IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

The Cleansing Effect of Banking Crises

Reint Gropp (Halle Institut for Economic Research)
Jörg Rocholl (ESMT)
Vahid Saadi (IE Business School and Halle Institute for Economic Research)

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Motivation

- We know a lot about the short term real effects of financial crises
  - In the short run less investment, employment and growth (Ivashina and Scharfstein, 2010; Chodorow-Reich, 2014, among others)
- But: We know little about the long-term implications of financial crises
- Do financial crises have persistent or even permanent effects?
  - Wix (2017) shows that labor regulation may affect the recovery path after a financial crisis.
- This paper: Does long-term productivity depend on the government intervention in the crisis?
  - *Forbearance* versus *Restructuring* in the banking sector

This paper

- How do financial disruptions affect long-term productivity?
  - Recessions are times of low opportunity cost of time and resources and hence, are times of more productivity-enhancing reallocations (Foster, Grim, and Haltiwanger, 2016)
  - Recessions may slow down productivity growth by intensifying credit frictions. One important aspect of such credit frictions is the case of legacy assets in the banking sector (e.g. Caballero, Hoshi, and Kashyap, 2008).
- Does it matter how the authorities deal with the credit disruption?
  - Is there a trade-off between the short run and the long run effects of financial crises?

Cleansing effect

- Marginal banks (close to the minimum capital requirement) are hesitant to realize losses.
  - *Sunk costs* (Dewatripont and Maskin, 1995)
  - *Soft budget constraints* (Caballero et al., 2008)
    may encourage banks to maintain lending to inefficient borrowers
  - Hence, unproductive firms stay in the market
- This distorts competition:
  - Loans to such firms are a subsidy to an inefficient firm,
  - Efficient firms have a harder time entering the market or increasing market share.
  - May reduce productivity.
- A financial crisis, by forcing marginal banks out of business, may “clean” the economy of inefficient banks and firms.

Empirical challenge

- We test our hypotheses using data on the US metropolitan statistical areas (MSA)
  - Unit of observation: MSA
- Identify exogenous variation in the degree of forbearance in a local market
  - IV approach to instrument for estimated forbearance
- Measure ex-post productivity
  - Follow productivity literature: wage growth, patents, per capita growth, firm entry and exit…
- Regress regulatory foreclosure during 2007/2010 financial crisis on post crisis (2011/2015) outcomes.

Timeline

Crisis Period
2007-2010
Restructuring/
Foreclosure

Post crisis outcomes
2011-2015
Productivity, job creation,
Patents etc.

Cleansing effect: this paper

- Higher regulatory forbearance to close banks during the crisis is associated with **lower output losses during the crisis**
- But: Higher regulatory forbearance is associated **negatively with post-crisis output and productivity growth**
  - Tough policy during the crisis yields higher job creation rates, higher wages, higher patent growth, higher new entry of firms years later
- Suggests that a tough stance in a crisis may have long-term benefits.

Literature

- Short-term disruptions in:
  - lending (Ivashina and Scharfstein (2010), Puri, Rocholl and Steffen (2011))
  - investments (Campello, Garaham, and Harvey (2010))
  - consumption (Damar, Gropp and Mordel (2014))
  - employment (Chodorow-Reich (2014))
- Bank recapitalization
  - Homar and van Wijnbergen (2016): recapitalization eliminates the problem of zombie banks.
  - Acharya, Eisert, Eufinger, and Hirsch (2017): (exogenously) recapitalized banks continue lending to zombie firms.
  - Schivardi, Sette, and Tabellini (2017): undercapitalized Italian banks engaged in zombie lending, but the aggregate effects on productivity are small.

Data

- Census Bureau's Business Dynamics Statistics
  - Number of firms, establishments, entries and exits, job creation and destruction, … for all US MSAs
- Quarterly Census of Employment and Wages
  - average annual wage growth for all US MSAs
- U.S. Patent and Trademark Office
  - Number of patents granted for all US MSAs
- Bureau of Economic Analysis
  - GDP and GDP per capita growth for all US MSAs
- The universe of US FDIC-insured commercial banks from 2000-2015 from the SNL
- FDIC's list of failed banks
  - We construct average crisis-period *bank restructuring* and *regulatory forbearance* at the MSA level

Regulatory forbearance

- We follow Wheelock and Wilson (2000) and estimate the following bank failure model:

$$failed_{i,t} = \alpha_0 + \alpha_1\, equiry\, ratio_{it-1} + \alpha_2 loan\, ratio_{it-1} + \alpha_3 real\, estate_{it-1} + \alpha_4 C\&I_{it-1} + \alpha_5 other\, real\, estate_{it-1} + \alpha_6 NPA_{it-1} + \alpha_7 ROA_{it-1} + \alpha_8 liquidity_{it-1} + \alpha_9 efficiency_{it-1} + \alpha_{10} \log(assets)_{it-1} + \alpha_{11} \log(age)_{it-1} + \sum_{j=1}^{2} \alpha_{11+j} GDPG_{t-j}^{MSA_i} + \sum_{k=1}^{11} \alpha_{13+k}\, Industry_{ik} + \varepsilon_{i,t} \quad (3)$$

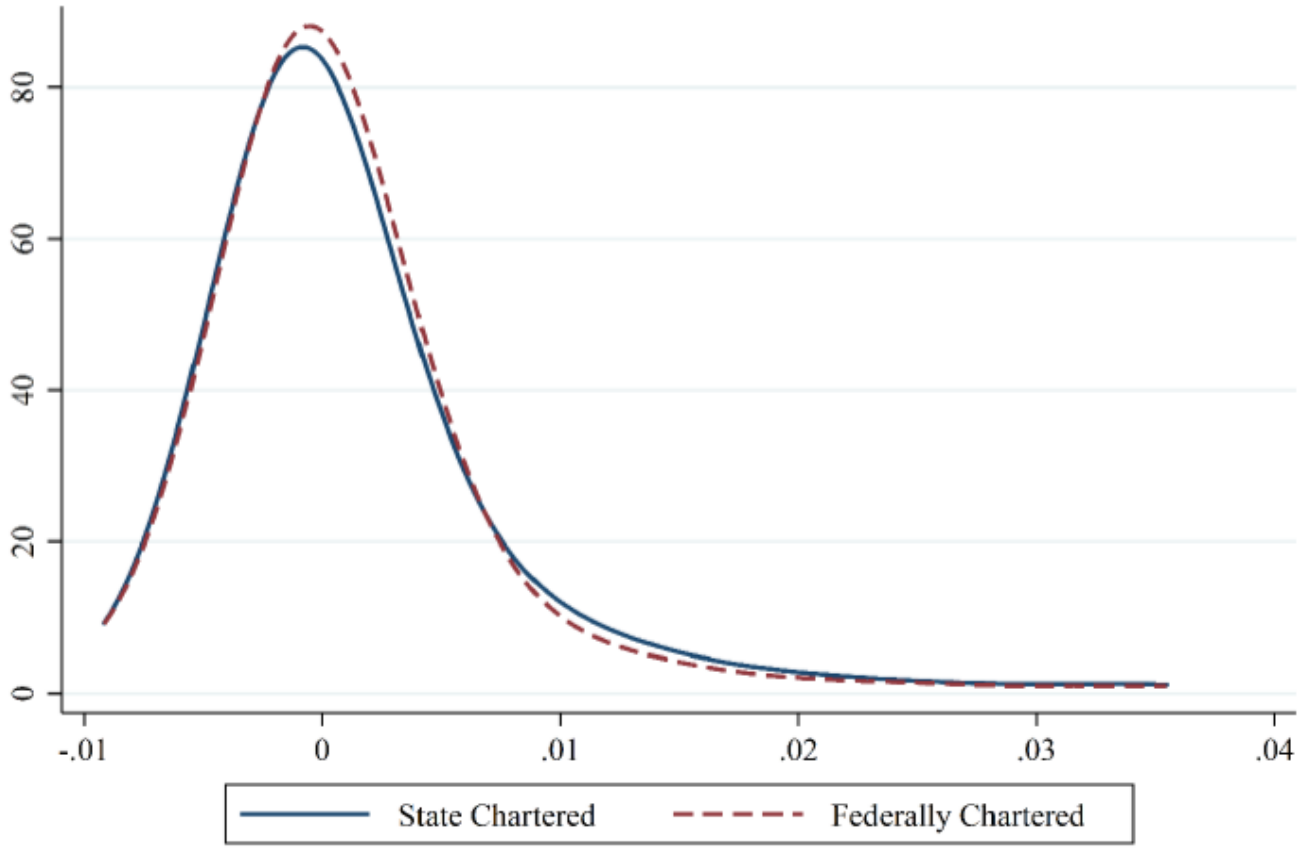
- *failed* bank = significant restructuring
- Our MSA level measure of forbearance is (bank size) weighted average of the residuals from the above equation, averaged over the time period from 2007 to 2010.

	Failure models	
	Linear	Logistic
Equity ratio	-0.0012***	-0.7547***
	(0.000)	(0.045)
Loan ratio	0.0002***	0.0084
	(0.000)	(0.011)
Real estate	-0.0002***	0.021
	(0.000)	(0.014)
C&I	-0.0002***	0.0283
	(0.000)	(0.017)
Other real estate	-0.0047***	-0.1594***
	(0.001)	(0.047)
NPA	0.0076***	0.1656***
	(0.000)	(0.021)
ROA	-0.0041***	-0.0860***
	(0.000)	(0.016)
Liquidity	0.0003***	-0.0443***
	(0.000)	(0.013)
Efficiency	0.0002***	0.0069***
	(0.000)	(0.001)
Ln(assets)	0.0016***	0.1158
	(0.000)	(0.075)
Ln(age)	-0.0006*	-0.0346
	(0.000)	(0.079)
L1.GDPG	0.0215*	-7.9892***
	(0.011)	(2.183)
GDPG	0.0709***	8.1592***
	(0.011)	(2.427)
Constant	-0.0216***	-3.7175*
	(0.007)	(2.013)
Industry shares	Yes	Yes
Adj. R-squared	0.119	
Pseudo R-squared		0.603
Observations	45674	45674

Regulatory forbearance

- Does the measure make sense in light of the literature?
  - State-chartered banks benefit more from regulatory forbearance than federally chartered banks. (Agarwal, Luca, Seru, and Trebbi (2014))
  - Higher competition in the local banking market reduces regulatory forbearance (Kang, Lowery, and Wardlaw (2014)).
  - Some states are persistently more forbearing than others.
  - Cross-guarantee provisions facilitate restructuring of subsidiaries relative to independent banks (Ashcraft, 2005).
- Is forbearance related to post-crisis bank health?

Regulatory forbearance: state- versus federally-chartered banks

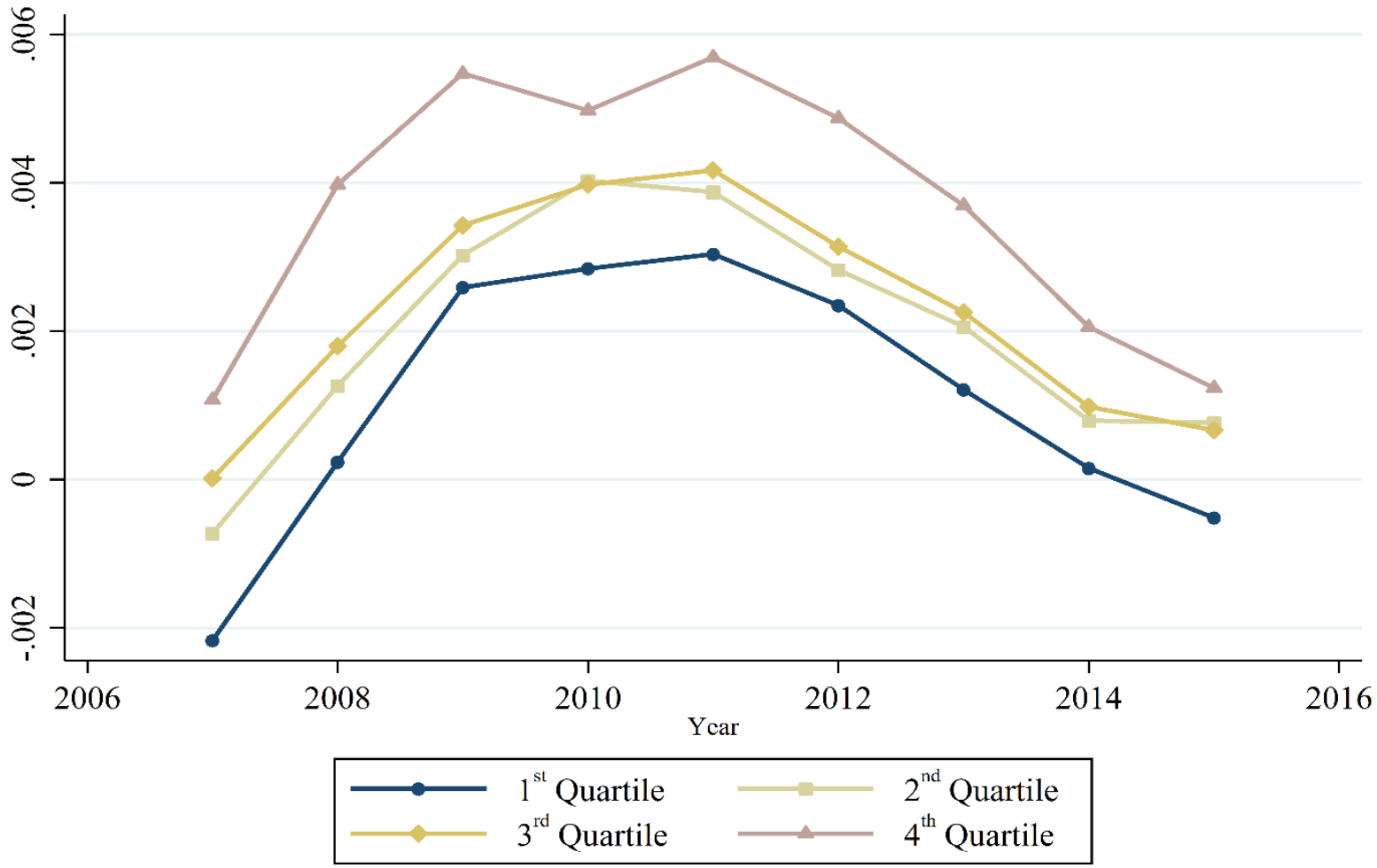


More forbearance

Regulatory forbearance: banking competition

	Forbearance	
	Linear	Logistic
Bank per tsd.	-0.0377***	-0.0120***
	(0.005)	(0.002)
Log(Assets)	0.000	-0.0001*
	(0.000)	(0.000)
Year Fixed Effects	Yes	Yes
Adj. R-squared	0.035	0.012
Obs.	43756	43756

Regulatory forbearance: state-level persistence



Is forbearance related to post-crisis bank health?

	Equity ratio	NPA	ROA
Highly Forbearing	-0.5032**	0.7511***	-0.0631
	(0.207)	(0.070)	(0.040)
ln(Assets)	-1.8815***	-0.0853***	0.0589***
	(0.117)	(0.017)	(0.015)
Year Fixed Effects	Yes	Yes	Yes
Adj. R-squared	0.057	0.045	0.015
Observations	13939	13950	13935

Identification: IV

- Bank closures and regulatory forbearance may be endogenous to expectations of future growth.
  - local supervisors may be laxer on distressed banks if growth expectations are already gloomy (Agarwal, Luca, Seru, and Trebbi, 2014)
- Therefore, we need an instrument that
  - correlates with regulatory forbearance,
  - but does not directly drive growth/productivity.
- Distance to Washington D.C.
  - affects banks' access to lawyers, lobbying firms, and politicians,
  - intensifies banker-supervisor personal ties,
  - matters for revolving door motives.
  - This affects banks' regulatory treatment in case of distress (Lambert, 2017, Dam and Koetter, 2012).
- Exclusion restriction: Distance to Washington D.C. is not a driver of productivity, except through regulatory forbearance.

Real outcomes during the crisis

- We run the following regression:

$$\bar{y}_i^{\{2007 \leq t \leq 2010\}} = \beta_0 + \beta_1 \bar{x}_i^{\{2007 \leq t \leq 2010\}} + \mathrm{B}\bar{X}_i + \epsilon_i$$

- y represents average MSA-level:
  - establishment and firm exit rate
  - job destruction rate
- x represents average MSA-level
  - bank restructuring or regulatory forbearance
- We instrument x with $log(distance + 1)$

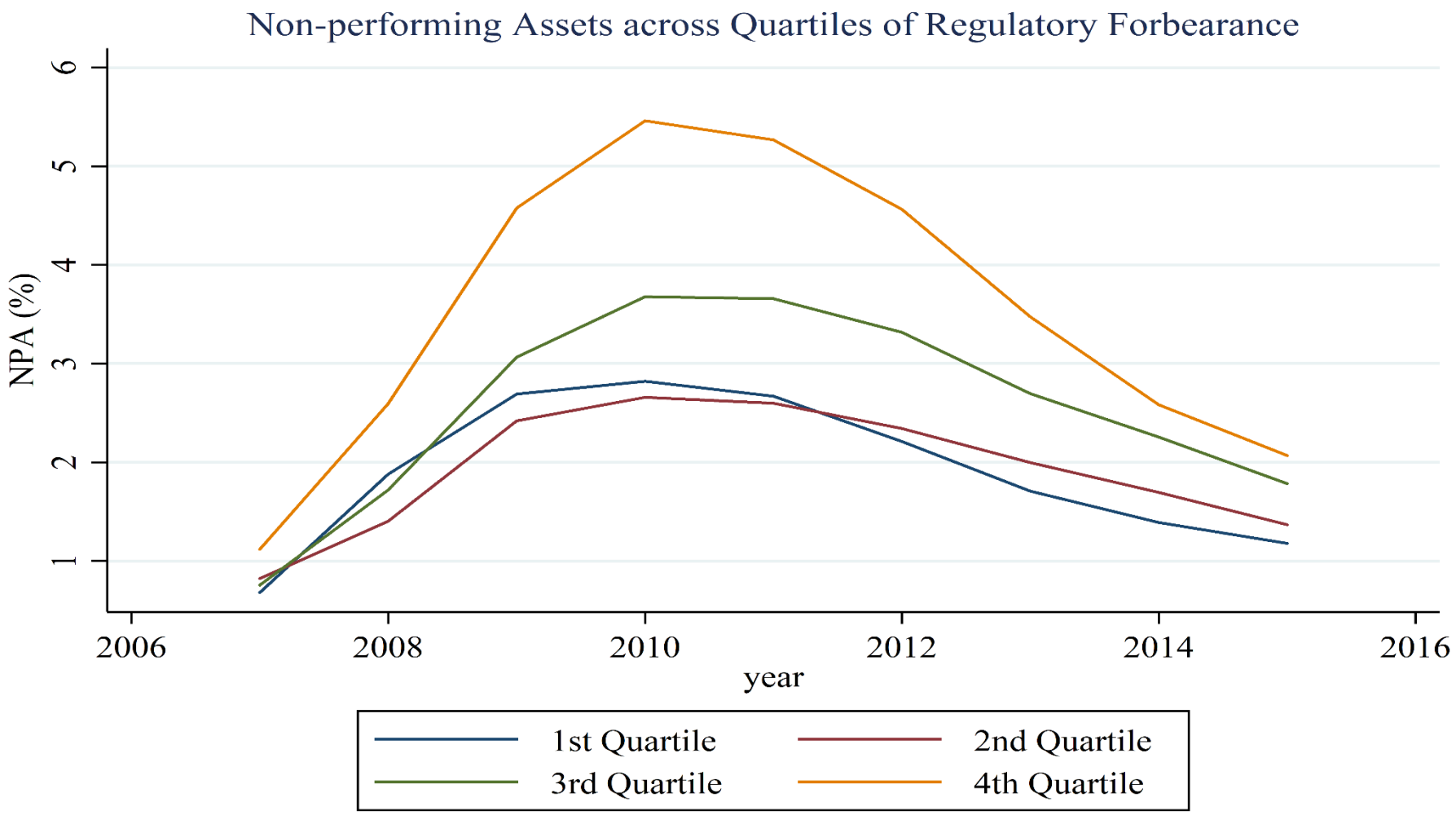
Results: first-stage IV

	Forbearance	Bank Restructuring
Log(Distance + 1)	-0.0078***	0.0569***
	(0.003)	(0.019)
House Price Growth during Crisis	0.0006	-0.007
	(0.001)	(0.004)
Pre-crisis Bank-to-GDP Ratio	0.0005	0.0055
	(0.002)	(0.012)
Pre-crisis GDP Growth	-0.0921	0.569
	(0.125)	(0.807)
Constant	0.0545***	-0.3694***
	(0.017)	(0.129)
Obs.	262	262
F-test of excluded instruments	8.98	8.62
Prob > F	0.003	0.004

Forbearance and real outcomes during the crisis

	Establishment Exit Rate	Firm Exit Rate	Job Destruction Rate	Job Destruction Rate by Deaths	Job Destruction Rate by Continuers
Forbearance	-0.3891***	-0.2881***	-0.4036**	-0.2001***	-0.2039**
	(0.144)	(0.112)	(0.162)	(0.077)	(0.095)
House Price Growth during Crisis	-0.0008***	-0.0007***	-0.0010***	-0.0004**	-0.0006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pre-crisis Bank-to-GDP Ratio	0.001	0.0011**	0.0007	0.0005	0.0003
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Pre-crisis GDP Growth	0.1842***	0.1862***	0.2404***	0.0844**	0.1574***
	(0.071)	(0.057)	(0.083)	(0.041)	(0.047)
Observations	262	262	262	262	262

Forbearance and NPA



Results: post-crisis outcome

- Forbearance reduces firm failures and restructuring in firms.
- To ascertain the long run real effects of this, we run the following regression:

$$\bar{y}_i^{\{t \geq 2011\}} = \gamma_0 + \gamma_1 \bar{x}_i^{\{2007 \leq t \leq 2010\}} + \Gamma \bar{X}_i + \varepsilon_i$$

- y represents average MSA-level:
  - establishment and firm entry rate, job creation rate, reallocation rate, employment growth, wage growth, patent growth, and gdp growth
- x represents average MSA-level
  - bank restructuring and regulatory forbearance
- We instrument x with $log(distance + 1)$

Forbearance and real outcomes after the crisis

	Establishment Entry Rate	Firm Entry Rate	Job Creation Rate	Job Creation Rate by Births	Job Creation Rate by Continuers	Reallocation Rate	Employment Growth	Wage Growth	Patent Growth	GDP Growth	GDP per capita Growth
Forbearance	-0.511**	-0.450**	-0.533**	-0.249**	-0.283**	-0.672*	-0.441**	-0.355**	-4.630**	-0.446**	-0.335**
	(0.216)	(0.195)	(0.242)	(0.108)	(0.143)	(0.357)	(0.190)	(0.144)	(2.296)	(0.193)	(0.158)
House Price Growth during Crisis	-0.001*	-0.001**	-0.001*	-0.000*	0.000	-0.001*	0.000	0.000	0.002	-0.001**	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)
Pre-crisis Bank-to-GDP Ratio	0.002***	0.002***	0.002***	0.001	0.002***	0.003**	0.001	0.000	0.012**	0.003***	0.001**
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.005)	(0.001)	(0.001)
Pre-crisis GDP Growth	0.249***	0.258***	0.249**	0.166***	0.083	0.312**	0.089	-0.019	-0.995	-0.168**	-0.262***
	(0.091)	(0.084)	(0.108)	(0.050)	(0.072)	(0.135)	(0.080)	(0.058)	(1.020)	(0.081)	(0.056)
Observations	243	243	243	243	243	243	243	243	242	243	243

Robustness

- Recapitalization (TARP)
- Mean reversion
- Use share of restructured bank assets instead of forbearance

TARP

- Recapitalization of distressed banks may allow distressed banks to realize losses and cut funding to their unprofitable borrowers (Giannetti and Simonov, 2014 and Homar and Van Wijnbergen, 2015)
- Are our results explained by differences in recapitalization of banks across MSAs?
- We checked whether
  - MSAs that received more TARP funds experienced more job closures during the crisis
  - MSAs that received more TARP funds experienced higher productivity growth after the crisis

Tarp: in-crisis effects

	Establishment Exit Rate (OLS)	Establishment Exit Rate (2SLS)	Job Destruction Rate (OLS)	Job Destruction Rate (2SLS)
TARP	-0.0002**	-0.0030***	-0.0004**	-0.0031**
	(0.000)	(0.001)	(0.000)	(0.001)
House Price Growth during Crisis	-0.0011***	-0.0012***	-0.0013***	-0.0015***
	(0.000)	(0.000)	(0.000)	(0.000)
Pre-crisis Bank-to-GDP Ratio	0.0007**	0.0021	0.0006	0.0019
	(0.000)	(0.002)	(0.000)	(0.002)
Pre-crisis GDP Growth	0.2531***	0.1234	0.3040***	0.1774*
	(0.055)	(0.079)	(0.066)	(0.099)
Adj. R-squared	0.4		0.353	
Observations	262	262	262	262

TARP: after crisis outcomes

	Establishment Entry Rate (OLS)	Establishment Entry Rate (2SLS)	Job Creation Rate (OLS)	Job Creation Rate (2SLS)	Employment Growth (OLS)	Employment Growth (2SLS)	Wage Growth (OLS)	Wage Growth (2SLS)
TARP	0.000	-0.0036**	-0.0004**	-0.0038**	-0.0003*	-0.0031**	-0.0001	-0.0025**
	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.001)	(0.000)	(0.001)
House Price Growth during Crisis	-0.0007***	-0.0009***	-0.0007***	-0.0009***	-0.0003**	-0.0005**	0.0002**	0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Pre-crisis Bank-to-GDP Ratio	0.0012***	0.0034*	0.0017***	0.0039**	0.0007	0.0025**	-0.0001	0.0014
	(0.000)	(0.002)	(0.000)	(0.002)	(0.001)	(0.001)	(0.000)	(0.001)
Pre-crisis GDP Growth	0.3423***	0.1757*	0.3310***	0.1724	0.1577***	0.0259	0.0421	-0.0701
	(0.058)	(0.100)	(0.064)	(0.117)	(0.051)	(0.095)	(0.031)	(0.072)
Adj. R-squared	0.31		0.262		0.076		0.014	
Observations	243	243	243	243	243	243	243	243

Conclusion

- Resolving banks' impaired assets can reduce the problem of zombie lending.
- Keeping distressed banks alive, despite being less destructive for the crisis period, does not seem to be beneficial for long-term productivity growth.
- The US financial crisis has not been productivity improving perhaps due to extensive government support of banks during the crisis.

Conclusion

- Should we consider **long-run implications** for productivity when **designing crisis intervention tools**?
  - Banking union
  - Deposit insurance
  - Regulation and supervision
- The political economy is negative: **short-run loss for a long-term gain**
  - Tie policy makers hands? Time inconsistency problem in financial crisis: in the short run it is always better to bail out.
- Gropp, Güttler and Saadi (2017) show that expectations of a bank bailout may reduce allocative efficiency outside of a crisis.
  - Inefficient firms are more likely to obtain credit when bail-out expectations of Banks are high.