

Discussion of Ottonello and Winberry 'Financial Heterogeneity and the Investment Channel of Monetary Policy'

Aubhik Khan

Ohio State University

1st IMF Annual Macro-Financial Research Conference

11 April 2018

Representative Firm: Jermann and Quadrini (2012)

Heterogeneous Firms: Khan and Thomas (2013), Khan, Senga and Thomas (2016), Arellano, Bai and Kehoe (2018)

Heterogeneous Entrepreneurs: Bassetto, Cagetti and De Nardi (2015), Buera, Fattal-Jaef and Shin (2015), Shourideh and Zetlin-Jones (2017)

Ottonello and Winberry

Firm leverage and the transmission of monetary policy shocks

Heterogeneous Firms with default risk

New elements

Capital quality shocks and time-varying price of capital

Sticky prices

Responsiveness of firm investment to monetary policy shocks falls with leverage

$$\Delta \log k_{t+1}(j) = \alpha(j) + \alpha_{st} + \beta l_{t-1}(j) \varepsilon_t^m + \Gamma' Z_{t-1}(j) + \varepsilon_t(j) \quad (3)$$

- $\alpha(j)$ is a firm-fixed effect, α_{st} is a sector-year fixed effect
- $Z_{t-1}(j)$ are firm-level controls including leverage, sales growth, size, current assets as a share of total assets and an indicator for fiscal quarter.
- Results are robust to replacing α_{st} with $\gamma \varepsilon_t^m$.
- **Why does β fall** when instrumenting $l_{t-1}(j)$ with $l_{t-9}(j)$?
 - -0.73 (table 3, panel A, column 2) to -2.64 (table 8 column 2)

Loan discount rate schedule $Q(z, k', b')$ falls in leverage, roughly $\frac{b'}{q'\omega(1-\delta)k'}$.

$$x + Q(z, k', b') b' - qk' \geq 0 \quad (1)$$
$$x = \max_n pz (\omega k)^{\theta} n^{\nu} - wn + q(1 - \delta) \omega k - b - \xi.$$

- Value of continuation, $V(z, k, b; s) \geq 0$ (as dividends non-negative).
- Firms forced to default when they cannot satisfy (1).
- Avoid excessive leverage which reduces x'

Rising loan interest rate schedule

- Reduces investment in productive firms with relatively low collateral $q\omega(1 - \delta)k$.
- Slows growth for young firms that begin small with low k .

Production heterogeneity and credit shocks

Khan and Thomas (2013) and Khan, Senga and Thomas (2016)

Collateral constraints and default risk

	<i>GDP</i>	<i>I</i>	<i>N</i>	<i>C</i>	<i>TFP</i>
07Q4-09Q2	-5.6	-19.0	-6.0	-4.1	-2.2

- Misallocation rises in (credit shock driven) recessions.
- Aggregate total factor productivity falls over time.

Heterogeneity matters

- Consistent with the flow of funds
- Incidence of financial frictions varies by firm.

Financial heterogeneity and monetary policy shocks

Ottonello and Winberry (2018)

Heterogeneity matters

- Steep marginal cost of loans dampens investment response of highly leveraged firms following monetary policy shock.
- Expansionary monetary policy will increase misallocation of capital
 - measured total factor productivity should fall
- Ottonello and Winberry maintain a constant measure of firms.
 - number of entrants increases with default
- Rising wages and price of capital will reduce value of entry.
 - young firms highly leveraged
 - does entry fall with expansionary monetary policy?

Default rates and Credit Spreads

Gomes and Schmid (2012), 'Equilibrium Credit Spreads and the Macroeconomy'

It's difficult to generate observed credit spreads with default rates.

default rate (BAA)	1.42%
credit spread (BAA-AAA)	0.98%

- Risk-neutral credit spread, with a recovery rate of 75 percent, would be 0.355%.
- Default is countercyclical and, in Gomes and Schmid, empirically consistent credit spreads are the result of a **countercyclical stochastic discount factor**.
- Risk premia rise in recessions when household's consumption is low.

Cyclical risk premia and the role of leverage

- In Ottonello and Winberry, the default rate is **2 percent**.
 - Dun and Bradstreet/Bernanke, Gertler and Gilchrist (1999): 3 percent
 - data contains a large number of private, alongside public, firms
- Credit spread (public firms) is BAA - 10 year treasury: **2.35 percent**
- Derived without aggregate uncertainty
 - a recovery rate of 91 percent is applied to $\omega q (1 - \delta) k$
 - what is recovery rate from face value of debt?
 - what is role of capital quality shocks, ω ?
- Relatively high default rates and volatile capital quality shocks deliver a steep marginal cost of leverage.

Concluding remarks

Credit spreads, total factor productivity and entry

If credit spreads are largely the result of countercyclical risk premium, the marginal cost of loans will be flatter in an expansion.

Heterogeneity in leverage will then matter less, more homogeneous response to expansionary monetary policy.

In the present model, heterogeneous responses imply a rise in misallocation and a fall in aggregate total factor productivity.

Further, the value of entry appears to fall with a monetary policy shock that reduces the risk free rate.

Concluding remarks

Leverage and responsiveness to monetary policy

Nonetheless, this work is valuable in offering a careful, quantitative study of monetary policy supported by authoritative empirical evidence on heterogeneity in firm investment response driven by differences in leverage.

Suggests that expansionary monetary policy does not alleviate the costs of external finance for risky, constrained firms.

Increasing investment in firms with high costs of external finance requires unconventional monetary policy.