# Credit and Fiscal Multipliers in China

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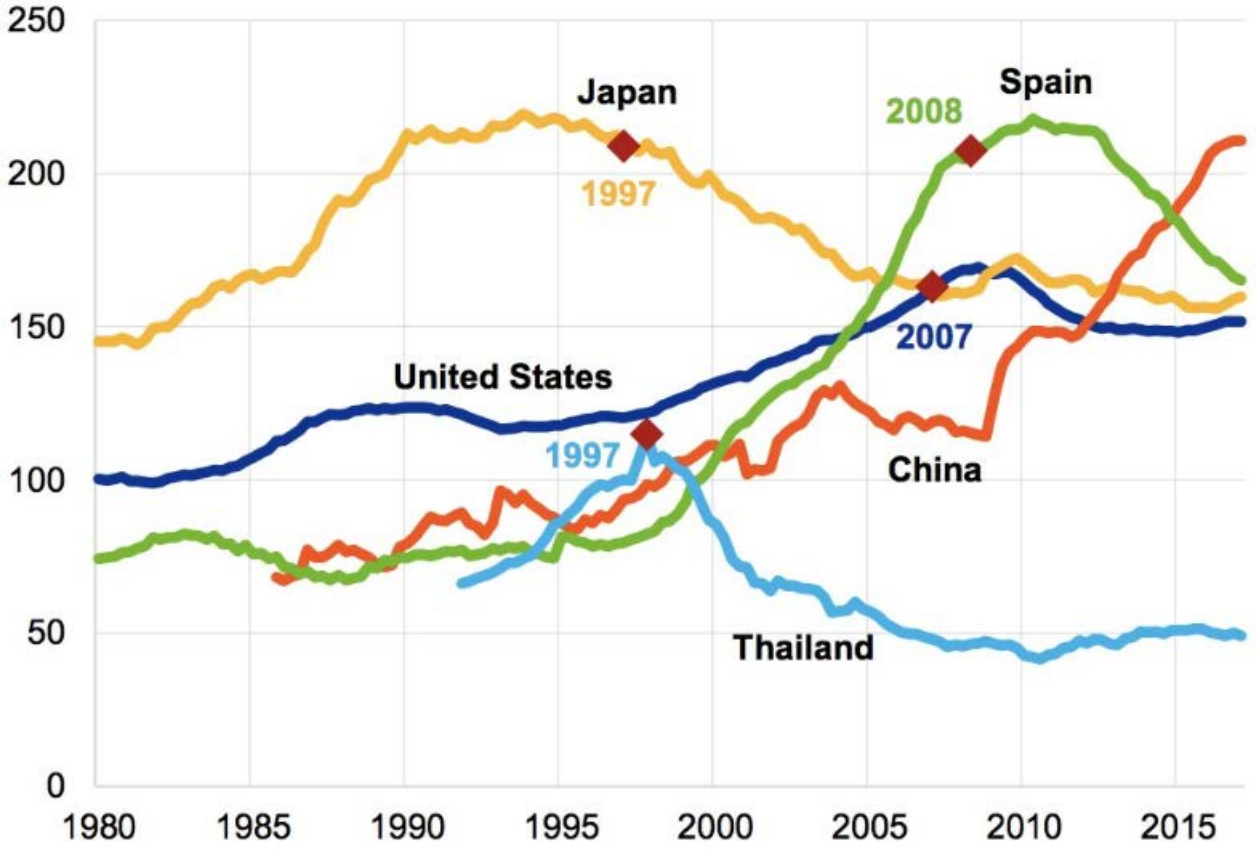
# Credit growth in China

- **Credit to private non-financial sector, % GDP**



# Credit growth in China

- **Macroprudential risks**

- **Misallocation of credit**
  - Deng et al (2015): real estate credit has little macro impact
  - Song et al (2011), Bai et al (2016), Cong et al (2017): SOE credit less effective than private credit
  - Huang et al (2017), Ru (2018): SOE loans crowd out private investment

- **Transition to lower credit growth – QUESTIONS**
  - **The contribution of credit to output growth historically?**
  - **The output drag from lower credit growth?**
  - **Can fiscal policy cushion the output drag?**

# This paper

- **Jointly estimate the causal effects of credit & fiscal on output**
  - Credit multiplier and fiscal multiplier
  - Credit policy can complement or substitute fiscal to achieve growth outcomes

- **Empirical challenges in estimating multipliers**
  - Control for concurrent changes in macro conditions
  - Exogenous shocks to credit and fiscal policy

- **Our identification approach**
  - Province-level analysis
  - Effects of relative changes in provincial credit/fiscal on relative output growth ("open economy multiplier", Nakamura and Steinsson, AER 2014)
  - Subnational political cycles affect the macroeconomic policy stance in a way that is exogenous to local economic conditions (cf. Guo, 2009)

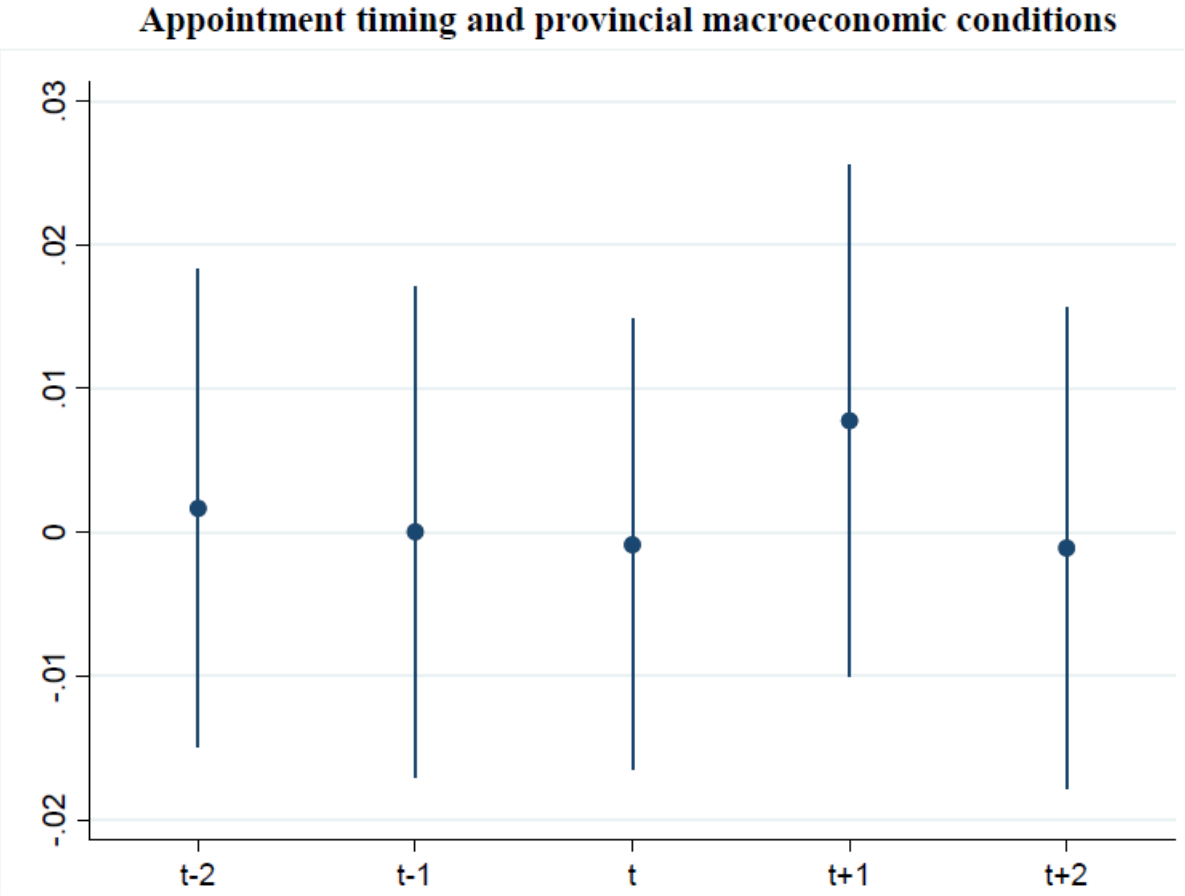
# “Open economy multipliers”

$$\frac{Y_{it} - Y_{it-2}}{Y_{it-2}} = \alpha_i + \gamma_t + \beta_G \frac{G_{it} - G_{it-2}}{Y_{it-2}} + \beta_{CR} \frac{CR_{it} - CR_{it-2}}{Y_{it-2}} + \varepsilon_{it}$$

- **Where:**
  - ***Y*** real GDP
  - ***G*** government expenditure (on budget)
  - ***CR*** bank loans (high correlation with TSF)
- Province level
- OLS and IV

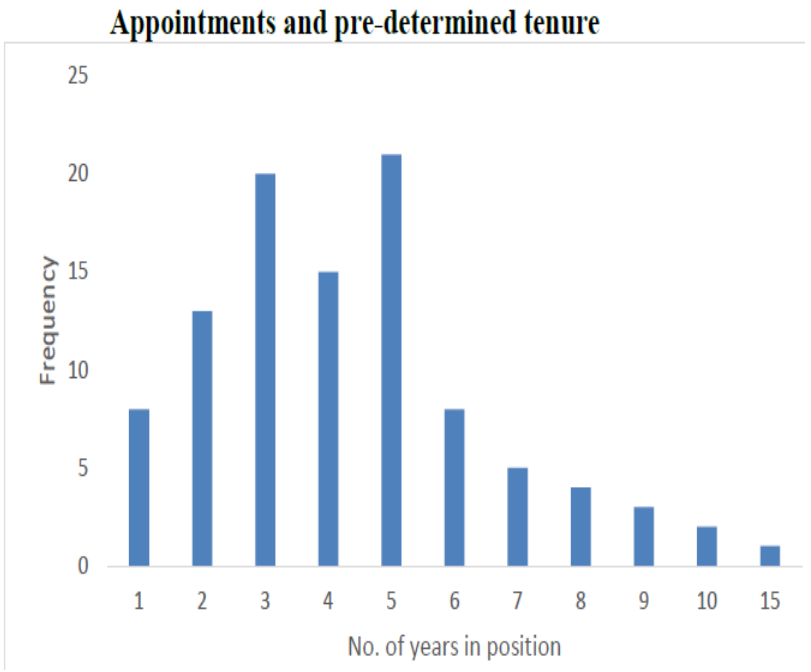
# Identification

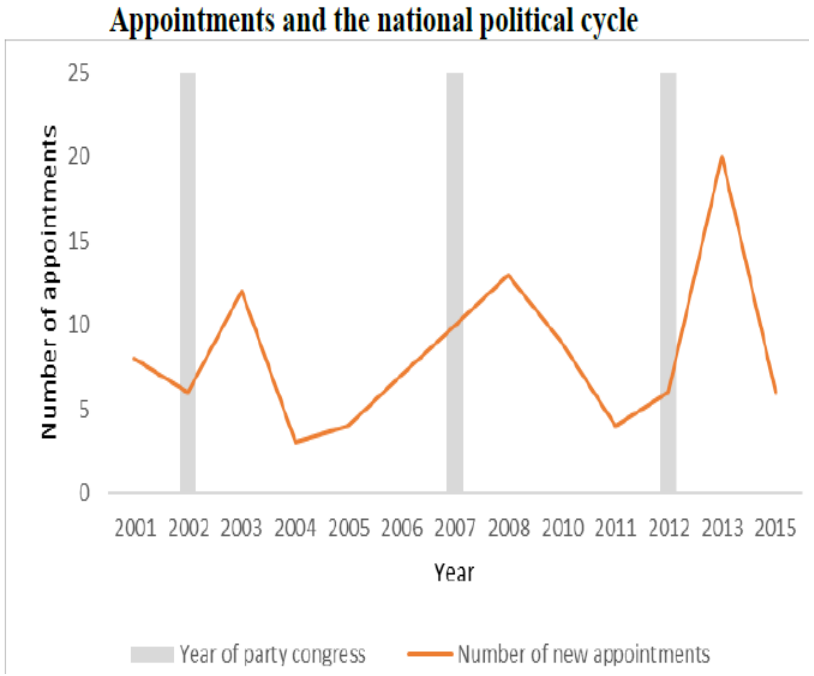
**1a. Appointments of provincial leaders are unrelated to local economic conditions…**



# Identification

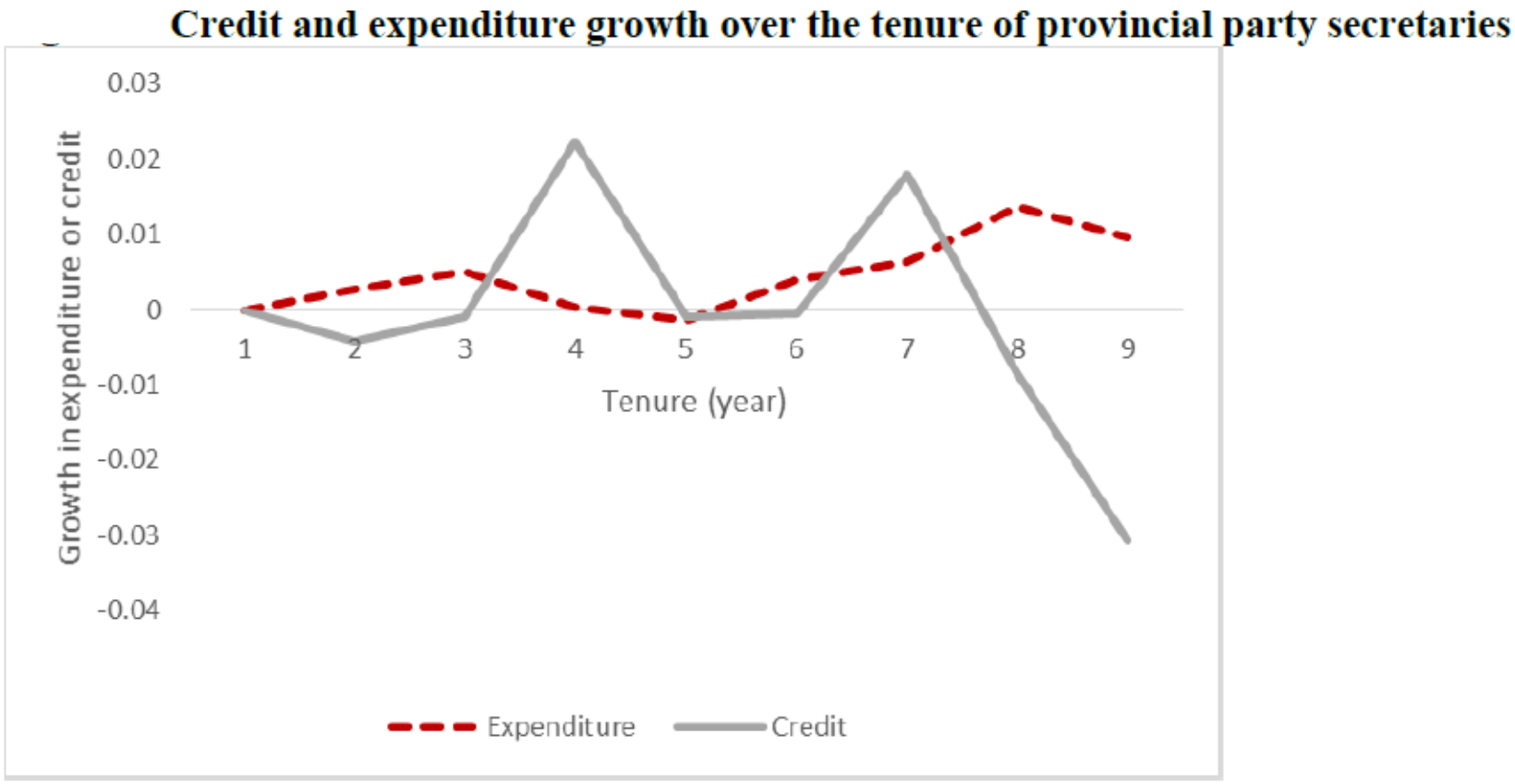
**1b. … Rather, the appointments reflect the 5-year term of the previous leader & the national political cycle**



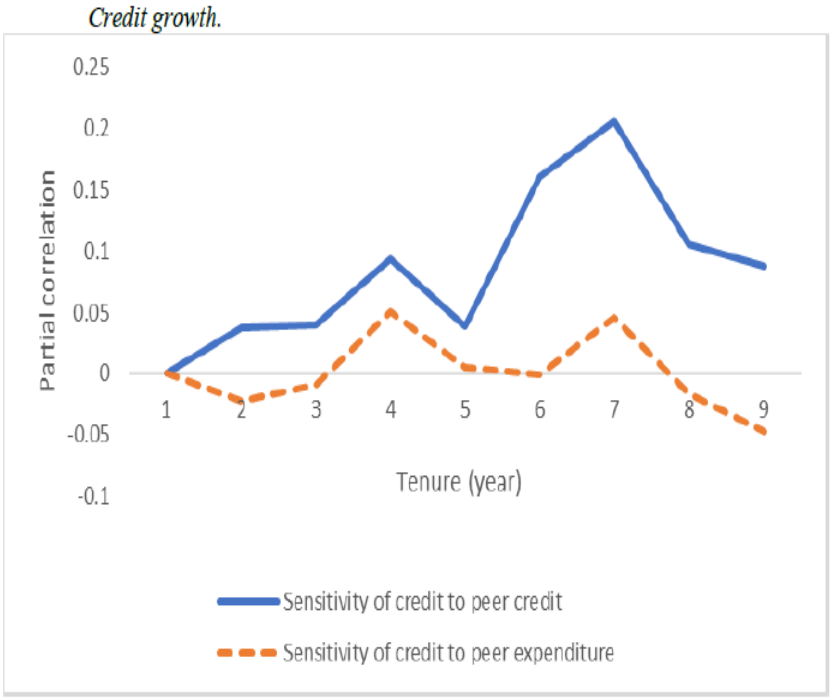
# Identification

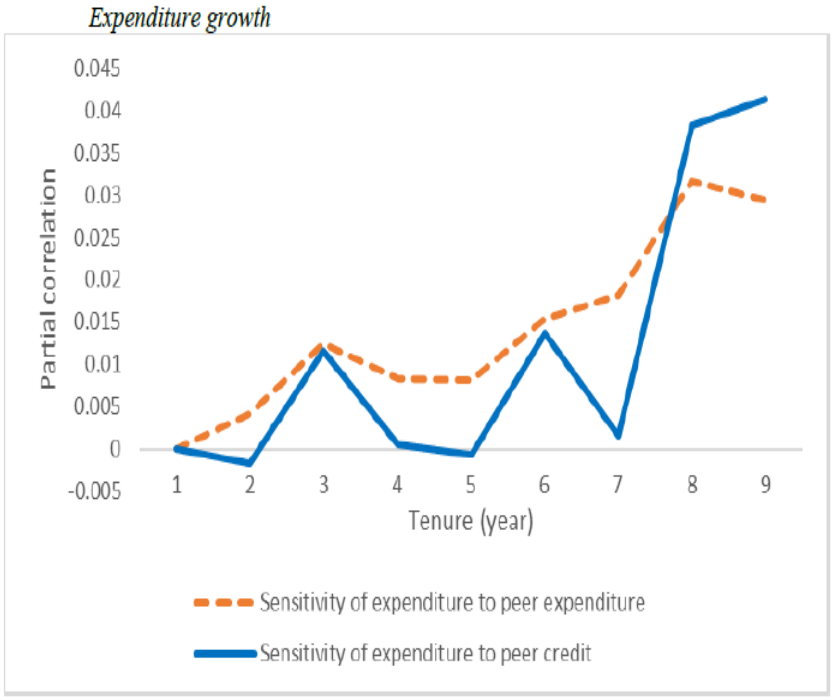
## 2. Tenure of provincial leaders affects macro policy stance



# Identification

## 3. The form of macro stimulus mimics that in other provinces



# First stage 2SLS

- **Explain credit and expenditure growth in a province through**
  - Tenure of the provincial leader
  - Interacted with credit and expenditure growth in other provinces (Credit and fiscal cycles do not coincide)
  - Province and year FE

# Results 2001-2016 (full sample)

| | Real GDP | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| | OLS | IV | OLS | IV | OLS | IV |
| Real Credit | 0.223*** | 0.283*** | | | 0.191*** | 0.202*** |
| | [0.035] | [0.039] | | | [0.033] | [0.040] |
| Real Expenditure | | | 1.009*** | 1.083*** | 0.795*** | 0.793*** |
| | | | [0.186] | [0.290] | [0.175] | [0.292] |
| Observations | 370 | 370 | 372 | 372 | 359 | 359 |
| R-squared | 0.770 | | 0.760 | | 0.803 | |
| Year and province FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Cragg-Donald Wald F | | 104.2 | | 112.2 | | 51.65 |
| Kleibergen-Paap rk Wald F | | 27.10 | | 23.36 | | 14.75 |

# Robustness

| | Real GDP | | | | | |
|---|---|---|---|---|---|---|
| | With first-stage controls | | Weighted results | | Detrended results | |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| | OLS | IV | OLS | IV | OLS | IV |
| Real Credit | 0.190*** | 0.197*** | 0.185*** | 0.180*** | 0.190*** | 0.209*** |
| | [0.034] | [0.038] | [0.033] | [0.036] | [0.033] | [0.040] |
| Real Expenditure | 0.767*** | 0.765*** | 1.050*** | 0.760** | 0.758*** | 0.780*** |
| | [0.177] | [0.291] | [0.269] | [0.301] | [0.158] | [0.284] |
| Real Credit in Neighboring Provinces | -0.005 | -0.007 | | | | |
| | [0.063] | [0.060] | | | | |
| Real Expenditure in Neighboring Provinces | 0.150 | 0.150 | | | | |
| | [0.199] | [0.204] | | | | |
| Secretary's Tenure | -0.001 | -0.001 | | | | |
| | [0.002] | [0.001] | | | | |
| Observations | 358 | 358 | 359 | 359 | 359 | 359 |
| R-squared | 0.804 | | 0.866 | 31 | 0.503 | |
| Year and province FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Cragg-Donald Wald F | | 51.68 | | 97.22 | | 31 |
| Kleibergen-Paap rk Wald F | | 13.90 | | 24.92 | | 47.84 |

# Results 2001-2008 (pre-crisis) vs. 2010-2015 (post-crisis)

| | Real GDP | | | |
|---|---|---|---|---|
| | 2001-2008 | | 2010-2015 | |
| | 1 | 2 | 3 | 4 |
| | OLS | IV | OLS | IV |
| Real Credit | 0.219*** | 0.215** | 0.197* | 0.107 |
| | [0.063] | [0.089] | [0.109] | [0.083] |
| Real Expenditure | 0.656*** | 0.747** | 0.766*** | 1.184*** |
| | [0.176] | [0.311] | [0.253] | [0.256] |
| Observations | 166 | 165 | 108 | 108 |
| R-squared | 0.681 | | 0.902 | |
| Year and province FE | Yes | Yes | Yes | Yes |
| Cragg-Donald Wald F | | 18.07 | | 14.04 |
| Kleibergen-Paap rk Wald F | | 11.96 | | 7.626 |

# Interpretation

- **Full sample multipliers: credit 0.2; fiscal 0.8**
  - IV > OLS: countercyclical policy
  - Joint > Separate: credit and fiscal stimuli used simultaneously

- **2010-2015 multipliers: credit 0.1** (insign.) **fiscal 1.2**
  - Higher fiscal multipliers is slower economy
  - Credit misallocation

# Provincial heterogeneity

| | Real GDP | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| | OLS | IV | OLS | IV |
| Real Credit | 0.171*** | 0.189*** | 0.185*** | 0.124** |
| | [0.027] | [0.036] | [0.045] | [0.053] |
| Real Expenditure | 0.530*** | 0.377 | 0.695*** | 0.777*** |
| | [0.188] | [0.266] | [0.211] | [0.293] |
| Real Credit * High SOE profit | 0.005 | -0.099 | | |
| | [0.036] | [0.081] | | |
| Real Expenditure * High SOE profit | 0.382*** | 0.802** | | |
| | [0.127] | [0.345] | | |
| Real Credit * High House price growth | | | 0.001 | 0.052 |
| | | | [0.029] | [0.047] |
| Real Expenditure * High House price growth | | | 0.089 | -0.114 |
| | | | [0.148] | [0.194] |
| Observations | 331 | 331 | 315 | 315 |
| R-squared | 0.830 | | 0.815 | |
| Year FE | Yes | Yes | Yes | Yes |
| Cragg-Donald Wald F | | 5.175 | | 9.795 |
| Kleibergen-Paap rk Wald F | | 3.208 | | 11.18 |

# Sectoral multipliers

$$\frac{Ind_{ijt} - Ind_{ijt-2}}{Y_{it-2}} = \alpha_i + \gamma_t + \beta_G \frac{G_{it} - G_{it-2}}{Y_{it-2}} + \beta_{CR} \frac{CR_{it} - CR_{it-2}}{Y_{it-2}} + \varepsilon_{it}$$

*Sectoral multipliers*

| | 2001-2015 | | | 2010-2015 | | |
|---|---|---|---|---|---|---|
| | Cons-truction | Manu-facturing | Services ex. financial | Cons-truction | Manu-facturing | Services ex. financial |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| *Real Credit* | | | | | | |
| Sectoral multiplier (i.e. contribution to overall output multiplier) | 0.015 | 0.11 | 0.046 | 0.003 | 0.07 | -0.098 |
| *divided by* sectoral share in GDP | 0.075 | 0.39 | 0.37 | 0.078 | 0.39 | 0.37 |
| *obtains* effect on industry growth | 0.20 | 0.28 | 0.12 | 0.04 | 0.18 | -0.27 |
| *Real Expenditure* | | | | | | |
| Sectoral multiplier (i.e. contribution to overall output multiplier) | 0.055 | 0.606 | 0.138 | 0.073 | 0.678 | 0.219 |
| *divided by* sectoral share in GDP | 0.075 | 0.39 | 0.37 | 0.078 | 0.39 | 0.37 |
| *obtains* effect on industry growth | 0.73 | 1.57 | 0.37 | 0.94 | 1.73 | 0.59 |

# Conclusions / Implications

- **The contribution of credit to output growth historically?**
  - **Meaningful: credit multiplier 0.2**
- **The output drag from lower credit growth?**
  - **Possibly low: post 2010, credit multiplier 0.1 and insignificant**
- **Can fiscal policy cushion the output drag?**
  - **Yes: fiscal multiplier 1.2 is high in international & historic comparison**

- **Low credit effectiveness <--> Lower credit growth has a small output drag**
  - Conditional on credit restrictions for the least effective firms, often SOEs
- **Fiscal stimulus is effective and preferred to credit stimulus**
  - But effectiveness lower when associated with ineffective SOEs
  - And focus the stimulus on services to achieve rebalancing