The Cross-Market Spillover of Shocks through Multi-Market Banks

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Introduction

- The recent financial crisis has renewed concerns about the transmission of financial shocks through the financial system.
- This paper studies the implications of multimarket banking for the spillover of shocks across regional mortgage markets.
- We focus on the U.S. housing market collapse of 2007-2009.

Main Questions

- Do multimarket banks transmit economic shocks across markets?
  - The shock is an increase in mortgage default rates
- Is the sensitivity of a bank's local lending to outside economic shocks bigger in its more peripheral markets?
  - Peripheral markets are those in which a multimarket bank does a small share of its mortgage lending
- Are changes in a bank's local portfolio lending (kept on books) offset by changes in its local securitized lending?
  - Securitized lending should be less sensitive to bank capital

Transmission of Outside Shock

Multimarket banks may respond to an outside shock by:

- **Decreasing** local lending because the shock reduces bank's overall capital (supply shock)

  → Spillover effect

- **Increasing** local lending because shock reduces borrowers' creditworthiness/demand in outside market (demand shock)

  → Substitution effect

Main Findings

- **Spillover effect outweighs substitution effect**: multimarket banks reduce local portfolio lending in response to increased defaults in other markets.

- **Effect is bigger in a bank's more peripheral markets**: local portfolio lending falls by a greater percent in such markets.

- **Changes in securitized lending are partly offsetting**: total lending also falls, though by somewhat smaller percent than portfolio lending.

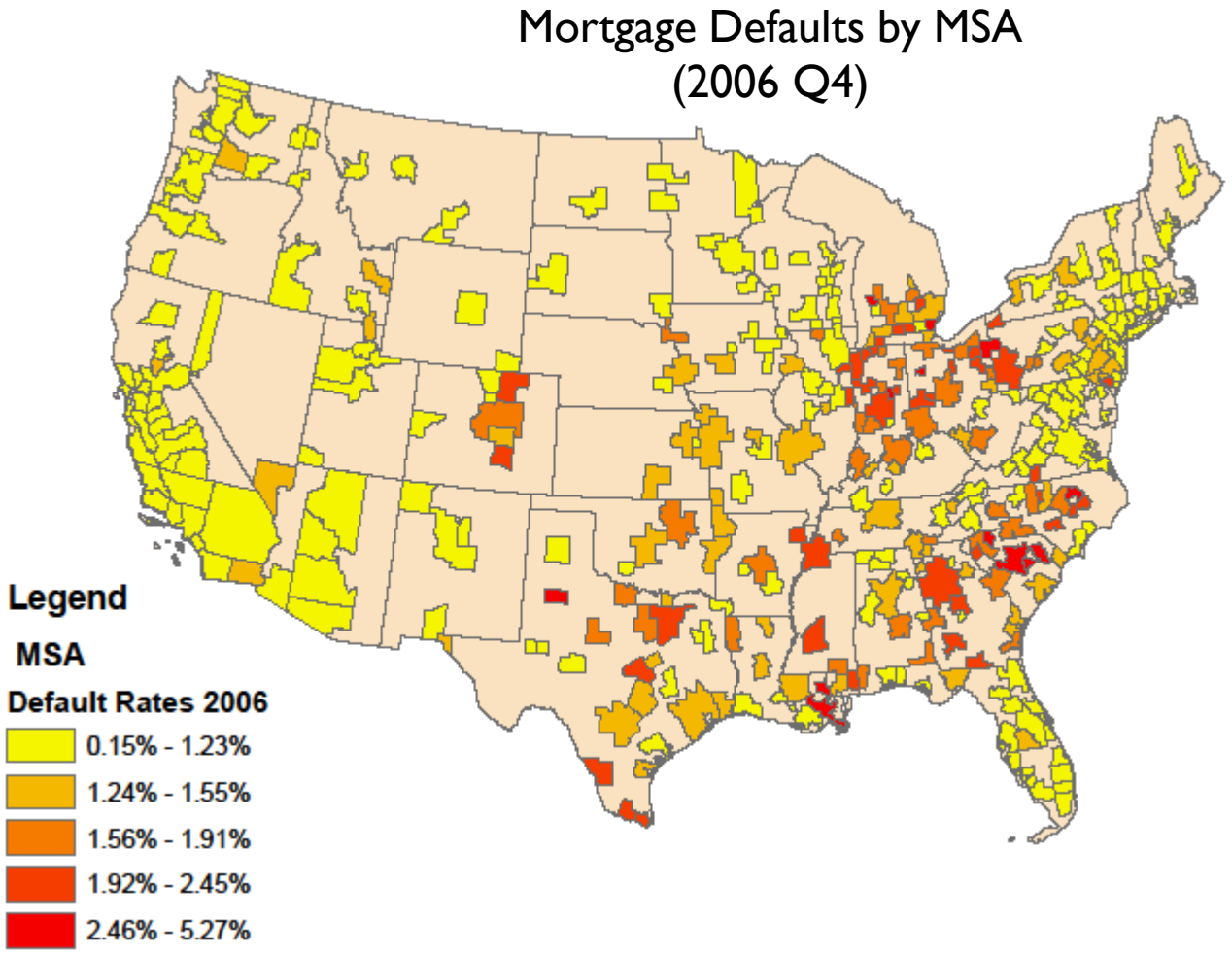
Related Literature

- Supply-side shocks
  - Bernanke and Lown (1991), Bernanke and Gertler (1995)
- Internal capital markets
  - Campello (2002), Ashcraft (2006), Huang (2008)
- Geographic diversification and local shocks
  - Morgan, Rime, and Strahan (2004), Becker (2007), Keeton (2009)
- International transmission of financial shocks
  - Peek and Rosengren (2000)
  - Khwaja and Mian (2008), Schnable (2010),Cetorelli and Goldberg (2008), Popov and Udell (2010)

Data

- Home Mortgage Disclosure Act (HMDA)
  - Loan-level data on mortgage originations in U.S. metro areas.
  - Loans kept on books (portfolio) versus loans sold to GSEs or non-affiliates in private sector (securitized).
- TrenData
  - Mortgage delinquency rates (past due 90+ days) by county.
- Call Reports (bank-level data)
  - Bank size (assets)
  - Ratio of tangible capital to equity (TCE).
  - Delinquency rate on loans other than residential real estate.
- Structure of data
  - 5,500 banks and thrifts (at the top-holder level).
  - 376 Metropolitan Statistical Areas (MSAs).
  - Four years (2006-2009)

Geography of Mortgage Defaults



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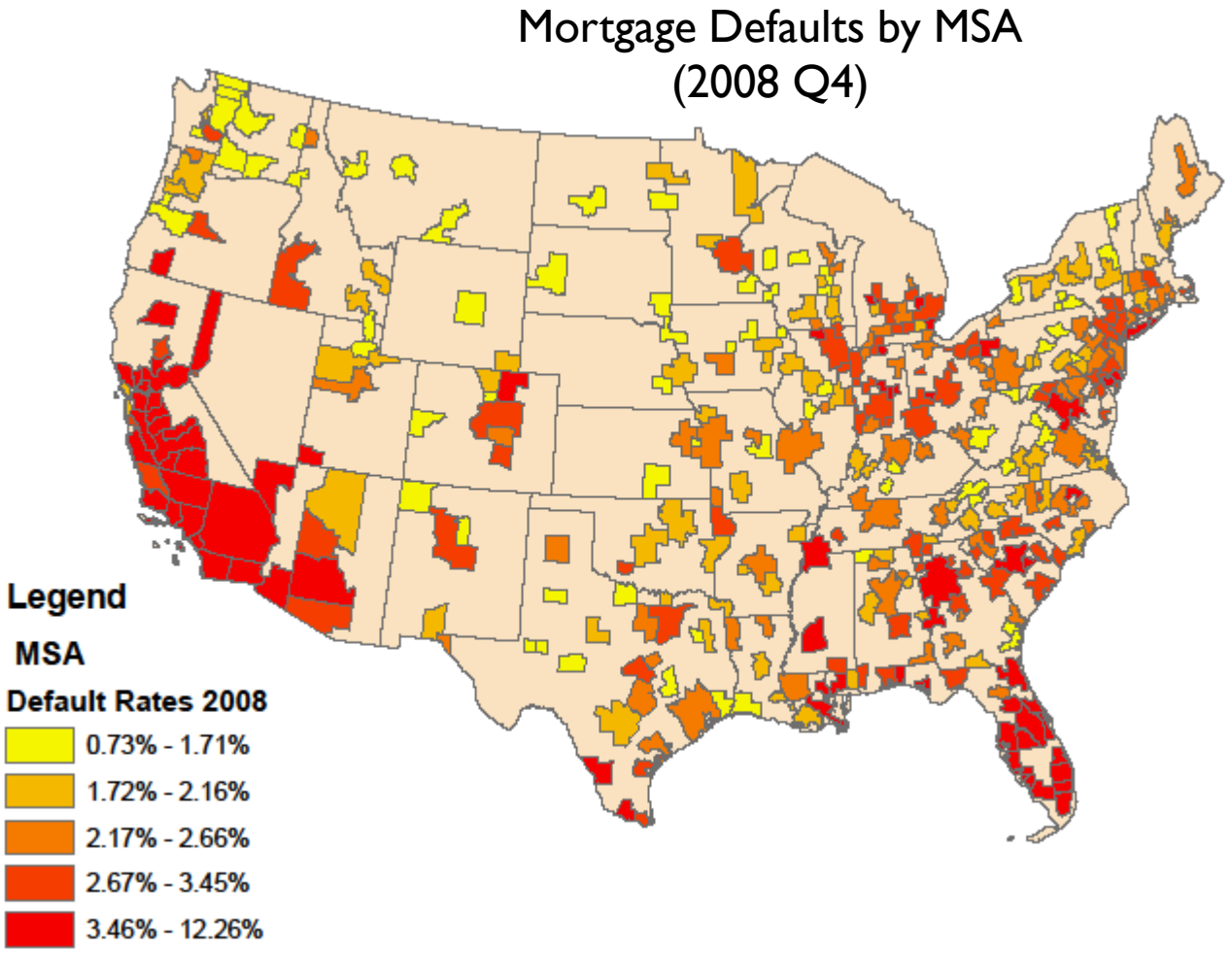

Sample Statistics on Mortgage Originations

Type of bank and type of lending	Pre-crisis originations (2006-2007), millions of dollars	Crisis originations (2008-2009), millions of dollars	Percent change
Single-market banks (1,273)	8,385.2	8,621.8	2.8
Portfolio	5,617.1	5,451.0	-3.0
Securitized	2,768.1	3,170.8	14.6
Multi-market banks (4,222)	951,285.5	407,140.7	-57.2
Portfolio	487,200.0	164,501.4	-66.3
Securitized	464,085.5	242,639.3	-47.7

Methodology

- **Divide the four years into two periods**: pre-crisis (2006-2007) and crisis (2008-2009).
- **Compute growth in originations from pre-crisis to crisis** for each bank/market observation, merger-adjusted.
- For independent variables, use value at end of pre-crisis period or change during pre-crisis period
- **Run cross-section regression** on market dummies, bank-level controls, and measures of the bank's exposure to other markets with increased delinquencies.

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Basic Regression Equation

Regression for growth of originations of bank *i* in metro area *m:*

$$(1)\quad LNGROWTH_{i,m} = a_m \cdot MARKET_{i,m} + b \cdot SIZE_i + c \cdot \Delta TCE_i + d \cdot \Delta NRNPL_i + e \cdot \Delta LOCALLOSS_{i,m} + f_k \cdot PERIPHERAL^k_{i,m} + g_k \cdot PERIPHERAL^k_{i,m} \cdot \Delta OTHERLOSS_{i,m} + \varepsilon_{i,m}$$

$LNGROWTH_{i,m}$:	growth of originations from pre-crisis to crisis
$MARKET_{i,m}$:	market dummy to control for local loan demand
$SIZE_i$, ΔTCE_i, $\Delta NRNPL_i$:	bank-level controls for pre-crisis period
$\Delta LOCALLOSS_{i,m}$:	control for within-market variation in delinquencies
$PERIPHERAL^k_{i,m}$:	dummy measuring how unimportant the market is in bank's total lending
$\Delta OTHERLOSS_{i,m}$:	average change in delinquency rate in bank's other markets in pre-crisis period

Interpretation of Coefficients

$$(1)\quad LNGROWTH_{i,m} = a_m \cdot MARKET_{i,m} + b \cdot SIZE_i + c \cdot \Delta TCE_i + d \cdot \Delta NRNPL_i + e \cdot \Delta LOCALLOSS_{i,m} + f_k \cdot PERIPHERAL^k_{i,m} + g_k \cdot PERIPHERAL^k_{i,m} \cdot \Delta OTHERLOSS_{i,m} + \varepsilon_{i,m}$$

- Spillover effect of outside shocks dominates substitution effect: $g_k < 0$
- Effect is bigger in the bank's more peripheral markets: $g_{k+1} < g_k$
- Securitized lending partially offsets result for g_k and g_{k+1}

Regression for Portfolio Lending

Dependent variable: Growth in originations from pre-crisis (2006-2007) to crisis (2008-2009)

	(1)	(2)
Multi Market (=1 if bank lends in other markets)	17.8***	
	[3.9]	
Multi market * ΔOther loss rate	-25.1***	
	[2.6]	
Core (=1 if market accounts for more than half of bank's total originations but not all)		-1.5
		[5.1]
Core * ΔOther loss rate		-17.1**
		[7.78]
Peripheral (=1 if market accounts for less than half of bank's total originations)		30.8***
		[4.1]
Peripheral * ΔOther loss rate		-39.8***
		[3.0]
Observations	14,491	14,491
Market Fixed Effects	yes	yes
Adjusted R Squared	0.20	0.21

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Observations	14,491	14,491
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Summary of Results for Portfolio Lending

- We find that growth in a multimarket bank's local portfolio lending falls in response to outside shocks.

- A 50 bp increase in other loss rate leads to a 13 percentage point fall in a multimarket bank's local lending growth.

- Effect is greater in peripheral markets than core markets:
  - A 50 bp increase in other loss rate leads to a 9 percentage point fall in lending growth in core markets but a **20 percentage point** fall in lending growth in peripheral markets.

- Results suggest that the **spillover effect of outside economic shocks dominates the substitution effect** (supply shocks play bigger role than demand shocks).

From Pre-crisis to Crisis: Securitized Loans

Dependent Variable: Growth in Originations

	(1)	(2)
Multi Market	0.711	
	[6.355]	
Multi market * Other loss rate	3.369	
	[2.794]	
Core		-9.416
		[8.864]
Core * Other loss rate		28.296**
		[13.483]
Peripheral		1.485
		[6.575]
Peripheral * Other loss rate		0.524
		[3.532]
Observations	7897	7897
Market Fixed Effects	Yes	Yes
Adjusted R Squared	0.11	0.11

From Pre-crisis to Crisis: Securitized Loans

Dependent Variable: Growth in Originations

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Multi Market	0.711	
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Market Fixed Effects	Yes	Yes
Adjusted R Squared	0.11	0.11

Results for Securitized Loans

- We find evidence of an off-setting effect through securitized loans.
  - Banks appear to reduce securitized lending less in response to outside shocks.
  - Banks may even increase securitized lending in the local market to compensate for the reduced ability to do portfolio lending in these markets.

Regression for Total Lending

Dependent Variable: Growth in originations from pre-crisis (2006-2007) to crisis (2008-2009)

	(1)	(2)
Multi Market	6.1*	
	[3.7]	
Multi market * ΔOther loss rate	-14.6***	
	[2.3]	
Core		-7.9*
		[4.7]
Core * ΔOther loss rate		-6.8
		[6.9]
Peripheral		14.8***
		[3.9]
Peripheral * ΔOther loss rate		-23.8***
		[2.8]
Observations	14,491	14,491
Market Fixed Effects	yes	yes
Adjusted R Squared	0.18	0.18

Regression for Total Lending

Dependent Variable: Growth in originations from pre-crisis (2006-2007) to crisis (2008-2009)

	(1)	(2)
Multi Market	6.1*	
	[3.7]	
Multi market * ΔOther loss rate	-14.6***	
	[2.3]	
Core		-7.9*
		[4.7]
Core * ΔOther loss rate		-6.8
		[6.9]
Peripheral		14.8***
		[3.9]
Peripheral * ΔOther loss rate		-23.8***
		[2.8]
Observations	14,491	14,491
Market Fixed Effects	yes	yes
Adjusted R Squared	0.18	0.18

Summary of Results for Total Lending

- A 50 bp-increase in the other loss rate leads to a 7 percentage point fall in total lending growth.

- As before, effect is greater effect in peripheral markets than core markets:
  - A 50 bp-increase in other loss rate leads to insignificant effect in core markets but a 12 percentage point reduction in lending growth in peripheral markets.

Planned Extensions

- Look at interaction with capitalization
  - E.g. Interaction of Other Loss Rate with (Residential Mortgage Portfolio/Capital)
- Evaluate measures based on distance
- Construct measures of local branch presence and investigate influence on bank response.

Conclusions

- We find evidence for **cross-market transmission** of economic shocks through multimarket banks.
- Multimarket banks reduce local mortgage lending in response to increased delinquencies in other markets, consistent with **spillover effect**.
- As expected, effects on local lending are bigger in multimarket banks' **peripheral markets**.
- **Securitized lending** partially offsets the decline in local portfolio lending due to outside shocks.
- **Policy implication**: Regulators of SIFIs may want to consider the transmission of shocks through multimarket banking.