Decomposing the Fiscal Multiplier

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How does fiscal policy affect the economy?

- What is the empirical **fiscal multiplier**?

  Old question; still contentious.

- The fiscal multiplier is *not* a structural parameter.

  Could be affected by a number of factors.

  Hard to use average estimates "off the shelf".

- How important is the **"monetary offset"**?

  Effect of fiscal policy may depend on the monetary response.

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  - *Blinder-Oaxaca decomposition*
  - *Isolate the **indirect effect** of treatment: Outcome depends on treatment, the covariates and their interaction.*

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  - *Blinder-Oaxaca decomposition*
  - *Isolate the **indirect effect** of treatment: Outcome depends on treatment, the covariates and their interaction.*
- How important is the monetary offset?
  - *Treatment less effective if your monetary policymaker is a hawk.*
  - Off-the-shelf identified fiscal consolidation episodes for a panel of countries (Guajardo et al. (2014)).
  - A proxy? Exploit cross-country sensitivity of interest rates to fiscal.

Main Results

1. The empirical fiscal multiplier is just below 1 on average, but varies with the monetary offset:
   - *Multiplier can be as low as 0 or as high as 2 for typical movements in policy interest rates.*

2. Blinder-Oaxaca decomposition is straightforward to implement and allows for a great deal of multivariate state-dependence.

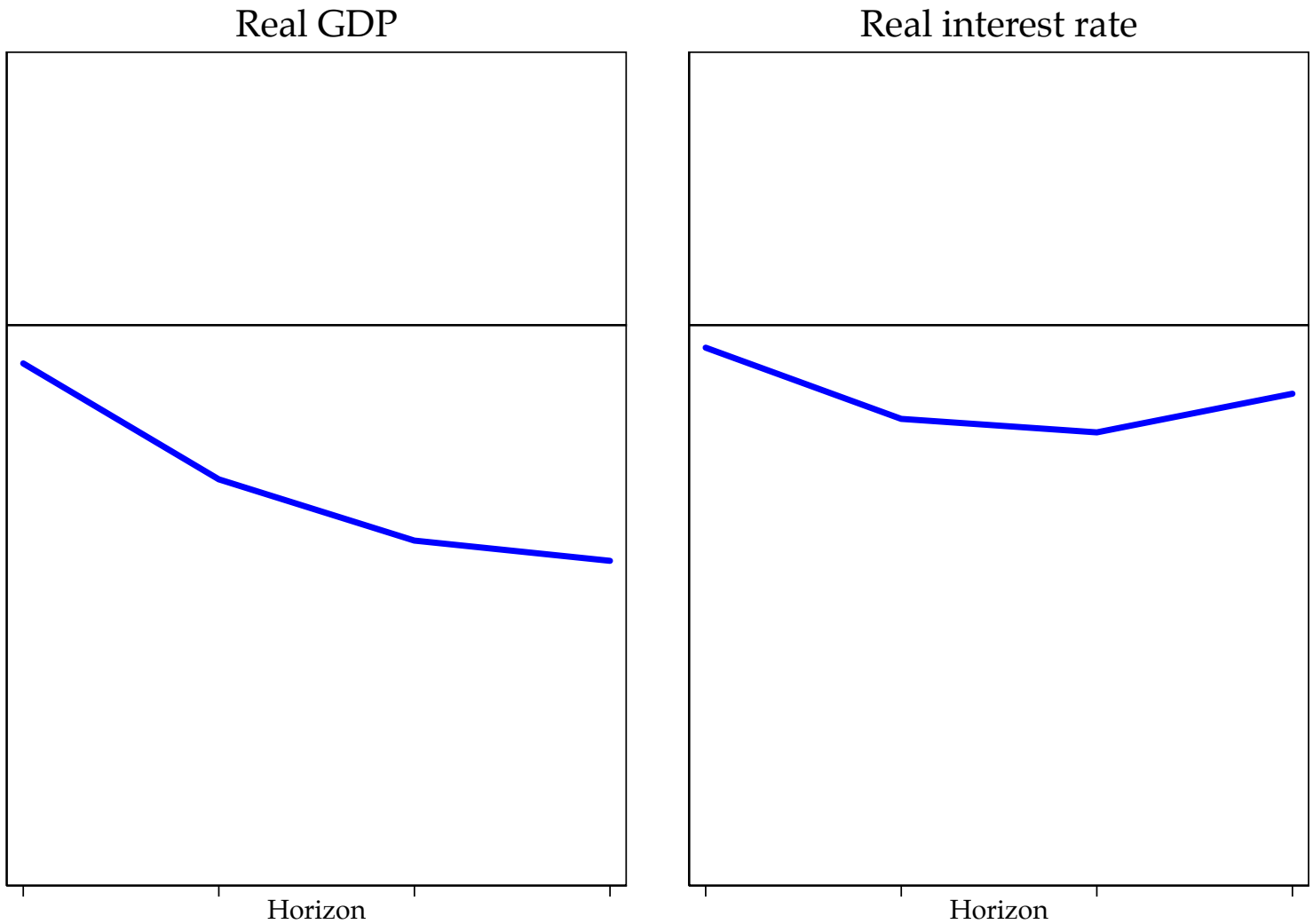
3. Multiplier varies with the output gap but more limited non-linearity along other dimensions such as Δdeficit or consolidation size.

Literature

- **Multiplier variation:** e.g. Auerbach and Gorodnichenko (2012), Corsetti et al. (2010), DeLong and Summers (2012), Ilzetzki et al. (2013), Jordà and Taylor (2016)
- **No monetary response multiplier using regional variation:** e.g. Nakamura and Steinsson (2014), Acconcia et al. (2014), Corbi et al. (2019), Chodorow-Reich (2019)
- **Multipliers at the ZLB:** e.g. Ramey and Zubairy (2018), Miyamoto et al. (2018), Canova and Pappa (2011) (Empirics); Woodford (2011), Christiano et al. (2011), Eggertsson (2011) (Theory);
- **Identification:** e.g. Guajardo et al. (2014), Romer and Romer (2010), Barro and Redlick (2011), Cloyne (2013), Mertens and Ravn (2013), Hayo and Uhl (2014) (Narrative); Blanchard and Perotti (2002), Mountford and Uhlig (2009) (SVARs)
- **Decomposition methods:** e.g. Fortin et al. (2011)

Idea & Approach

Typical Fiscal Consolidations on Average



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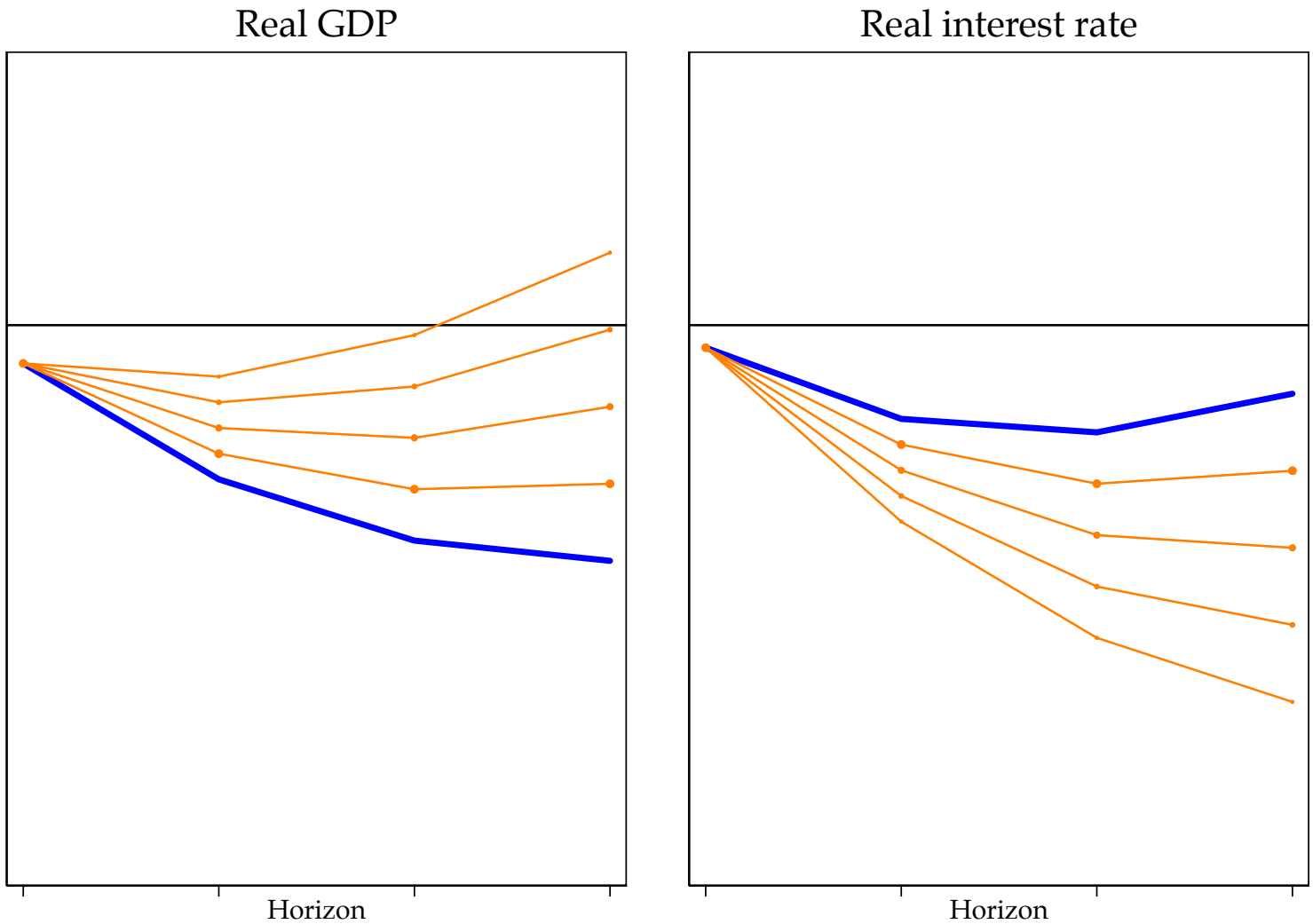

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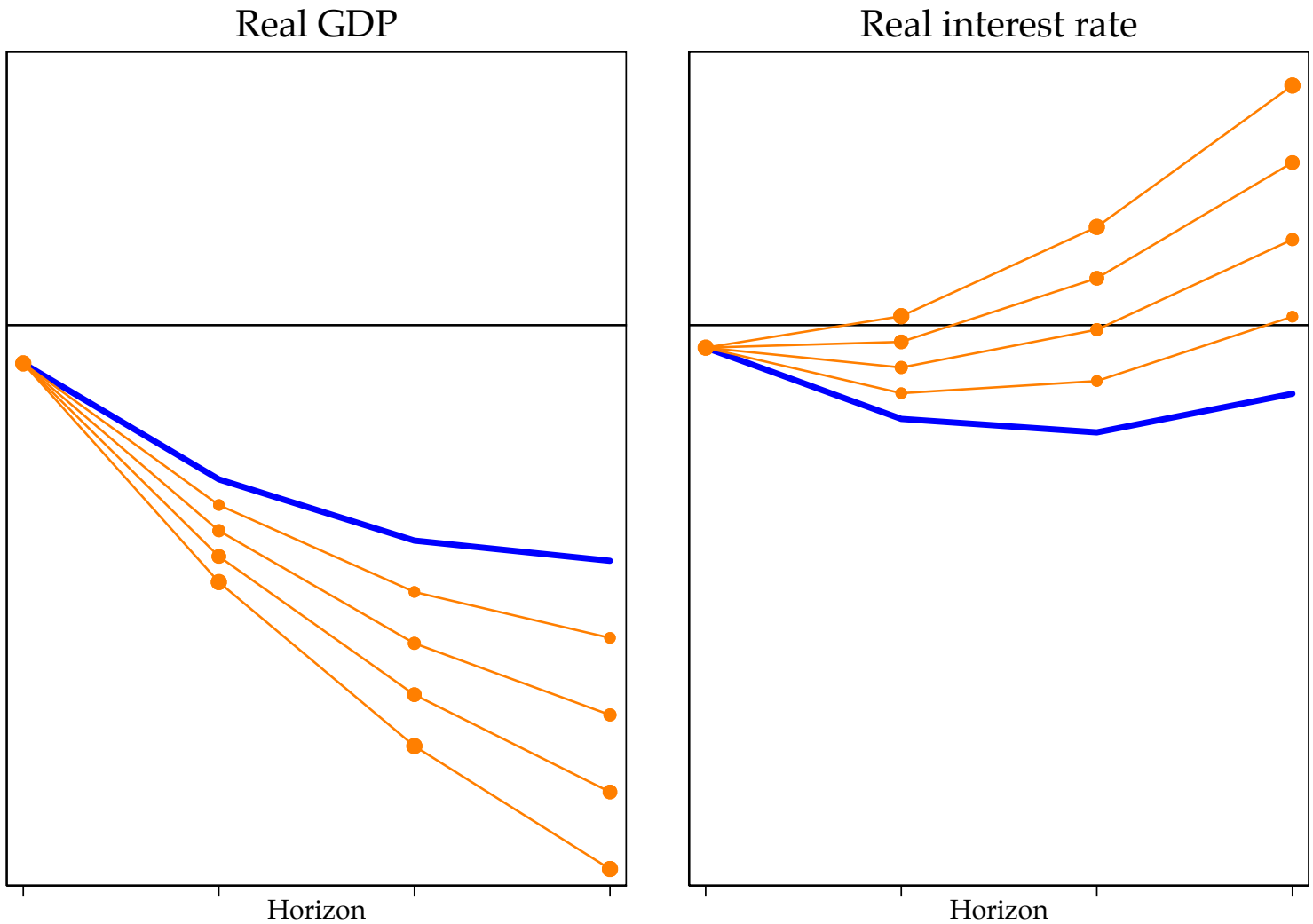

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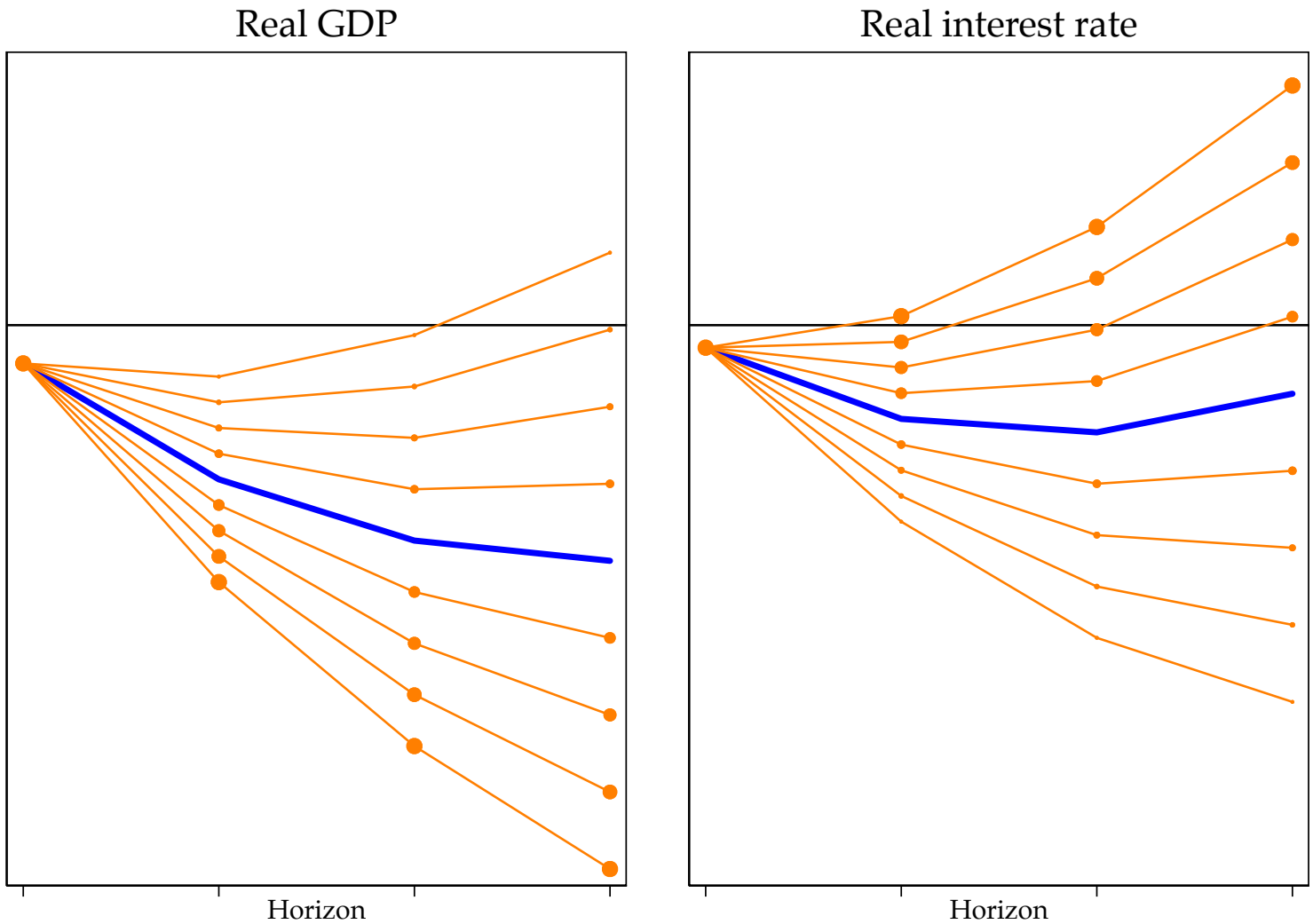

The Blinder-Oaxaca Decomposition

- Consider the potential outcome y:

$$y_j = \mu_j + (\boldsymbol{x} - \boldsymbol{\mu_x})\gamma_j + \epsilon \quad \text{for } j \in \{0, 1\}$$

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- Comparing means across treatment/control groups:

$$E(y_1|f = 1) - E(y_0|f = 0) = \{\mu_1 + E[(\boldsymbol{x} - \boldsymbol{\mu_x})|f = 1]\gamma_1\} - \{\mu_0 + E[(\boldsymbol{x} - \boldsymbol{\mu_x})|f = 0]\gamma_0\}$$

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- Add and subtract the *counterfactual* $E[(\boldsymbol{x} - \boldsymbol{\mu_x})|f=1]\gamma_0$:

$$E(y_1|f=1) - E(y_0|f=0) = \underbrace{(\mu_1 - \mu_0)}_{\text{Direct}} + \underbrace{E[(\boldsymbol{x} - \boldsymbol{\mu_x})|f=1](\gamma_1 - \gamma_0)}_{\text{Indirect}} + \underbrace{\{E[(\boldsymbol{x} - \boldsymbol{\mu_x})|f=1] - E[(\boldsymbol{x} - \boldsymbol{\mu_x})|f=0]\}}_{\text{Composition}}$$

Generalization

$$\Delta^h y_{t+h} = \underbrace{\mu_0^h + (\boldsymbol{x}_t - \overline{\boldsymbol{x}})\gamma_0^h + f_t\,\beta^h}_{\text{usual local projection}} + \underbrace{f_t\,(\boldsymbol{x}_t - \overline{\boldsymbol{x}})\boldsymbol{\theta}^h}_{\substack{\text{Blinder-Oaxaca} \\ \text{extension}}} + \omega_{t+h}$$

Direct effect:	$\hat{\beta}^h$
Indirect effect:	$(\overline{\boldsymbol{x}}_1 - \overline{\boldsymbol{x}})\hat{\boldsymbol{\theta}}^h$
Composition effect:	$(\overline{\boldsymbol{x}}_1 - \overline{\boldsymbol{x}}_0)\hat{\gamma}_{\boldsymbol{0}}^{\boldsymbol{h}}$

This is a *decomposition*:

- $\boldsymbol{x}$ is potentially multi-dimensional.
- Also need to think carefully about causality/identification.

Fiscal Monetary Interactions

Data & Narrative Approach

- We need some identified variation in fiscal policy: Guajardo, Leigh, and Pescatori (2014) dataset of consolidation episodes.
- Cross-country panel of 17 countries from 1978-2009.
- Additional macro data: Jordà, Schularick, and Taylor (2017).
- f: fiscal treatment (size of consolidation as % of GDP)
  $\boldsymbol{x}$: lagged GDP growth, output gap, real interest rates, deficit to GDP ratio, world GDP growth.

Blinder-Oaxaca logic: *Does a less activist monetary regime translate into bigger recessions following a fiscal consolidation?*

How to Proxy for the Monetary Regime?

- **Step 1:** Regress policy rates h periods ahead on fiscal treatment today. Allow this response to vary by country, i.

  $\Rightarrow$ *Country specific response of interest rates to fiscal:* $\Theta^f_{h,i}$

- **Step 2:** Include (de-meaned) $\Theta^f_{h,i}$ in control set:

$$\Delta^h y_{i,t+h} = \mu_i^h + (\boldsymbol{x}_{i,t} - \overline{\boldsymbol{x}})\boldsymbol{\gamma}^h + f_{i,t}\beta^h + f_{i,t}(\boldsymbol{x}_{i,t} - \overline{\boldsymbol{x}})\boldsymbol{\theta}_x^h + f_{i,t}\Theta^f_{i,h}\boldsymbol{\theta}_f^h + \omega_{i,t+h}$$

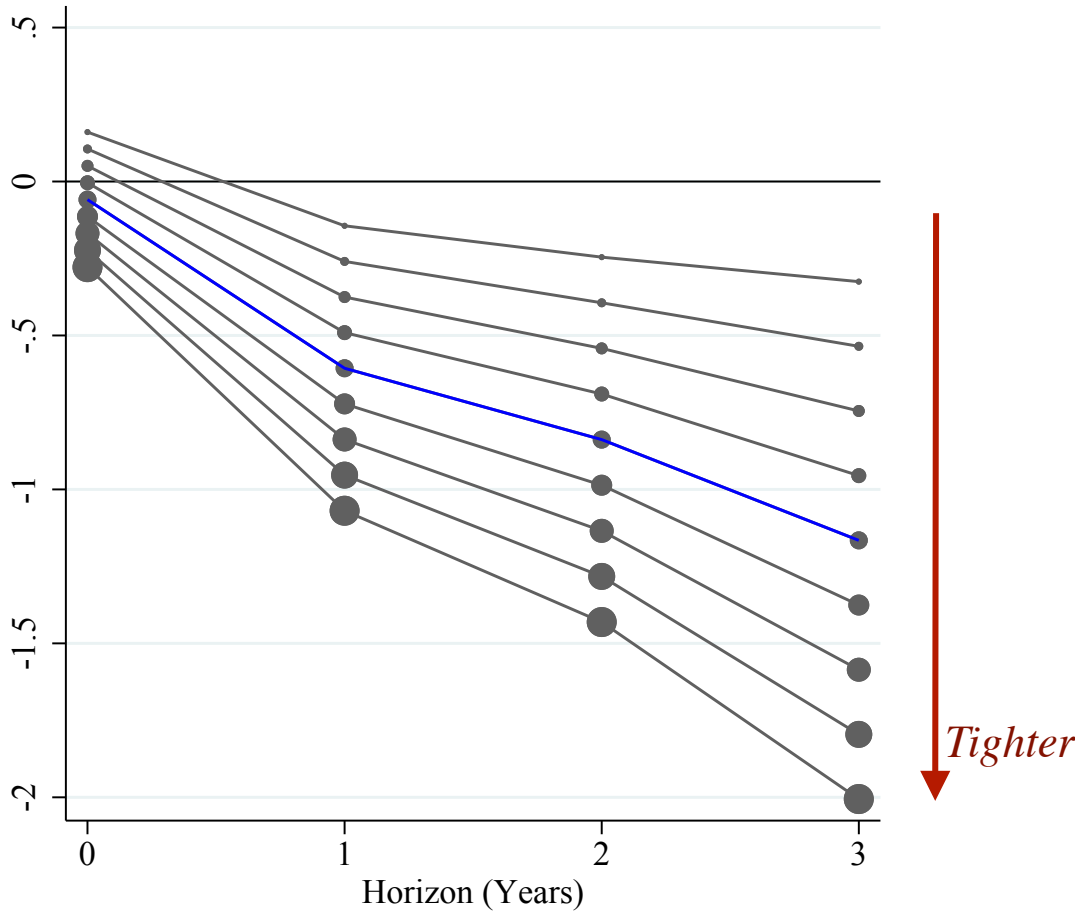
- Works well using simulations from a conventional NK model. >

Example

Monetary Fiscal Interactions

Response of GDP to a 1% of GDP fiscal consolidation

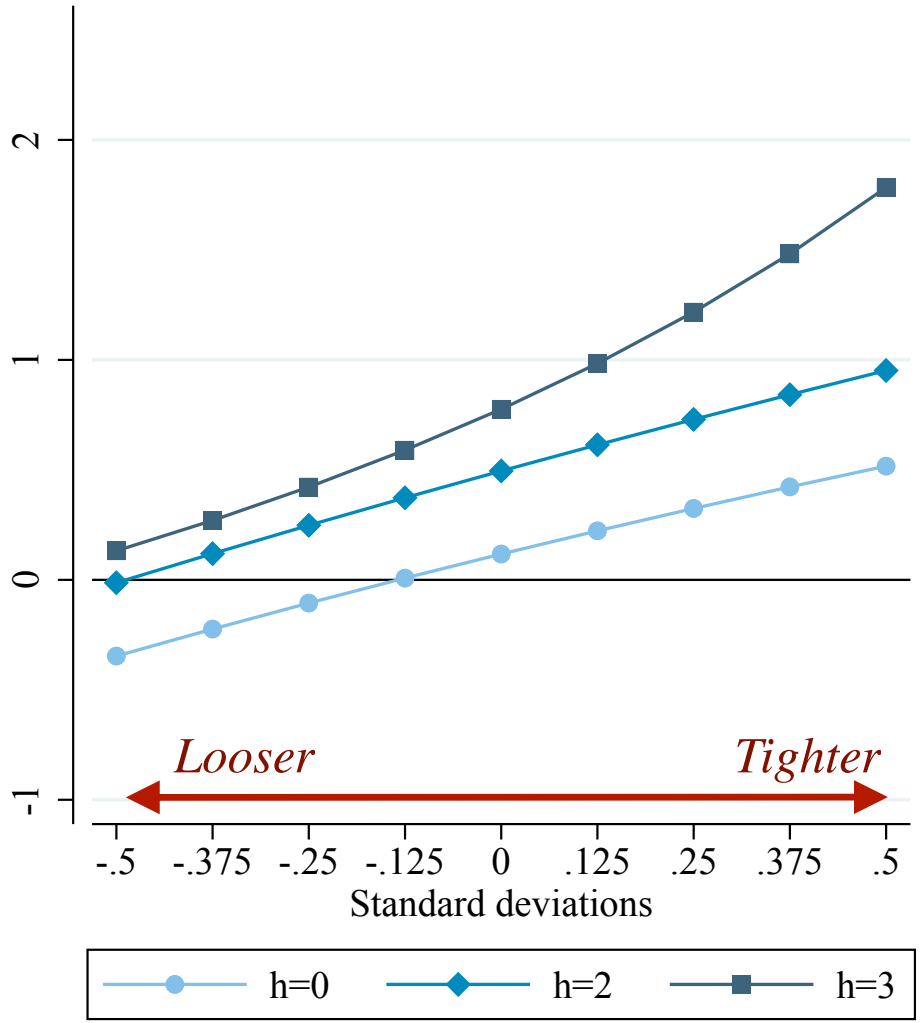
Overall response by Θ^f (%)



Θ^f from -0.5 to $+0.5$ s.d. (small to large circles left fig): interest rate varies by $\approx$ 1pp.

Deficit | Real Rate | Significance

Cumulative GDP Fiscal Multiplier by Monetary Regime



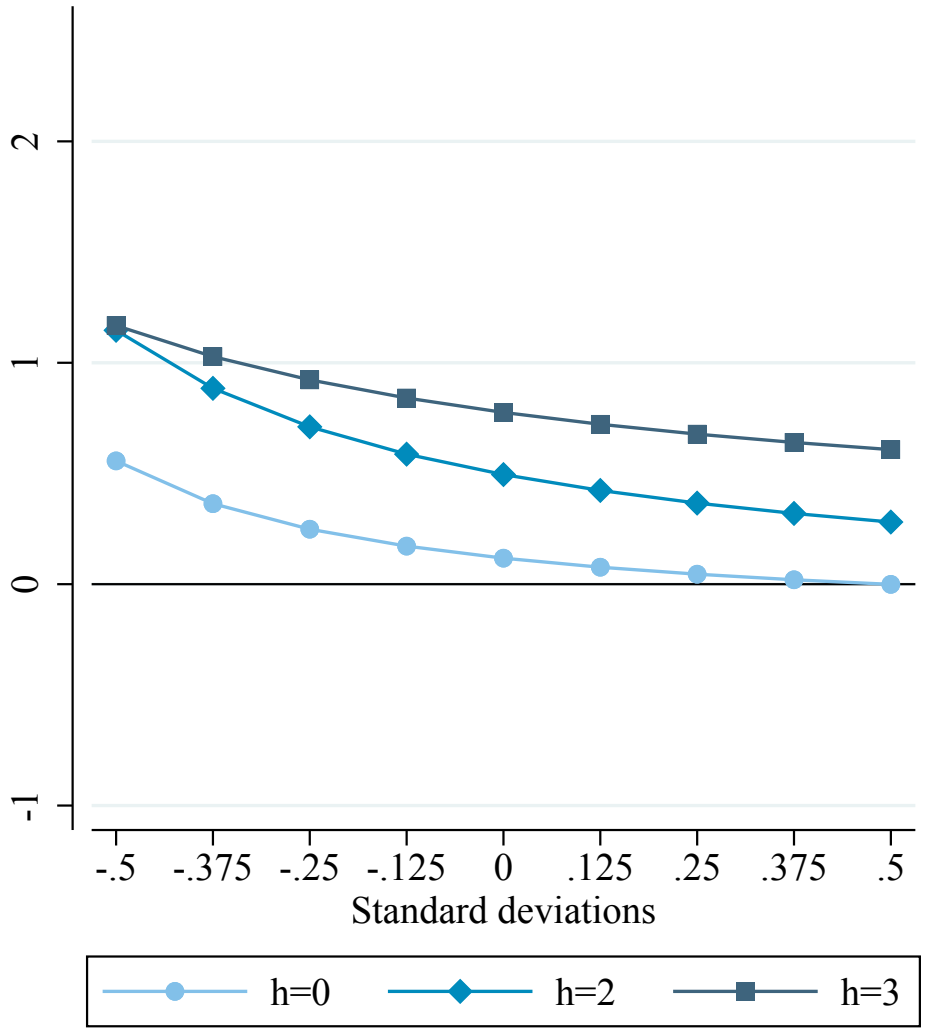
Cumulative GDP fiscal multiplier at year h $(\sum_{k=0}^{h} \Delta^k GDP_{t+k})/(\sum_{k=0}^{h} \Delta^k Deficit_{t+k})$
varying Θ^f *from* -0.5 *to* $+0.5$ *s.d.*

Robustness & Extensions

- Variation in the controls $\boldsymbol{x}$. >
- Using time fixed effects. >
- Identifying the indirect effect using monetary shocks. >
- Allowing for variation in the no-monetary response multiplier. >
- **Other forms of state-dependence:** Multiplier is larger with a negative output gap. Limited indirect effect from other factors...

Output Gap State-Dependence

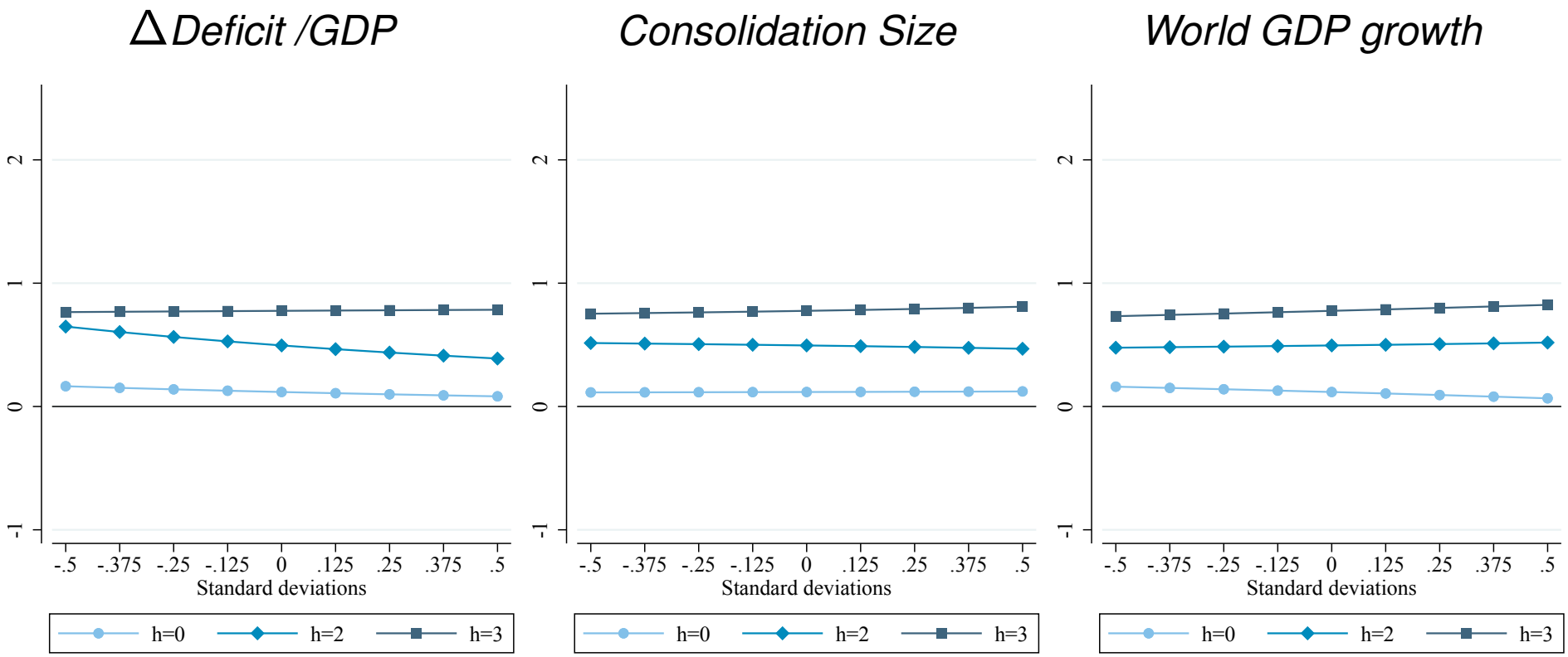
Cumulative Fiscal Multiplier for GDP: Varying the Output Gap



Cumulative GDP multiplier at year h varying the output gap from -0.5 *to* $+0.5$ *s.d.*

Limited Indirect Effect from Other Factors

Cumulative Fiscal Multiplier for GDP: Varying the Other Factors



Summary

- Many multiplier estimates are average treatment effects.
- We unpack this further: time series version of the Blinder-Oaxaca decomposition. Straightforward to implement and allows for a great deal of multivariate state-dependence.
- *Is fiscal policy more effective when implemented in less activist monetary regimes?*
- **Yes**. Multiplier can vary from around zero to near 2.
- Fiscal-monetary interactions play an important role in explaining the empirical fiscal multiplier.