

Causal criteria for aggregate change in demography: issues and illustrations

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Outline

Preliminaries

- intervention model

- variability

- levels of analysis

Demographic examples

- mechanical

- substantive

Causal criteria/guidelines

Preliminaries...1

Intervention model rarely applicable

- can't manipulate => no causes?
- imaginary intervention irrelevant
- where intervene, good counterfactuals absent
- causes of effects, effects of causes

Preliminaries... 2

Variability not always of interest—seeking to explain variation may result in:

- restricting range of questions
- cross-sectional answers to questions about change
- missing determinants of change in overall level

Levels of analysis

So, find an alternative approach

Start with causes we know for sure!

mechanical demographic processes

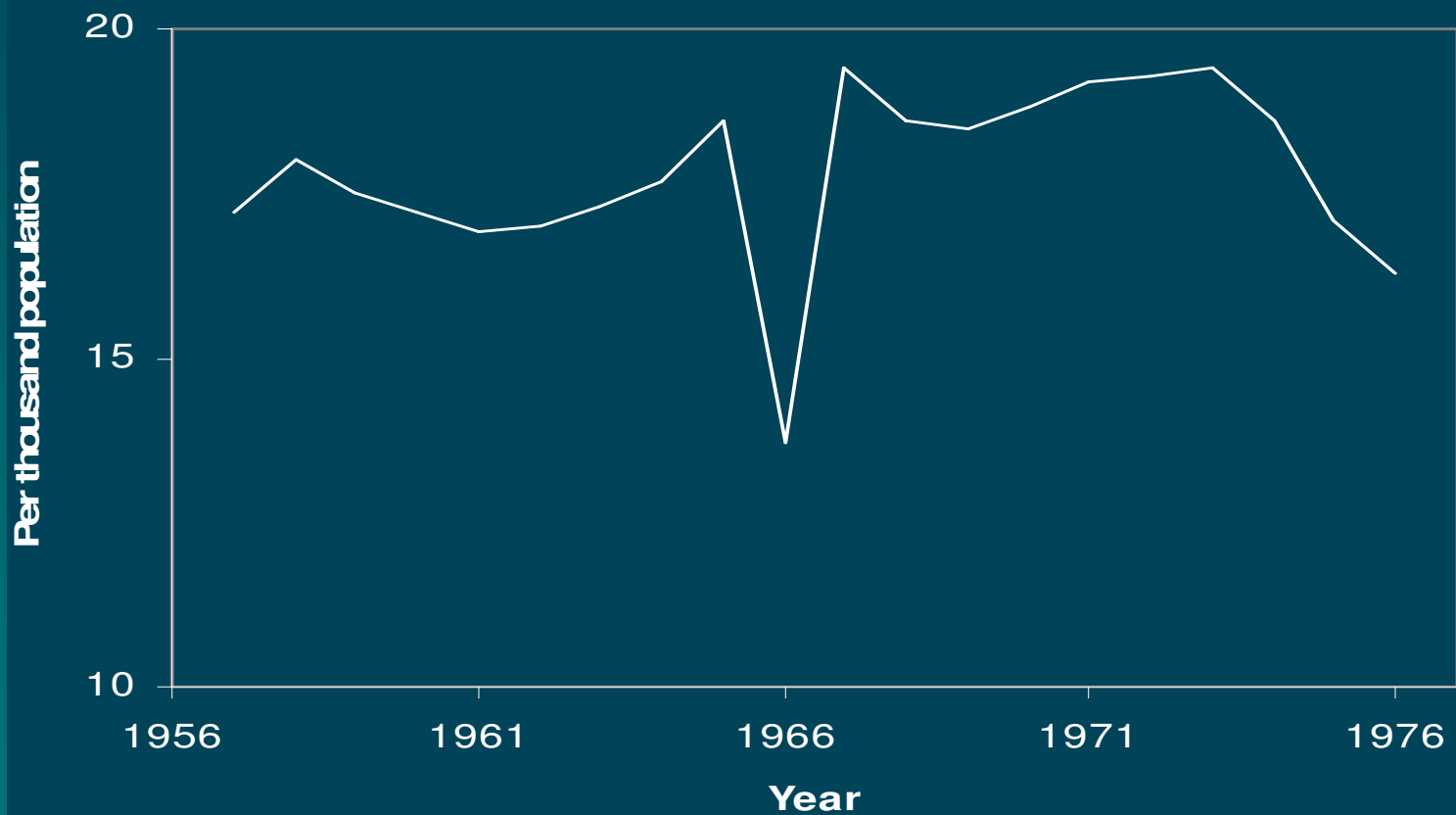
Then, substantive examples

from clear-cut to more complex

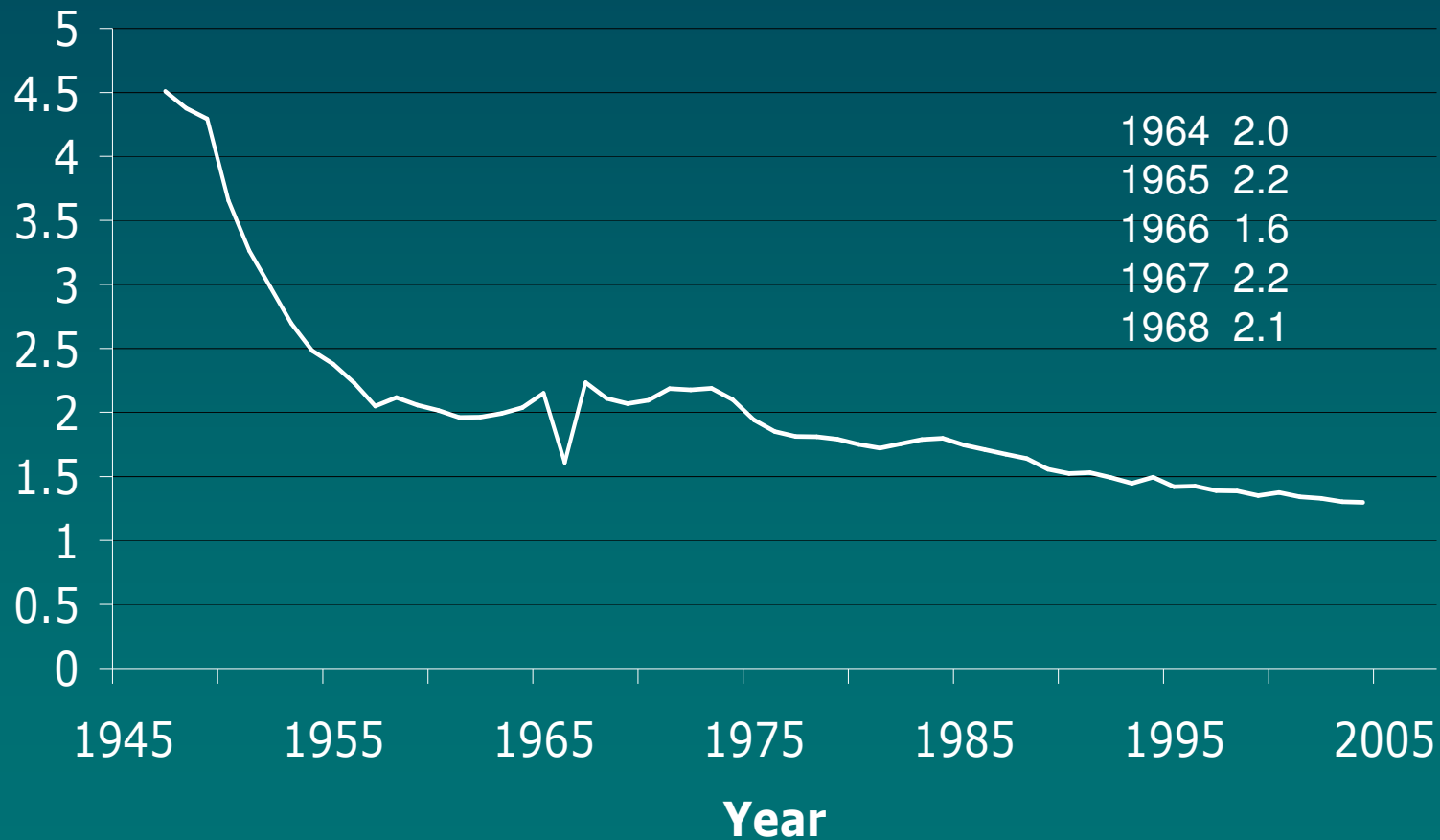
Exploring causation easier in these demographic examples because...

- events discrete, measurable
- can be located in time
- reasonable supply of reliable data
- can respond rapidly to exogenous factors
- mainly exogenously determined

Crude birth rates, Japan 1957-76



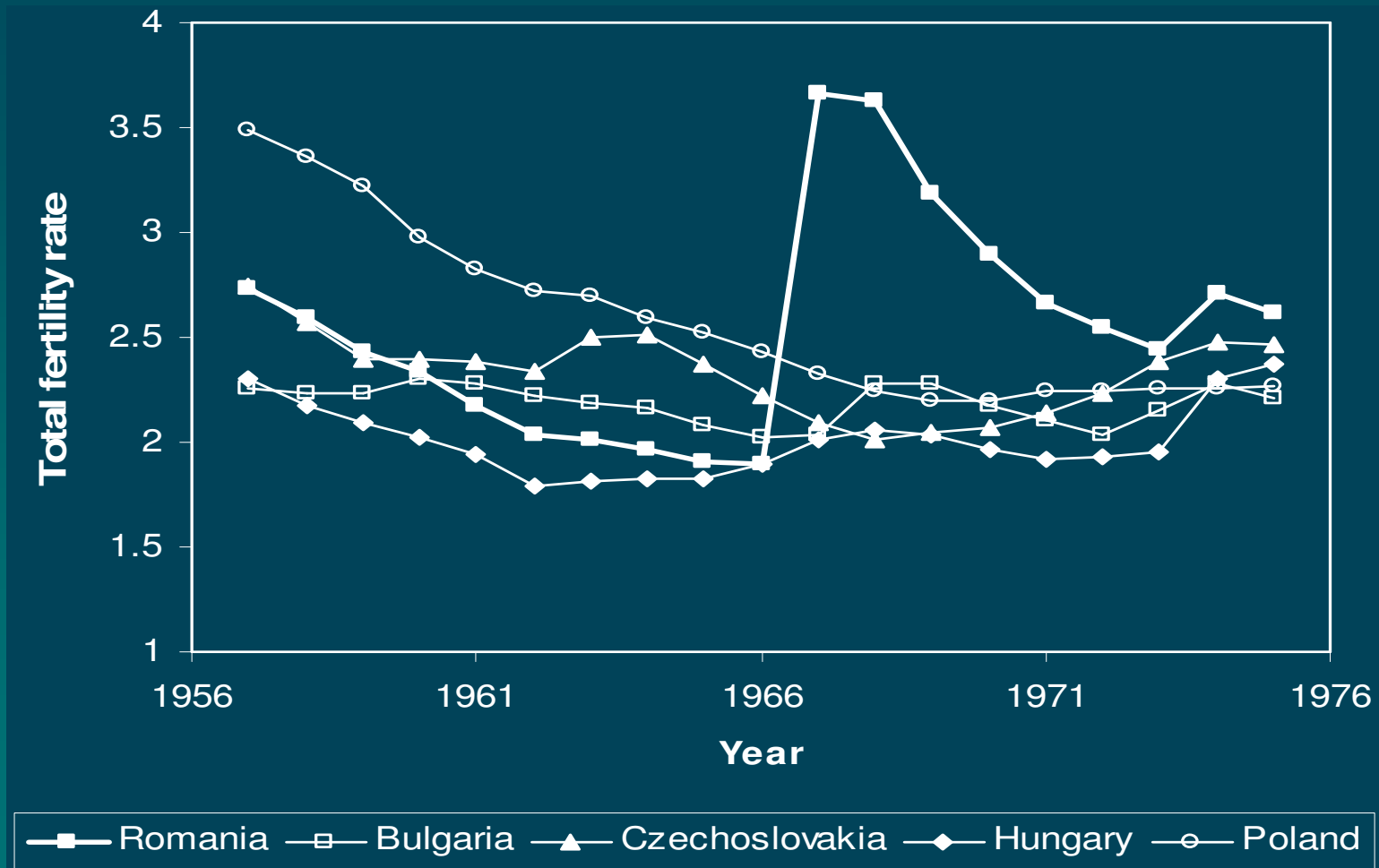
Total fertility rate, Japan 1947-2004



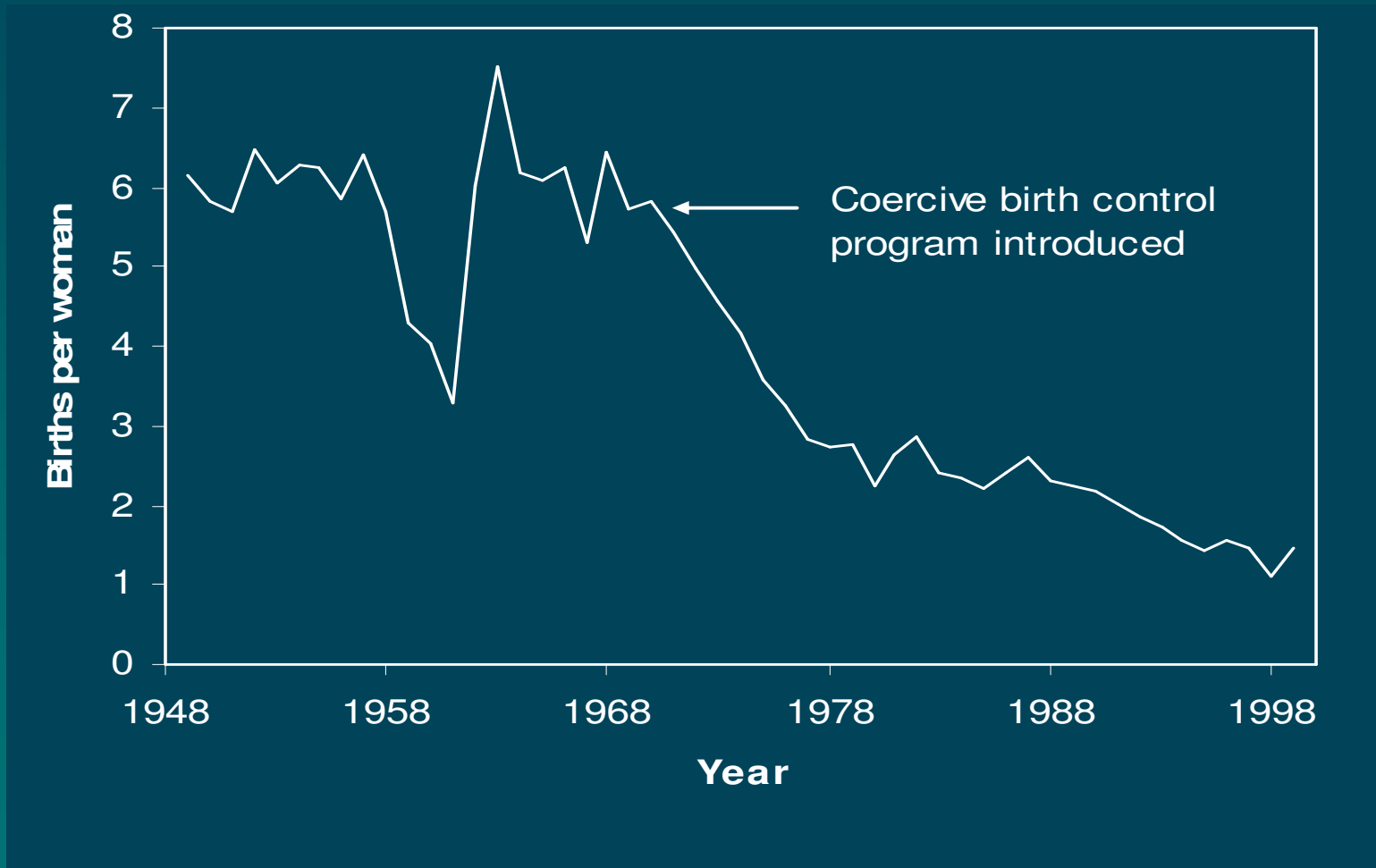
Distinctive features

1. cause precedes effect — *time order*
2. effect follows soon after — *contiguity*
3. effect lasts while cause does — *duration*
4. unusual / large effect — *distinctiveness*
5. in expected direction — *direction*
6. appropriate scale — *proportionality*
7. similar effects — *recurrence*
8. only in Fire Horse year — *no cause, no effect*
9. realistic process specifiable — *mechanism*
10. alternatives ruled out — *no alternative*

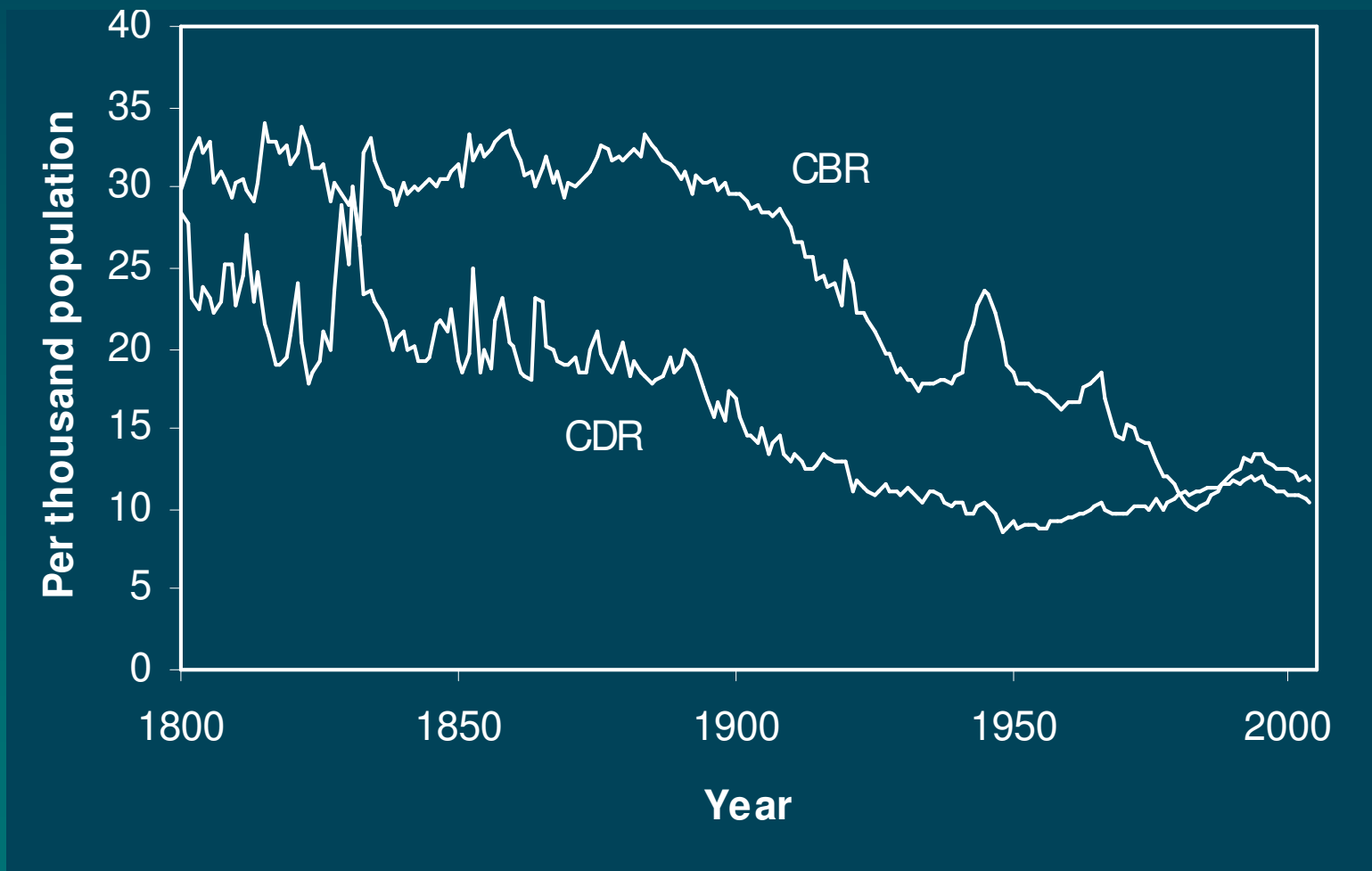
TFR, Romania and selected E. European countries 1957-1975



Total Fertility Rate, China 1949-1999

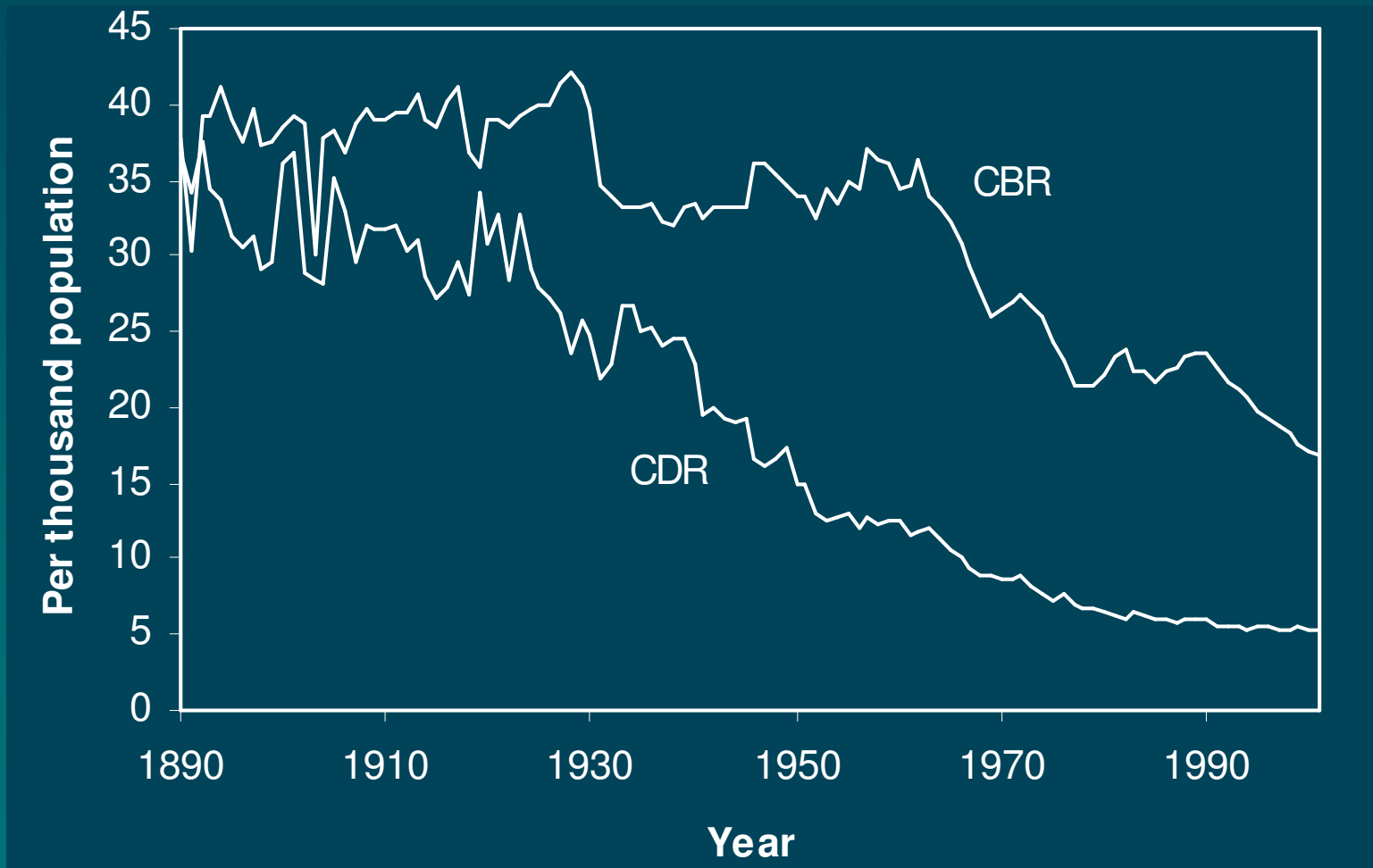


Crude birth and death rates, Denmark 1800-2004



Sources: Chesnais (1992) and Statistics Denmark (2005)

Crude birth and death rates, Chile 1885-2000



Sources: Mitchell (1983) and INE-CELADE (2000)

Criteria *support* causal inference but *not definitive*

Essential time order
 mechanism
 no alternative

Others useful

Guidelines only: don't always apply

Meeting criteria does not = proof of cause

Concluding comments..1

Intervention / experimental model rarely applicable, so what do we do?

- assume it applies?
- abandon causal inference?
- find another solution

Criteria not logical conditions but
“empirical cues” + many qualifications

Applicable more broadly

Concluding comments.. 2

Single vs multiple causes
specify and check implications

Remote vs proximate causes

Evolutionary explanations

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