

Measurement Error in Macroeconomic Data and Economics Research: Data Revisions, Gross Domestic Product, and Gross Domestic Income

Andrew C. Chang, Board of Governors of the Federal Reserve System
Phillip Li, Office of Financial Research, US Department of the Treasury
ASSA 2018

Motivation

- ▶ Macro data are estimates of latent variables.
 - ▷ Macro data contain measurement error.
- ▶ Consistent estimation requires either:
 - ▷ No measurement error.
 - ▷ Assumption on measurement error structure.
- ▶ Example: $Y = X\beta + \epsilon$. For consistency, either assume:
 - ▷ No measurement error in Y and X .
 - ▷ Additive normal measurement error only in Y .

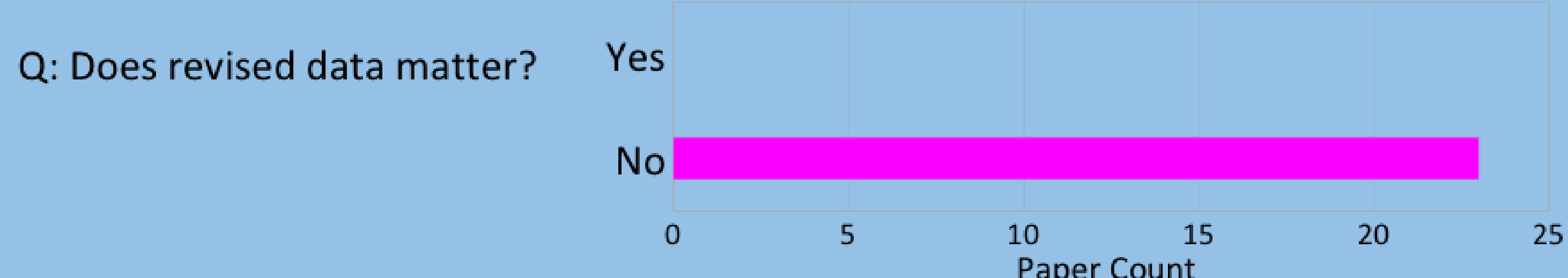
Objectives

- ▶ Analyze measurement error's effect on research with pre-defined method
 - ▷ Attempt to replicate 59 macro studies that use gross domestic product (GDP).
 - ▷ Reestimate 23 replicated models using:
 - ▶ Revised GDP data – literature finds large effect of revisions on estimation.
 - ▶ Gross domestic income (GDI) - no literature on reestimation on GDI.
 - ▷ Look for qualitative difference in results.

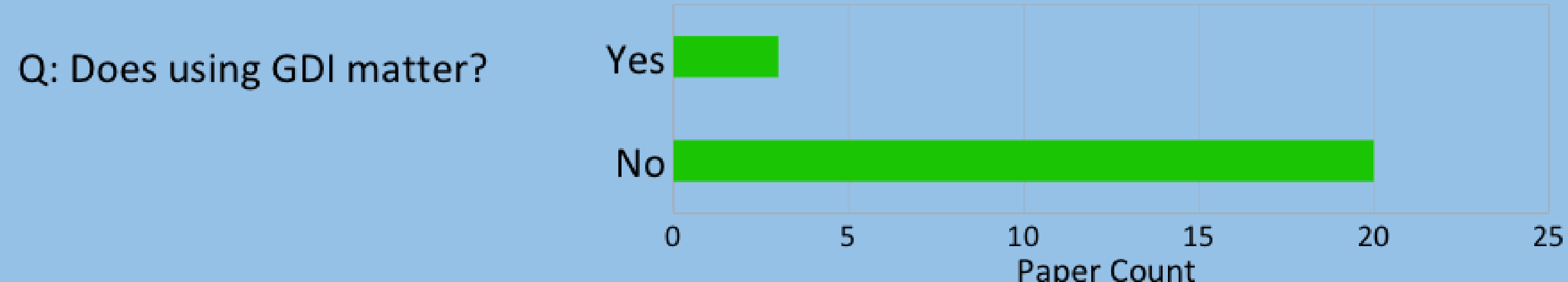
Replication results



Revision results



GDI results



Implications

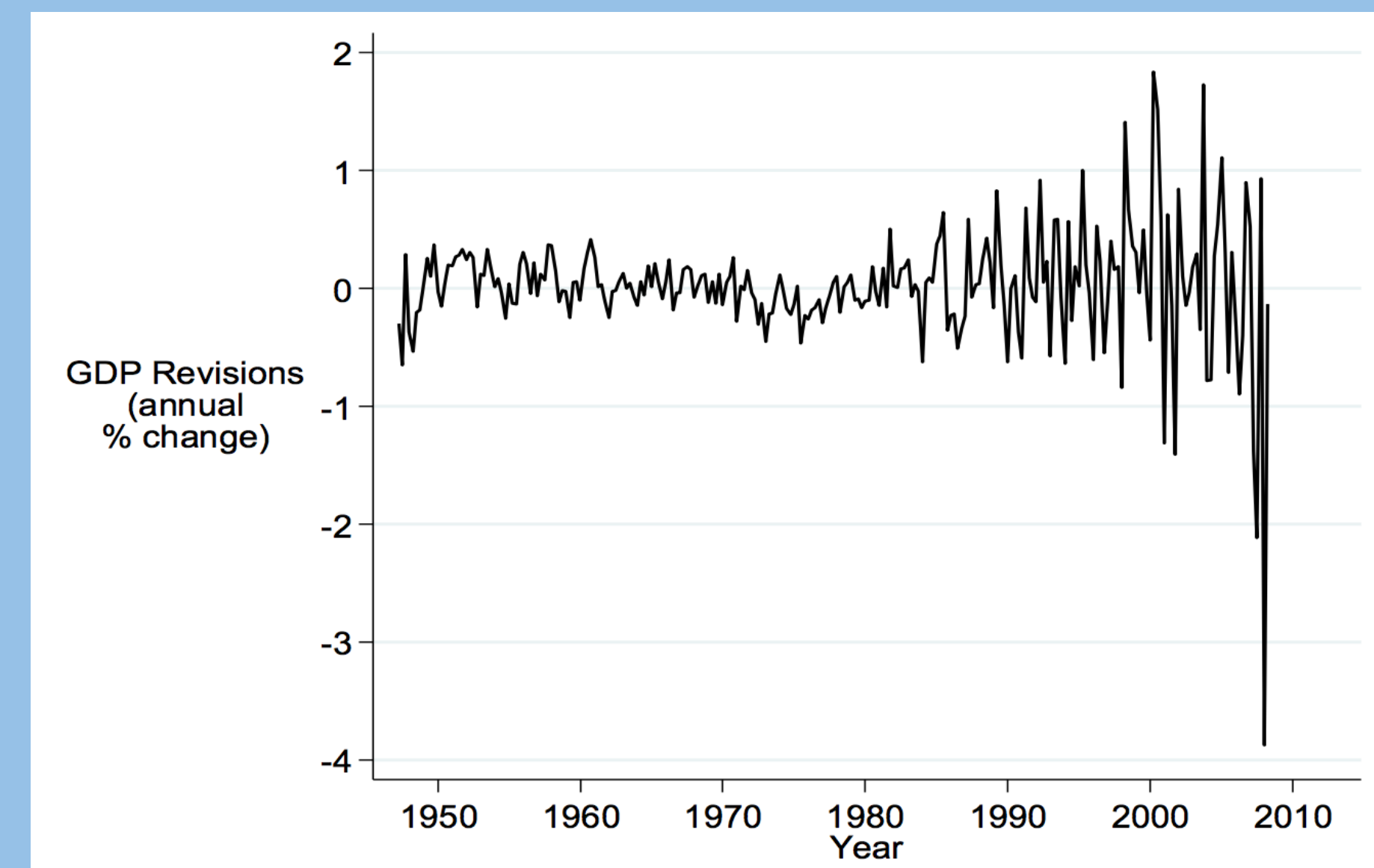
- ▶ Economic models need to account for data uncertainty.
 - ▷ Estimation with GDI instead of GDP can give fundamentally different results!
- ▶ File drawer bias in publication.
 - ▷ Find little effect of revised data on estimation - goes against literature.

Background

- ▶ Two largely independent estimates of latent output
 - ▷ Expenditure-side estimate of output: $GDP = C + I + G + NX$
 - ▷ Income-side estimate of output: $GDI = \text{Compensation} + \text{Corporate Profits} + \text{Other Capital Income}$

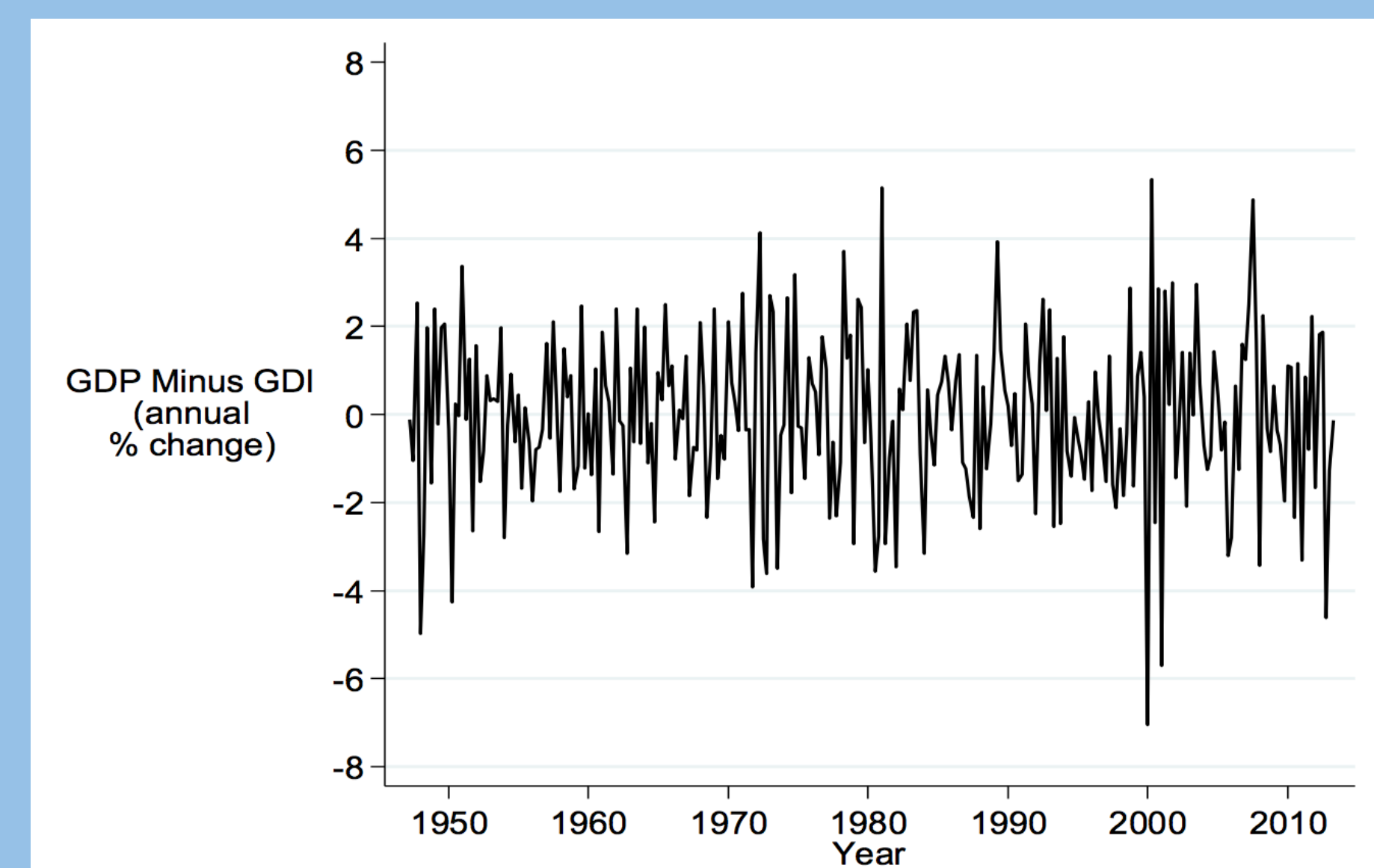
GDP revisions

GDP revised to reduce measurement error. Revisions are large.



GDP vs. GDI

GDP and GDI differ persistently due to measurement error.

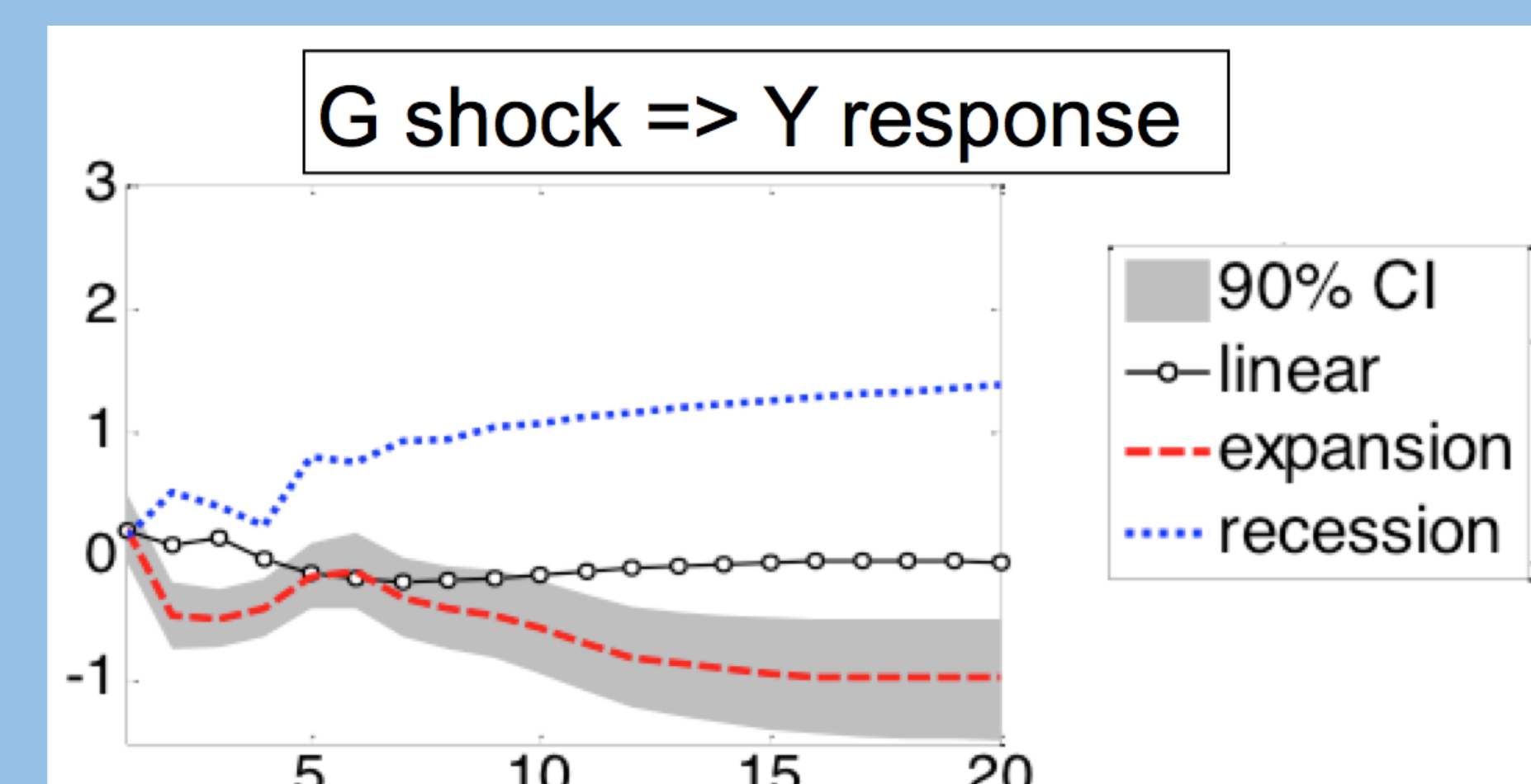


Proposed approach

If we could rewrite the key original text with models estimated on revised GDP or GDI, then we count the estimation as different.

Auerbach and Gorodnichenko (2012)

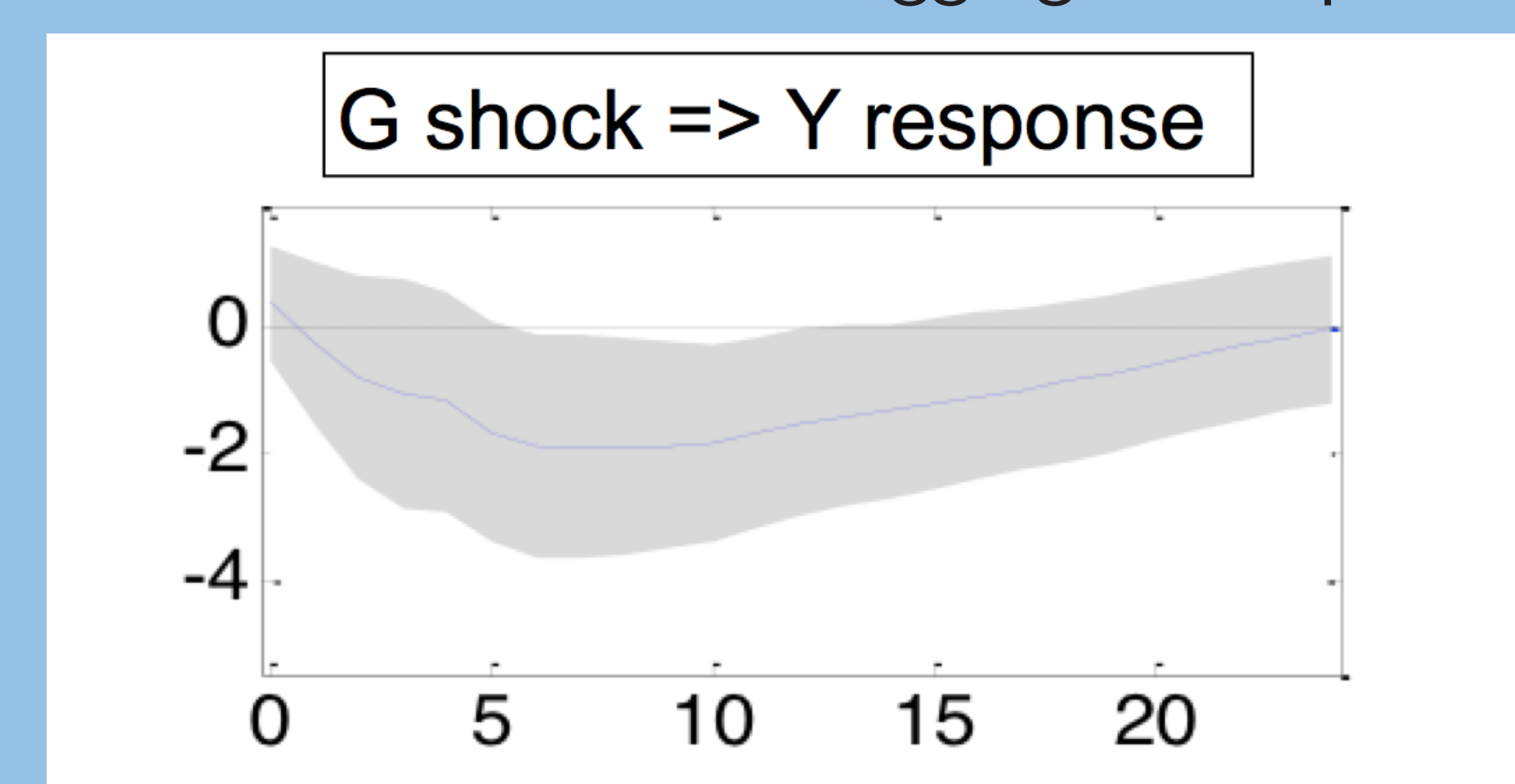
Auerbach and Gorodnichenko (2012): "...fiscal policy [is] considerably more effective in recessions than expansions."



Text would be the same (fiscal multiplier larger in a recession).

Corsetti, Meier, Müller (2012)

Corsetti, Meier, and Müller (2012): "[an] increase in government spending causes a substantial rise in aggregate output."



Text would be different (no expansionary effect when using GDI).