Securitization, the Bank Lending Channel and Asymmetric Monetary Transmission

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3 October 2013
Seðlabanki Íslands

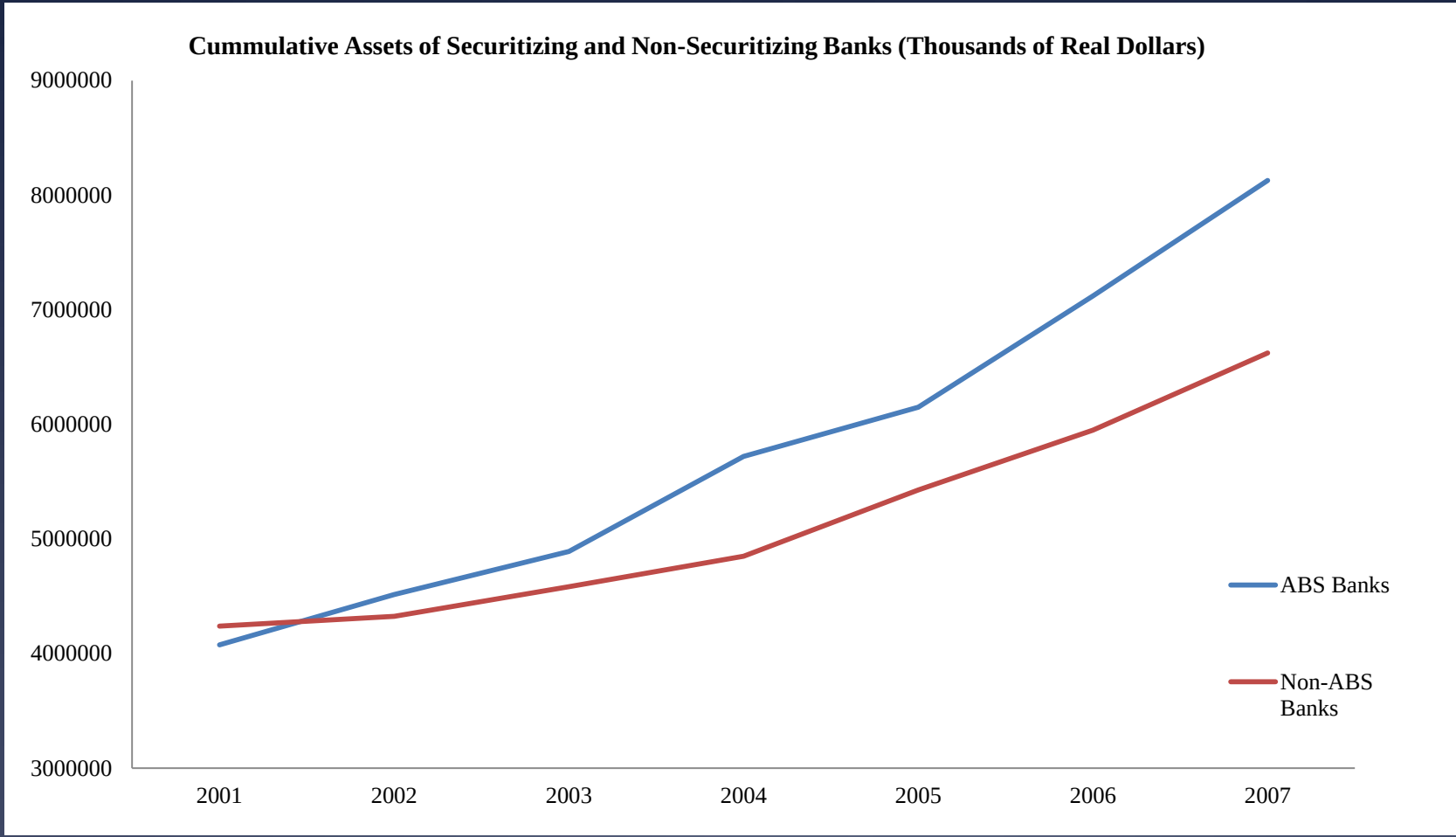
Securitization in the U.S. Financial System

- Government sponsorship of Fannie Mae (1938) and Freddie Mac (1970).
  - Designed to promote home ownership by reducing the cost of borrowing to individuals.
  - Increased liquidity of mortgages through securitization. Pooled mortgages originated by banks.
- Collateralized-debt obligations (CBOs) developed in the late 1990s to combine collateralized mortgages, other loans and bonds.
  - Led to significant growth in asset-backed securities.

Securitization in the U.S. Financial System

- Low U.S. interest rates through the late 1990s and early 2000s.
  - Fueled demand for housing and mortgages.
- Growth of new lending products and new lenders.
  - Private firms began securitizing mortgages, much as Freddie Mac and Fannie Mae had.
  - The combination of increased liquidity in the mortgage market, and lower interest rate costs led to significant growth in asset-backed securities owned by banks and other financial institutions.

Securitization in the U.S. Financial System



Bank Lending Channel

- Monetary policy shocks affect the supply of credit from banks.
  - Contractionary monetary policy shock reduces bank reserves.
  - Bank reserves decline leads to a reduction in bank deposits (money multiplier).
  - Banks seek to replace these liabilities. They could
    - attract depositors with higher interest rates, or
    - issue commercial paper.
  - Some banks cannot easily raise liabilities this way.
    - Instead, they overcome the reduction in relatively liquid liabilities through more careful screening and credit rationing, contracting loan supply.

Bank Lending Channel

- Monetary policy shocks affect the supply of credit from banks.
  - Alternatively, banks could sell off bonds to replace lost reserves, but this affects the liquidity and risk composition of assets.

Evidence on Bank Lending Channel

- Bank lending channel occurs in aggregate, but the effects are small in magnitude.
  - Bernanke and Blinder (1992), Ramey (1993), Kashyap, Stein and Wilcox (1993), Kashyap and Stein (1994), Bernanke and Gertler (1995).
- Bank lending channel is asymmetric: banks reduce loan supply more in response to contractionary monetary policy shocks.
  - Cover (1992), Kishan and Opiela (2006), Bhaumik, Dang and Kutan (2011)

Evidence on Bank Lending Channel

- Bank lending channel affects small banks more than large banks.
  - U.S. banking system has many small- and medium-sized banks when compared with other advanced economies.
  - Small banks are less able to insulate their balance sheets from shocks, and reduce lending more than large banks.
    - Less able to raise high-interest deposits and rely on commercial paper market.
    - Gertler and Gilchrist (1992), Oliner and Rudebush (1992), Kashyap, Lamont, and Stein (1992), Kashyap and Stein (2000)

Evidence on Bank Lending Channel

- Bank capitalization affects transmission through the bank lending channel
  - Banks that are less well-capitalized tend to contract their loan supplies more in response to a contractionary policy shock.
    - Kishan and Opiela (2000), Altumbas, Fazylov, and Molyneux (2002), Opiela (2008)
- Bank balance sheet liquidity
  - Banks with lower liquidity tend to experience a stronger bank lending channel.
    - Matosek and Sarantis (2009)

Bank Lending Channel and Securitization

- Securitization should weaken the bank lending channel
  - Securitization allows banks to hold a more liquid asset (in lieu of mortgages).
  - This should allow banks to shield their loan portfolios more effectively against contractionary policy shocks.

Bank Lending Channel and Securitization

- Empirical Evidence
  - Aggregate data - Estrella (2002)
    - Securitization has decreased the response of U.S. output to changes in the federal funds rate.
  - Bank-level data
    - Altumbas, Gambacorta and Marques-Ibanez (2009) found European banks that securitized were less responsive to monetary policy.
    - Aysun and Hepp (2011) found securitization leads to a larger balance sheet channel using U.S. call report data.

Hypotheses

- Capitalization
  - (1) Among low-capital banks, contractionary policy should be more effective in reducing loan growth than expansionary policy is in increasing loan growth.
  - (2) Among high-capital banks, expansionary policy should be more effective in increasing loan growth than contractionary policy is in reducing loan growth.
- Securitization
  - (3) After CBOs were developed in 1996, expansionary and contractionary policy should be less effective in influencing loan growth.
  - (4) Banks that securitize their assets should be less responsive to both expansionary and contractionary monetary policy.

Data

- Panel data set of U.S. banks, 1980Q1-2010Q4
- Report of Conditions and Income ("call reports")
  - Balance sheet data on individual banks in the U.S.
  - Detailed data on securitization was not collected until 2000. Prior to this date, loan type is reported, but not whether or not it is part of a CBO.
- All data are inflation-adjusted using the Consumer Price Index.

Data

- Banks divided based on size and capitalization.
  - Size
    - Large (Assets > $1 billion)
    - Medium ($1 billion > Assets > $100 million)
    - Small (Assets < $100 million)
  - Capitalization
    - Constrained banks (capital-asset ratio < 8%)
    - Unconstrained banks (capital-asset ratio > 8%)

Data

	Large Banks	Medium Banks	Small Banks
Capital Ratio<8%			
Total Loans/Assets	58.69%	58.70%	56.61%
Real Estate Loans/Assets	28.47%	28.47%	28.60%
Consumer Loans/Assets	11.24%	11.28%	9.72%
Large Time Deposits/Assets	11.55%	11.54%	11.10%
Capital Ratio>8%			
Total Loans/Assets	55.51%	53.16%	56.62%
Real Estate Loans/Assets	28.67%	28.66%	28.61%
Consumer Loans/Assets	8.91%	8.94%	9.72%
Large Time Deposits/Assets	10.86%	10.85%	11.17%

Empirical Methodology

- Dependent variable: Total loan growth
- Explanatory variables:
  - Federal funds rate (including four lags)
  - Dummy interaction terms with the federal funds rate
    - Contractionary monetary policy (asymmetry in loan growth response)
    - Securitization 1996Q1-2010Q4 and 2001Q1-2010Q4 (presence and prevalence of securitization)
  - Real GDP growth (including four lags)
  - Other dummy variables and time trend
    - Seasonality, Basel I (1990Q3), call report definitions (1984)

Empirical Methodology

- Loan growth may be affected banks shifting time deposits and securities, independent of monetary policy.
- Two-stage regression procedure
  - Identify unexpected changes in large time deposits and securities.
    - First stage regression: Growth in large time deposits and securities regressed on all other explanatory variable.
    - Residuals used as explanatory variables in the loan growth regressions.

Results (1996Q1 Structural Break)

- Sums of coefficients associated with federal funds rate changes.
- Expansionary = negative changes in funds rate

Policy Stance/Bank Size	Pre-1996 Low Capital Banks	Pre-1996 High Capital Banks	Post-1996 Low Capital Banks	Post-1996 High Capital Banks
Large Banks (Expansionary)	-2.96***	-2.46***	7.48**	1.81
Large Banks (Contractionary)	-3.54*	8.527*	-.533***	-6.51*
Medium Banks (Expansionary)	-.812***	3.46***	-.689**	-6.61**
Medium Banks (Contractionary)	-3.47**	4.20***	-.739***	13.04**
Small Banks (Expansionary)	-.776***	3.05***	1.077	-1.25*
Small Banks (Contractionary)	-3.21**	2.258**	-2.53*	-1.25
Significant at 10%*, 5%**, 1%***				

Results (1996 Structural Break)

- Consistent with earlier findings, strength of bank lending channel varies with bank size and capitalization.
  - Unexpected positive signs for high capital banks consistent with Kashyap and Stein (2000) and Kishan and Opiela (2000, 2006). Possible borrowers switch from constrained to unconstrained banks.
- Asymmetric policy effects – Hypotheses (1)-(2)
  - (1) Contractionary policy coefficients larger than expansionary ones. Larger differences among medium and small banks.
  - (2) Expansionary policy has a larger positive effect on loan growth at only large high-capital banks.
- Securitization – Hypothesis (3)
  - Bank lending channel weaker post 1996 for low capital banks, but not for high capital banks.

Results (2001 Structural Break)

- Sums of coefficients associated with federal funds rate changes.
- Expansionary = negative changes in funds rate

Policy Stance/Bank Size	Pre-2001 Low Capital Banks	Pre-2001 High Capital Banks	Post-2001 Low Capital Banks	Post-2001 High Capital Banks
Large Banks (Expansionary)	-.174***	-1.59***	-3.36**	1.87*
Large Banks (Contractionary)	-.427***	5.89***	-1.11*	.923
Medium Banks (Expansionary)	-.841**	.791**	9.09**	.851
Medium Banks (Contractionary)	1.69	2.94**	-5.55**	-5.82*
Small Banks (Expansionary)	.464***	-1.18***	3.81*	1.36
Small Banks (Contractionary)	9.61*	4.52**	-1.03	0.822
Significant at 10%*, 5%**, 1%***				

Results (2001 Structural Break)

- Asymmetric policy effects – Hypotheses (1)-(2)
  - Pre-2001: mixed evidence in favor
    - (1) Contractionary policy coefficients larger than expansionary ones, but only for large banks. Contractionary coefficients for small and medium-sized banks are larger in magnitude, but not statistically significant.
    - (2) Expansionary policy has a larger positive effect on loan growth at large and small high-capital banks.
  - 2001-2010: evidence against
    - (1) Contractionary policy coefficients generally smaller than expansionary ones.
    - (2) Little statistical significance in coefficients.
- Securitization – Hypothesis (3)
  - Bank lending channel appears to be stronger after 2001.

Empirical Methodology: 2001Q1-2010Q4

- To test hypothesis (4), identify banks which securitize.
  - Same dependent and explanatory variables, with the addition of a securitization variable.
    - Total value of securitized assets, including
      - Home equity lines
      - Credit card receivables
      - Auto loans
      - C&I loans
      - Other consumer loans
    - Dummy variable = 1 (ABS Banks); = 0 (non-ABS banks).
  - Banks categorized as small and large only
    - Increased bank consolidation has significantly reduced the number of medium-sized banks in the 2001-2010 sample.

Results: 2001Q1-2010Q4

Policy Stance/ Bank Size	Low-Capital Non-ABS Banks	Low-Capital ABS Banks	High-Capital Non-ABS Banks	High-Capital ABS Banks
Large Banks (Expansionary)	-2.44**	4.836**	-6.03***	-4.834***
Large Banks (Contractionary	-4.55***	2.97***	-3.40***	-3.029***
Small Banks (Expansionary)	5.37***	5.134***	-4.357***	5.023***
Small Banks (Contractionary)	-3.57**	-3.146***	-2.99***	-3.102***
Significant at 10%*, 5%**, 1%***				

Results (2001Q1-2010Q4)

- Asymmetric effects still present.
- Securitization
  - Large banks holding asset-backed securities are less responsive to monetary policy shocks.
  - Small ABS banks with high capital were less responsive to expansionary policy compared with non-ABS banks.
  - No statistically significant difference between low-capital ABS versus non-ABS small banks.

Degree of securitization

- Securitized assets/Total assets interacted with monetary policy variables.
- Sum of interaction term coefficients (including degree of securitization) reported below.
- Statistically significant for large banks only.

Bank/Policy	Low-Capital Banks	High-Capital Banks
Large Banks (Expansionary)	-1.300**	.9021
Large Banks (Contractionary)	-2.009*	-.6025*
Small Banks (Expansionary)	-.4938	-.6346
Small Banks (Contractionary)	.9286	.9021
Significant at 10%*, 5%**, 1%***		

Conclusion

- Bank lending channel is asymmetric and varies with bank size and capitalization.
- After CBOs were introduced in 1996, low-capital banks are less responsive to monetary policy shocks (weaker bank lending channel).
- Effects of securitization on bank lending channel depends on composition of banking sector.
  - Banking system populated with large well-capitalized banks which securitize is less responsive to monetary policy shocks.

Banking sector composition

* Large banks are more likely to securitize and account for the overwhelming majority of total bank assets.

	Number of banks		Banks that securitize			Banks that do not securitize	
Year	Total	Sample	Number	Size ($millions)	Average sec. assets/total assets	Number	Size ($millions)
2001	9,302	6,790	242	$13,837	0.45	6,548	$537
2002	8,998	6,620	174	$26,943	0.41	6,446	$483
2003	8,822	6,595	179	$29,184	0.29	6,416	$517
2004	8,665	6,514	140	$40,981	0.33	6,374	$574
2005	8,543	6,463	142	$45,810	0.29	6,321	$656
2006	8,498	6,412	142	$48,615	0.26	6,270	$740
2007	8,352	6,351	159	$49,373	0.22	6,192	$833
2008	8,119	6,221	161	$55,289	0.18	6,060	$924
2009	8,061	6,183	165	$40,492	0.12	6,018	$690

Banking sector composition

- In aggregate, bank lending channel effects are small.
- Likely to be smaller with securitization, but asymmetric effects persist with large low capital banks.
- Aysun and Hepp (2013) demonstrated that while bank lending channel is weak in aggregate, the broad credit channel has measurable aggregate effects.