Did TARP Banks Get Competitive Advantages?

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Motivation

- Troubled Asset Relief Program (TARP): During 2008-2009, the US Treasury infused capital in a large number of banking organizations (709).
  - Goals: Improve the stability of the financial system and increase availability of credit.

- Literature on regulatory interventions in the banking sector often opines that public guarantees distort competition.
  - French et al. (2010), Gropp, Hakenes and Schnabel (2011), Calderon and Schaeck (2012).

  - "Government bailout reactions give institutions considered systemically important competitive advantages by lowering their financing costs and allowing them to offer lower prices and thus have a better position on the market than their competitors".
    - French, K. et al, The Squam Lake report, Fixing the Financial System, Princeton University Press, 2010, p.19.

➡ **One possible unintended consequence of the TARP program is that it may have given recipient banks competitive advantages over non-recipient banks, potentially distorting the flow of resources, with possible implications for financial stability.**

Research Questions

- This paper conducts an empirical assessment of TARP on bank competition.
- Did TARP give recipient banks competitive advantages?
  - Market Share
  - Market Power
- Are these competitive advantages, if any, different for TARP banks that repaid early?
  - These banks may have shed some cost advantages or disadvantages of the program
- We consider:
  - Local Market Share and Lerner Index as indicators of competitive advantage
  - Full sample of commercial banks in US (2005-2012)
  - Bank-level difference-in-difference (DID) regressions

Literature

Determinants of TARP

- **Decisions to apply for and receive TARP**: Bayazitova and Shivdasani (2012), Duchin and Sosyura (2012)
- **Decision to exit TARP**: Bayazitova and Shivdasani (2012), Wilson and Wu (2012)

Other Effects of TARP

- **Returns/Valuation**: Fahlenbrach and Stulz (2010), Ng, Vasvari, and Wittenberg-Moerman (2010), Veronesi and Zingales (2010)
- **Risk Taking and Lending**: Taliaferro (2009), Black and Hazelwood (2012), Duchin and Sosyura (2012), Li (2012)

Effects of Other Government Interventions

- **Risk Taking**: Berger, Bouwman, Kick, and Schaeck (2012), Brandao-Marques, Correa, and Sapriza (2012), Dam and Koetter (2012), Hryckiewicz (2012)
- **Competition**: Cordella and Yeyati (2003), Gropp, Hakenes, and Schnabel (2011), Calderon and Schaeck (2012)

Capital and Competition

- Calomiris and Mason (2003), Calomiris and Wilson (2004), Allen, Carletti and Marquez (2011), Mehran and Thakor (2012), Berger and Bouwman (forthcoming)

Literature

Market Power Effect of TARP

- Koetter and Noth (Working Paper, 2013)

- Finds that a higher probability of bailout is associated with higher market power.
- Their approach is substantially different from ours in several important respects:
  1) Do not consider the actual TARP bailout, but rather probability of bailout.
  2) Do not consider market share effects.
  3) Do not use a DID approach.
  4) Do not consider or distinguish among seven different effects that bailouts may have on market share and market power.
  5) Do not draw a distinction between TARP banks that repaid early and TARP banks that did not repay early.

Competitive Advantage Indicators

1. **Market share**
   - Proxied by local market asset share (Metropolitan Statistical Area (MSA) or rural county).

2. **Market power**
   - Proxied by Lerner Index for Gross Total Assets (GTA).

$$Lerner\ GTA_{it} = \frac{Price_{it} - MC_{it}}{Price_{it}}$$

   - Increase in *Price* and/or decrease in *MC* would be measured as an increase in market power.
     - Increase in *Price* would come from charging higher interest rates and fees for loans and loan commitments.
     - Lower *MC* would come from paying lower interest rates on deposits and non-deposit funds.

Hypotheses: Market Share

- **Hypothesis 1a**: TARP banks **increased** their market shares relative to non-TARP banks.
- *Predation Effect:* TARP banks may use the capital infusions to compete more aggressively.
  - Examples: Some of the TARP recipients used the funds to acquire peers with poorer capital ratios.
    - MB Financial acquired in 2009 several failing institutions: Benchmark Bank, Corus Bank NA, InBank and Heritage Community Bank.
    - M&T Bank Corp, New York, acquired all the outstanding common stock of Provident Bankshares Corp in May 2009, and Wilmington Trust Corporation.
  - $=>$ **higher market share**
- *Safety Effect:* TARP banks may be perceived as safer due to the bailout.
  - Customers take more loans and loan commitments from them because TARP banks are less likely to fail or become financially distressed.
  - Creditors are more likely to lend them money because TARP banks are more likely to pay back.
  - $=>$ **higher market share**
- *Cost Advantage Effect:* TARP funds may be cheaper than non-TARP funds.
  - TARP banks have an incentive to expand their portfolios because they are more cheaply funded.
  - $=>$ **higher market share**

Hypotheses: Market Share

- **Hypothesis 1b**: TARP banks **decreased** their market share relative to non-TARP banks.
- *Charter Value/Quiet Life Effect:* Bailout may increase charter value and/or allow for a "quiet life," decreasing incentives for aggressive behavior and risk taking.
  - => **lower market share.**
- *Stigma Effect*: TARP banks may lose market confidence, as market may perceive them as relatively risky and likely to fail (opposite of the safety effect).
  - Customers take less loans and loan commitments from them because TARP banks may be more likely to fail or become financially distressed
  - Creditors are less likely to lend them money because TARP banks are less likely to pay back
  - => **lower market share**
- *Cost Disadvantage Effect:* TARP funds may be more expensive than non-TARP funds (opposite of the cost advantage effect).
  - TARP banks decrease their portfolios because costs of funds are higher.
  - => **lower market share**

Hypotheses: Market Power

- **Hypothesis 2a:** TARP banks **increased** their market power relative to non-TARP banks.

- ***Safety Effect:*** TARP banks may be perceived as safer due to bailout.
  - Customers pay more for loans and loan commitments from them because TARP banks are less likely to fail or become financially distressed.
  - Creditors charge them lower interest rates because TARP banks are more likely to pay back.
  - => **higher market power**

- ***Moral Hazard Effect:*** Reductions in market & regulatory discipline result in shifts into riskier portfolios.
  - Customers pay more for loans and loan commitments from them because they are riskier pool of customers.
  - Creditors may charge higher interest rates if they perceive the TARP banks as riskier, but increase will be less than enough to compensate for the riskier asset portfolio.
  - => **higher market power**

- ***Charter Value/Quiet Life Effect:*** Bailout may increase charter value and/or allow for a "quiet life," decreasing incentives for aggressive behavior and risk taking.
  - TARP banks maintain higher rates and fees for loans and loan commitments rather than going after business.
  - TARP banks maintain lower deposit and non-deposit funding rates rather than going after business.
  - => **higher market power**

- ***Cost Advantage Effect:*** TARP funds may be cheaper than non-TARP funds.
  - TARP banks have a decline in MC and may reduce price (by a lesser amount) to attract more business.
  - => **higher market power**

Hypotheses: Market Power

- **Hypothesis 2b**: TARP banks **decreased** their market power relative to non-TARP banks.

- *Predation Effect:* TARP banks may use the capital infusions to increase market share.
  - TARP banks offer loan and loan commitment customers lower rates and fees
  - TARP banks offer higher rates on deposits and non-deposit funds
  - => **lower market power**

- *Stigma Effect:* TARP banks may lose market confidence, as market perceives them as relatively risky and likely to fail (opposite of the safety effect).
  - Customers demand lower rates on loans and loan commitments from them because TARP banks may be more likely to fail or become financially distressed
  - Creditors charge TARP banks more for funds because TARP banks may be less likely to pay back
  - => **lower market power**

- *Cost Disadvantage Effect:* TARP funds may be more expensive than non-TARP funds (opposite of the cost advantage effect).
  - TARP banks have an increase in MC and may increase price (by a lesser amount)
  - => **lower market power**

Effects May Influence Market Share & Market Power in the Same or Opposite Directions

Effect	Indicators of Competitive Advantage	
	Market Share	Market Power
Predation	↑	↓
Safety	↑	↑
Cost Advantage	↑	↑
Charter Value/Quiet Life	↓	↑
Stigma	↓	↓
Cost Disadvantage	↓	↓
Moral Hazard	?	↑

What happens to banks that repaid early?

Effect	Indicators of Competitive Advantage	
	Market Share	Market Power
Predation	↑	↓
Safety	↑	↑
Cost Advantage	↑	↑
Charter Value	↓	↑
Quiet Life	↓	↑
Stigma	↓	↓
Cost Disadvantage	↓	↓
Moral Hazard	?	↑

- We expect the main effects of early repayment to be reductions in any cost advantage or disadvantage.
- We expect for those that repaid early, the cost disadvantage effect was more likely in force than the cost advantage effect.
- Since the cost disadvantage effect has negative arrows on both market share and market power, the reduction of this effect should make the overall impact of TARP more positive or less negative for those that repaid early.

Preview of Main Results

- Our difference-in-difference (DID) analysis yields three important results:

1. Overall, the TARP recipients did get competitive advantages and increased both their market shares and market power relative to non-TARP recipients.
   - Consistent with the empirical dominance of H1a over H1b and H2a over H2b.

2. The competitive advantages seem to be dominated primarily by TARP recipients that repaid early, suggesting that these banks significantly reduced their cost disadvantages.

3. The findings suggest that the safety effect and the cost disadvantage effect are the most important.

Sample Construction and Data

- TARP transactions data for Oct 2008 to Dec 2010 and TARP recipients list from the US Treasury's website (756 transactions for 709 unique institutions).
  - Match by name and location the institutions in the list with their corresponding RSSD9001 (Bank ID) where available.

- Match with bank data from quarterly Call Reports for the period 2005:Q1 to 2012:Q4.
  - Aggregate Call Report data of all the banks in the BHC at the holding company level if the BHC has more than 1 commercial bank owned.
  - Normalize all financial variables using seasonally adjusted GDP deflator to be in real 2012:Q4 dollars.
  - Exclude from our data:
    - Firm-quarter observations that are not referring to commercial banks (RSSD9331 $\neq$ 1).
    - Observations with missing or incomplete financial data for total assets and common equity.
    - Observations with missing or negative data for the income statement items such as interest expenses, personnel expenses, and non-interest expenses, etc.
    - Observations for banks that failed before Q1 of 2009 (before observation of TARP effects).
    - Regressions also lose one quarter of observations because of the use of lagged values for some of the exogenous variables.

- Other Data Sources: Summary of Deposits, List of Corrective Actions, Federal Housing Finance Agency, US Census Bureau, Center for Responsible Politics.

- Final regression sample has 178,381 bank-quarter observations for 7,323 unique banks.

Regression Framework (DID)
All TARP Banks Considered Equally

$$Y_{it} = \alpha + \beta_1 \cdot TARP\ Recipient_{it} + \beta_2 \cdot Post\ TARP_{it} + \beta_3 \cdot Post\ TARP_{it} \times TARP\ Recipient_{it} + \\ + \delta \cdot X_{it-1} + Time_t + \varepsilon_{it}$$

- Y_{it} is market share or market power.
- X_{it-1} are control variables.
- $TARP\ Recipient_{it}$ is a dummy =1 if the bank was provided TARP capital support.
- $Post\ TARP_{it}$ is a dummy = 1 in 2009-2012, the period after the TARP program started following Duchin and Sosyura (2012).
- $Post\ TARP_{it} \times TARP\ Recipient_{it}$
  - DID term
  - Captures the effect of the treatment (TARP) on the treated (TARP recipients) compared to the untreated
    - A positive coefficient would show the presence of a competitive advantage

Indicators of Competitive Advantage

1. **Market share** is proxied by local market asset share (Metropolitan Statistical Area (MSA) or rural county).
   - In the cases of multimarket banks, we use weighted average local market asset share, where the weights are the proportions of deposits in the different markets (deposits are the only banking variable for which location is available).

2. **Market power** is proxied by Lerner Index for Gross Total Assets (GTA).

$$Lerner\,GTA_{it} = \frac{Price_{it} - MC_{it}}{Price_{it}}$$

$$Price_{it} = \frac{TotalBank\,Revenue}{GTA} = \frac{InterestIncome + NoninterestIncome}{GTA}$$

$$\ln(Cost_{it}) = \beta_0 + \beta_1 \ln GTA_{it} + \frac{\beta_2}{2} \ln GTA_{it}^{\,2} + \sum_{k=1}^{3} \gamma_{kt} \ln W_{k,it} + \sum_{k=1}^{3} \phi_k \ln GTA_{it} \ln W_{k,it} + \sum_{k=1}^{3} \sum_{j=1}^{3} \ln W_{k,it} \ln W_{j,it} + \varepsilon_{it}$$

$$MC_{it} = \frac{Cost_{it}}{GTA_{it}} \left[\beta_1 + \beta_2 \ln GTA_{it} + \sum_{k=1}^{3} \phi_k \ln W_{k,it} \right]$$

Control Variables

- **Proxies for CAMELS** (the declared set of financial criteria used by regulators for evaluating banks, following Duchin and Sosyura (2012))
  - *Capital Adequacy*
  - *Asset Quality*
  - *Management Quality*
  - *Earnings*
  - *Liquidity*
  - *Sensitivity to Market Risk*

- **Other bank characteristics** (following Bayazitova and Shivdasani (2012), Berger, Bouwman, Kick and Schaeck (2012), Duchin and Sosyura (2012), and Berger and Bouwman (forthcoming))
  - *Bank Size* (log of GTA)
  - *Bank Age*
  - *Merger* (dummy which takes a value of 1 from the time that the bank acquired another institution and 0 otherwise)
  - BHC (whether bank is part of a BHC)
  - *Listed* (whether public or not),
  - *Metropolitan* (whether the majority of their deposits are in Metropolitan Statistical Areas)
  - *Weighted HHI Deposits* (local deposits concentration)
  - *Number States*
  - *Change in Median Income (weighted)*
  - *Change in Real Estate Index (weighted)*

Regression Framework (DID)
Breaking Out TARP by Early Repayment

$$Y_{it} = \alpha + \beta_1 \cdot TARP\ Recipient\_Not\ Repaid_{it} + \beta_2 \cdot TARP\ Recipient\_Repaid_{it} + \beta_3 \cdot Post\ TARP_{it} + \\ + \beta_4 \cdot Post\ TARP_{it} \times TARP\ Recipient\_Not\ Repaid_{it} + \beta_5 \cdot Post\ TARP_{it} \times TARP\ Recipient\_Repaid_{it} + \\ + \delta \cdot X_{it-1} + Time_t + \varepsilon_{it}$$

- $TARP\ Recipient\_Not\ Repaid_{it}$ is a dummy = 1 if the bank did not repay in 2009-2010.
- $TARP\ Recipient\_Repaid_{it}$ is a dummy = 1 if the bank repaid in 2009-2010.
- $Post\ TARP_{it}$ is a dummy = 1 in 2009-2012, the period after the TARP program started, following Duchin and Sosyura (2012).
- $Post\ TARP_{it} \times TARP\ Recipient\_Not\ Repaid_{it}$ & $Post\ TARP_{it} \times TARP\ Recipient\_Repaid_{it}$
  DID terms
  - Capture the effects of the treatment (TARP) on the treated (TARP banks that did not repay early and TARP recipients that repaid early) compared to the rest

Effect of TARP on Bank Competition (Main Evidence)

Dependent Variable:	*Market Share*		*Market Power*	
Independent Variables:	**(1)**	**(2)**	**(3)**	**(4)**
TARP Recipient	-0.012***		-0.025***	
	(-14.375)		(-6.870)	
Post TARP	-0.018***	-0.018***	0.223***	0.223***
	(-11.091)	(-11.094)	(39.676)	(39.694)
TARP Recipient * Post TARP	0.003***		0.037***	
	(3.005)		(8.244)	
TARP Recipient_Not Repaid		-0.013***		-0.023***
		(-15.586)		(-5.821)
TARP Recipient_Repaid		-0.007***		-0.025***
		(-2.809)		(-3.827)
TARP Recipient_Not Repaid * Post TARP		0.002**		0.022***
		(2.226)		(4.363)
TARP Recipient_Repaid * Post TARP		0.008**		0.105***
		(2.363)		(12.175)
Controls	**Yes**	**Yes**	**Yes**	**Yes**
Time Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**
Observations	178,381	178,381	178,381	178,381
R-squared	0.205	0.206	0.380	0.380

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

- TARP banks gained a competitive advantage: increased market shares and market power when compared to the non-TARP banks after TARP capital injections (columns 1 & 3).
  - These results are consistent with the empirical dominance of H1a over H1b and H2a over H2b.
- The competitive advantage is predominantly for the TARP banks that repaid early (columns 2 & 4).

Effect of TARP on Bank Competition (Main Evidence)

- Results are economically significant.
  - The coefficient on $Post\ TARP_{it}$ x $TARP\ Recipient_{it}$ of 0.0033 in the market share equation increases the local market share by 6.71%, evaluated at the average market share of 0.0492.
  - The coefficient on $Post\ TARP_{it}$ x $TARP\ Recipient_{it}$ of 0.0375 in the market power equation increases the Lerner Index by 83.14%, evaluated at the average Lerner Index of 0.0451.

Lerner Components

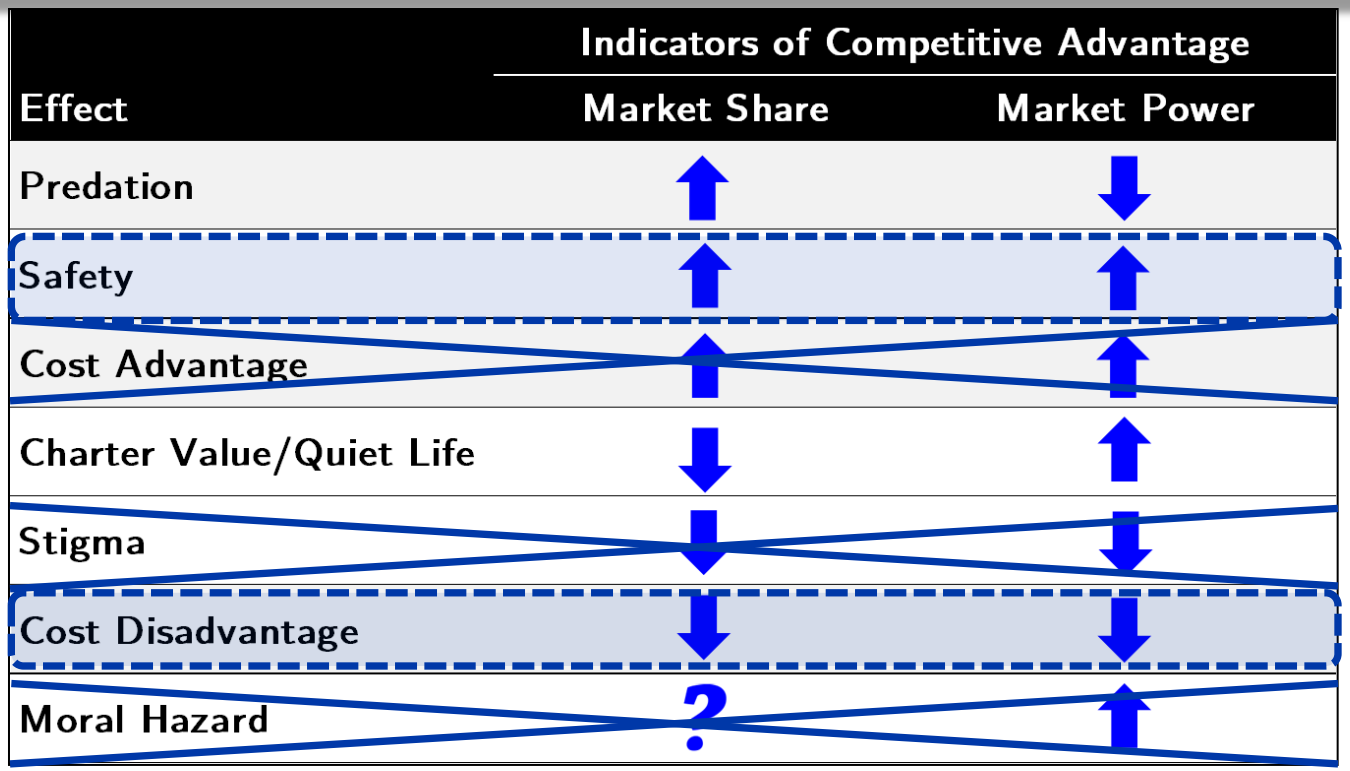
	Dependent Variable: Lerner Components			
	Price		*MC*	
Independent Variables:	**(1)**	**(2)**	**(3)**	**(4)**
TARP Recipient	0.000***		0.001***	
	(12.278)		(14.277)	
Post TARP	-0.004***	-0.004***	-0.007***	-0.007***
	(-106.258)	(-106.282)	(-96.912)	(-96.945)
TARP Recipient * Post TARP	-0.000***		-0.001***	
	(-7.006)		(-11.597)	
TARP Recipient_Not Repaid		0.000***		0.001***
		(13.261)		(13.998)
TARP Recipient_Repaid		0.000**		0.000***
		(2.307)		(4.302)
TARP Recipient_Not Repaid * Post TARP		-0.000***		-0.001***
		(-9.107)		(-9.707)
TARP Recipient_Repaid * Post TARP		0.000**		-0.001***
		(2.136)		(-7.475)
Controls	**Yes**	**Yes**	**Yes**	**Yes**
Time Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**
Observations	178,381	178,381	178,381	178,381
R-squared	0.539	0.539	0.438	0.439

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

- To shed light on the sources of the competitive advantages, we decompose our main measure of market power, *Lerner GTA*, into its components: *Price* and *Marginal Cost (MC)*.

- Main finding is primarily due to MC going down, suggesting that the market power gain is mainly on the input side (lower prices for deposits and/or other sources of funding).

Effect of TARP on Bank Competition (Main Evidence)



- Moral hazard seems unimportant because *Price* does not significantly increase.
- Cost disadvantage effect seems to dominate the cost advantage effect, at least for the banks that repaid early, because when the cost effects are removed, the competitive advantages are amplified.
- The safety effect, the only remaining one with positive influences on both market share and market power, appears to dominate the stigma and cost disadvantage effects, which have negative influences on both.
  - The safety effect seems to primarily come in the form of lower interest rates for deposits and/or other types of financing, which more than offset the higher cost of TARP funds.

Endogeneity Concern

- TARP capital might be more often provided to the strongest banks, which may be more likely to gain a competitive advantage, yielding a spurious relationship.

- To address this concern, we employ two methods:

- **Propensity Score Matching (PSM)**: match each TARP recipient based on the propensity score probabilities to one or more non-TARP banks with similar characteristics (size, capitalization level, and profitability) using several PSM techniques.
  1) 1-1 matching without replacement
  2) 1-1 matching with replacement
  3) Nearest-neighbor matching with n=2 with replacement
  4) Nearest-neighbor matching with n=3 with replacement

- **Instrumental Variable (IV)**
  - Political & regulatory connections instruments for *TARP Recipient*
  - *CEO Compensation* and *Coincident Index* (state-economic conditions) for early repayment.

PSM: Matched Sample Analysis – Market Share

	Dependent Variable: *Market Share*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Independent Variables:	PSM: 1:1 Matching w/o replacement		PSM: 1:1 Matching w/ replacement		PSM: 2 Neighbors w/ replacement		PSM: 3 Neighbors w/ replacement	
TARP Recipient	-0.011***		-0.013***		-0.012***		-0.013***	
	(-8.860)		(-9.561)		(-10.953)		(-12.294)	
Post TARP	-0.013***	-0.013***	-0.023***	-0.023***	-0.021***	-0.021***	-0.018***	-0.018***
	(-3.634)	(-3.622)	(-5.931)	(-5.927)	(-6.319)	(-6.298)	(-5.635)	(-5.619)
*TARP Recipient * Post TARP*	0.005***		0.006***		0.004***		0.005***	
	(3.016)		(3.558)		(3.058)		(3.821)	
TARP Recipient_Not Repaid		-0.012***		-0.014***		-0.013***		-0.014***
		(-10.036)		(-10.483)		(-12.273)		(-13.827)
TARP Recipient_Repaid		-0.006**		-0.008***		-0.006**		-0.006**
		(-2.276)		(-3.103)		(-2.571)		(-2.568)
*TARP Recipient_Not Repaid * Post TARP*		0.004**		0.005***		0.004**		0.004***
		(2.491)		(3.080)		(2.484)		(3.197)
*TARP Recipient_Repaid * Post TARP*		0.010***		0.011***		0.010***		0.010***
		(2.788)		(3.091)		(2.707)		(2.977)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	34,634	34,634	31,302	31,302	42,361	42,361	51,447	51,447
R-squared	0.118	0.119	0.118	0.119	0.119	0.119	0.121	0.122

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

- Market share results continue to hold.

PSM: Matched Sample Analysis – Market Power

	Dependent Variable: *Market Power*							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Independent Variables:	PSM: 1:1 Matching w/o replacement		PSM: 1:1 Matching w/ replacement		PSM: 2 Neighbors w/ replacement		PSM: 3 Neighbors w/ replacement	
TARP Recipient	-0.006		-0.013**		-0.009**		-0.009**	
	(-1.249)		(-2.555)		(-2.043)		(-2.214)	
Post TARP	-0.285***	-0.285***	0.106***	0.106***	0.263***	0.263***	0.306***	0.306***
	(-22.214)	(-22.252)	(7.457)	(7.485)	(21.180)	(21.201)	(25.255)	(25.282)
*TARP Recipient * Post TARP*	0.022***		0.022***		0.022***		0.022***	
	(3.319)		(3.254)		(3.970)		(4.179)	
TARP Recipient_Not Repaid		-0.005		-0.011**		-0.007		-0.007
		(-0.881)		(-2.035)		(-1.471)		(-1.564)
TARP Recipient_Repaid		-0.012*		-0.020***		-0.015**		-0.015**
		(-1.699)		(-2.723)		(-2.209)		(-2.231)
*TARP Recipient_Not Repaid * Post TARP*		0.009		0.009		0.010		0.009
		(1.322)		(1.260)		(1.625)		(1.556)
*TARP Recipient_Repaid * Post TARP*		0.080***		0.081***		0.080***		0.082***
		(8.288)		(8.326)		(8.948)		(9.368)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	34,634	34,634	31,302	31,302	42,361	42,361	51,447	51,447
R-squared	0.396	0.397	0.399	0.400	0.410	0.411	0.408	0.409

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

- Market power results continue to hold, except that only TARP recipients that repaid early continue to show a competitive advantage.

Instrumental Variable Analysis (Second Stage)

	Second Stage (IV 2SLS)			
Dependent Variable:	***Market Share***		***Market Power***	
Independent Variables:	**(1)**	**(2)**	**(3)**	**(4)**
TARP Recipient	0.027**		-0.391***	
	(2.368)		(-6.337)	
Post TARP	-0.023***	-0.022***	-0.542***	-0.534***
	(-13.756)	(-10.642)	(-82.167)	(-78.694)
TARP Recipient * Post TARP	0.011***		0.123***	
	(3.330)		(7.236)	
TARP Recipient_Not Repaid		0.227***		-0.247**
		(6.950)		(-2.022)
TARP Recipient_Repaid		0.116***		-0.108*
		(5.937)		(-1.694)
TARP Recipient_Not Repaid * Post TARP		-0.035***		-0.037
		(-3.340)		(-1.047)
TARP Recipient_Repaid * Post TARP		0.034***		0.280***
		(3.260)		(9.443)
Controls	**Yes**	**Yes**	**Yes**	**Yes**
Time Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**
Observations	172,002	167,112	172,002	167,112
R-squared	0.198	0.064	0.323	0.347
F-test	247.052***	25.298***	247.052***	25.298***

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

- Second stage results show that the main results continue to hold, except that only TARP recipients that repaid early show a competitive advantage.

Alternative Measures of TARP

	Bailout Amount / GTA				*Bailout Amount / Risk-Weighted Assets*			
Dependent Variable:	*Market Share*		*Market Power*		*Market Share*		*Market Power*	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Independent Variables:								
TARP Recipient	-0.287***		0.005		-0.175***		-0.272	
	(-13.763)		(0.028)		(-10.203)		(-1.459)	
Post TARP	-0.018***	-0.018***	0.225***	0.225***	-0.018***	-0.018***	0.224***	0.224***
	(-11.269)	(-11.257)	(39.789)	(39.851)	(-11.247)	(-11.257)	(39.490)	(39.502)
TARP Recipient * Post TARP	0.106***		0.611***		0.090***		0.459**	
	(2.975)		(2.834)		(3.612)		(2.328)	
TARP Recipient_Not Repaid		-0.282***		0.098		-0.181***		-0.211
		(-13.108)		(0.494)		(-10.363)		(-1.028)
TARP Recipient_Repaid		-0.295***		-0.480**		-0.089		-0.592***
		(-4.888)		(-2.076)		(-1.418)		(-3.295)
TARP Recipient_Not Repaid * Post TARP		0.015		-0.039		0.045*		0.118
		(0.426)		(-0.153)		(1.698)		(0.511)
TARP Recipient_Repaid * Post TARP		0.509***		3.638***		0.392***		2.843***
		(5.307)		(10.906)		(4.191)		(10.857)
Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Time Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Observations	178,381	178,381	178,381	178,381	178,381	178,381	178,381	178,381
R-squared	0.205	0.205	0.380	0.380	0.205	0.205	0.380	0.380

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

- Replace the *TARP Recipient* dummies with alternative measures of TARP infusion: *Bailout Amount/ GTA* and *Bailout Amount/ Risk-Weighted Assets* .

- Results continue to hold, except that only TARP recipients that repaid early continue to show a competitive advantage.

Alternative Measures of Market Shares

Dependent Variable:	*Local Market Share Loans*		*Local Market Share Deposits*	
	(1)	(2)	(3)	(4)
Independent Variables:				
TARP Recipient	-0.011***		-0.007***	
	(-13.359)		(-16.428)	
Post TARP	-0.013***	-0.013***	-0.012***	-0.012***
	(-7.787)	(-7.788)	(-12.684)	(-12.691)
TARP Recipient * Post TARP	0.002**		0.002***	
	(2.001)		(2.852)	
TARP Recipient_Not Repaid		-0.011***		-0.006***
		(-12.083)		(-14.957)
TARP Recipient_Repaid		-0.012***		-0.008***
		(-7.443)		(-9.265)
TARP Recipient_Not Repaid * Post TARP		0.001		0.001
		(1.147)		(1.029)
TARP Recipient_Repaid * Post TARP		0.005***		0.006***
		(2.681)		(4.547)
Controls	**Yes**	**Yes**	**Yes**	**Yes**
Time Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**
Observations	178,380	178,380	178,381	178,381
R-squared	0.202	0.202	0.291	0.291

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

- Replace *Local Market Share Assets* with alternative measures of market shares: *Local Market Share Loans* and *Local Market Share Deposits*.
- Results continue to hold, except that only TARP recipients that repaid early continue to show a competitive advantage.

Alternative Econometric Models

	Bank Fixed Effects				Bank Random Effects			
Dependent Variable:	*Market Share*		*Market Power*		*Market Share*		*Market Power*	
Independent Variables:	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
TARP Recipient					-0.032***		-0.039***	
					(-9.421)		(-4.504)	
Post TARP	-0.007***	-0.007***	-0.538***	-0.538***	-0.008***	-0.008***	-0.096***	-0.096***
	(-10.285)	(-10.285)	(-97.972)	(-98.009)	(-11.489)	(-11.483)	(-20.319)	(-20.301)
TARP Recipient * Post TARP	0.004***		0.043***		0.004***		0.042***	
	(8.787)		(9.871)		(3.493)		(4.571)	
TARP Recipient_Not Repaid						-0.034***		-0.041***
						(-10.577)		(-4.553)
TARP Recipient_Repaid						-0.025***		-0.017
						(-2.624)		(-0.985)
TARP Recipient_Not Repaid * Post TARP		0.003***		0.025***		0.004***		0.025**
		(6.423)		(5.116)		(2.578)		(2.391)
TARP Recipient_Repaid * Post TARP		0.007***		0.121***		0.008***		0.118***
		(8.848)		(15.602)		(3.758)		(8.265)
Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Time Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Bank Effects	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Observations	178,381	178,381	178,381	178,381	178,381	178,381	178,381	178,381
R-squared	0.886	0.886	0.612	0.612	0.071	0.071	0.292	0.293

Robust t-statistics in parentheses: *** p<0.01, ** p<0.05, * p<0.1

- Main results continue to find support.

Conclusions

- We investigate whether TARP may have given its recipients competitive advantages.

  1. Overall, TARP recipients did get competitive advantages and increased both their market shares and market power relative to non-TARP recipients, consistent with the empirical dominance of H1a over H1b and H2a over H2b.

  2. The competitive advantages are due primarily or entirely to TARP recipients that repaid early, suggesting that these banks significantly reduced their cost disadvantages.

  3. Results may be driven primarily by the safety effect, which is partially offset by the cost disadvantage effect, at least for the banks that repaid early.

- Results suggest that TARP may have resulted in a possible distortion in competition, which might have misallocated resources, with potential implications for financial stability.