Safer Ratios, Riskier Portfolios: Banks' Response to Government Aid

Ran Duchin Denis Sosyura

University of Michigan

MICHIGAN
ROSS SCHOOL OF BUSINESS

Motivation

- Key economic features of the past few years:
  - Increased government regulation
  - Unprecedented wave of bailouts around the world
- Research question: what are the consequences?
  - credit origination
  - risk-taking
- *What this amounts to is an unintended extension of the official safety net…The obvious danger is that risk-taking will be encouraged and efforts at prudential restraint will be resisted.*

  - Paul Volcker

Empirical Focus

- Capital Purchase Program (CPP) – the first and largest TARP initiative
  - Stated goals: stimulate lending and increase financial stability
  - Government restrictions to curb risk taking:
    - Limits on incentive pay to prevent "excessive risk taking"
    - Limits on dividends and share repurchases to prevent asset substitution
- 707 financial institutions received CPP capital

CPP Summary Statistics		
Total investment, $bil.	Percent of bailed banks	Average Investment, $mil.
204.9	9.9%	301.3

Methodology

- Study the effect of CPP capital infusions on bank risk-taking in a diff-in-diff setting (approved vs. denied CPP applicants)

- Investigate three main channels of bank operations:
    - Retail lending → residential mortgages
    - Corporate lending → large corporate loans
    - Investments → financial securities

- After identifying mechanisms, study changes in aggregate risk

Empirical Setting

- Large cross section of firms affected by simultaneous and unexpected liquidity shock

- Banks have a lot of flexibility in capital deployment
  - No separate disclosure requirements for bailout funds
  - *"This is opportunity capital. They didn't tell me I had to do anything particular with it."* - *Chairman of PlainsCapital Bank*
  - *"Make more loans?" "We're not going to change our business model or our credit policies to accommodate the needs of the public sector"*
    - Chairman of Whitney National Bank

Major Financial Institution Participation Commitment

In support of the US financial system and the broader US economy, the [name of QFI] agrees to:

Goldman Sachs

$ 10 bin

- Issue Preferred Shares in the amount of [ ] to the US Treasury under the terms and conditions of the TARP Capital Purchase Program announced today.

- Participate in the FDIC program guaranteeing new issues of eligible senior liabilities by banks and bank holding companies and transaction accounts as announced today under the systemic risk exemption invoked by the FDIC, US Treasury, and the Federal Reserve.

- Expand the flow of credit to US consumers and businesses on competitive terms to promote the sustained growth and vitality of the US economy.

- Continue to work diligently, under existing programs, to modify the terms of residential mortgages as appropriate to strengthen the health of the US housing market.

FAX (415) 975-7151
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Signature

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Date

Main Findings

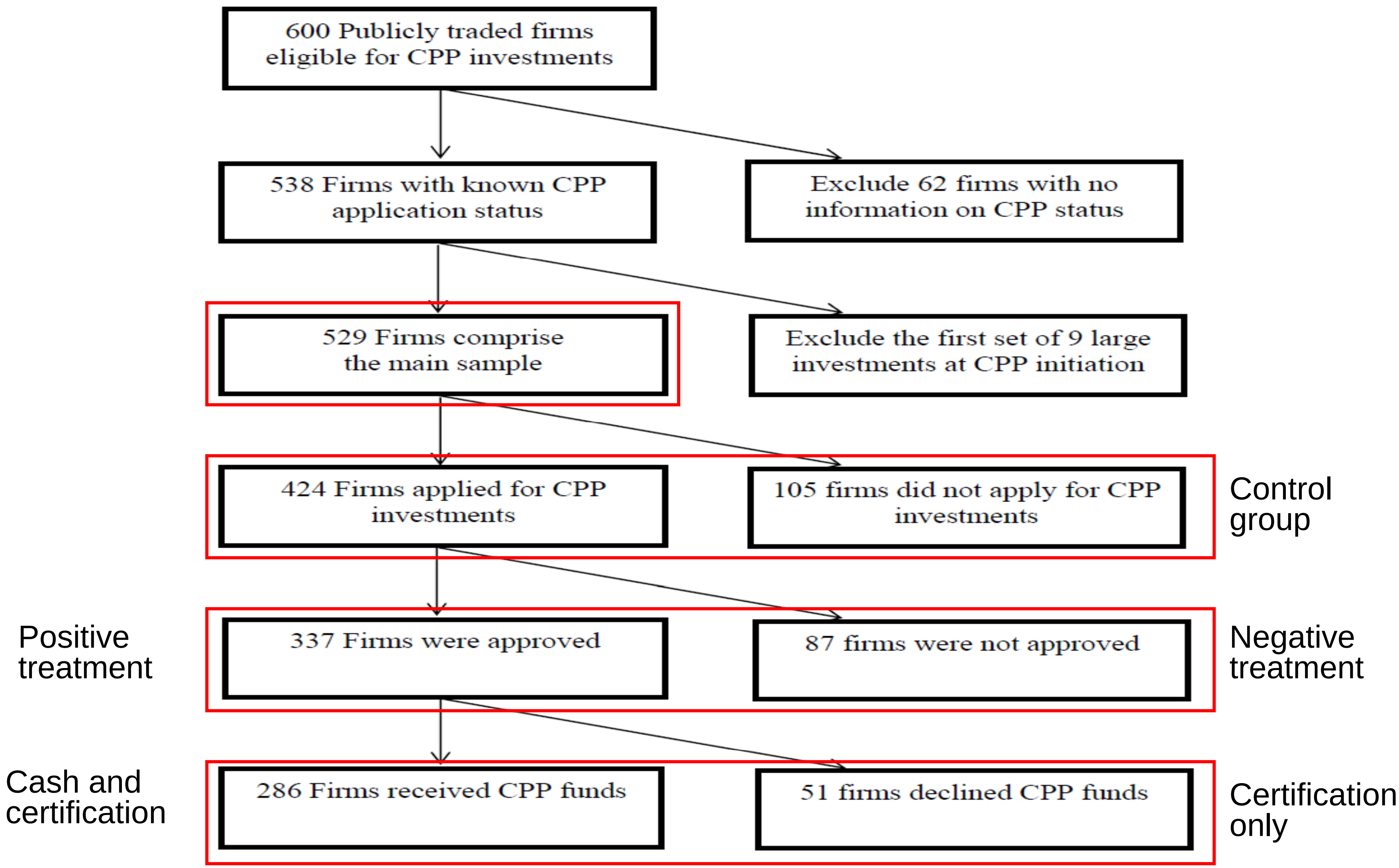
- No changes in total lending between approved and denied CPP banks
- A significant increase in risk-taking by CPP banks:
  - Investment portfolios: a shift toward riskier securities
  - Credit origination: a shift toward riskier loans
- Banks increase exposure within the same regulated asset class, thus maintaining or improving their capitalization ratios
- Overall, bailed banks appear safer based on capitalization levels, but show a large increase in volatility and default risk

What Explains Higher Risk Taking?

- **Government intervention into business strategy**
  - CPP approval + cash vs. CPP approval only
  - What happens after a firm repays TARP capital?
- **Low-risk arbitrage opportunities**
  - Increase in loan charge-offs and investment losses
  - Increase in stock volatility, beta, and likelihood of default
- **Moral hazard**
  - Results appear to be driven by government certification, not the capital
  - Strategic response to capital regulation in increasing risk exposure
  - Effect stronger for larger banks

Overall, a revised probability of government support likely played a significant role in banks' risk exposure

Data: CPP Applications



Risk Taking in Credit Origination

Dependent variable = Loan Approval Indicator (1 = approved, 0 = denied)

Model	Matched samples	Instrumental variable	No instrument
After CPP	0.086*** [0.001]	0.083** [0.023]	0.086*** [0.000]
After CPP x CPP recipient	-0.050** [0.043]	-0.053* [0.092]	-0.051*** [0.001]
Loan-to-income	-0.031*** [0.000]	-0.029*** [0.000]	-0.031*** [0.000]
After CPP x CPP recipient x Loan-to-income	0.030** [0.036]	0.033** [0.033]	0.029** [0.012]
After CPP x Loan-to-income	-0.012*** [0.000]	-0.007* [0.081]	-0.004*** [0.008]
CPP recipient x Loan-to-income	-0.003 [0.510]	-0.006 [0.210]	-0.005 [0.245]
Bank fixed effects?	Yes	Yes	Yes
Local market fixed effects?	Yes	Yes	Yes
Borrower type fixed effects?	Yes	Yes	Yes
Bank level controls?	Yes	Yes	Yes
Local economy controls?	Yes	Yes	Yes
R-Squared	0.166	0.368	0.374

Investments: Summary of Evidence

- CPP banks increase allocations to investment securities
  - The total weight of investment securities in bank assets increased by 5.3% after CPP relative to non-recipient banks.

- Increase in investments primarily driven by MBS and corporate debt
  - Allocation to riskier securities increased at CPP banks by 6.2% after CPP relative to non-recipients
  - In contrast, CPP participants reduced their investment in lower-risk securities by 6.9% relative to non-recipients banks

Average interest yield on investment portfolios of CPP banks increased by 9.4% after CPP relative to unapproved CPP applicants

Overall Risk

- CPP recipients significantly reduced leverage: capital asset ratio increased at CPP banks by 18.4% after CPP relative to non-recipients

- Reduction in leverage was more than offset by an increase in asset risk
  - Beta of CPP banks increased by 11.4% vs. non-recipients
  - Stock volatility of CPP banks increased by 32.3% vs. non-recipients
  - Aggregate risk (measured by distance to default) of CPP banks increased by 23.7% after CPP vs. non-recipients

Overall: investing in higher-yield assets, while improving capital ratios

Should We Care?

- April 18, 2011:

  S&P lowers the U.S. government debt outlook to negative

  - The risks from the U.S. financial sector are higher than before 2008
  - Higher probability and cost to U.S. government of another round of extraordinary assistance

- Aug. 5, 2011:

  S&P downgrades U.S. long-term debt for the first time since beginning ratings in 1860

Conclusion

- Liquidity shocks have an asymmetric effect on lending
- Banks' strategic response to capital requirements erodes the efficacy of this mechanism in risk regulation
- Risk taking incentives from government protection appear to outweigh federal monitoring and institutional restrictions

Overall Bank Risk

Risk Measure	Z-Score	Standard deviation of ROA	Standard deviation of earnings	Capital asset ratio	Beta	Stock return volatility
Model	(1)	(2)	(3)	(4)	(5)	(6)
After CPP	-0.664*** [3.699]	0.001 [0.688]	0.002 [0.897]	-0.020*** [6.918]	0.131** [2.342]	0.040*** [9.702]
CPP recipient	0.471*** [4.126]	-0.001 [0.652]	-0.001 [0.640]	0.004 [1.156]	0.020 [0.349]	-0.005*** [2.798]
After CPP x CPP recipient	-0.265** [2.378]	0.003*** [3.460]	0.003*** [3.439]	0.019*** [6.093]	0.087** [1.989]	0.021*** [4.855]
Bank level controls?	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,122	7,178	7,178	7,185	5,632	5,632
R-squared	0.276	0.409	0.410	0.135	0.395	0.185

CPP Capital Allocation Process

Banks submit a short application

Regulator Makes a Recommendation

Banks

Primary Banking Regulator

- Federal Reserve
- FDIC
- Comptroller of Currency
- Office of Thrift Supervision

Treasury

Declared selection criteria = ***CAMELS***:

*C*apital adequacy

*A*sset quality

*M*anagement

*E*arnings

*L*iquidity

*S*ensitivity to market risk

Treasury decides whether to invest and how much

$$$

Application for TARP Capital Purchase Program (CPP)

Please complete the following information and follow the submission instructions as described on your Federal banking agency's website. In addition to completing the information on this form, please provide a description of any mergers, acquisitions, or other capital raisings that are currently pending or are under negotiation and the expected consummation date (no longer than 1 page).

In the event the applicant files an application with the appropriate Federal banking agency prior to the availability of the investment agreement, the applicant must file an amended application which includes updated responses to any items in the application that required prior review of the investment agreement.

Institution Name: ____________________

Address of Institution: ____________________

____

Primary Contact Name: ____________________

Primary Contact Phone Number: ____________________

Primary Contact Fax Number: ____________________

Primary Contact Email Address: ____________________

Secondary Contact Name: ____________________

Secondary Contact Phone Number: ____________________

Secondary Contact Fax Number: ____________________

Secondary Contact Email Address: ____________________

RSSD, Holding Company Docket Number and / or FDIC Certificate Number, As Relevant: ____________________

Amount of Preferred Shares Requested: ____________________

Amount Of Institution's Authorized But Unissued Preferred Stock Available For Purchase: ____________________

Amount Of Institution's Authorized But Unissued Common Stock: ____________________

Amount Of Total Risk-Weighted Assets As Reported On The Holding Company's Or Applicable Institution's Most Recent FR-Y9, Call Report, Or TFR, As Relevant: ____________________

Institution Has Reviewed The Investment Agreements And Related Documentation On Treasury's Website (Yes/No): ____________________

Describe Any Condition, Including A Representation Or Warranty, Contained In The Investment Agreements And Related Documentation, The Institution Believes it Cannot Comply With By November 14, 2008 And Provide A Timeline For Reaching Compliance[1]: ____________________

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Type of Company[2]: ____________________

Signature of Chief Executive Officer (or Authorized Designee): ____________________

Date of Signature: ____________________

Regulating Risk via Financial Reporting

If there are no disclosure requirements for the use of government capital, what are some of the standard mechanisms for monitoring banks' risk?

Capital adequacy ratios = (various measures of capital) / risk-weighted assets

Risk-weighted assets are computed based on asset class: riskier assets are assigned higher weights.

Intuition: banks must keep greater safety reserves if they hold riskier assets

Risk Weights for Some Asset Classes	
	Weight in denominator
Treasuries	0
Federal agency securities	0.2
Residential mortgages	0.5

Identification (1): Selection

- Goal: isolate the effect of government aid on bank risk-taking, controlling for bank selection, economic conditions, and credit demand
- **Issue:**
  - Recipients may be selected on attributes correlated with subsequent risk-taking and lending capabilities
- **Approach:**
  - Control for selection criteria (CAMELS, size, and crisis exposure)
  - Observe approvals & denials → subsamples matched on approval propensity
  - Robustness: bank fixed effects

Identification (2): Economic Conditions

- **Issue:**
  - Changes in economic conditions affect banks' risk

- **Approach:**
  - <u>Diff-in-diff</u>: loan originations by bailed vs. non-bailed banks before & after CPP
  - Applications submitted in the same housing market (U.S. census tract)
  - Control for time-variant changes in regional economic conditions:
    - Home vacancy rate
    - Housing price index
    - Unemployment

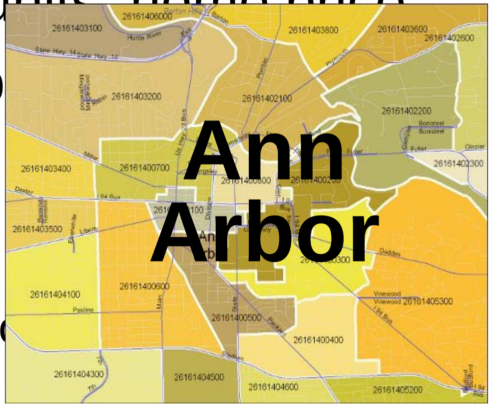
Data: Credit Origination

- Application-level data on mortgages from the Home Mortgage Disclosure Act Database
  - Borrower income, gender, and other demographics
  - Property location by U.S. Census tract (median population of 4,000 people)
  - Bank decision on the application
  - Borrower risk: (1) loan/income;

    (2) high-risk borrower indicator (spread over Treasuries > 3%)

- Housing market data: home vacancies, housing u
  index, population, per capital income, and unemp

- Data on large corporate loans from DealScan
  - Originating bank, recipient firm, date of origination, and l



Interpretation

- No significant effect of CPP on:
  - Total volume of credit origination
  - Distribution of demand for loans between approved and unapproved banks
- Significant effect on the risk of originated credit:
  - CPP banks shifted their credit origination toward riskier, higher yield mortgages
- Results are very similar for corporate loans
- Banks' active decisions or government intervention?
  - Find a similar response across approved banks, whether or not they received capital → unlikely driven by government intervention