

Capital Mobility and Regulation Frictions: Evidence from U.S. Lottery Winners

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The Role of Banks in Integrating Local Credit Markets

- ▶ Over the past thirty years the banking system in the U.S. has gone through significant changes
- ▶ In particular, the removal of restrictions to expand across states has led to a more consolidated industry
 - ▶ Dominated by banking organizations that can gain an advantage by operating across state lines
- ▶ This consolidation increases the role that banks play in integrating the local credit markets to efficiently allocate capital
- ▶ Given recent interest in the role of capital allocation in macroeconomics (e.g., Hsieh and Klenow, 2009), understanding how banks allocate capital is a first-order question

This Paper

This paper explores how multimarket banks reallocate capital following an exogenous increase in funding

In particular, I consider the following questions:

- ▶ How funding shocks propagate throughout banks' entire organization?
- ▶ What are the frictions that affect fund mobility?

To this end, I combine a new source of quasi-experimental variation in funding availability from jackpot lottery winners with hand-collected data

Main Findings

- ▶ Exposure to jackpot shocks leads to a significant increase in deposits (19.48%) and loan origination (14.36%)
- ▶ Funds are transmitted across different credit markets
- ▶ However, the increase in lending is five times greater in the state in which the funding shock occurs relative to other states
- ▶ Part of the current banking regulation (Section 109) appear to explain why state boundaries matter
 - ▶ The increase in lending within the winner's state only occurs in out-of-state markets, where Section 109 applies
 - ▶ The allocations are greater in states where banks must lend a greater fraction of deposits locally
 - ▶ Finally, it also negatively impacts banks' loan performance

Background on U.S. Jackpot Lottery Games

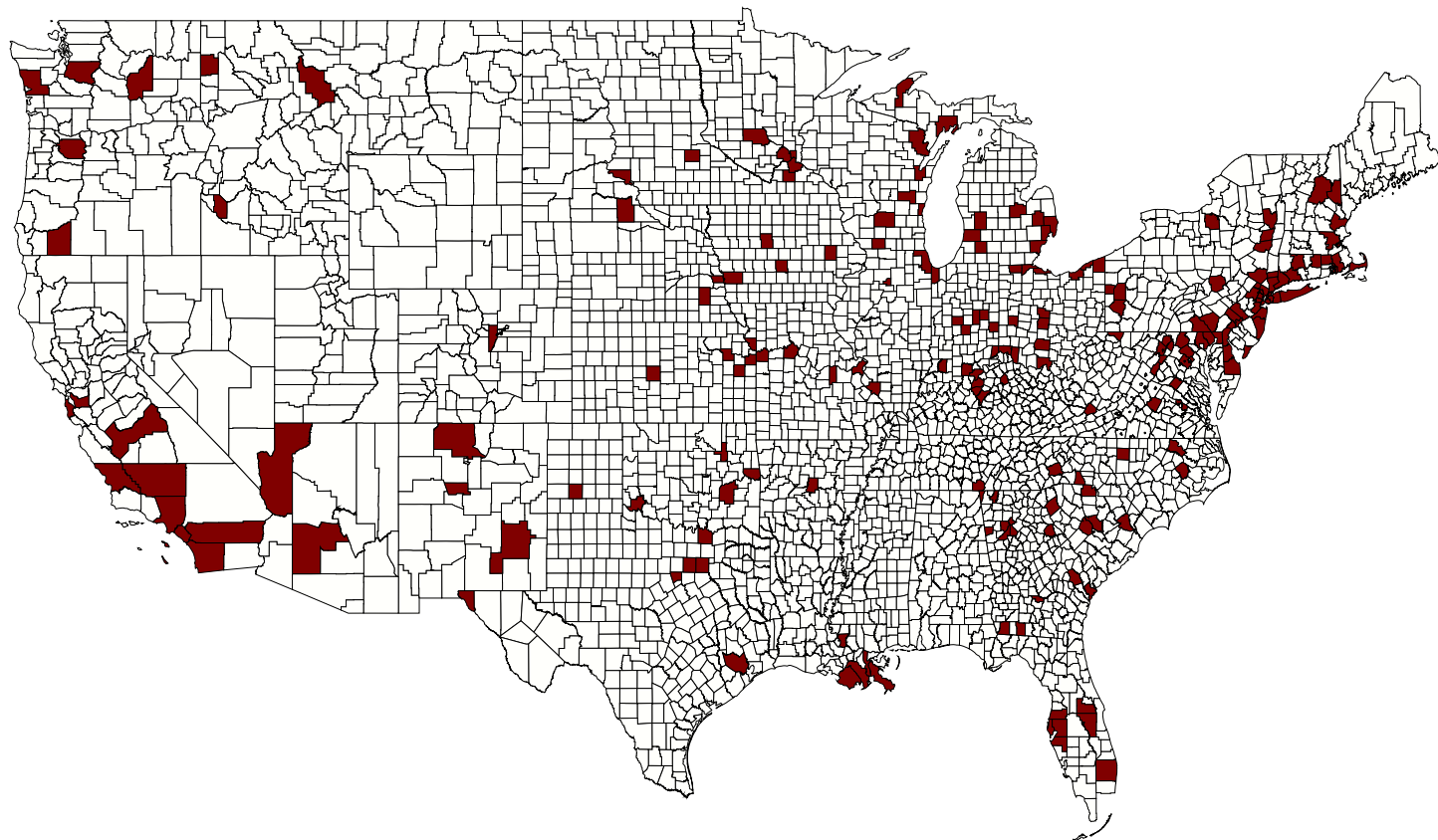
- ▶ Powerball (PB) and Mega Millions (MM) are the two most important shared jackpot games (offered in 44 states)
 - ▶ **Jackpot:** the current minimum is \$40 and for PB and MM
 - ▶ **Odds of winning:** 1 in 292,201,338 for PB; 1 in 302,575,350 for MM
 - ▶ **Annuity option:** it is paid in 30 graduated installments over 29 years
 - ▶ **Cash option:** it is the approximate present value of the installments

Jackpot Winners Statistics: 2002-2013

Jackpot Winners	303
Mean Prize (in 2013 After-Tax Dollars)	\$46,558,420
Type of Prize	
Cash	282
Non-cash (Annuity or Unclaimed)	21
Winner's State of Residence	
Same State	274
Different State	29

MM and PB Jackpot Winners by County, 2002-2013

303 winners, 41 states, 212 counties, 298 ZIP codes



Research Design: Bank-level Analysis

- ▶ The empirical design exploits banks' exposure to a winner's location (i.e., a winner's ZIP code)

- ▶ The retailer's address, where a winning ticket is sold, is public information
- ▶ Players usually live close to where they buy their lottery tickets

The Powerball website states: "The vast majority of winning tickets are purchased by someone close to the lottery terminal where it was purchased"

- ▶ Thus, it is plausible exogenous that the bank has a presence (branch) in the winner's ZIP code, conditional on bank size
- ▶ Control for credit demand: compare lending for banks in the treatment group to banks in the control group, while controlling time-varying effects at the CBSA-level
- ▶ The empirical strategy allows tracing the windfall shock throughout banks' entire organization, by providing data on the location and timing of lenders exposed to it

Bank-level Exposure to the Jackpot Shock: Summary Stats

Bank-level Exposure	Exposed		Non-Exposed	
	Mean	SD	Mean	SD
Number of Branches in the Winner's ZIP Code	1.513	0.917	-	-
Share of Branches in the Winner's ZIP Code	0.182	0.177	-	-
Number of Banks		641		10280
Number Banks-Years		5852		82345

Banks characteristics	Exposed	Non-Exposed
log(Assets)	12.232 [1.404]	11.111 [1.328]
Equity/Assets	0.099 [0.034]	0.109 [0.048]
ROA	0.005 [0.009]	0.005 [0.010]

Jackpot Shock Effect on Deposits

$$\log(outcome_{ijt}) = \alpha_{jt} + \beta_1 \text{number branches}_i + \beta_2 \text{number branches}_i \times post_{it} + \gamma' X_{it-1} + \varepsilon_{ijt},$$

	$\Delta \log \text{ Deposits}$	
	(1)	(2)
Number of Branches x Post	0.0103*** (0.00302)	0.00961*** (0.00312)
Size control	Yes	Yes
Additional Controls	No	Yes
CBSA x Year FE	Yes	Yes
Observations	187,844	187,844
R-squared	0.083	0.088

- **Robustness:** similar results using the share of branches in the winner's ZIP Code

Jackpot Shock Effect on Lending

	log Total Amount of Small Business Loans	
	(1)	(2)
Number of Branches x Post	0.174*** (0.0589)	0.171*** (0.0603)
Size control	Yes	Yes
Additional Controls	No	Yes
CBSA x Year FE	Yes	Yes
Observations	359,955	359,955
R-squared	0.143	0.149

Robustness checks:

- ▶ **Pre-trends test:** no evidence of pre-trends in the different outcomes
- ▶ **Placebo test:** no evidence of effect when the prize remains unclaimed, the winner chooses the annuity option, or the winner lives in a different state
- ▶ **Larger prizes:** the impact of a jackpot shock is greater for the larger prizes

Banks' Reallocation of Capital at Work

Winner's CBSA v. Other CBSAs

	Δ log Deposits (1)	log Total Amount of Small Business Loans (2)
Number of Branches $\times$ Post $\times$ Winner CBSA	0.0164*** (0.00591)	1.169*** (0.155)
Number of Branches $\times$ Post $\times$ Non-winner CBSA	0.00470 (0.00330)	0.151** (0.0633)
Wald Tests of Coefficients (p-value)	0.0355	0.0000
Additional Controls	Yes	Yes
CBSA $\times$ Year FE	Yes	Yes
Observations	187,844	359,955
R-squared	0.089	0.152

Do State Boundaries Matter?

	log Total Amount of Small Business Loans	
	(1)	(2)
Number of Branches $\times$ Post $\times$ Winner State	0.509*** (0.0836)	
Number of Branches $\times$ Post $\times$ Non-winner State	0.0981 (0.0815)	0.0981 (0.0814)
Number of Branches $\times$ Post $\times$ Non-winner CBSA $\times$ Winner State		0.446*** (0.0821)
Number of Branches $\times$ Post $\times$ Winner CBSA		0.722*** (0.105)
Wald Tests of the First Two Coefficients (p-value)	0.0000	0.0000
Wald Tests of the Second and Third Coefficients (p-value)		0.0000
Additional Controls	Yes	Yes
CBSA $\times$ Year FE	Yes	Yes
Observations	359,955	359,955
R-squared	0.150	0.151

- **Robustness:** similar results in markets both with and without branches

Potential Mechanisms

Main Mechanism: Regulatory Pressure - Section 109

- ▶ Section 109 prohibits a bank from establishing, or acquiring, branches outside its home state primarily for deposit production
- ▶ It applies to any bank that has branch controlled by an out-of-state bank
- ▶ Two-step test:
 - ① Conduct a loan-to-deposit (LTD) ratio test of the bank's statewide operations to the host state LTD ratio
 - ② Determine whether the bank is meeting the credit needs of the communities served in the host state

→ The loan origination should be higher following a funding shock: **1)** in the out-of-state markets and **2)** in the states with the greater LTD ratio

Out-of-State v. In-State Markets

	log Total Amount of Small Business Loans	
	(1)	(2)
Number of Branches $\times$ Post	0.0750 (0.0811)	0.0317 (0.0789)
Number of Branches $\times$ Post $\times$ Winner State	0.402*** (0.0875)	0.0684 (0.133)
Subsamples	Out-of-State	In-State
Additional Controls	Yes	Yes
CBSA $\times$ Year FE	Yes	Yes
Observations	309,208	50,747
R-squared	0.172	0.369

Section 109 at Work?

	log Total Amount of Small Business Loans	
	(1)	(2)
Number of Branches x Post x Winner State x Host Ratio >50%	0.501*** (0.0937)	0.313 (0.195)
Number of Branches x Post x Winner State x Host Ratio <50%	0.388*** (0.106)	0.0366 (0.239)
Number of Branches x Post x Non-winner State x Host Ratio >50%	0.0588 (0.0497)	0.263 (0.169)
Number of Branches x Post	0.108 (0.153)	-0.180 (0.148)
Wald Tests of the First Two Coefficients (p-value)	0.0322	0.2425
Subsamples	Out-of-State	In-State
Additional Controls	Yes	Yes
CBSA x Year FE	Yes	Yes
Observations	309,208	50,747
R-squared	0.167	0.368

Other Mechanism: Optimal Decentralization

- ▶ When soft information is important, some level of decentralization in lending is optimal (Stein, 2002)
 - ▶ Information asymmetries could lead the bank to optimally assign lending discretion to local managers
- ▶ The greater lending within the winner's state can be due to proximity to the treated branches
 - ▶ Branches closer to their borrowers are more likely to lend to informationally difficult borrowers (e.g., small business) (Petersen and Rajan, 2002)
- ▶ Thus, due to optimal organization design local managers have discretion in lending, and because of the soft information, lending decisions are local

→ The increase in loan origination should be concentrated on the CBSA's closer to where the shock happened (i.e., winner's CBSA)

- ▶ **Finding:** no evidence of difference in lending between markets closer to and farther away from the winner's CBSA

Consequences of Funding Shocks

Consequences of Funding Shocks: Loan Performance

	Non-performing Loans _{t+1} / Total Loans _t (1)	Charge-off _{t+1} / Total Loans _t (2)
Number of Branches x Post	0.00140** (0.000674)	0.000345* (0.000185)
Additional Controls	Yes	Yes
Bank FE	Yes	Yes
Year FE	Yes	Yes
Observations	101,992	101,992
R-squared	0.211	0.417

Section 109 and Loan Performance

	Non-performing Loans _{t+1} / Total Loans _t (1)	Charge-off _{t+1} / Total Loans _t (2)
Number of Branches x Post	0.00185*** (0.000515)	0.000340* (0.000199)
Number of Branches x Post x Out-of-State	-0.00182 (0.00123)	-0.00146*** (0.000436)
Number of Branches x Post x Out-of-State x Host Ratio >50	0.00257* (0.00138)	0.00198*** (0.000733)
Additional Controls	Yes	Yes
Bank FE	Yes	Yes
Year FE	Yes	Yes
Observations	101,992	101,992
R-squared	0.211	0.413

Conclusion

- ▶ The analysis in this paper explores how multistate banks reallocate funds following windfall shocks
 - ▶ Research design may be replicated in other settings
- ▶ Funds are reallocated to different lending markets; however, the allocation is considerably greater in states that provide the funds
- ▶ State boundaries matter for fund mobility in part due to Section 109, which also negatively impacts banks' loan performance
- ▶ Highlights frictions generated by the current regulation that can reduce capital mobility
 - ▶ Potentially diminish improvements in the efficiency of allocation of capital from the banking deregulation

Thank you!