How Firms Respond to Business Cycles: The Role of Firm Age and Size

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How Firms Respond to Business Cycles: The Role of Firm Age and Size

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IMF

November 7, 2012
Empirical exploration of cyclical behavior of firms by age and size

Young/small firms respond more strongly to the business cycle
  ▶ specially more so during the great recession
  ▶ collapse in local housing prices

Significance of paper’s findings and approach:
  ▶ combined with theory, can use micro-data to infer nature of shock
    ★ TFP shock, credit shock
  ▶ nature of shock matters for policy response
A theory to study Firm Responses to TFP and Credit Shocks

- Large number of entrepreneurs distinguished by:
  - Idiosyncratic productivity: $e$, stochastic
  - Wealth: $a$, endogenously chose to max. lifetime utility

- Production and factor choice

$$\pi = \max_{l,k} f(k, l, Z_se_s) - w_sl - (\delta + r_s)k$$

s.t.

$$k \leq \lambda_s a_s$$
Predictions from TFP shock

- Credit conditions are good (high $\lambda$), and TFP falls (low $Z$)

$$l, k \propto f (Z; w, r)$$

- no further reallocation beyond idiosyncratic shocks
Predictions for Firm Credit Shocks

- **credit crunch** (i.e. $\lambda_s$ falls)

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Predictions for Firm Credit Shocks

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  \[ L \text{ and } K \text{ reallocated from constrained to unconstrained entrepreneurs} \]
Predictions for Firm Credit Shocks

- **credit crunch** (i.e. $\lambda_s$ falls)

  $$l, k \propto f(Ze, a; w, r)$$

- L and K reallocated from constrained to unconstrained entrepreneurs
- Who is (un)constrained depends on joint distribution over \{e, a\}
  1. low wealth low productivity: young, small, likely unconstrained
  2. low wealth high productivity: young, small, likely constrained
  3. high wealth: old and unconstrained; large or small based on productivity
Predictions for Firm Credit Shocks

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- L and K reallocated from constrained to unconstrained entrepreneurs
- Who is (un)constrained depends on joint distribution over \( \{e, a\} \)
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- Hope is Age, Size or joint Age-Size distribution inform about \( \{e, a\} \)
Can a Single Dimension Signal a Credit-Crunch?

- Mixed results in the literature about the role of size:
  - Moscarini and Postely-Vinay (2012): the large are more cyclical
  - Gertler and Gilchrest (1994): small are more responsive to monetary contractions
Can a Single Dimension Signal a Credit-Crunch?

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- This paper: State and time-series variation and time/state fixed effects
  - Net Growth of Small firms falls significantly relative to Large
  - Consistent with Gertler and Gilchrest

- Although effect of age/size decomposition is stronger, age not essential to detect shock
  - Classification by size is enough according to theory

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Other Theory-Based Implications to be Tested

- Net growth differential between young/small and large/mature falls
  - But large/mature are net job destroyers. why?
  - Unconstrained firms should be expanding: lower factor prices

- State-level variation in wage adjustment:
  - Are large/mature firms growing faster in states where wages fell the most?

- TFP as cyclical indicator
  - Theory predicts no differential response by firm size age
  - VAR impulse responses to TFP shock consistent with this?
Can Firm Size Alone Signal a Credit-Crunch? Model Implications

- Response to credit crunch (Buera, Fattal-Jaef and Shin (2012))

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### State and Time Series Variation, Time and State Fixed Effects: Net Growth Differentials by Size Only

**Size Only**

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<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
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<tbody>
<tr>
<td>Chg. Unemp Rate</td>
<td><strong>-0.828</strong>*</td>
<td><strong>0.114</strong>*</td>
<td><strong>-1.129</strong>*</td>
</tr>
<tr>
<td></td>
<td>(0.131)</td>
<td>(0.025)</td>
<td>(0.211)</td>
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<td>Real GDP GR</td>
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<td>HP-Filtered Unemp. Rt.</td>
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| N                 | 1530         | 1530          | 1530          |

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$