Fiscal Stimulus Effects on Credit Constraints and the Role of Firm Entry

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Motivation I: Credit Crunch and Firm Entry Drop

- During the 2007-09 contraction, the credit crunch in the U.S. economy coevolved with a dramatic and persistent decline (27%) in firm entry.
- Recent literature has documented the interlinkage between these two phenomena:
  - Bergin et al. (2018): firm entry part of the transmission mechanism of financail shocks to the real economy.
  - Sedlacek (2019): the slow recovery of the US economy from the 2007 recession was due to the persistent decline in firm entry, caused by a worsening in financial conditions.
- Appropriate policy responses to tackle these two phenomena?

Motivation II: Policy Responses

Monetary Policy

- According to the theory, expansionary *monetary policy* can stimulate credit supply (credit channel) and firm entry (Bilbiie et al., 2007b; Bergin and Corsetti, 2008; Lewis, 2009; Lewis and Poilly, 2012).
- An massive and unprocessed monetary expansion pursued by the U.S. Federal Reserve during that recession but did not manage to stimulate neither bank credit (Orlowski, 2016) nor firm entry $\Rightarrow$ firm entry was below its pre-crisis level until late 2014 Sedlacek (2019).

Motivation III: Policy Responses

Fiscal Policy

- This study asks to what extent *fiscal policy* can be utilized to both alleviate credit constraints and stimulate firm entry.
- Fiscal policy and Financial Conditions ⇒ Auerbach et al. (2020): fiscal stimulus can lower the cost of credit (empirical)
- Fiscal policy and Firm Entry ⇒ Lewis (2009), Chugh and Ghironi (2011), and Cooke and Damjanovic (2020): fiscal stimulus supports firm entry, but frictionless contexts, no size of fiscal shocks, short run.

Outline & Findings

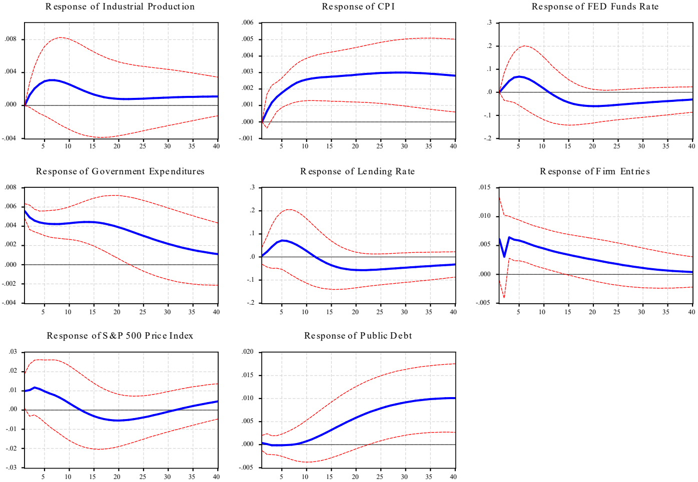
- Analysis in two steps:
  - **Empirical Evidence:** a VAR model, covering the period 1993Q3-2019Q4, documents empirically that the expansionary fiscal policy can stimulate both credit supply and new business formation.
  - **Theoretical Framework:** a NK-DSGE model with endogenous firm entry and financial frictions to study fiscal policy.
    - Credit Channel of Fiscal Policy: a fiscal expansion can relax credit constraints faced by firms, leading to a gradual and persistent rise in firm numbers.
    - Firm Entry Dimension of Fiscal Policy: firm entry dynamics are a crucial dimension for fiscal policy analysis in the presence of financial frictions $\Rightarrow$ firm entry substantially affects the persistence of the impact of fiscal shocks on the aggregate economy and the size of fiscal multipliers, especially in the long run.

Empirical Evidence

- Data: US economy, 1993q3-2019q4
- 8-variable VAR model: industrial production (log), CPI (log), FED funds rate, real government consumption expenditures (log), 3-month interbank lending rate, firm entries (log), public debt (log), stock prices (S&P500 index - log).
- Sources: Federal Reserves Economic Database (FRED), US Bureau of Labor Statistics (BLS).

Empirical Evidence II

Figure: Responses to 1 sd increase in Government Spending



Empirical Evidence III

Impulse Responses

- **Firm Entry:** We have a positive and persistent increase $\Rightarrow$ it is significant from the first quarter and lasts for 20 quarters.
- **Lending Rate:** we have a decrease but with a lag $\Rightarrow$ it requires 20 quarters before before becoming significant and lasts for 7 quarters.
- Notably, the effects of fiscal policy emerge around the time that the effect on firm entry fades, implying an inter-linkage between the two effects.
- **Stock Prices:** instant positive response but short-lived $\Rightarrow$ it lasts for around 5 quarters.

Empirical Evidence IV

Sensitivity Analysis

- Alternative variable ordering
- National Financial Condition Index (NFCI)
- Estimation of IRFs using Jorda's (2005) Local Projections

The Model I: Endogenous Firm Entry

- We build on the pioneer model of **endogenous firm entry** of Bilbiie et al. (2007a; 2012).
- New firms enter after paying a one-time sunk cost (that depends on the total number of firms entering the market).
- The number of firms in the economy evolves as follows:

$$N_t = (1-\delta)(N_{t-1} + N_t^E)$$

  where: N_t = total number (continuum) of firms, N_t^E = number of entrants, δ = death probability.

- New Keynesian Framework: (i) monopolistic competition: each firm produces a differentiated good; (ii) nominal rigidity: incumbents and entrants face a quadratic cost of adjusting prices over time (Bilbiie et al., 2007b).
- We expand this setup towards two directions: (i) we add financial frictions (Bergin et al., 2018), (ii) we study fiscal policy (Leeper et al., 2010).

The Model II: Firm Financing and Financial Frictions

- **Firm financing:** Firms can finance entry and production through an endogenous mix of debt (households) and equity (investors) (Bergin et al., 2018)
- **Collateral Constraint:** To finance production (labor expenses) and entry, firms must borrow an intra-period loan from households subject to an enforcement constraint:

$$\underbrace{q_t}_{\text{firm's equity value}} = \underbrace{E_t\left[m_{t+1}V_{t+1}(j)\right]}_{\text{end-of-period firm's value (collateral)}} \geq \underbrace{\xi_t}_{\text{financial shock}} \times \underbrace{w_t l_t(j)}_{\text{loaned amount}}$$

Households are willing to lend to firms only if the liquidation value in case of default is at least sufficient to cover the loaned amount.

Households can liquidate the firms' end-of-period value suffering a liquidation loss ($\xi_t < 1$).

The Model III: Fiscal Policy

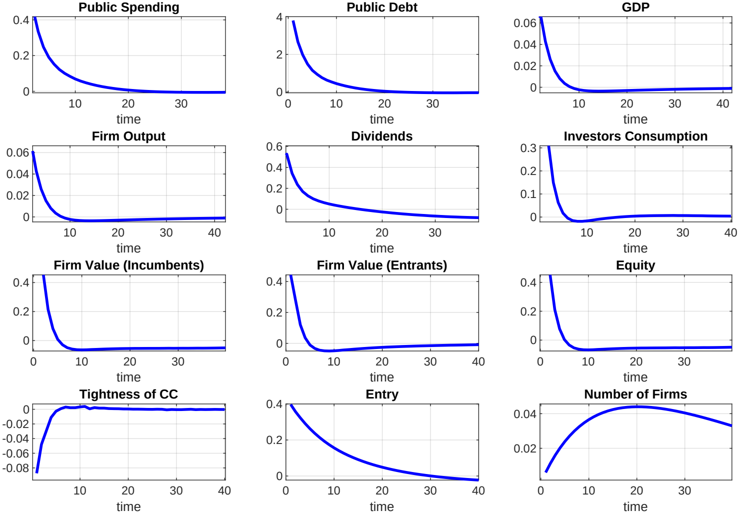
- ***Three policy instruments***: government spending, labour income tax and corporate revenue tax
- ***Detailed specifications for fiscal rules*** according to which all fiscal policy instruments respond to both the level of public debt and the state of economic activity (Leeper et al., 2010) $\Rightarrow$ procyclical fiscal policy and non-trivial debt dynamics
- ***Present value multipliers*** (Mootford and Uhlig, 2009) to capture both short- and long-run dynamics of fiscal shocks, discounting properly macroeconomic effects in the future

The Model IV: Agents

- New Keynesian DSGE Model
  1. Monopolistically competitive intermediate goods sector $\Rightarrow$ endogenous firm entry + collateral constraints
  2. Final good producer $\Rightarrow$ aggregate product
  3. Representative household $\Rightarrow$ supplies labor, purchases bonds from firms and government
  4. Representative investor $\Rightarrow$ finances new and existing firms through equity purchase
  5. Government $\Rightarrow$ distortionary taxes in labor income and firm revenue
  6. Independent monetary authority $\Rightarrow$ Taylor-type interest rate rule

Results I: Government Spending Shock

Figure: Responses to an Expansionary Government Spending Shock

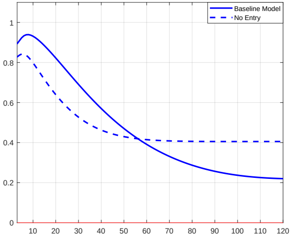


Model's Mechanics

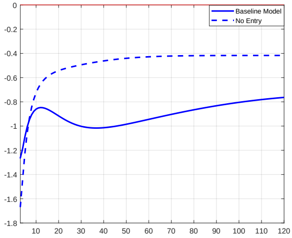
- The shock raises aggregate demand $\Rightarrow$ before firm number adjust, firm's output and profits/dividends/value increase.
- current dividends are income for investors $\Rightarrow$ their consumption increases, more willing to save/invest (increase in their stochastic factor).
- equity, the discounted value of future dividends, increases $\Rightarrow$ collateral constraints are eased.
- business environment temporally more attractive $\Rightarrow$ higher number of entrants, gradual increase in the number of firms.
- As the number of firms increases, entry becomes more costly $\Rightarrow$ adjustment.

Results II: Present-Value-Multipliers for Output

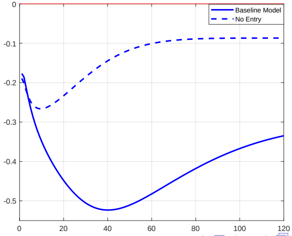
(a) Government Spending



(b) Labor Tax



(c) Firm Revenue Tax



Results II: Present-Value-Multipliers for Output

- Present-value multipliers change substantially when firm entry dynamics are taken into consideration.
- Adjustments in firm numbers lead to higher government spending multipliers at shorter horizons but at the cost of smaller multipliers over longer horizons.
- Allowing firm numbers to adjust leads to substantially larger multipliers of labor and firm revenue taxes in the medium- and long-run.

Work to do

- Better empirical analysis (e.g. SVAR or local projections).
- Estimation of model's parameters.
- Optimized (or estimated) coefficients for policy rules (determinacy).

Conclusions I

- During the 2007-09 contraction, the credit crunch in the U.S. economy coevolved with a dramatic and persistent decline (27%) in firm entry.
- Expansionary monetary policy had limited success in tackling these two phenomena.
- We show that fiscal policy can be used as an alternative or additional corrective policy tool.

Conclusions II

- **Credit Channel of Fiscal Policy:** We find that fiscal stimulus can contribute to lowering the cost of credit and stimulating firm entry.
- **Firm Entry Dimension of Fiscal Policy:** We also find that firm entry dynamics constitute a crucial dimension for fiscal policy analysis in the presence of financial frictions: they substantially affect both the persistence and the size of the impact of fiscal shocks on the aggregate economy, especially in the long run.