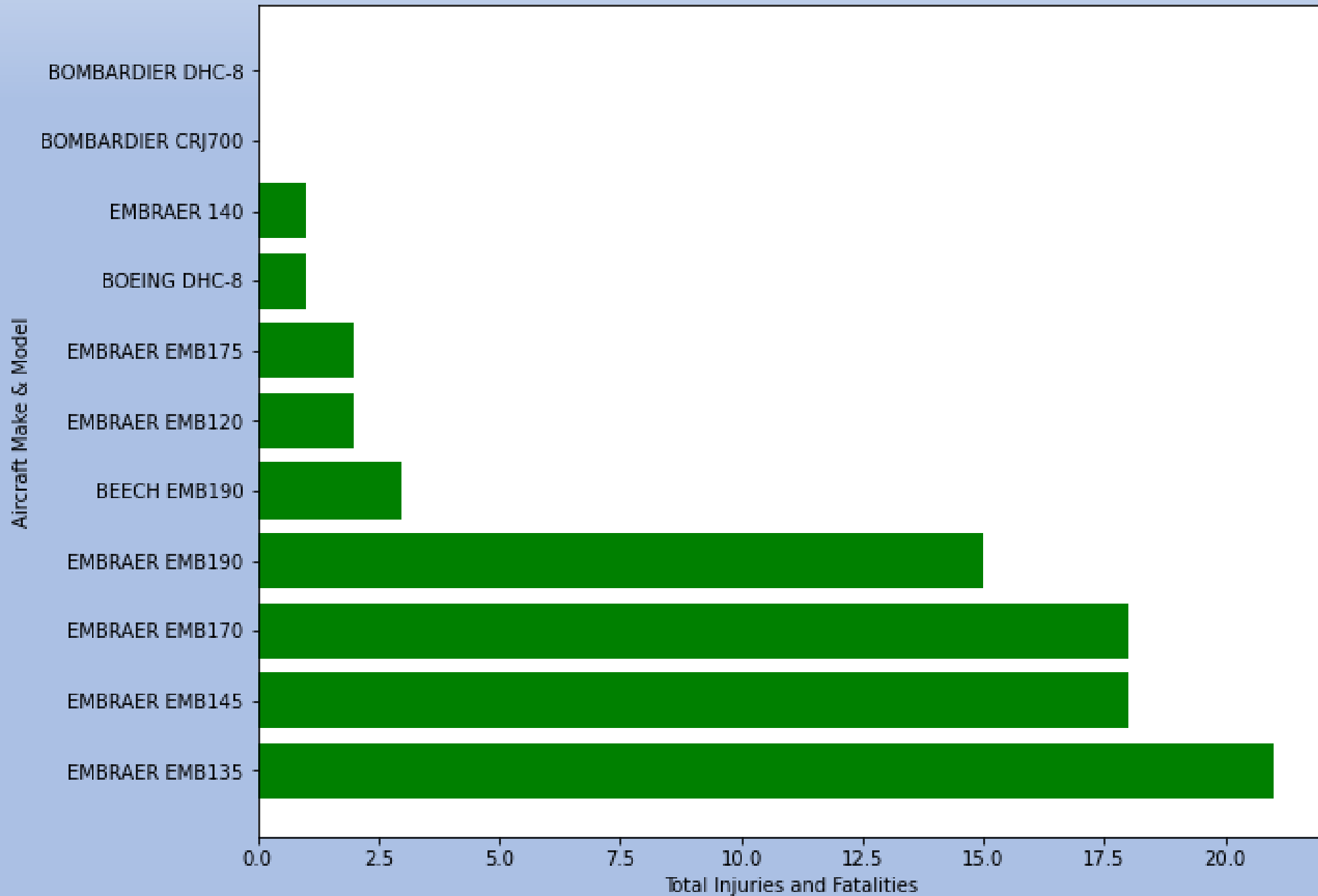
why categorize planes by size?



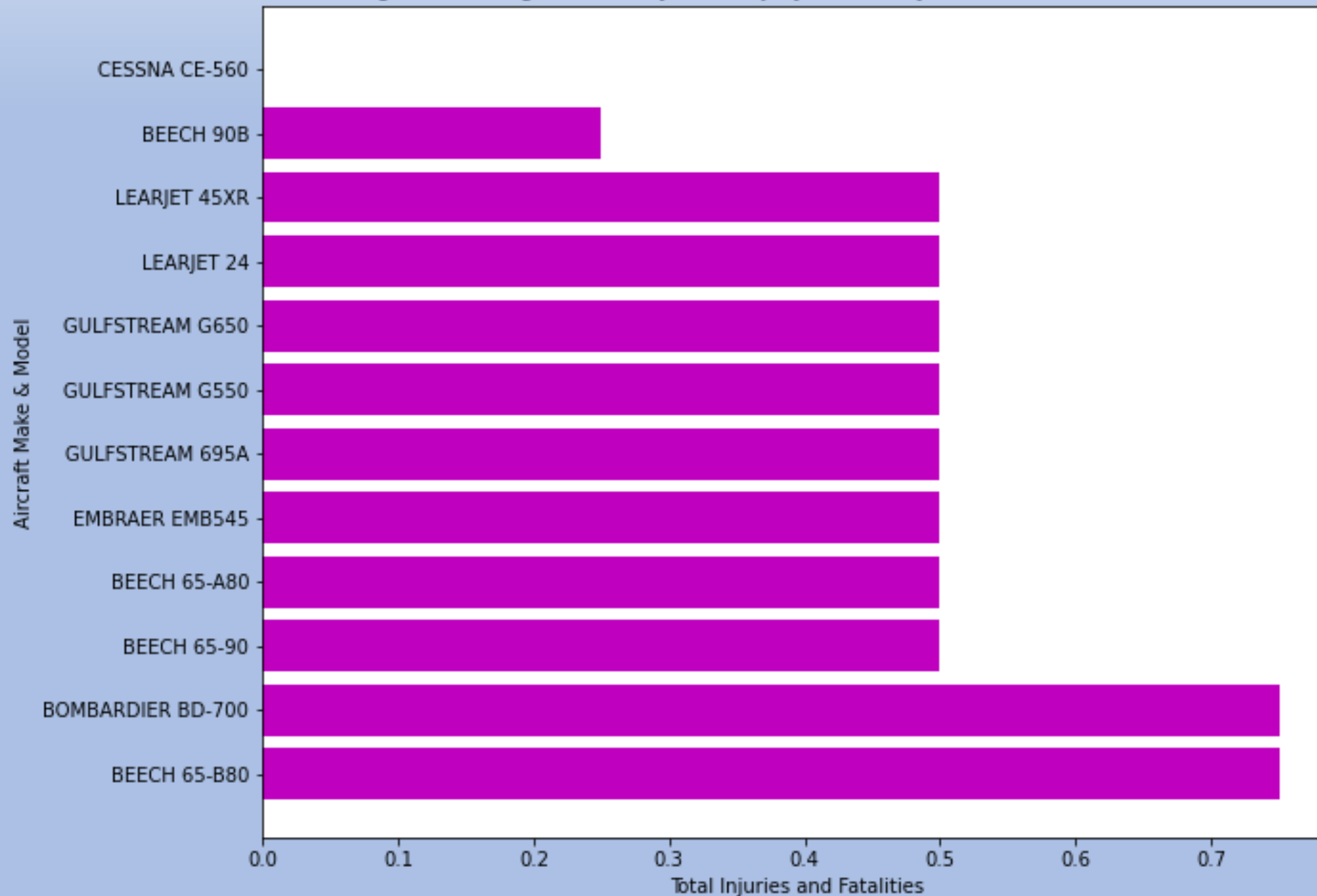
Total Injuries & Fatalities by Large Airliner Make & Model



Total Injuries & Fatalities by Regional Airliner Make & Model



Weighted Damage Counts by Zero-Injury-or-Fatality Private Plane Make & Model



results summary

- single-engine planes have a much higher-risk than planes with two or more engines
- private aircraft are more affordable, but have more accidents
- private aircraft accidents are deadlier overall
- regional aircraft have the fewest accidents, but larger airliners are similarly safe



Next Steps:

- evaluate total number of flights for each aircraft make & model
- factor in
 - each make & model up-front cost
 - maintenance costs
 - benefits of new versus used aircraft
- granulate private-regional-large airliner tiers
- investigate whether certain flight routes are lower-risk than others

A photograph of an airplane wing, likely from a commercial jet, extending from the right side of the frame towards the center. The wing is white with a dark leading edge and a small orange-tinted wingtip. Below the wing, a vast mountain range is visible, partially obscured by a layer of white clouds. The sky is a clear, deep blue.

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