Fiscal Policy and Occupational Employment Dynamics

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Effects of fiscal policy

- Classical question: ***How does fiscal policy affect the economy?***
  - Extensive literature investigates how $G \uparrow$ impact on macro **aggregates** like Y, C, or N.

- Important aspect of fiscal policy require taking into account **heterogeneity**.
  - Who benefits? Who loses?
  - Substantial interest in disaggregated effects of fiscal policy (Anderson, Inoue, and Rossi, 2016; Cloyne and Surico, 2017, Giavazzi and McMahon, 2012; Nekarda and Ramey, 2011).

- This paper documents substantial heterogeneity in impacts of changes in G on **labor market** outcomes across **occupations**.

Main results

- Employment in blue-collar occupations hardly affected by fiscal stimulus.
- Employment rises disproportionately in service, sales, and office occupations.
- Implications:
  - Destabilizing effect of countercyclical fiscal policy on employment composition.
  - Income inequality/polarization.
- Explanation based on occupation-specific capital/labor substitutability.

How do we proceed?

1. Estimate Vector-Autoregressive models (VARs) and analyze effects of spending expansions on employment by occupation.

2. Explore role of sectors, industries, and workers' characteristics.

3. Develop theoretical (macro) model to explain key empirical facts.

Baseline specification

Estimate vector-autoregressive models with quarterly U.S. data (sample 1983-2015):

$$Y_t = c_0 + c_1 t + \sum_{i=1}^{4} A_i Y_{t-i} + u_t$$

Variables in vector Y:

1. real government spending per capita
2. real GDP per capita
3. real interest rate: federal funds rate - inflation fwd.
4. real government tax receipts per capita
5. debt-to-GDP ratio
6. one-quarter ahead government spending forecast (survey of professional forecasters)
7. different employment variables (**rotation**)

Baseline specification

Identification of exogenous variation in government spending:

- Short-run restrictions.
- Government spending exogenous within the quarter (implementation lag of fiscal policy), as in Blanchard and Perotti (2002).
- Variation unforeseen by professional forecasters.

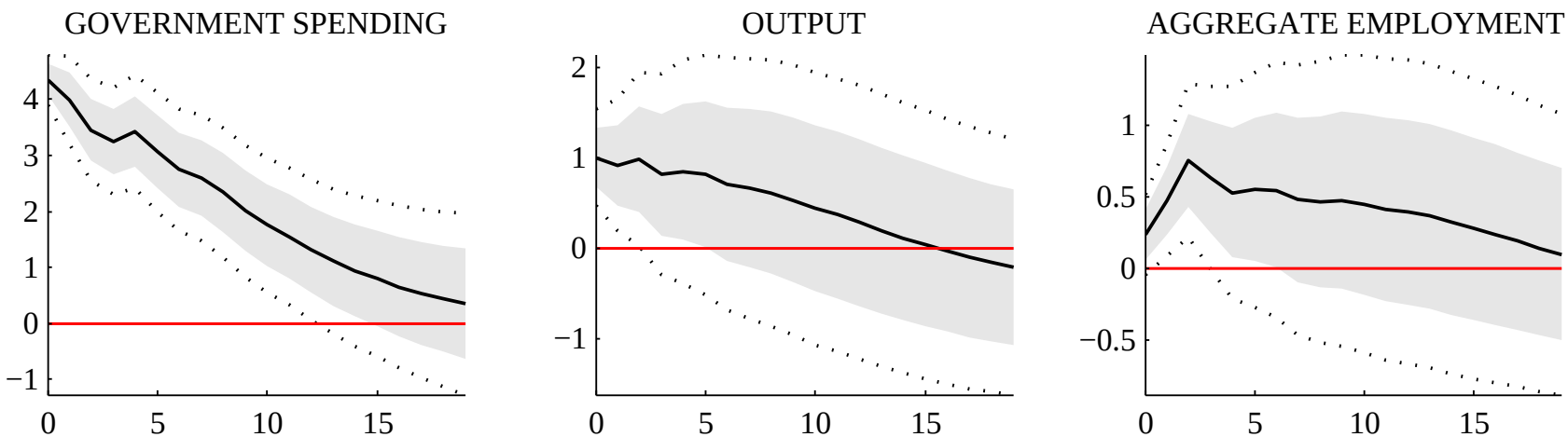
Baseline specification

Occupational employment data: Current Population Survey.

Focus on major occupation groups (Census 2002 Classification), aggregated to three broader occupation groups:

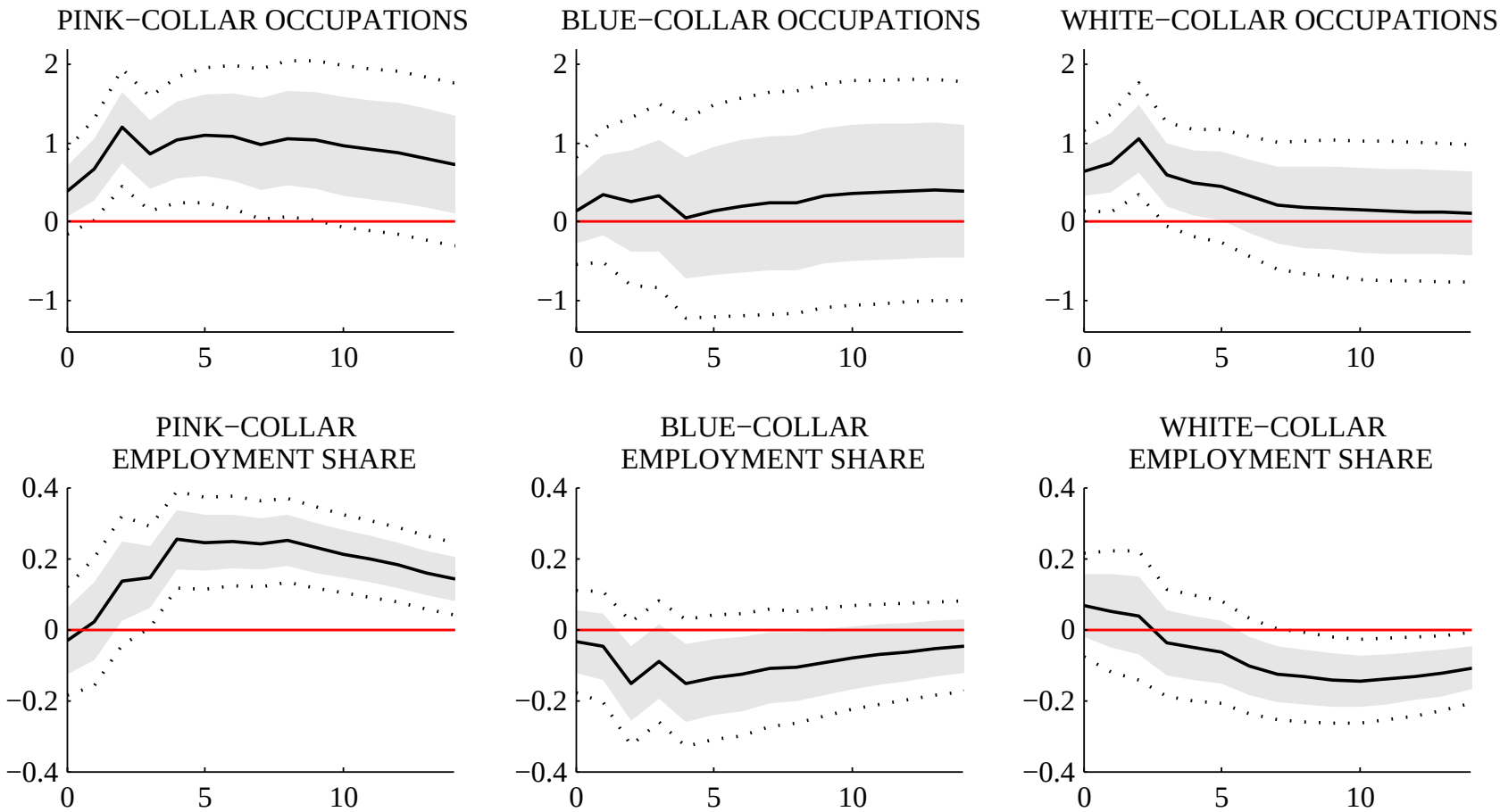
- Management, professional, and related occupations ("white-collar").
- Natural resources, construction, maintenance, production, transportation, and material moving occupations ("blue-collar").
- Service, sales and office occupations ("pink-collar").

Effects on macroeconomic aggregates



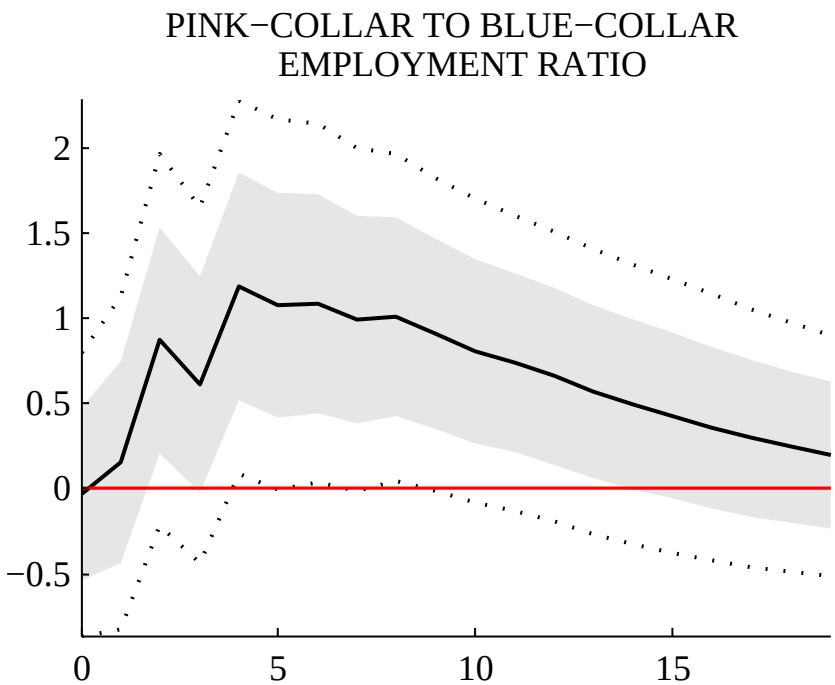
- Government spending multiplier ≈ 1.
- Results in line with the literature (see, e.g., Ramey, 2011, Pappa, 2009, and Monacelli, Perotti, and Trigari, 2010).

Occupational employment dynamics



- Disproportionate increase in pink-collar employment. ▸ subcategories
- No discernible change in blue-collar employment. ▸ subcategories

Pink-collar to blue-collar employment ratio

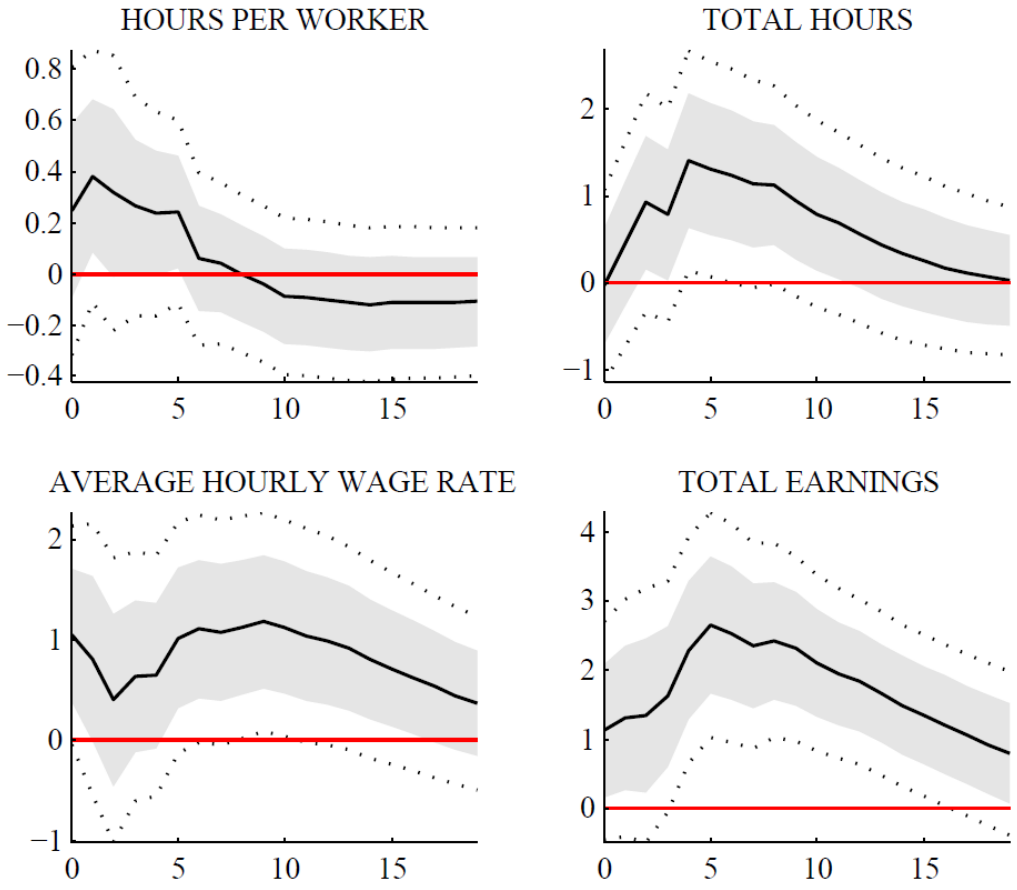


- *Pink-collar:* **two in five workers** on average but almost **two of three jobs** created by fiscal policy.
- *Blue collar:* **one in four workers** on average but only **one in ten jobs** created by fiscal policy.

Robustness

- Re-specifications of the reduced-form VAR, most importantly:
  - Trends,
  - Sample.
- Alternative identification approaches:
  - Forecast errors,
  - sign restrictions.
- Government investment versus government consumption.

Further labor-market outcomes (pink-to-blue ratio)



- Dynamics at intensive margin reinforce dynamics at extensive margin.
- Co-movement of relative occupational employment and relative occupational wage rates.

▸ unemployment

Potential explanations for heterogeneous occupational employment dynamics

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3. Different labor-supply reactions across occupations groups due to different workers' characteristics.
    - But, shift from blue to pink also within groups of workers with similar characteristics (gender, age).

Explanation: Labor demand

- In response to G shocks, there are occupational employment dynamics not explained by sectors, industries, or labor supply.

- Co-movement of relative occupational employment and relative occupational wage rates.

$\Rightarrow$ Firms increase **demand** for pink-collar workers by more than demand for blue-collar workers.

- Next steps:
  - Explain this occupation-specific labor-demand response.
  - Build a quantitative macro model incorporating this effect.

Main element

- Fundamental difference between blue-collar and pink-collar occupations: short-run substitutability between labor and capital services.
- In the short run, firms can raise output by using capital more intensely.
- **Blue-collar** employment: relatively good substitute to capital services.
  - Blue-collar workers perform routine-manual labor including a substantial share of interaction with capital/machines.
- **Pink-collar** employment: relatively poor substitute to capital services in the short run.
  - Pink-collar (service, sales, and office) occupations include substantial share of direct human interaction.

The model

- NK business cycle model augmented by occupational labor and different degrees of substitutability between inputs.

- Production function (nested CES):

$$y_{j,t} = z \cdot \left(\alpha \cdot (v_{j,t})^{\frac{\theta-1}{\theta}} + (1-\alpha) \cdot \left(a_t \cdot n^p_{j,t}\right)^{\frac{\theta-1}{\theta}} \right)^{\frac{\theta}{\theta-1}},$$

  where

$$v_{j,t} = \left(\gamma \cdot \left(\tilde{k}_{j,t}\right)^{\frac{\phi-1}{\phi}} + (1-\gamma) \cdot \left(a_t \cdot n^b_{j,t}\right)^{\frac{\phi-1}{\phi}} \right)^{\frac{\phi}{\phi-1}}.$$

- For $\phi > \theta$, blue-collar labor n^b_t is closer substitute to capital services $\tilde{k}_t = u_t k_{t-1}$ compared to pink-collar labor n^p_t and vice versa for $\phi < \theta$.

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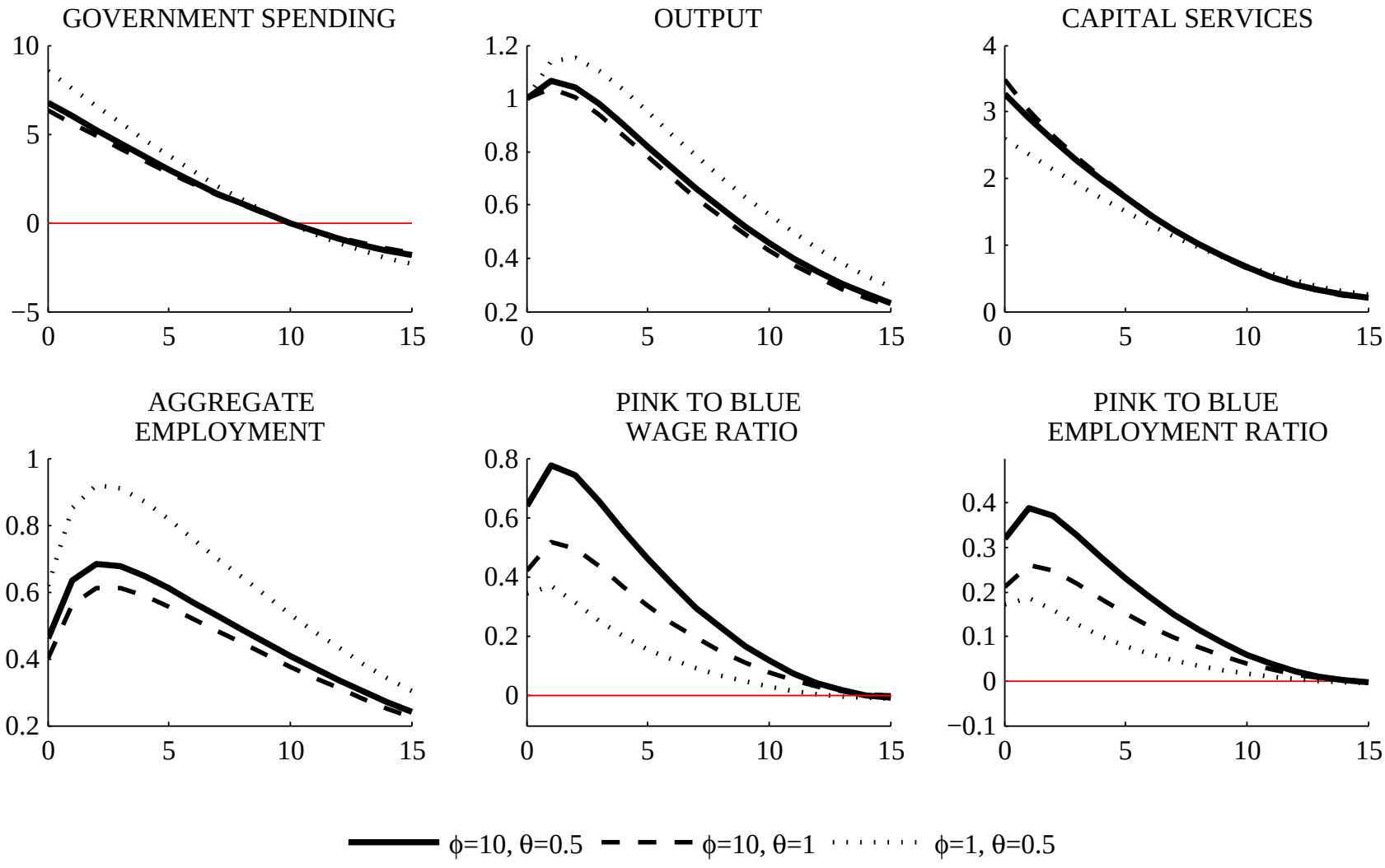
- → Firms increase their demand for pink-collar labor by more than their demand for blue-collar labor.
- → **Relative pink-collar employment boom associated with rise in relative pink-collar wages.**

▸ analytical results in simplified model

Impulse Responses



▸ calibration ▸ productivity shocks

Conclusion

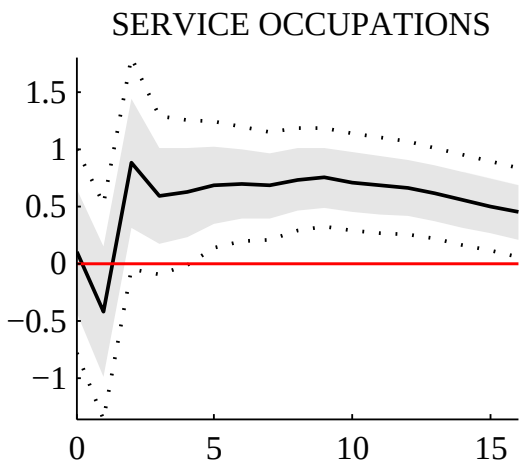
- Fiscal expansions lead to...
  - disproportionate employment growth in pink-collar occupations,
  - weak and insignificant employment growth in blue-collar occupations,
  - a shift of employment from blue-collar to pink-collar occupations.

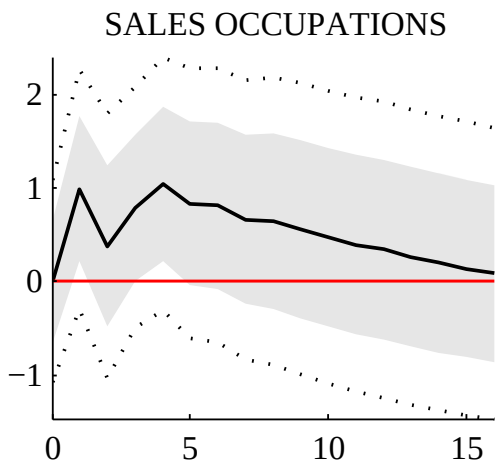
- Theoretical explanation based on occupation-specific short-run capital/labor substitutability.

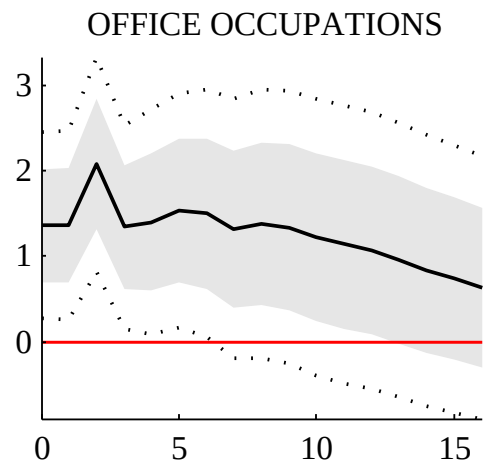
- Policy makers may want to target stimulus packages toward blue-collar dominated industries.

Additional material

Results for subcategories of pink-collar occupations







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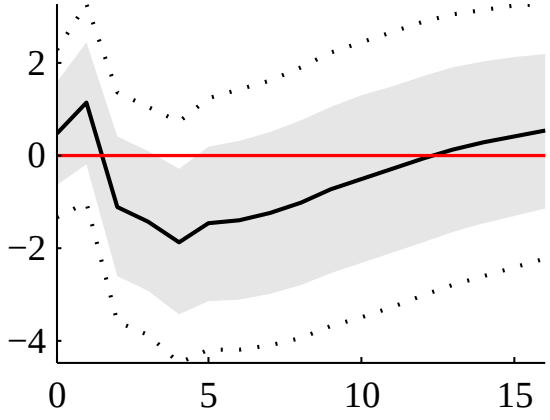
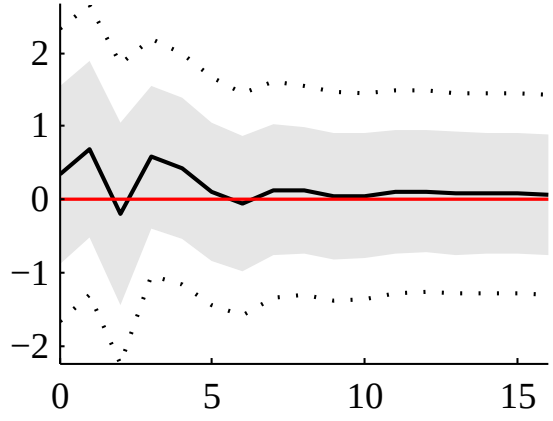
Results for subcategories of blue-collar occupations

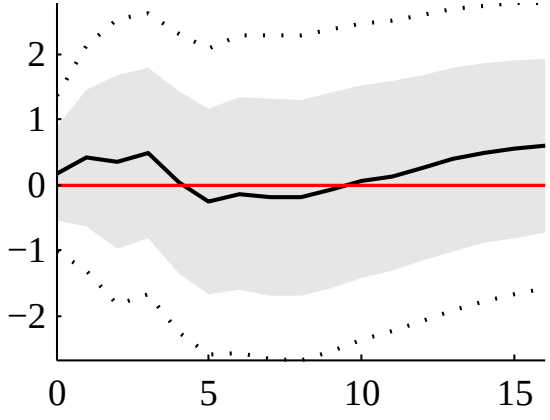
CONSTRUCTION AND EXTRACTION OCCUPATIONS



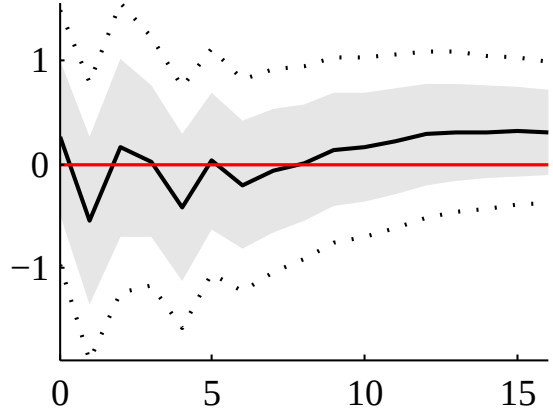
INSTALLATION, MAINTENANCE, AND REPAIR OCCUPATIONS



PRODUCTION OCCUPATIONS



TRANSPORTATION AND MATERIAL MOVING OCCUPATIONS



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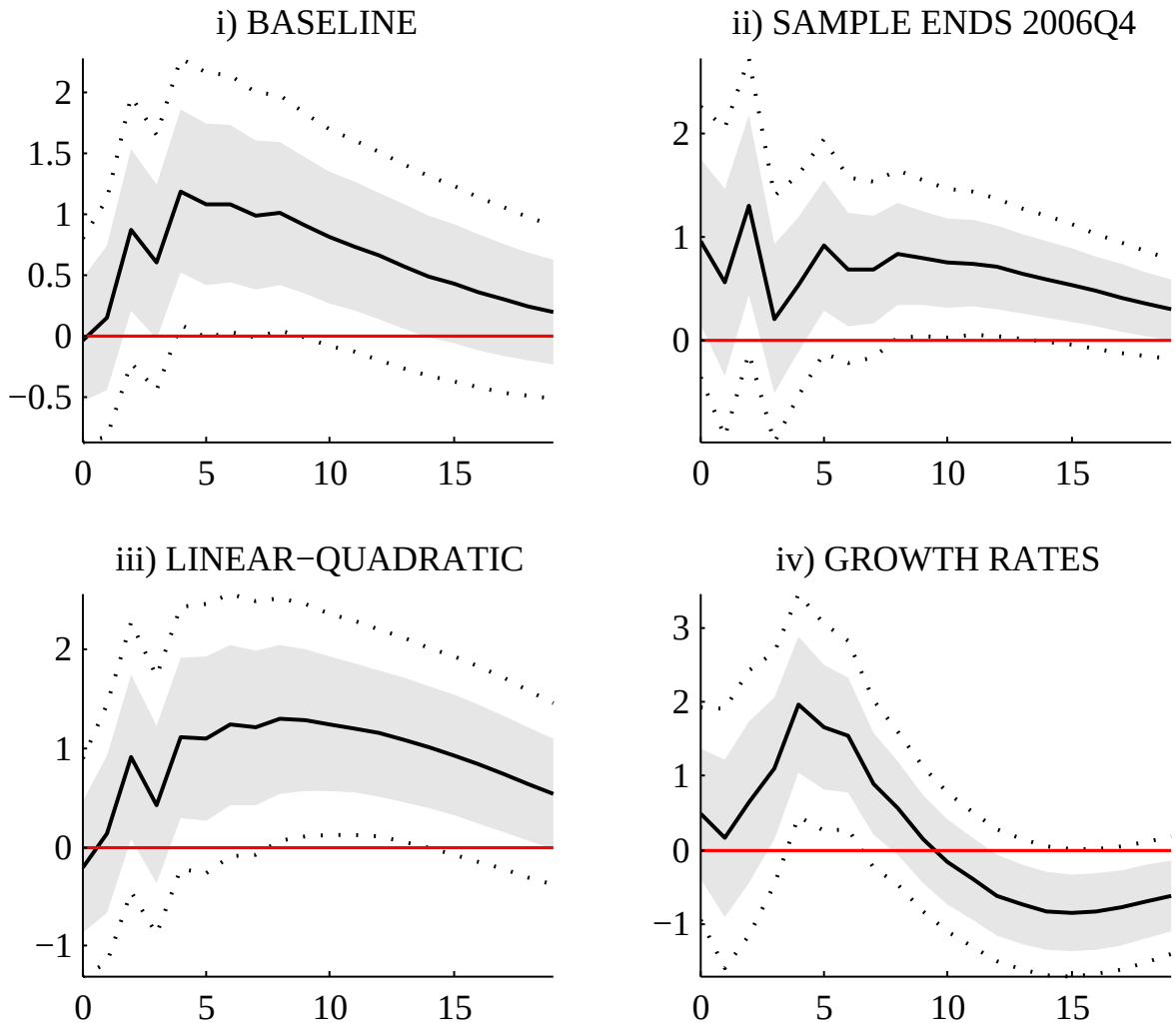
Robustness



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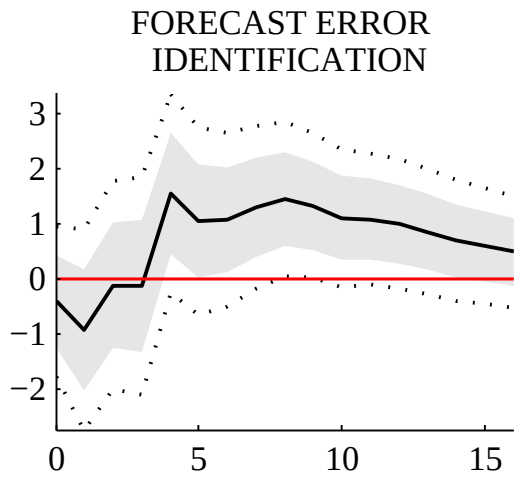

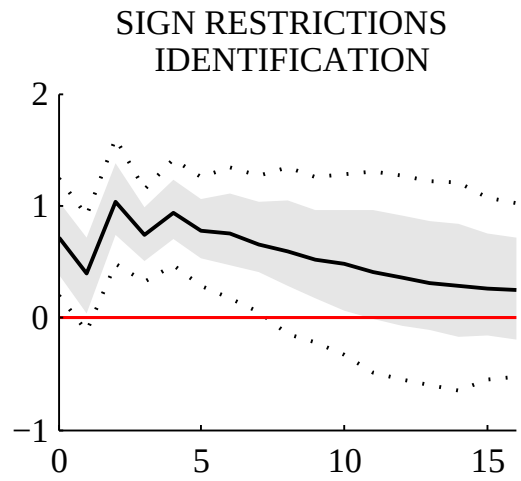

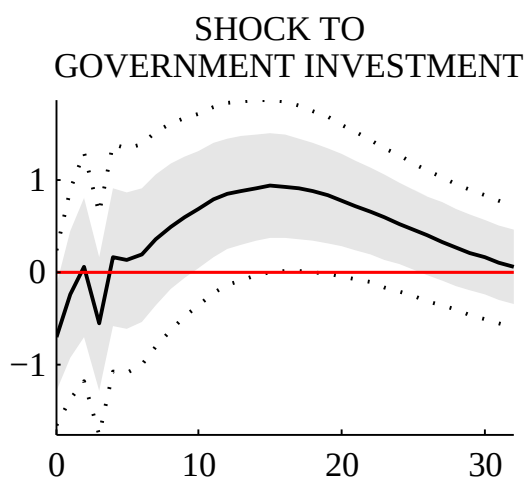

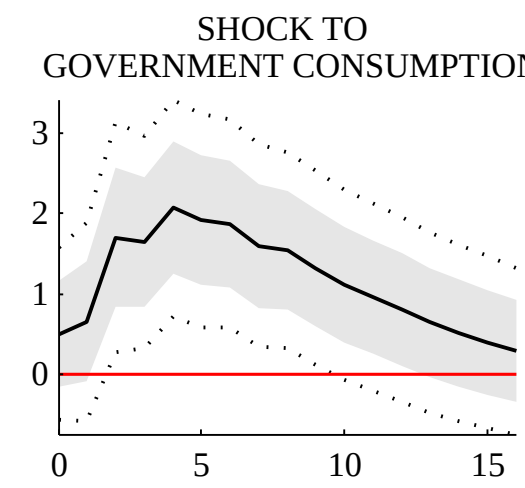

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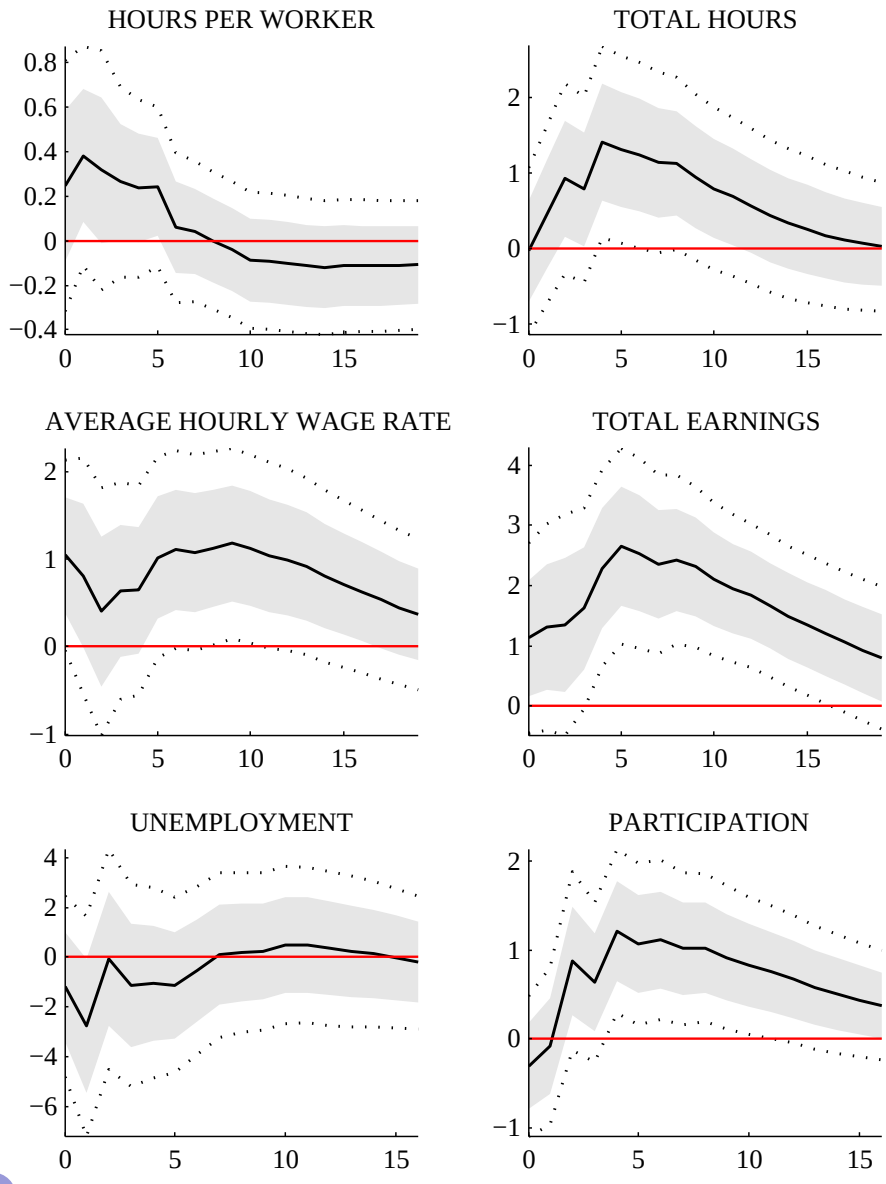
Further labor-market outcomes (pink-to-blue ratio)



- Dynamics at intensive margin reinforce dynamics at extensive margin.
- Co-movement of relative occupational employment and relative occupational wage rates.
- Unemployed blue-collar workers do not switch occupation.

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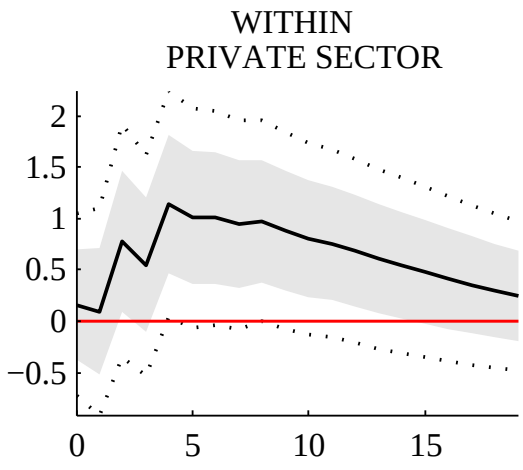
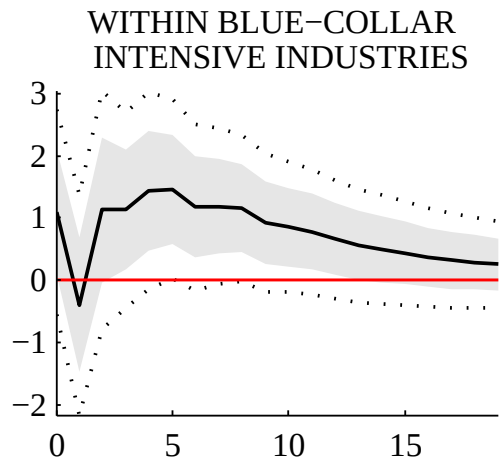
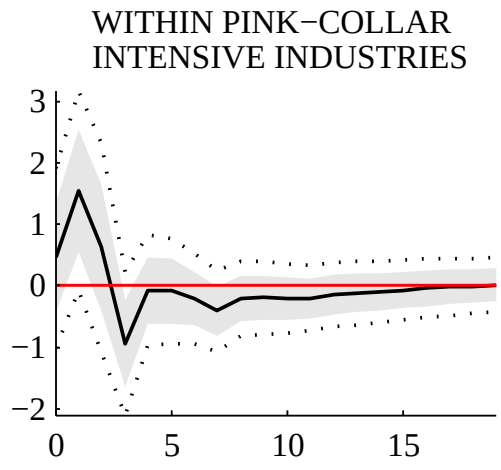
Within-industry employment dynamics







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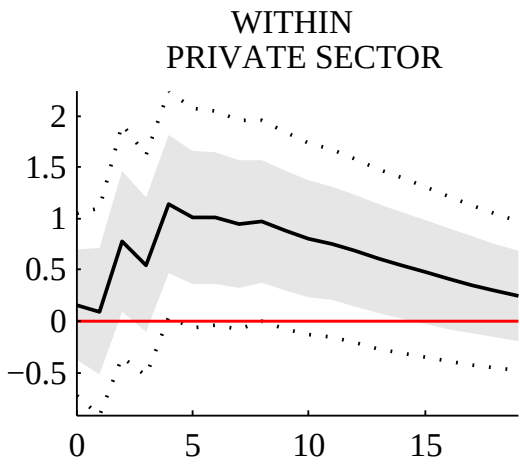

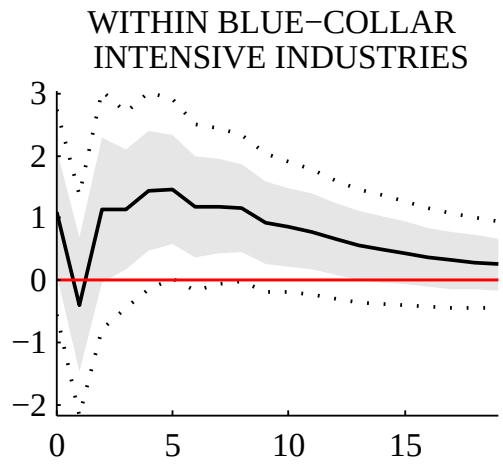

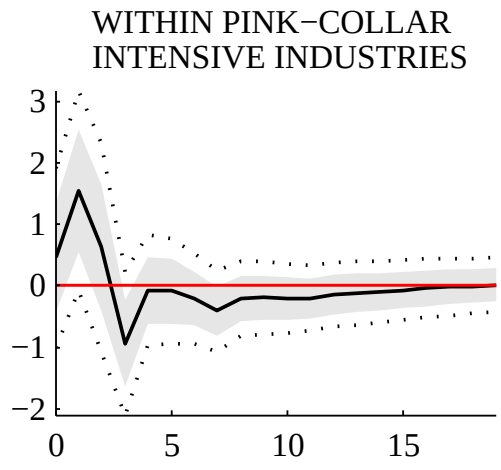

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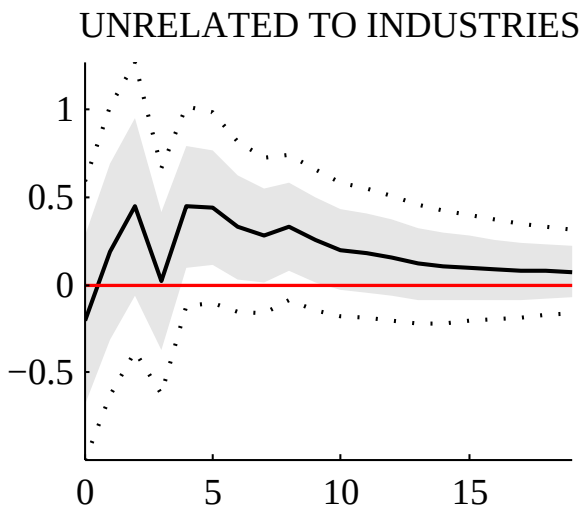
Occupational dynamics unrelated to industries

- Hypothetical occupational employment series: $\hat{o}'_t = S \times i'_t$.
- i_t: observed employment dynamics in major industries, S: matrix of mean occupation shares in major industries.
- Observed occupational employment o_t.
- Residual $\varepsilon'_t = o'_t - S \times i'_t$.



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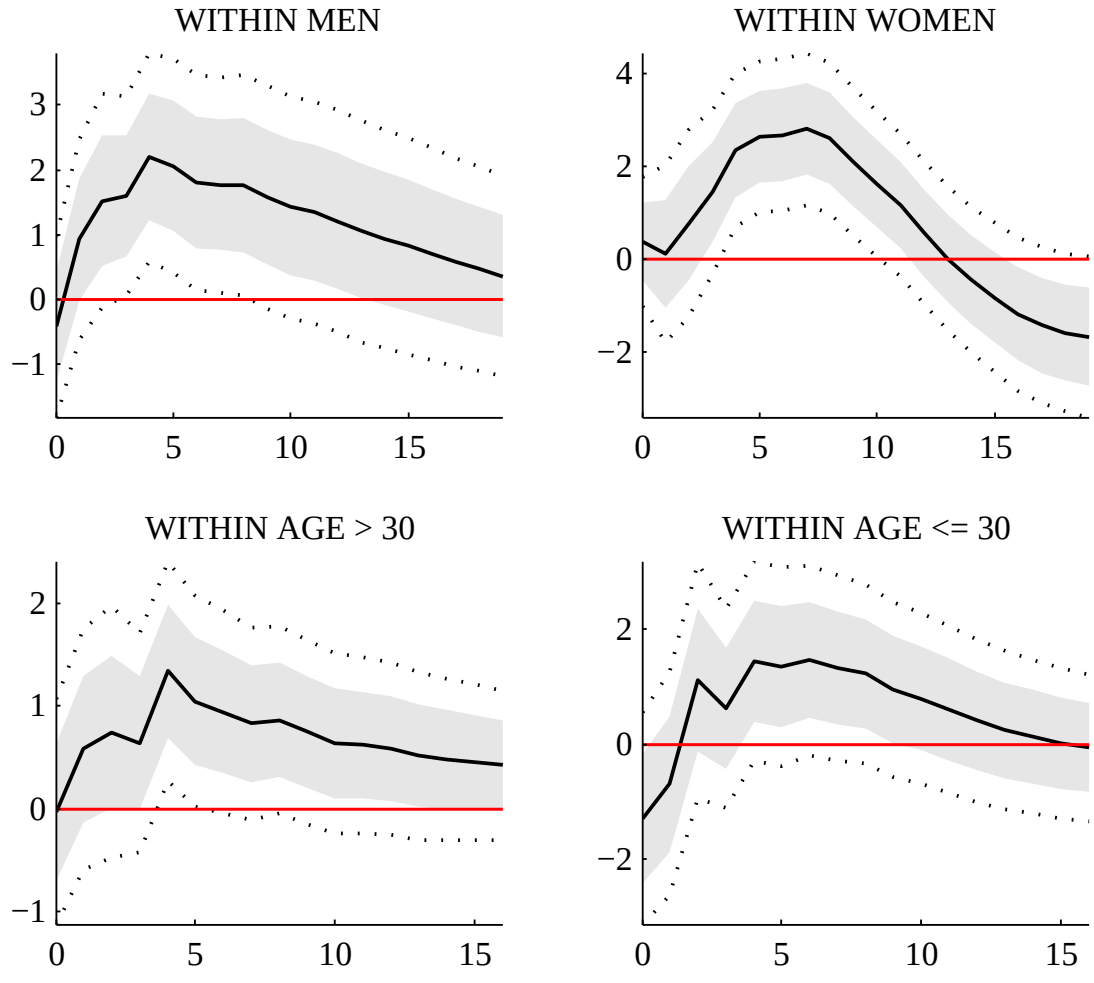
Within-gender and within-age employment dynamics



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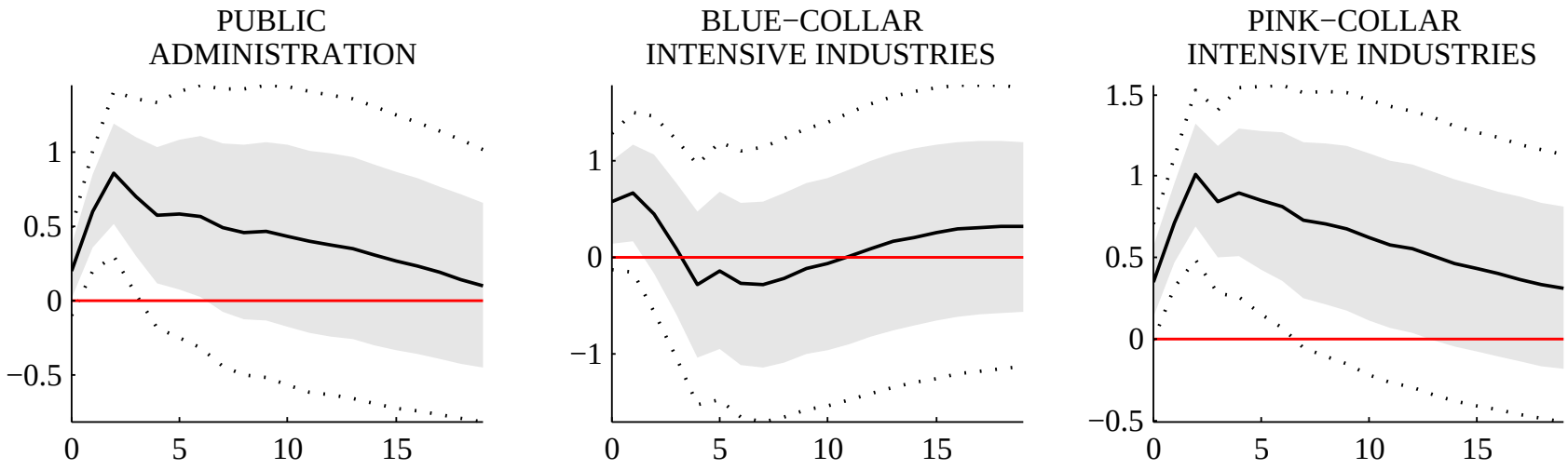
Between-industry employment dynamics



Simplified model

- No autocorrelation of fiscal policy shocks.
- No output reaction of monetary policy, $\delta_y = 0$.
- Physical capital constant, $\kappa_i \to \infty$.
- No adjustment costs.
- Log utility, $\sigma \to 1$.
- Zero wealth effect on labor supply.

Analytical results

- Output response to fiscal shock:

$$\widehat{y}_t = \Lambda^{-1} \cdot \Xi \cdot g \cdot \widehat{g}_t.$$

  - Spending hikes expansionary if $\Lambda > 0$.

- Response of employment ratio to fiscal shock:

$$\widehat{n}_t^p - \widehat{n}_t^b = \frac{2}{\Lambda \cdot \Delta} \cdot (\Delta - \eta) \cdot (\phi - \theta) \cdot g \cdot \widehat{g}_t.$$

- $\widehat{n}_t^p - \widehat{n}_t^b > 0$ if...

  - supply of capital services is relatively elastic compared to the supply of labor ($\Delta > \eta$) and
  - blue-collar labor is the closer substitute to capital services than pink-collar labor ($\phi > \theta$).

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Calibration

Calibration broadly follows Schmitt-Grohe and Uribe (2012).

- Elasticity of substitution in consumption: $\sigma = 1$.
- Near-zero wealth effect on labor supply: $\xi \approx 0$. ▸ sensitivity
- Frisch elasticity $\eta = 1/2$.
- Investment adjustment cots $\kappa_i = 9$.
- Price elasticity of demand calibrated to a 20% markup.
- Elasticity of capital utilization $\Delta = \delta_1/\delta_2 = 3$.
- Probability of not adjusting prices (Calvo parameter): $2/3$.
- Taylor rule: $\delta_\pi = 1.5$, $\delta_y = 0.5/4$.
- Share parameters γ and α: calibrated to a steady-state labor income share of 67% and a pink-collar to blue-collar wage ratio of 0.86.
- **Key parameters ϕ and θ varied.**

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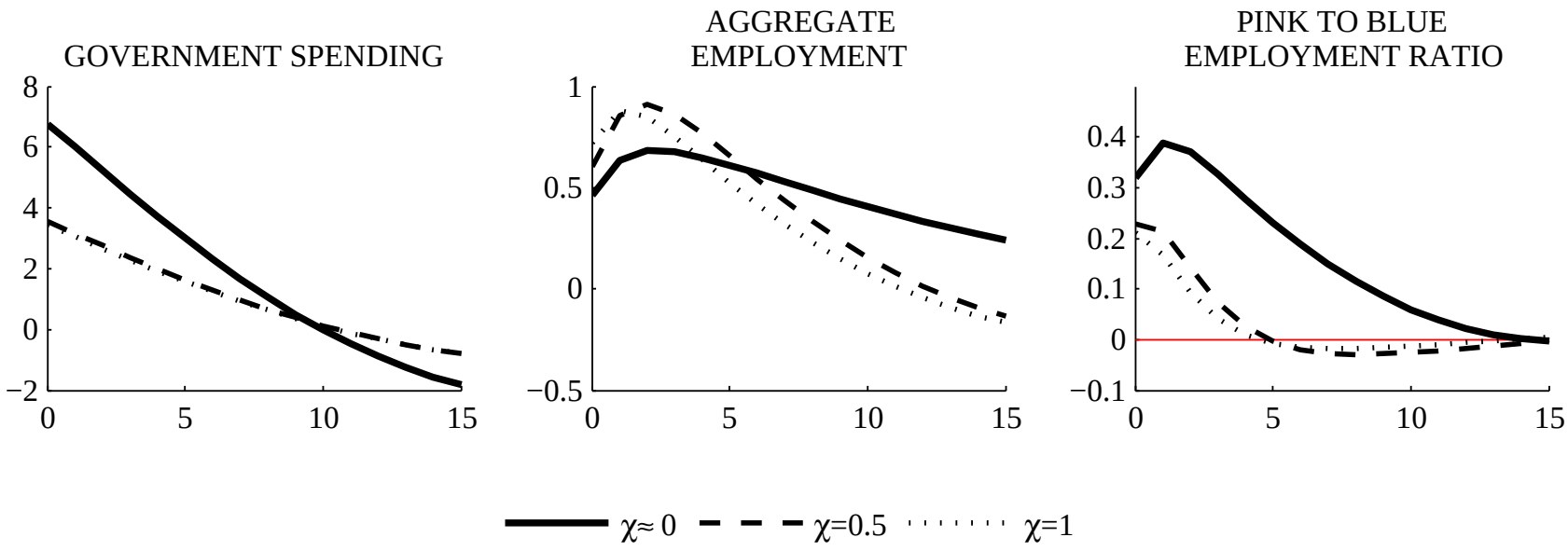
Different wealth elasticities



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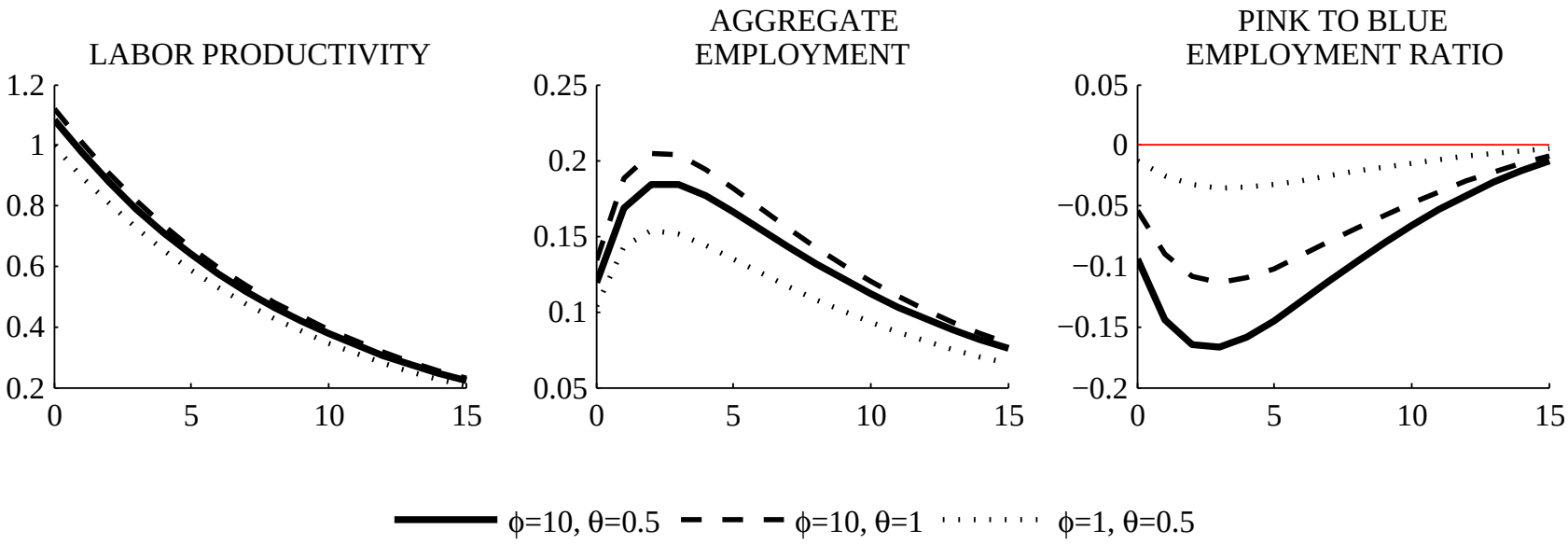
Labor productivity shock



Not all upswings are associated with shifts towards service, sales, and office occupations.

Interpretation of shocks

Does this imply that

- ... all demand shocks trigger shifts towards service, sales, and office occupations?
- ... the high unconditional volatility of blue-collar employment is only driven by supply shocks?

Note: representative-industry model, abstracts from industry effects.

- Demand shocks which trigger between-industry dynamics may lead to blue-collar job booms (e.g., plausible for investment specific technology shocks).
- Unconditional moments potentially also driven by such demand shocks.

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