



# The scarring effects of deep contractions

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# Introduction

- Economies can experience *lasting shifts* in *trend-adjusted* output
  - Examples: GFC; maybe also Covid or Russian invasion?
  - Strong evidence of scarring effects after financial crises, but also more broadly for other events (Cerra et al 2023)
- Under which conditions do such shift occur?
  - Exogenous technology or *endogenously* via R&D or labor hysteresis?
  - **Symmetrically for big and small, as well as positive and negative, shocks?**
- Large implications for policy
  - Conditions unknown => large error in long-run growth forecasts
  - E.g., endogenous reverse hysteresis => always accommodative policy?!

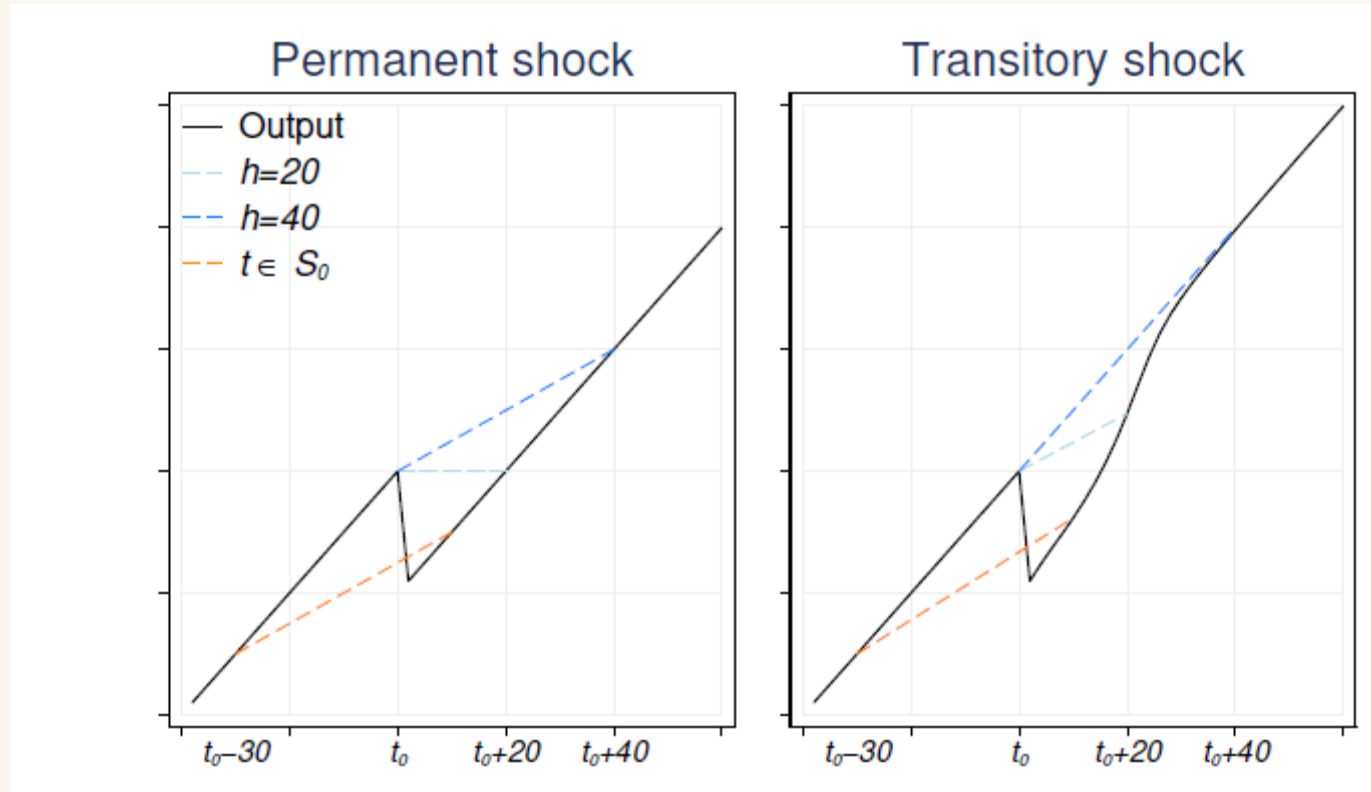
# What do we do?

- Current statistical methods for detecting hysteresis
  - Nelson & Plosser (1982); Cerra & Saxena (2008); Reinhart & Rogoff (2014); Blanchard et al (2015)
  - Not well suited to investigate asymmetric effect wrt sign and size
- We develop a new test that
  - Permits detection of asymmetric effects
  - No crucial arbitrary assumptions
- Application to real GDP from 24 countries for 1970Q1-2019Q4
  - Narrative classification of large contractions to test for endogenous drivers

# Related literature

- Large literature on stationary vs unit-root dynamics
  - Eg, Nelson & Plosser (1982); Cochrane (1986); Cerra & Saxena (2008); Darne (2009); Shelley and Wallace (2011); and Cushman (2016)
- GDP movements around turns in business cycles or events
  - Eg Cerra & Saxena (2005); Claessens et al. (2012); Reinhart & Rogoff (2014); Jorda et al. (2013, 2015))
  - Local projection test (Jorda et al 2022)
- Shifts in trend output around large events
  - Eg Blanchard et al. (2015) or Ball (2014)

# Method illustrated

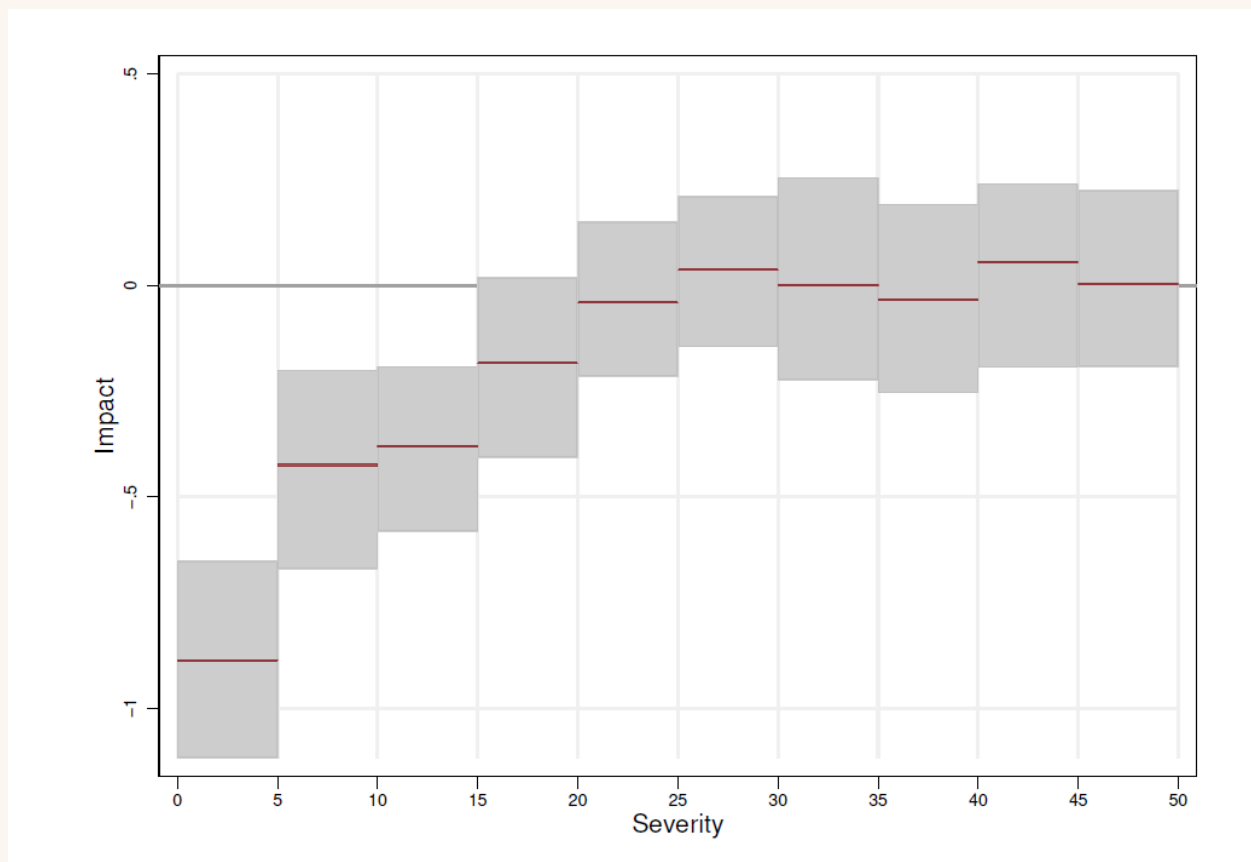


- Test: Is the mean of the  $h$ -period ahead growth rates at the set of  $t_0$ s significantly below the mean of the other  $h$ -period ahead growth rates?

# Method

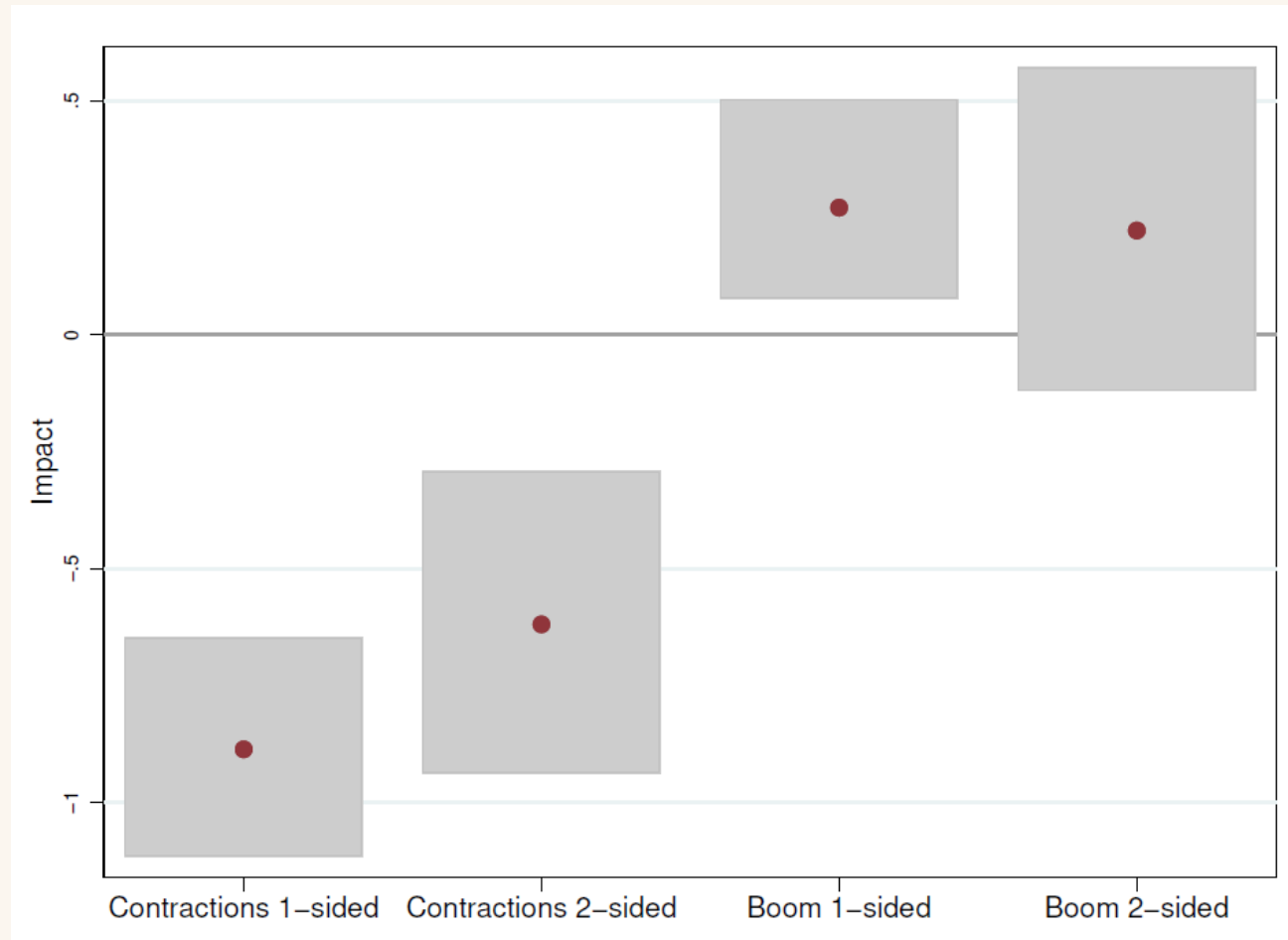
- Three steps:
  1. Identify a set of  $t_0$ :s (associated eg with large contractions/expansions, MP shocks etc.)
  2. Calculate long-horizon (eg 10-year) GDP growth rates starting from the  $t_0$ :s
  3. Test if the mean of these growth rates is statistically different from the mean of the same horizon growth rates calculated at all other points in the sample
- For step (1), identify  $t_0$ :s from the *annual* GDP growth distribution
  - Group  $t_0$ :s according to percentile intervals: 0th-5th, 5th-10th, ..., 45th-50th
- For step (3):
  - Bootstrapped standard errors to account for serial and cross-correlation (ala Politis and Romano (1994))

# Result 1: Only big contractions have scarring effects



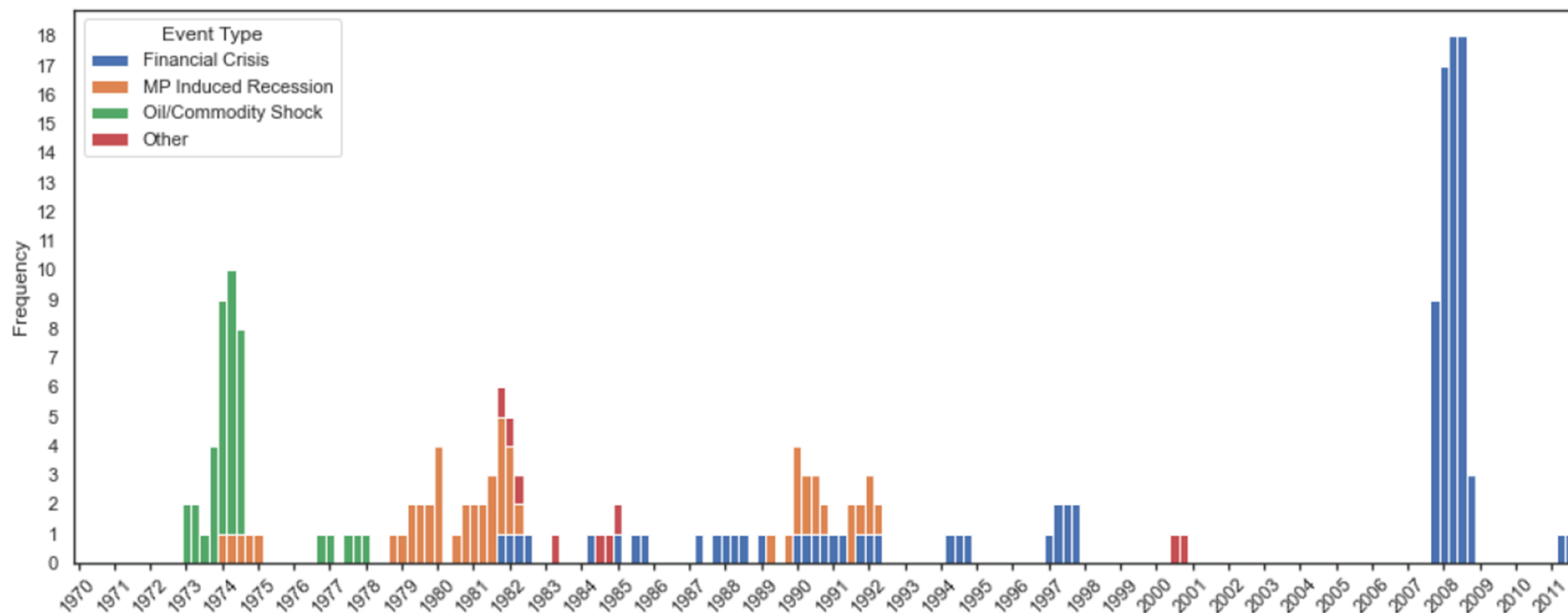
- For most severe contractions, reduction in 10-year growth rates ~ 4.75% loss in level of GDP

## Result 2: Big expansions do not have lasting effects

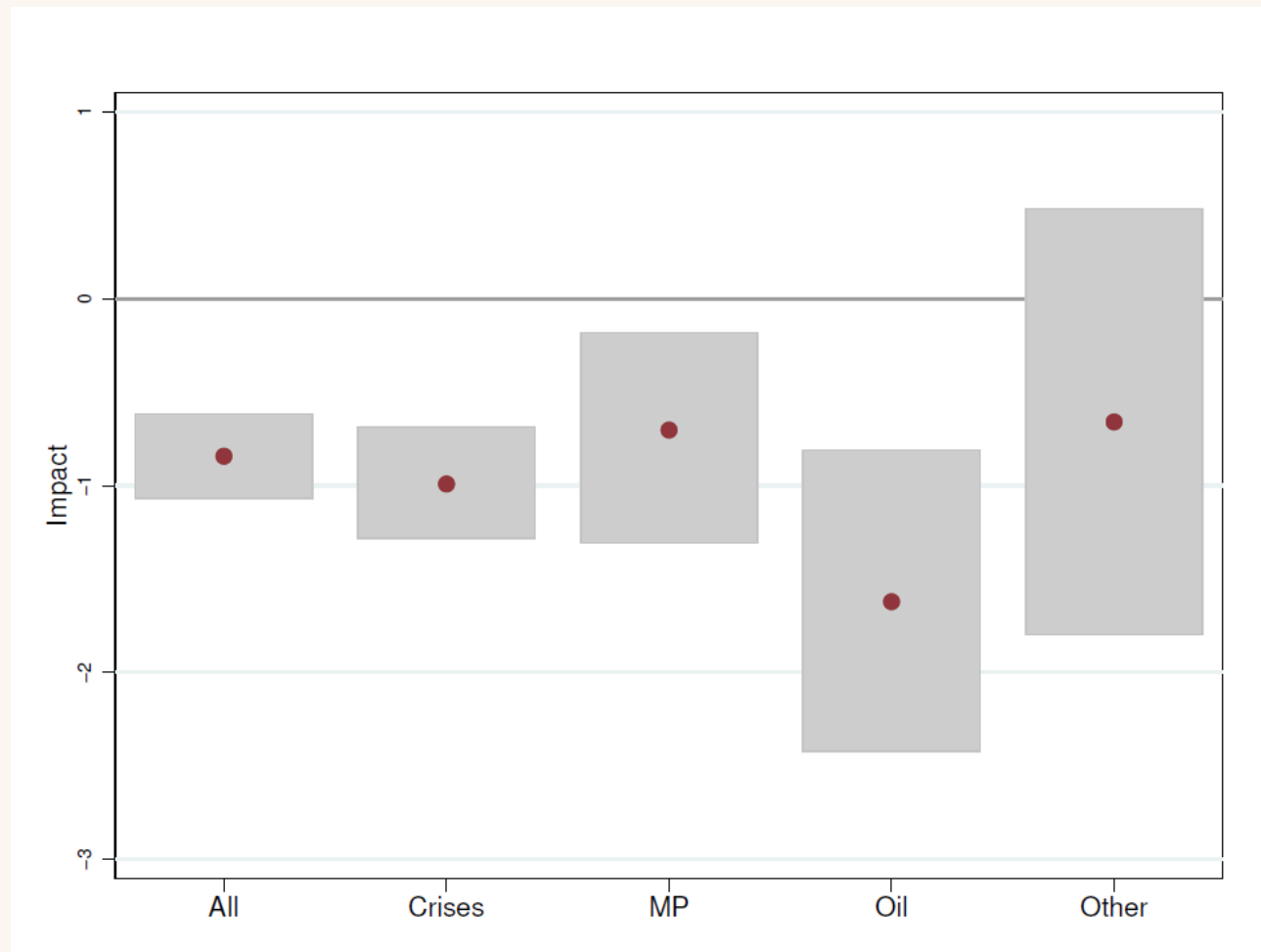




# Digging deeper: Classifying big contractions



# Result 3: Nature of big contractions not important



# Robustness

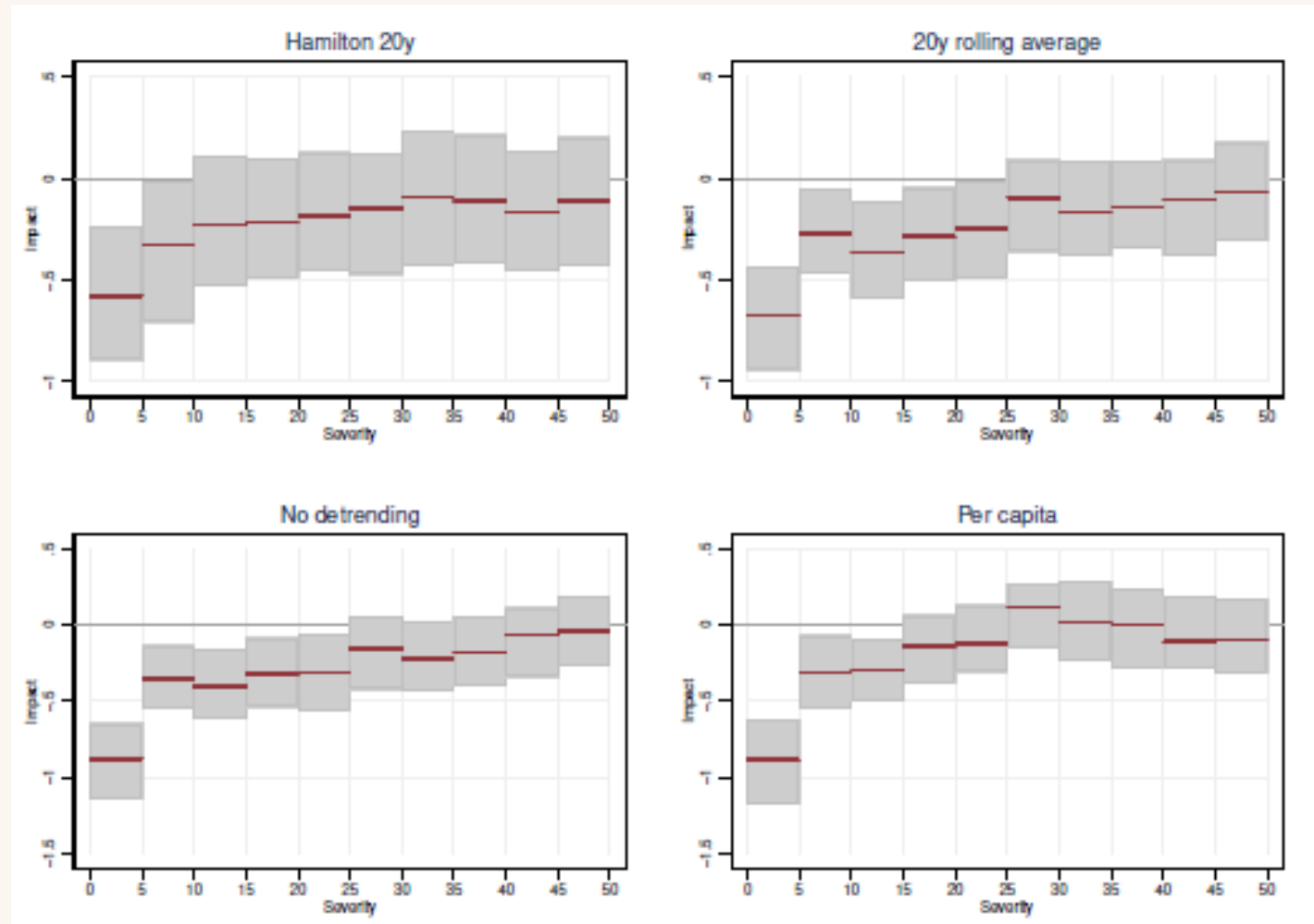
- The  $h - 1$  observations before  $t_0 \rightarrow$  bias against finding scarring
  - Robustness: exclude the  $h - 1$  observations before  $t_0$  [\(link\)](#)
- Growth slowdown  $\rightarrow$  bias unclear
  - Baseline: HP detrended ( $\lambda = 400K$ ); Robustness: other detrending [\(link\)](#)
- Misclassifying starting points ( $t_0$ :s)
  - Robustness: identify  $t_0$ :s from shocks, quarterly growth rates, etc. [\(link\)](#)
- Booms before contractions  $\rightarrow$  bias to find scarring
  - Robustness: use  $t_0 - b$  instead of  $t_0$ , with  $b = 2$  or 3 years [\(link\)](#)
- Sample dependency? Do sample splits [\(link\)](#)
- Too short growth horizon? Do longer horizons [\(link\)](#)

# Conclusions

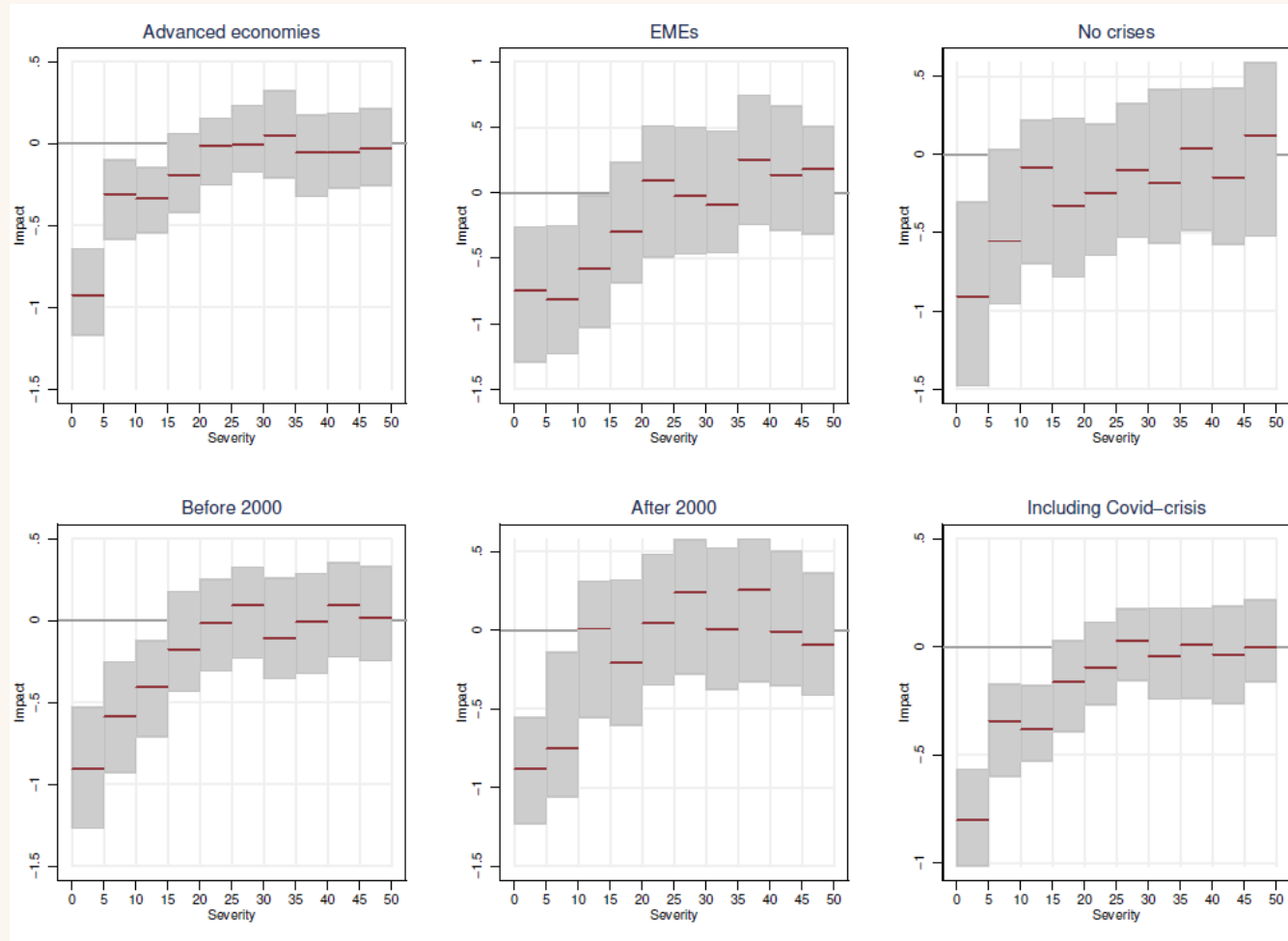
- Some contractions cause scars that are long lasting
  - Particularly big contractions where annual growth drops below the 15<sup>th</sup> percentile are associated with such scarring
  - Smaller contractions do not lead to such scarring
  - Big expansions do not have corresponding positive effects
  - Specific cause does not seem to matter much
- Messages for policy
  - Avoid “dark corners”
  - Even more costly to counter e.g., negative supply shocks than thought
  - Asymmetric policy responses wrt booms and busts?

# Appendix

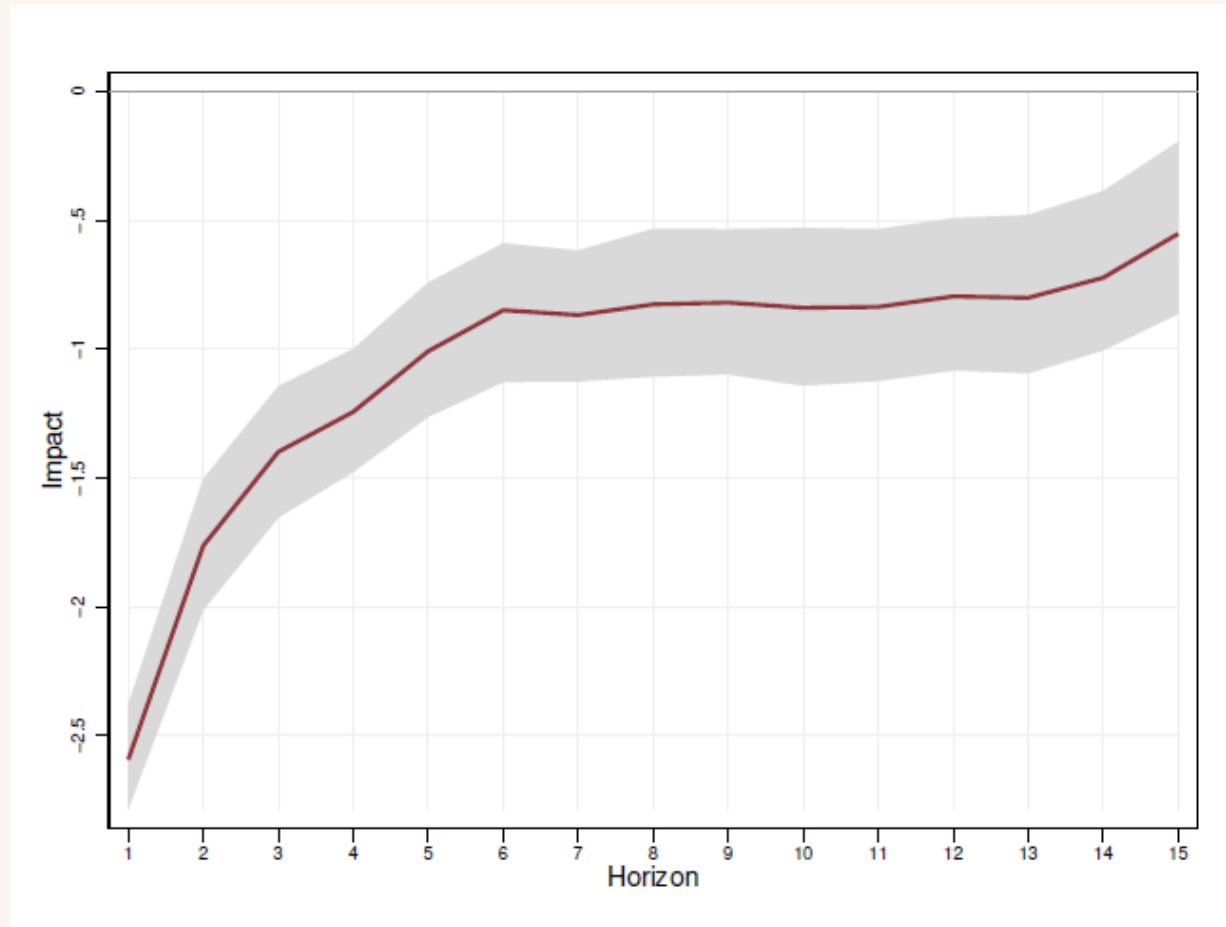
# Different detrending methods (back)



# Sample splits (back)

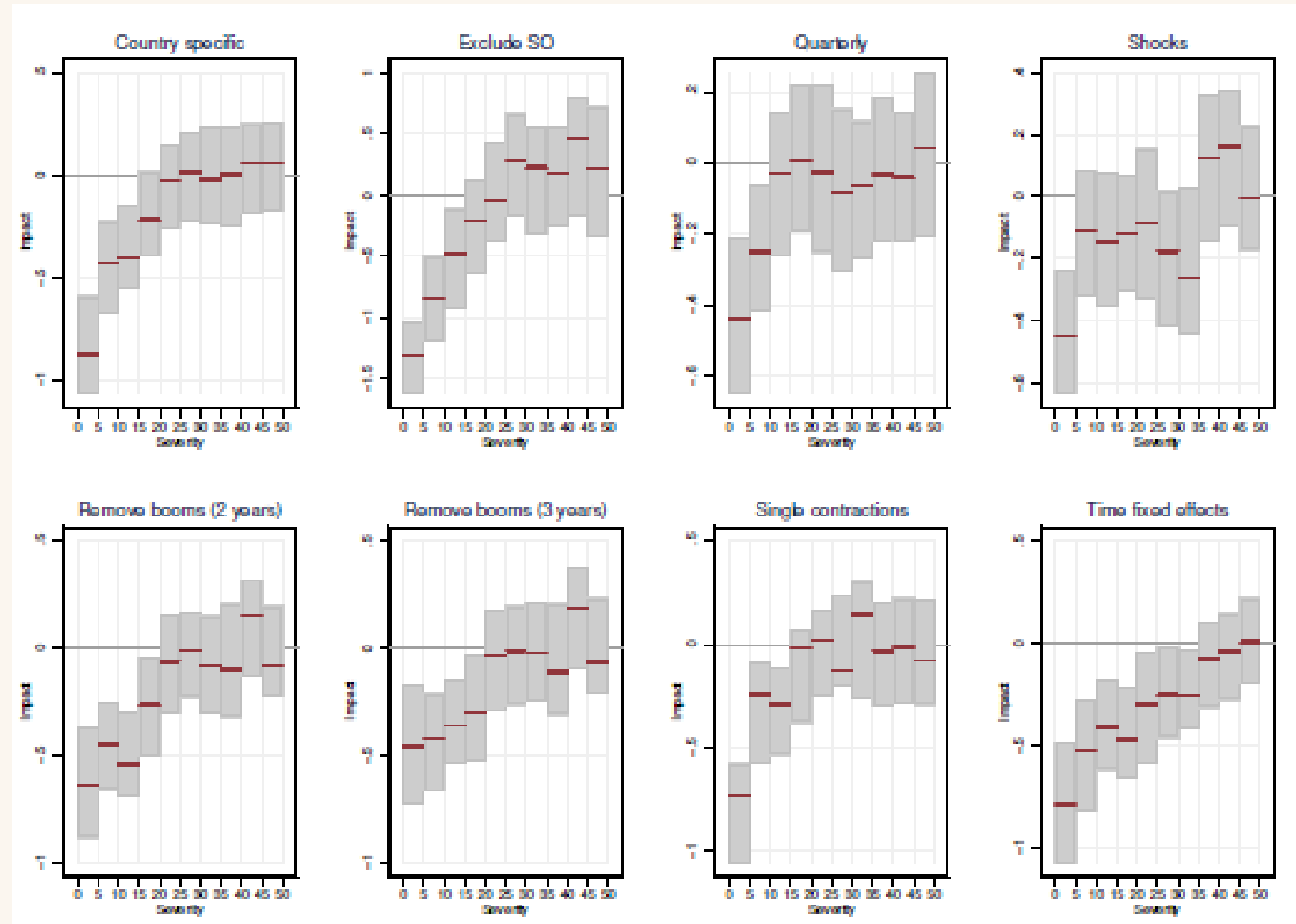


## Longer horizons (back)





# Different approaches to identifying contractions (back)



# Country-specific results

