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*Shocks at Large Banks and Banking  
Sector Distress:  
The Banking Granular Residual*

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Integrating Micro and Macro-economic Perspectives on  
Financial Stability  
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## ■ Summary

- Build on micro-macro models that link micro-econometric model of distress to aggregate VAR
    - Jacobson et al. (2005), Pesaran et al. (2004, 2006), Kick & Kötter (2007), De Graeve et al. (2008), Castrén et al. (2007)
  - Small-Bank distress not only caused by systematic factors (firm, macro, financial sector), but also by shocks at large banks (“size distribution”)
  - Construct measure of such large-bank shocks: GR
    - Add this to logit model of bank distress
    - Do shocks affect likelihood of distress at smaller banks?
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## ■ Granular residual, Gabaix (2005)

- $GR_t = (\sum_{i=1, \dots, K} S_{i,t-1})^{-1} (\sum_{i=1, \dots, K} S_{i,t-1} \varepsilon_{i,t})$ 
    - $S$  = sales,  $\varepsilon$  = growth shock
  - *Large* part of aggregate fluctuations arise from individual shocks to *small* number of *large* firms
  - Economy with  $N$  firms i.d. shocks, aggregate fluctuations have size proportional to  $1/\sqrt{N}$  ( $1/\sqrt{N}$  diversification)
  - Assumptions:
    - $E[\sigma_{g_i} S_i] = 0$ ,
    - Power-law distribution of firm size (80-20 rule) =>
  - $1/\ln(N)$  diversification
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## ■ Power-law (distribution)

- PL:  $f(x) = ax^k + o(x^k)$ 
    - Scale invariance:  $f(cx) = c^k f(x)$ , proportional to  $f(x)$ , i.e. scaling argument preserves shape of function
  - Analogy for P-L distributions
  - Examples of PLD:
    - Pareto principle (80-20)
    - Wealth distribution:  $N(w>200m)/N(w>100m) = \alpha$ , then  $N(w>2m)/N(w>1m) = \alpha$
    - $\Pr(\text{earnings fall} > 40\%)$  can be derived from  $\Pr(\text{earnings fall} > 20\%)$ , et cetera.
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- Comments
    - Granular residual
      - Parallel Gabaix; construction
    - Data
    - Results
    - Other / minor
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- Granular residual
    - What channel is it supposed to capture?
      - Gabaix: GR  $\Rightarrow$  GDP growth, Solow residual
      - BBN: GR  $\Rightarrow$  Pr(distress)
    - Which variable to use?
      - Gabaix:  $K=100$ , Size=sales, shocks=to sales growth
      - BBN:  $K_1=10$ ,  $K_2=N$ , TA (size), EBIT (output), equity (shocks)
    - What determines banks' systemic importance?
      - Assets? Intermediation intensity? Linkages?
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- Granular residual
    - Equity shocks?
      - How to think of current worldwide increases in bank equity?
      - Sequence of bad and positive shocks? Underlying causes?
    - Is Operating income a good measure of large banks impact on smaller banks?
      - BBN suggestion: interbank exposure
    - What is your “theory” of systemic risk propagation?  
Be precise!
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## ■ Data

- How many entries do you need to eliminate?
    - How deal with “Consolidated and partner on disc”?
  - How treat parent & subsidiary for the sake of shock construction?
  - How do you deal with mergers (TA-shocks)?
  - Which bank category do your top 10 belong to?
  - Reliability of end-of-year (quarter data) to generate shocks due to asset value (equity) fluctuations?
  - Try output gap instead of GDP growth
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## ■ Results

- Figure 2: different GR definitions do not produce stable patterns => makes finding that definition has no impact on parameter estimates suspicious
  - Table 1: surprising that GDP is (not) significant for distress category I-II (III-IV)
  - Table 2: GR only significant for Co-op banks
  - Table 3: Interpretation that “Equity GR has strongest impact” probably not correct – unless all variables have been standardized
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## ■ Results

- High interbank assets reduce PD!?
  - Separating positive and negative shocks (results not fully reported): both positive and negative GR shocks reduce PD
    - Possibility: + shocks reduce systemic risk, - shocks create opportunities for smaller competitors
    - Need to resolve this!
  - Macro stress test: why restrict  $\partial(\text{macro}_t)/\partial(\text{MP}_{t-j}) < 0$ ,  $i= 1, 2, 3, 4$ .
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## ■ Minor issues

- Some confusion in the text
    - “systemic risk outside financial sector”
    - Random or fixed effects?
  - Incomplete linkages in the FS
    - Are they empirically a source of systemic liquidity crises?
  - Explain properties of Power Law
  - Some numbers don't add up (data section)
  - Plot distress rates for categories I-IV
  - General and country-specific specification?
  - All variables are in percent of what (reserves, loans)?
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## ■ Conclusion

- Interesting paper
- Innovative idea
- Implementation and story telling need work!
- Asymmetry and counterintuitive effects

