

Meetup 6: Narrative Structure

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Week Summary

- Goal of this week: think more concretely about stories
- Read: Chapter 29 of Fundamentals, Chapter 7 of Storytelling
- HW: Data Story 3 Due on Sunday
- Discussion: Put week 1 story in story arc format

What is a story?

- From Fundamentals:

A story is a set of observations, facts, or events, true or invented, that are presented in a specific order such that they create an emotional reaction in the audience.

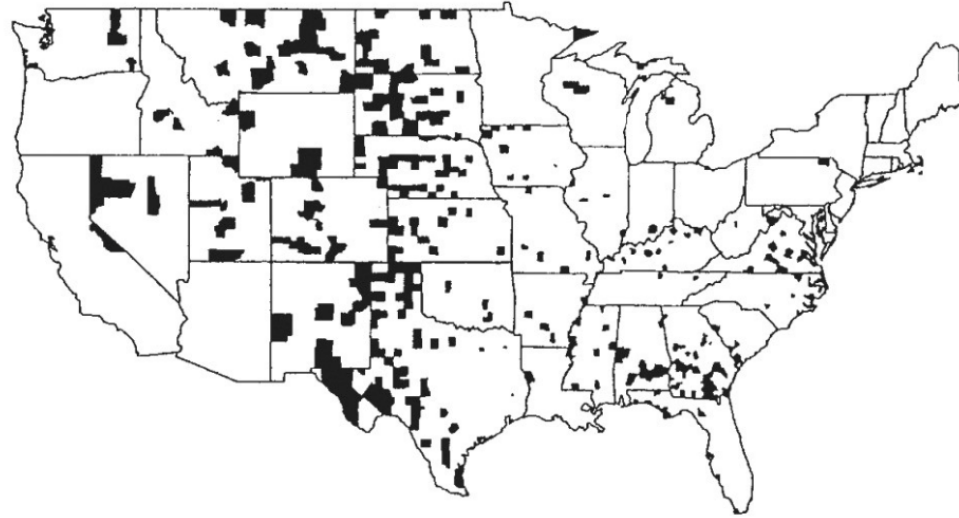
Why emotion?

- Quantitative culture: dismissive of stories, emotion
 - Deemed “squishy”
- This is a bad mistake
 - Emotional response is key to how we communicate
- You can tell stories while objectively presenting the truth

How do stories create an emotional response?

- Initial build up of conflict and tension
- Release of tension at the conclusion of story

Example: Where are the Cancers?



Counties with the LOWEST
kidney cancer death rates
(1980-1989)

Gelman Hill Teaching Stats

- Lowest counties all rural

Why Lowest Cancer in Rural Areas?

- Maybe rural counties have lower pollution?

Why Lowest Cancer in Rural Areas?

- Maybe rural counties have lower pollution?
- Healthier, fresher food?

Why Lowest Cancer in Rural Areas?

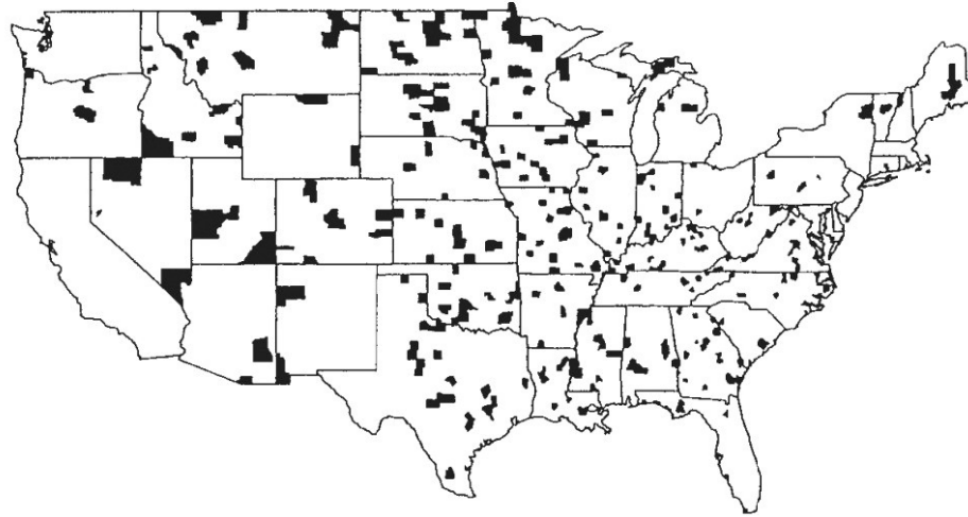
- Maybe rural counties have lower pollution?
- Healthier, fresher food?
- Low stress, active lifestyle?

Why Lowest Cancer in Rural Areas?

- Maybe rural counties have lower pollution?
- Healthier, fresher food?
- Low stress, active lifestyle?

Shall we fund a big study to investigate???

Plot Twist



Counties with the HIGHEST
kidney cancer death rates
(1980-1989)

Gelman Hill Bag of Tricks

- Rural counties also have the highest death rates!

Thought Experiment: Consider a small county

- The county has 100 people
- If it has 1 kidney cancer death in the decade, it's rate will be by far the highest in the country
- If it has 0 deaths, it's rate will be the lowest in the country

Variance of a binomial distribution

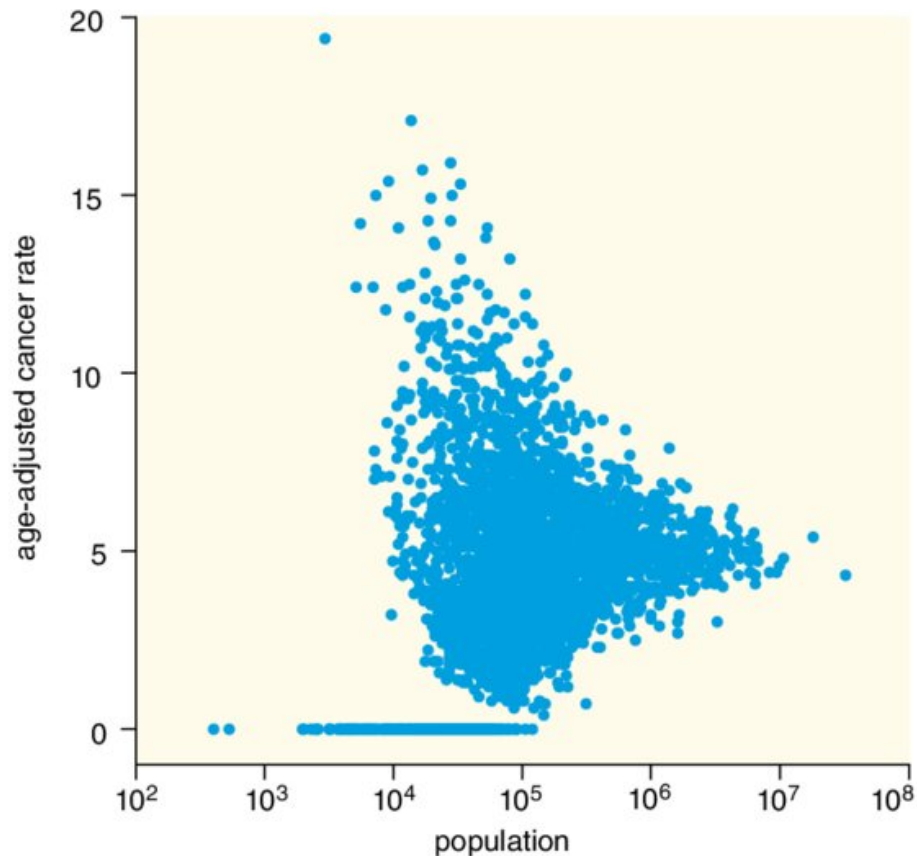
- probability p of dying from kidney cancer
- rate $\hat{r} = \frac{m}{n}$ observed deaths divided by population

$$\text{var}(\hat{r}) = \frac{p(1 - p)}{n}$$

- Big n close to mean
- Expect small counties to dominate the extremes

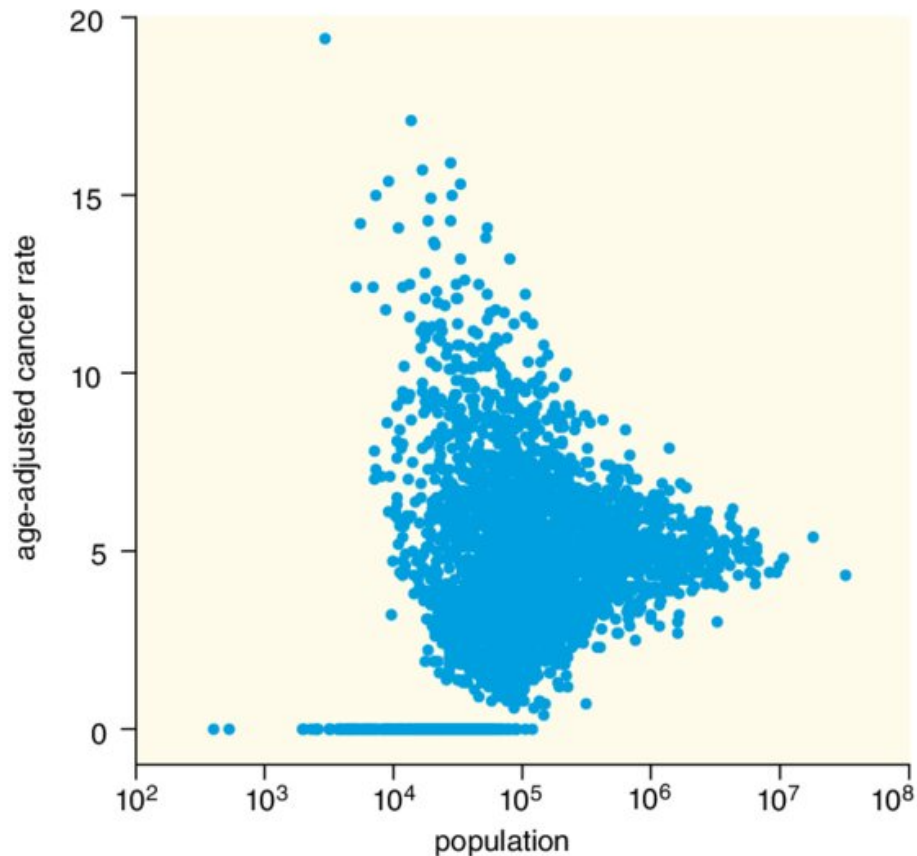
Be skeptical of maps

- This phenomenon isn't unique to this variable
- See this funnel shape all the time!



Aside

- Funnel plot also good for showing bias in research studies
- Effect size gets small when study is bigger



Story Arc

- Opening: Why are Cancer rates lowest in rural counties?
- Challenge: They are also highest in rural counties!
- Action: Use stats, binomial variance formula
- Resolution: Be wary when comparing unequally sized groups

Story Arcs

- A story arc is a pattern which a story takes
- It is designed to build and then resolve conflict
- There are several different structures for arcs

Arc 1

- Opening
- Challenge
- Action
- Resolution

Arc 2

- Lead: Give away main point
- Development: Introduction and details
- Resolution: Return to main point and moral

Arc 2 applied

- Lead: *Maps are biased because of population heterogeneities*
- Development: *You can draw contradictory conclusions from maps. They can show that rural living both prevents and causes Kidney Cancer. This is because rural counties have high variance*
- Resolution: *This issue plays a role whenever you compare groups of different sizes. Always consider standard errors!*

Arc 2 applied (alt)

- Lead: *All maps lie to you*
- Development: *You can draw contradictory conclusions from maps. They can show that rural living both prevents and causes Kidney Cancer. This is because rural counties have high variance*
- Resolution: *This issue plays a role whenever you compare groups of different sizes. Always consider standard errors!*

Arc 3

- Action
- Background
- Development
- Climax
- Ending

Arc 3

- Action: Show both figures together to get into conflict immediately
- Background: Present other examples of this and the challenges they caused
- Development: Connect with population size
- Climax: Variance Formula, least squares techniques
- Ending: Highlight importance across areas

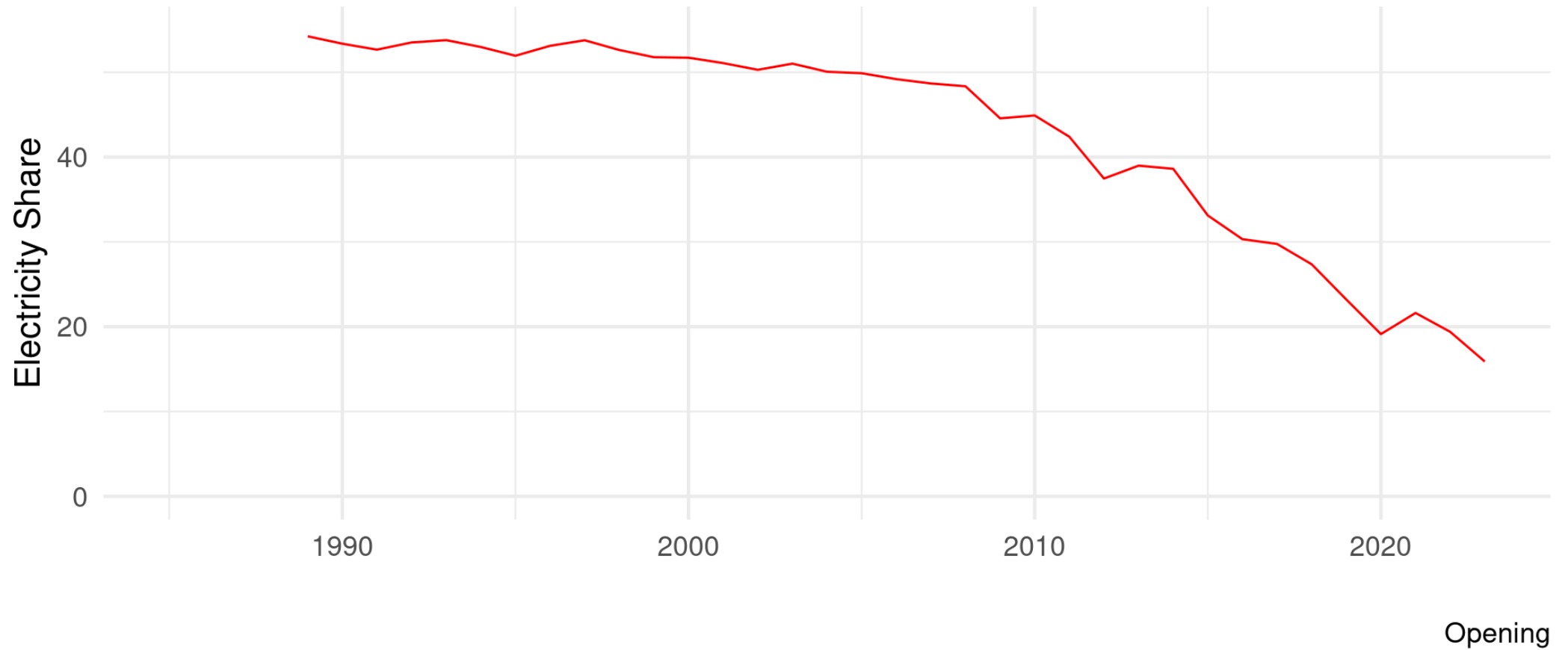
Translating to Figures

- Map your figures to story arc
- (usually) need multiple figures

Example: Opening

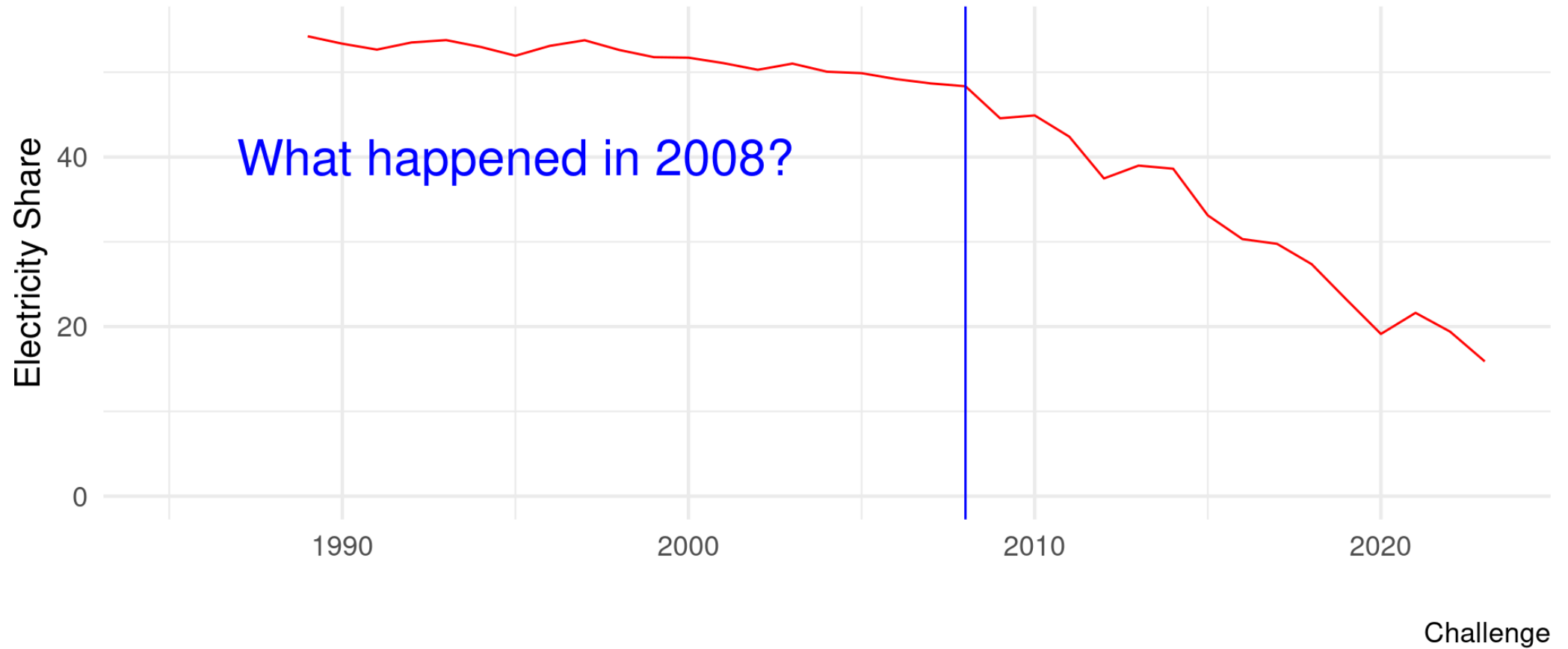
The US Power Grid Depends Less on Coal

Coal Power Share



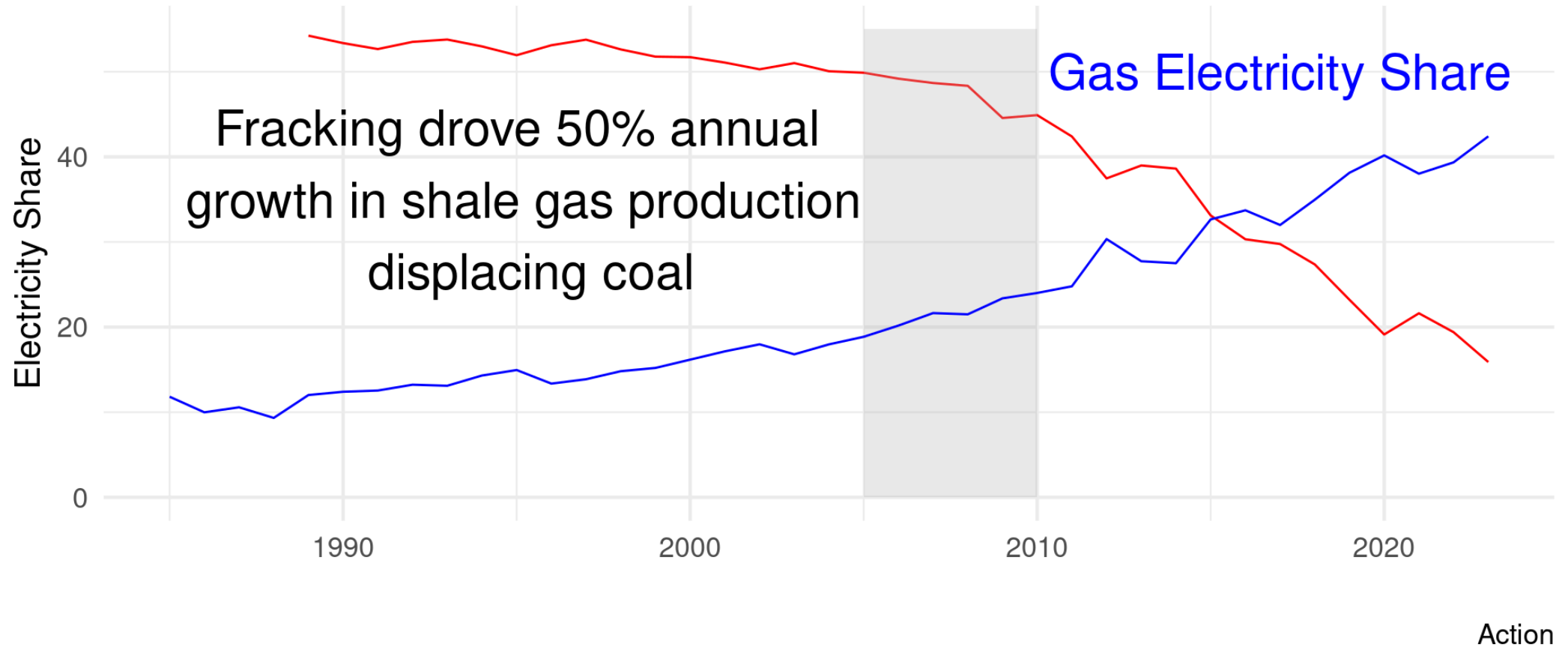
Example: Challenge

The US Power Grid Depends Less on Coal
Coal Power Share



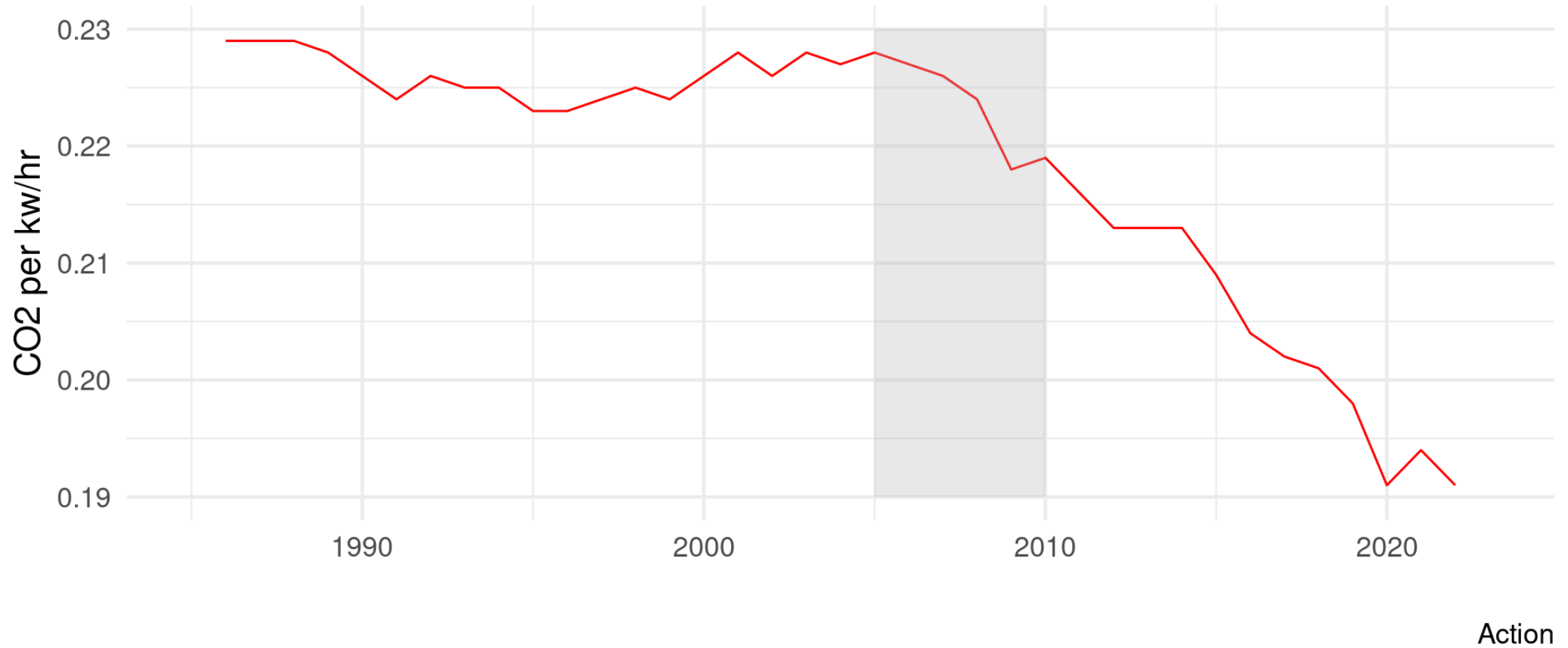
Example: Action

The US Power Grid Depends Less on Coal
Coal Power Share



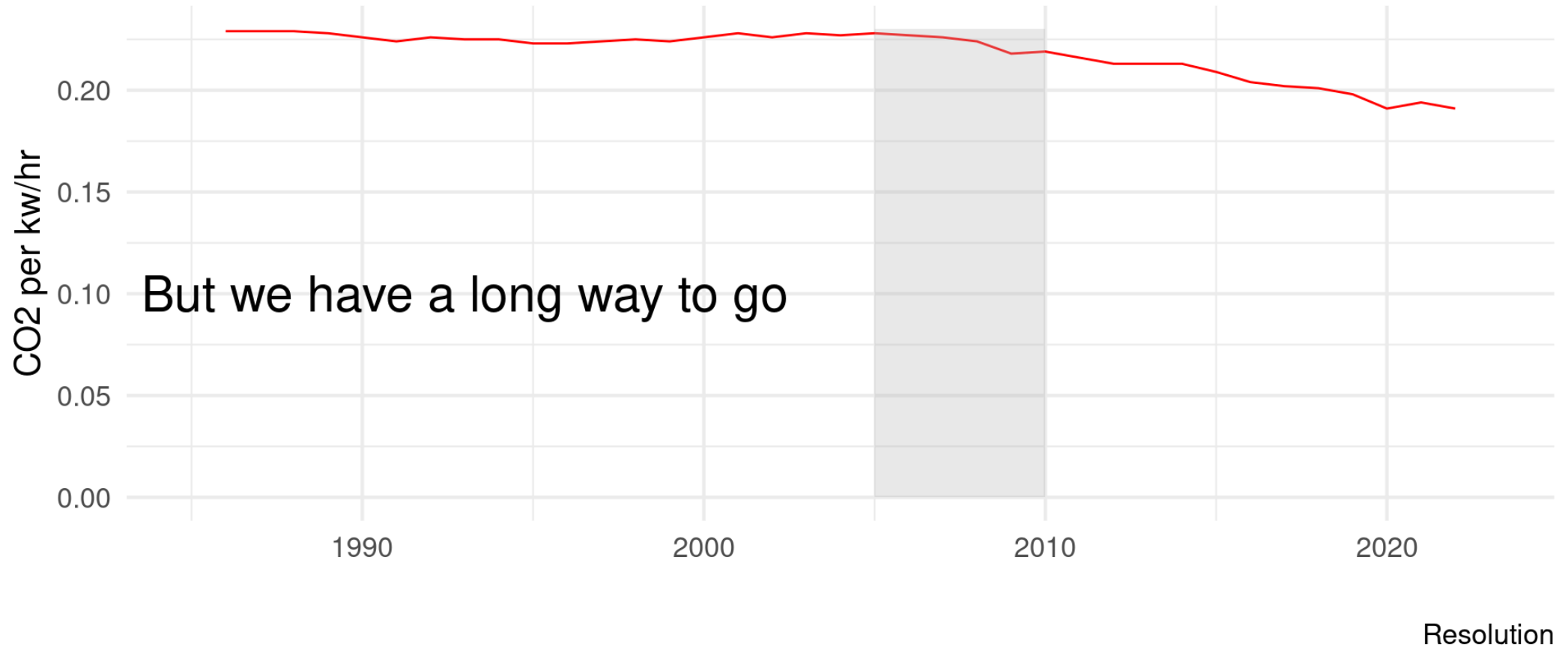
Example: Action

The Coal-Gas Transition Made the Grid More Efficient
Carbon Intensity of Electricity Production



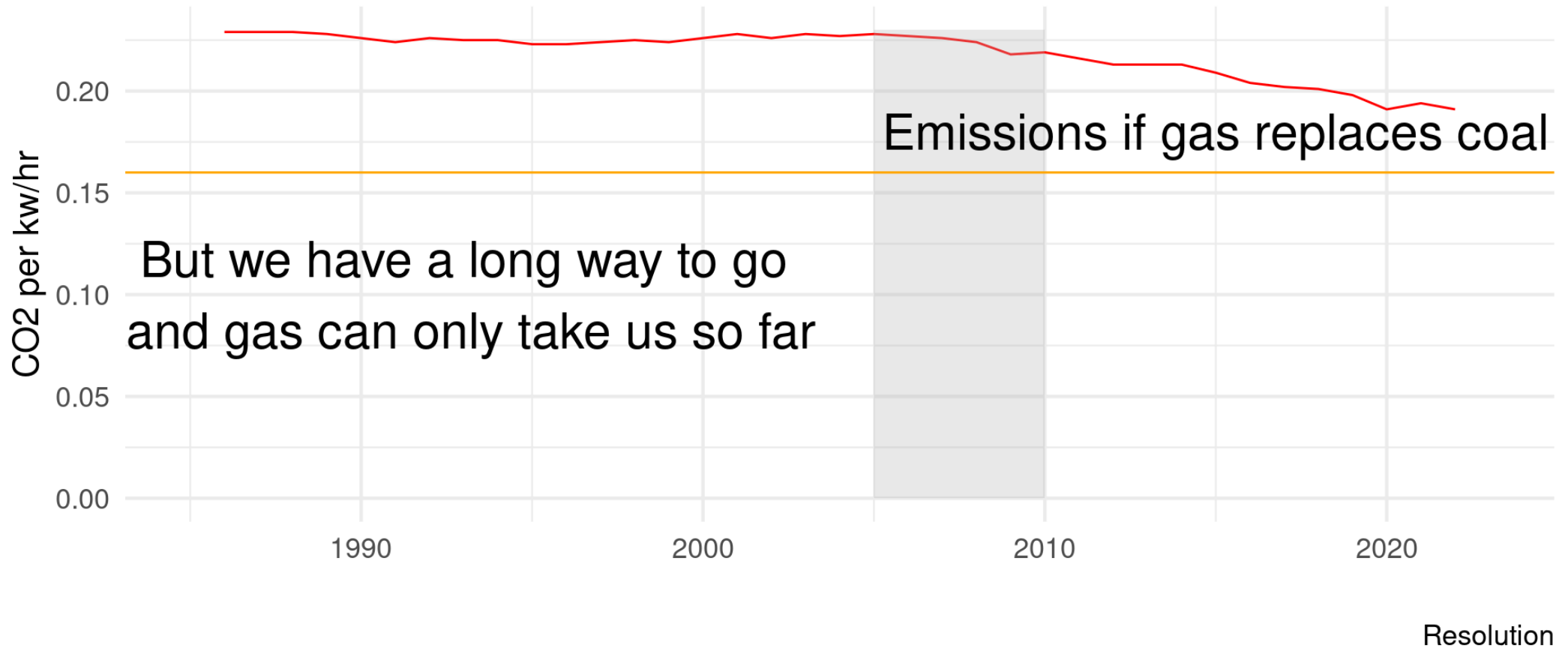
Example: Resolution

The Coal-Gas Transition Made the Grid More Efficient
Carbon Intensity of Electricity Production



Example: Resolution

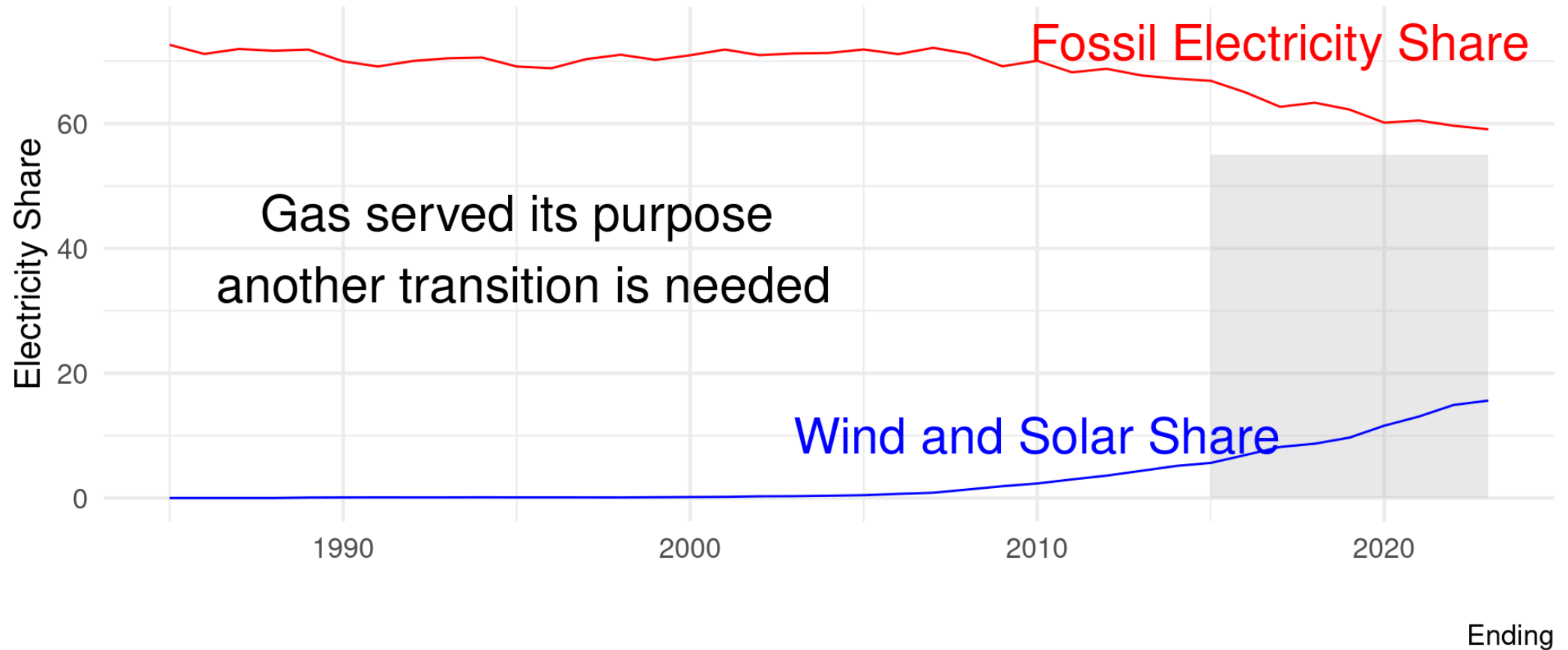
The Coal-Gas Transition Made the Grid More Efficient
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Example: Ending

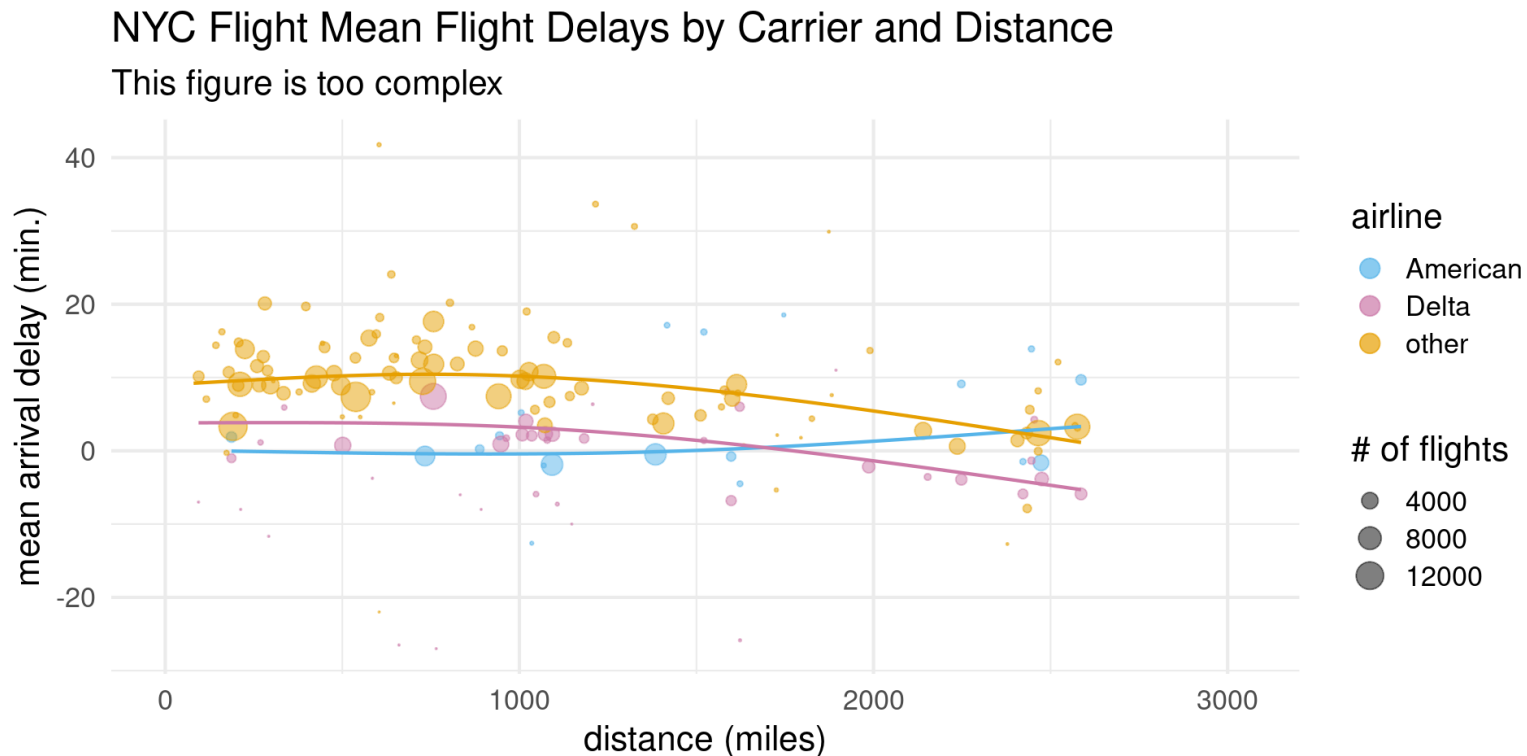
Is a new transition beginning?

Fossil and Renewable Electricity Share

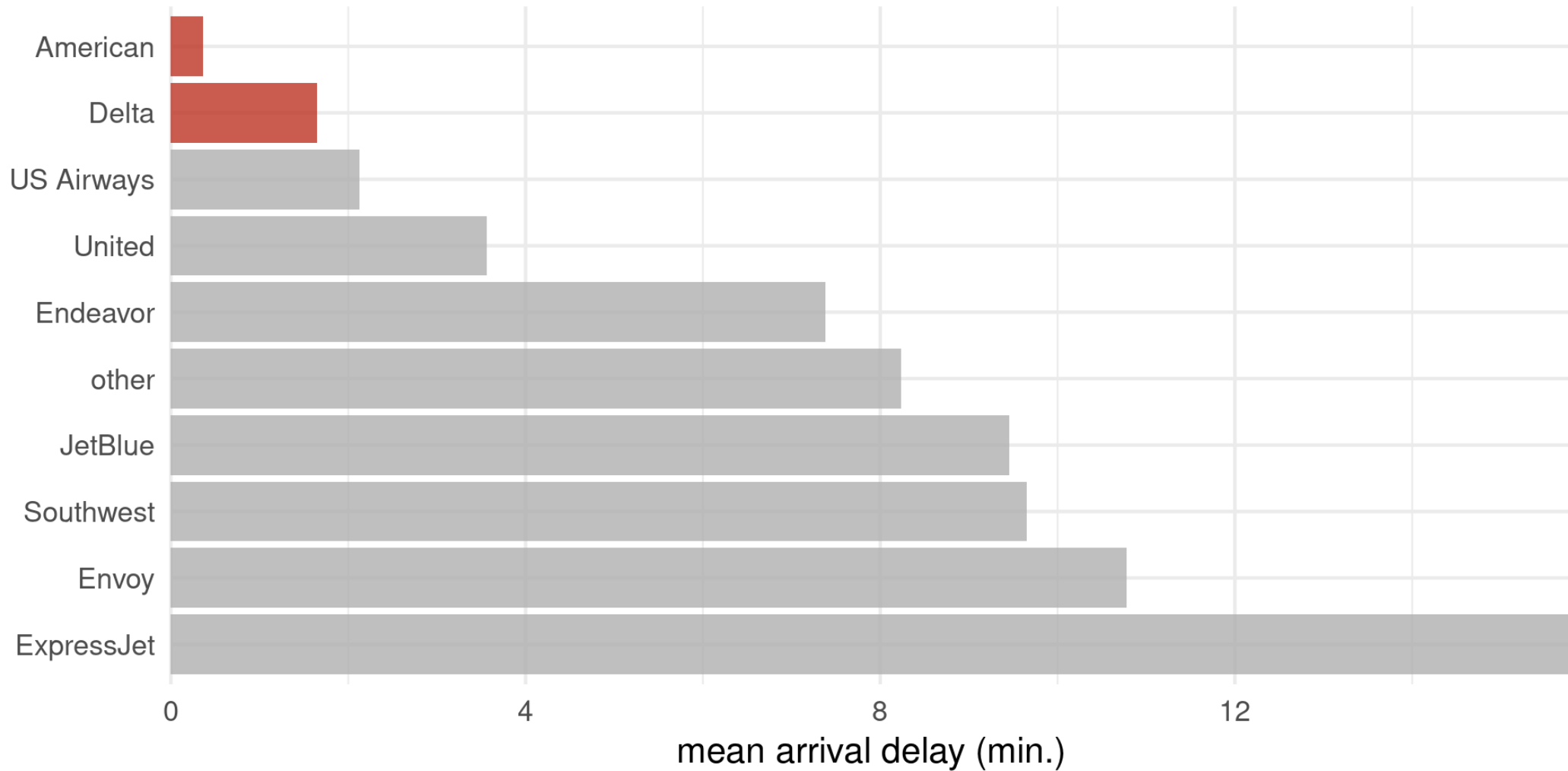


Making Figures for Busy People

- Make your figure as simple as possible, but no simpler!
- They shouldn't need 30 minutes to decipher all the details



Complexity Hid the Story?

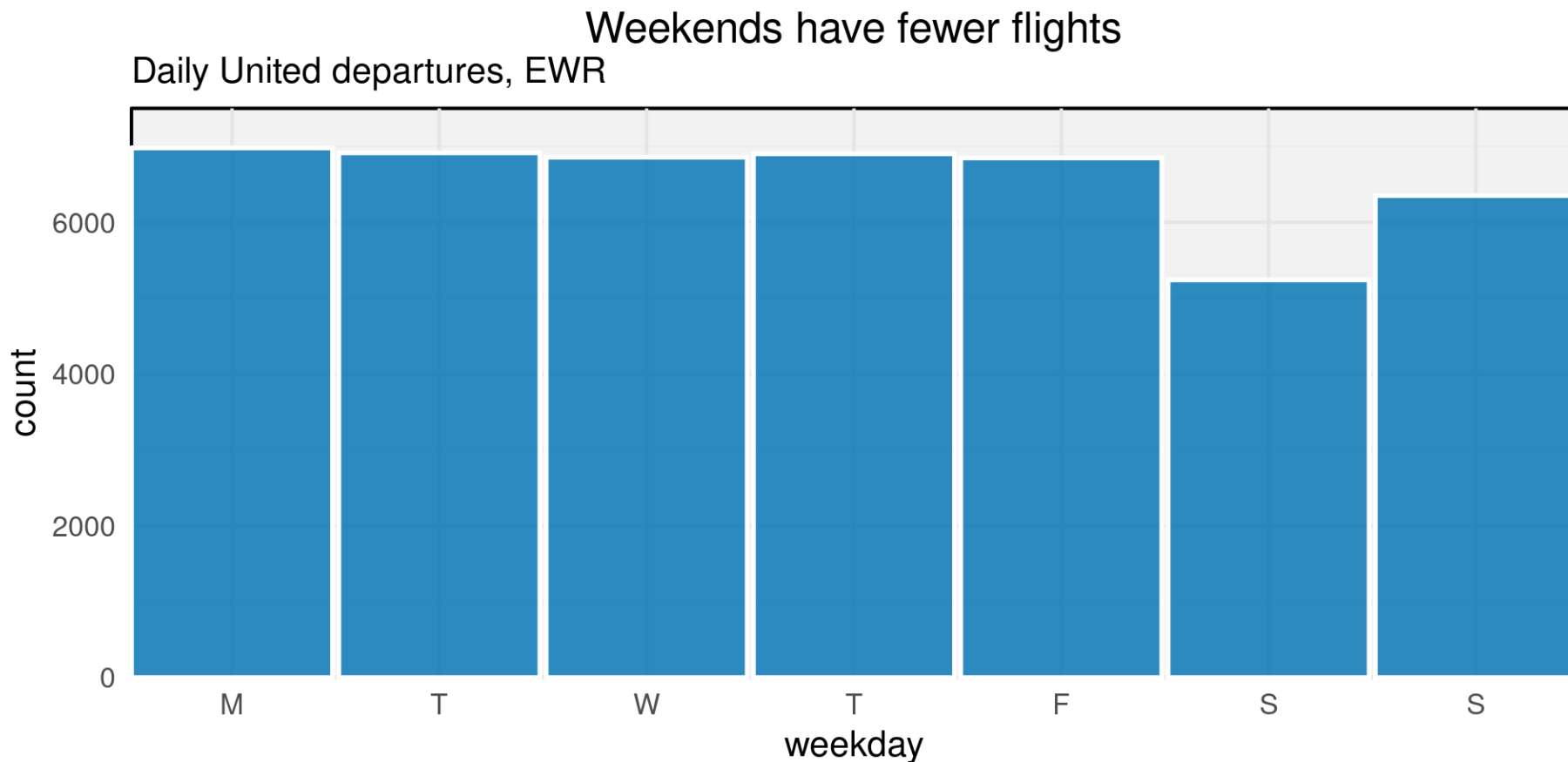


Build up to complexity

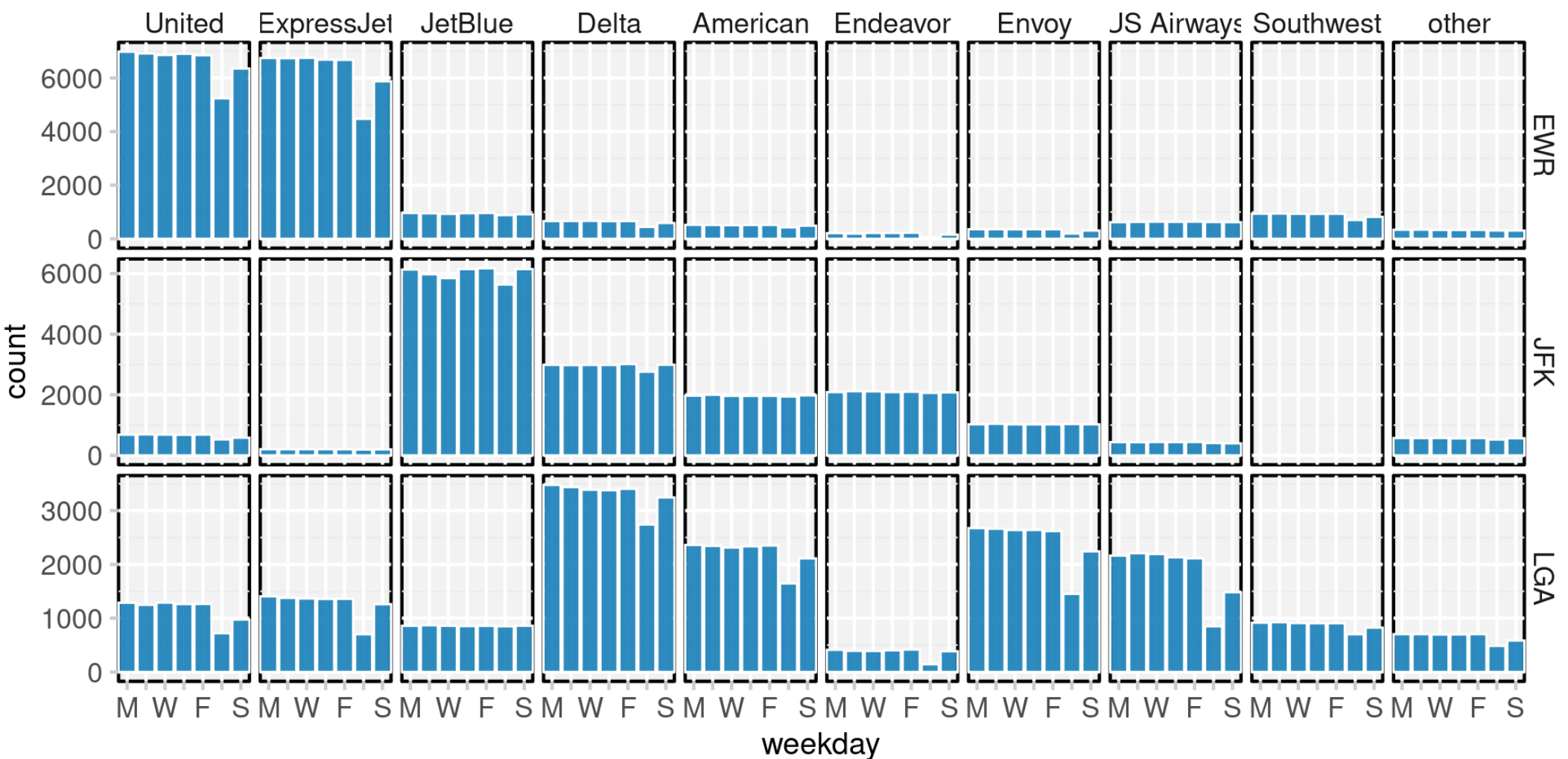
- Sometimes a complex plot is required
- Don't lead with complexity
 - Instead show something simpler first
 - Primes your audience to understand the complex figure

Start Simple

- Here show a single panel first (or aggregate over all carriers)



Then go Complex



Thanks!