Securitisation, Bank Capital and Financial Regulation: Evidence from European Banks

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Introduction

- How do banks manage their **capital position** and their balance sheet **when securitising**?
  - To what extent the **definition of capital ratios** matters?
  - Is the **funding liquidity position** of originator banks relevant?
  - How much the effects **differ across products** subject to distinct regulatory regimes?
- Focus of this paper: Securitisation Issuances Sponsored by European Banks from 1999 to 2010
- Interesting stylised fact: the change - at the time of the crisis - in the "purpose" of securitisation
  1. from a credit risk transfer technique
  2. to an operation to create eligible collateral assets

Outline

- Introduction
- Some Stylised Facts on Securitisation in Europe
- The Regulatory Framework in Europe
- Conceptual Framework
- Data and Empirical Setting
- Empirical Analysis
  - Securitisation and Bank Capital Ratios
  - Heterogeneity across Products and Regulation
- Conclusions

Stylised Facts

Securitisation Issuances in Europe

Volumes of Issuances

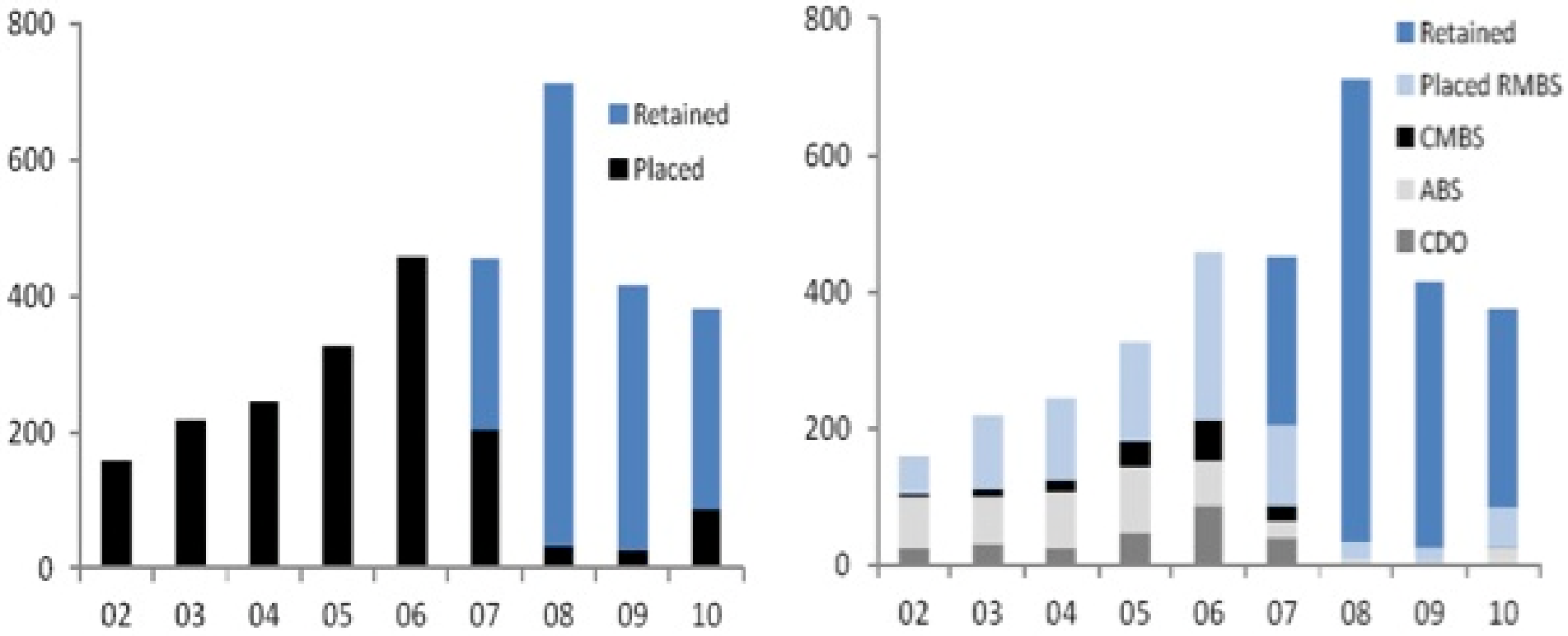


Figure 1: European Securitisation Issuances 2002 – 2010 in € bn. Source: AFME (2011)

Stylised Facts

ABS Retention for Euro Area Banks

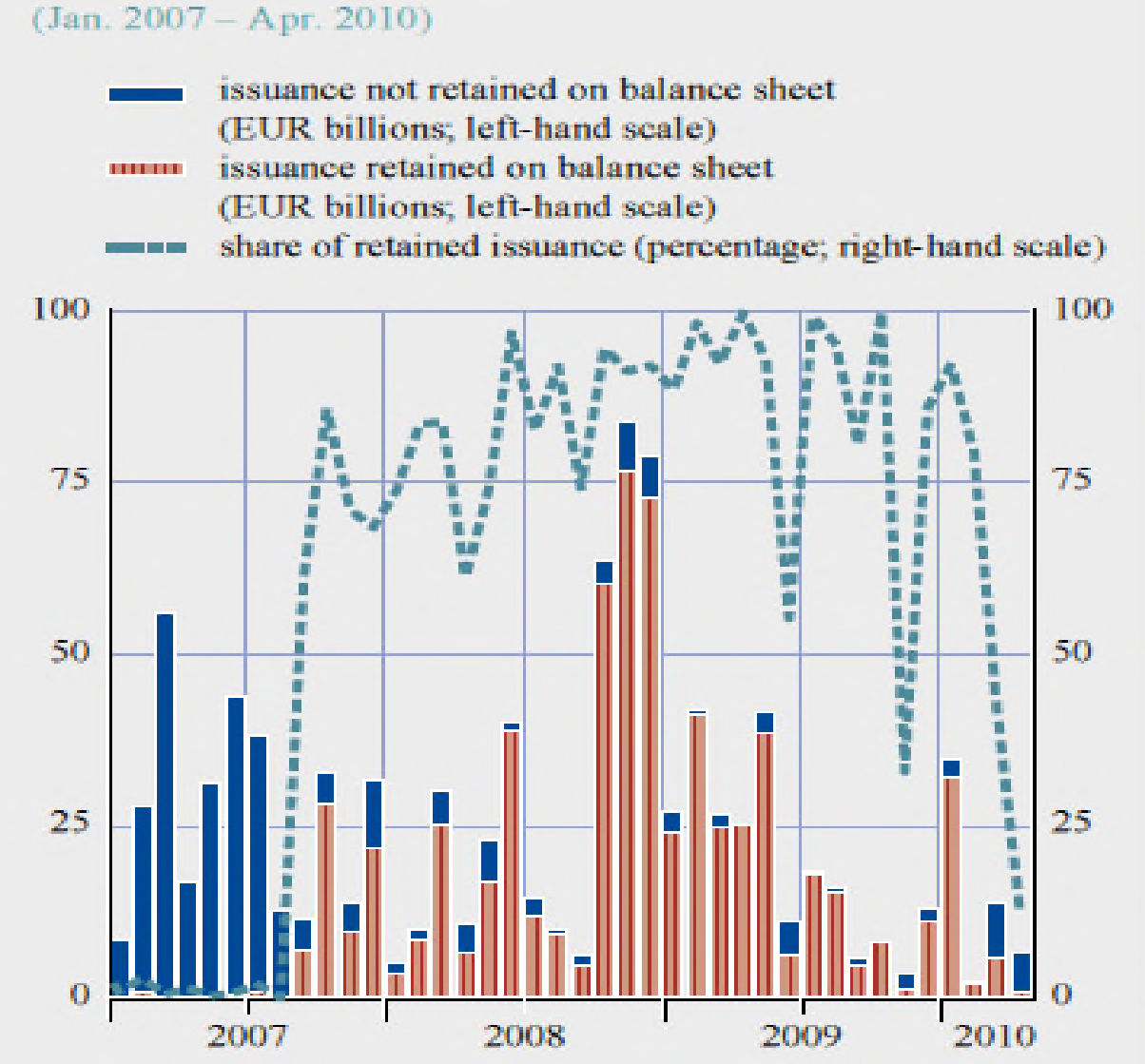


Figure 2: Asset-Backed Security Issuance by Euro Area Banks. Source: ECB(2010)

Stylised Facts

Use of Collateral for ECB Market Operations

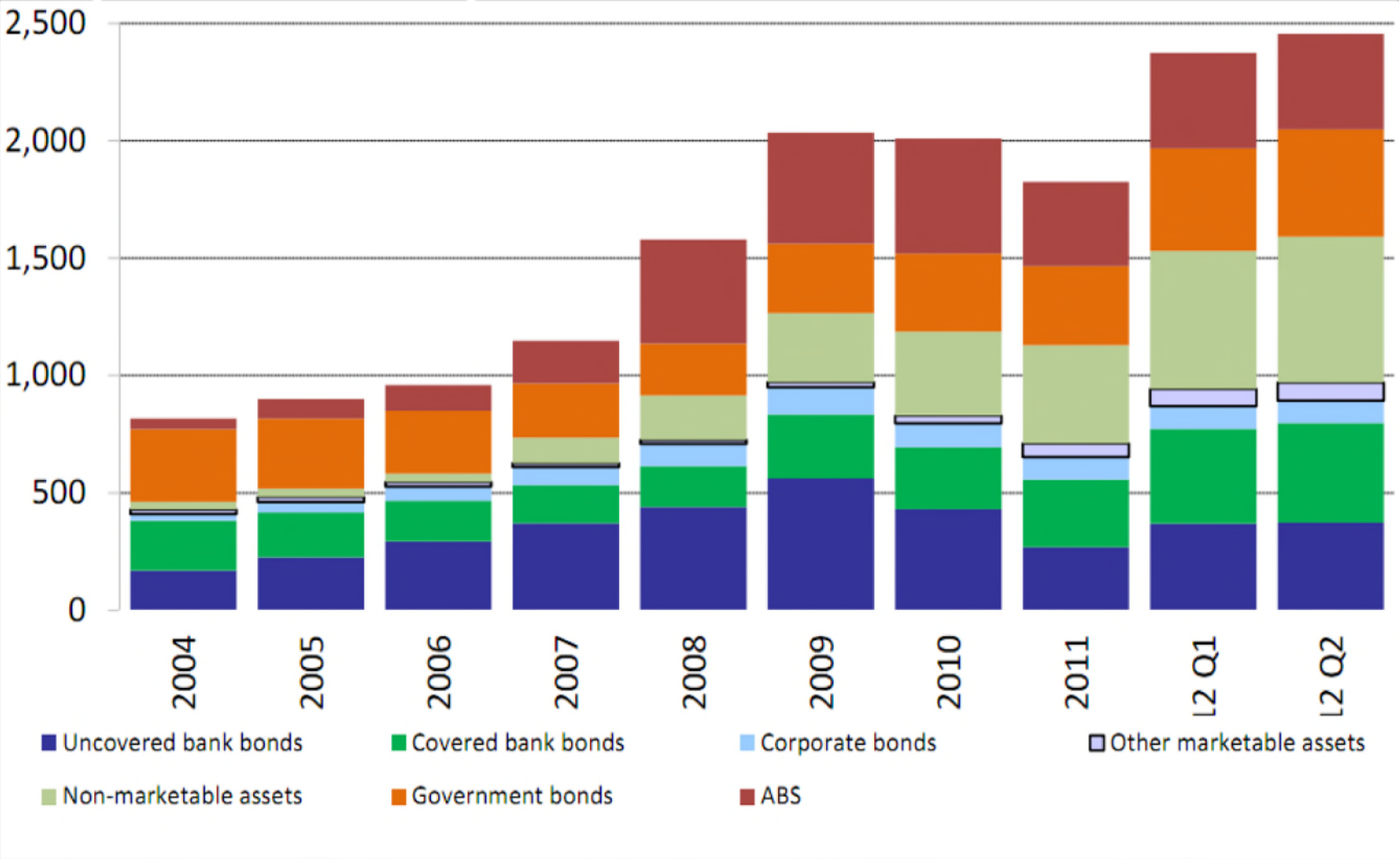


Figure 3: Use of Collateral by Asset Type 2004 – 2012 € bn. Source: Coeuré B. (2012)

Stylised Facts

Use of ABS as Collateral in the Eurosystem

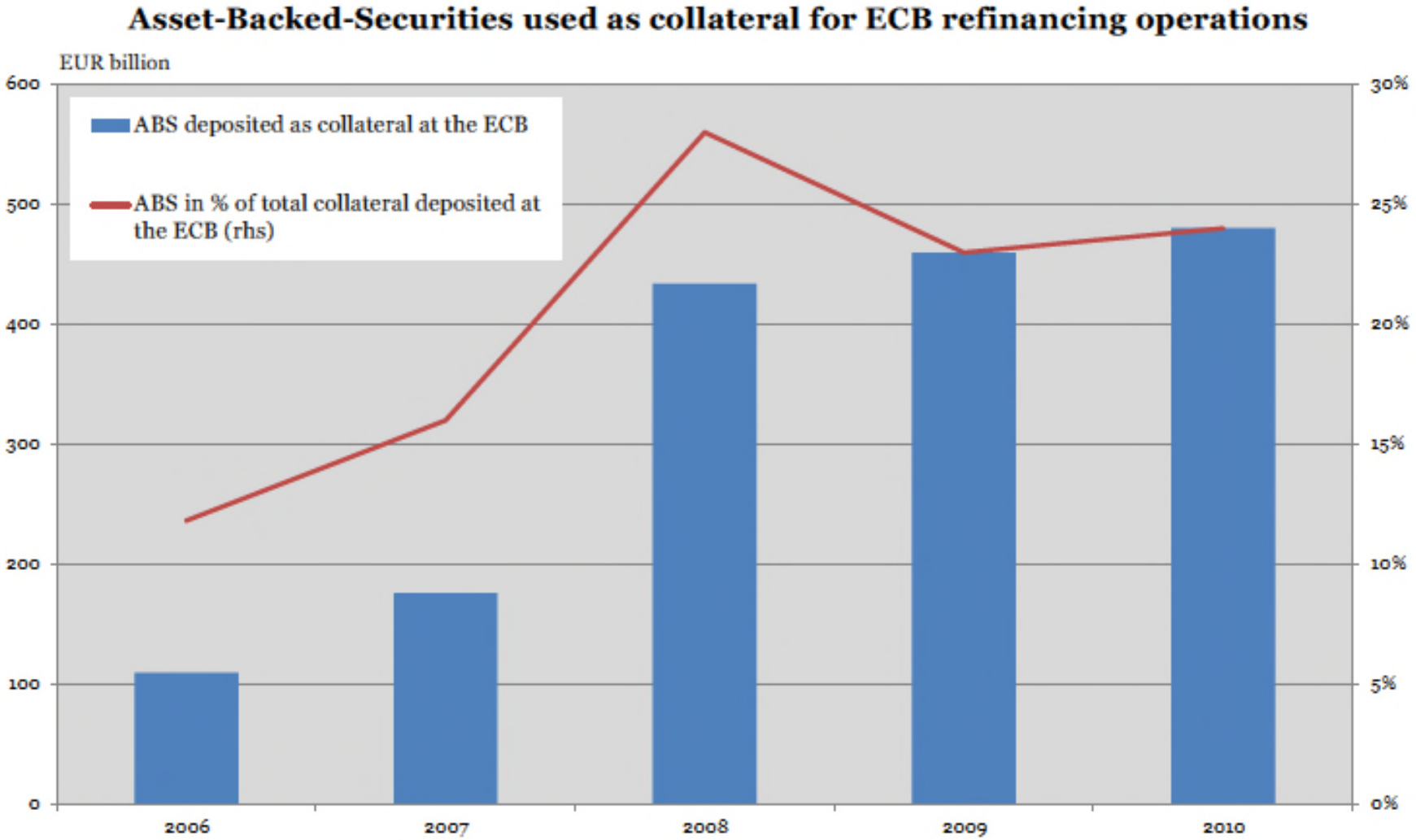


Figure 4: Use of ABS as Collateral for ECB Refinancing Operations. Source: Bouveret A. (2011)

The Regulatory Framework in Europe

- **Collateral Framework (Eurosystem)**
  - ABSs accepted as eligible collateral for market operations:
    - If rated at least as A (but preferably as AAA due to haircuts)
    - If denominated in Euro
    - If issued in the European Economic Area by an EEA issuer

- **Prudential Requirements (Securitisation Framework)**
  - **Basel I:** No differences in risk weights across securitisation products
  - **Basel II:** Risk weights for on-balance securitisation positions mainly determined on the basis of the rating-based approach.

Empirical Analysis

- **Questions:** How do originator banks change their capital position when securitising?

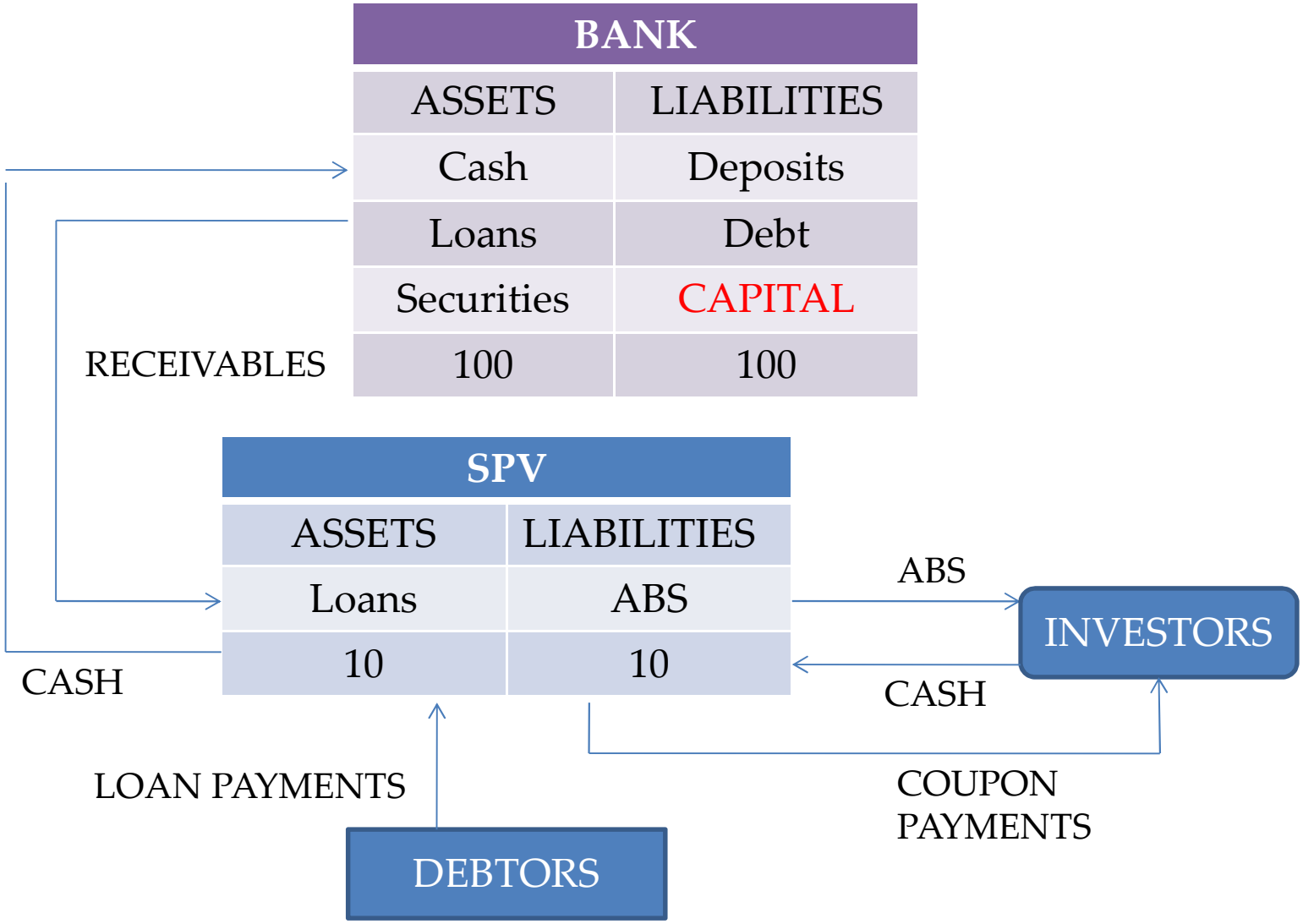
1. For different measures of **solvency ratios** (risk-weighted/leverage)?
2. Differences across **time periods** (before/after the crisis)?
3. Heterogeneities **across banks** in terms of **funding liquidity**?
4. Differences **across products**, subject to distinct regulatory regimes (collateral/prudential)?

Related Literature

Securitisation, Credit Risk Transfer and Retention

- ***Explicit Support***: credit or liquidity enhancement on contractual basis
  - **Skin in the game mechanism** (Gorton and Pennacchi, 1995; Albertazzi, Eramo, Gambacorta and Salleo, 2011; Demiroglu and James, 2012)
  - **Assignment of high credit rating** (Erel, Nadaul and Stulz, 2011; Adelino, 2009)
  - **Securitisation as a funding device** (Uhde and Michalak, 2010; Michalak and Uhde, 2012)
  - **Regulatory arbitrage** (Acharya, Schnabl and Suarez, 2013; Demyanyk and Loutskina, 2013)
- ***Implicit Recourse***: post-sale support without previous contractual commitment
  - **Reputational reasons** (Higgins and Mason, 2004)

Conceptual Framework
A Stylised Representation of Securitisation



Conceptual Framework
Securitisation, Credit Risk and Bank Capital Ratios

➢ **Intuition:**

- Securitisation may have different effects on capital position depending on whether banks transfer or retain credit risk

➢ **Focus on the risk-based capital ratio:**

When securitising, the originator bank can decide to:

- Transfer completely the credit risk

  CAP_RATIO ⇧

- Retain part of the credit risk
  - by providing ***explicit support*** (ex ante tranche retention)
    - *If* $RWA_{SECURITISATION} = RWA_{ASSETS}$

      CAP_RATIO =
    - *If* $RWA_{SECURITISATION} < RWA_{ASSETS}$

      CAP_RATIO ⇧
  - by providing ***implicit recourse*** (post-sale support)
    - *CAP_RATIO* ⇩ *(larger magnitude in case of losses)*

Conceptual Framework

Securitisation, Credit Risk and Bank Capital Ratios

➢ **The Expected Variations in Risk-based Capital and Leverage Ratios**

RISK TRANSFER		RISK RETENTION	
Risk-based capital ratio		**Risk-based capital ratio**	
⇧	If bank keeps cash, invests in less risky assets or repays debt	⇧	If $RWA_{SECURITISATION} < RWA_{ASSETS}$ Or if bank increases capital
=	If bank invests in equally risky assets	=	If $RWA_{SECURITISATION} = RWA_{ASSETS}$ And if bank keeps capital constant
⇩	If bank invests cash in more risky assets	⇩	If $RWA_{SECURITISATION} > RWA_{ASSETS}$ Or if bank provides implicit support
Leverage ratio		**Leverage ratio**	
⇧	If bank doesn't consolidate the SPV or derecognises the assets	⇧	If bank increases capital
=	If bank uses cash to repay debt	=	If bank keeps capital constant
⇩	If bank keeps cash or invests in new assets	⇩	If bank provides implicit support

Data Description

- *Combine tranche-level data on securitisation issuances with bank balance sheet info for the corresponding originator banks*
- *Capital IQ:* data on issuances of structured products (ABSs, CDOs, CLOs) sponsored by European banks.
  - Quarterly data on 17,114 securitisation tranches from Q1 1999 to Q4 2010
  - In 2011 a retention rule has been introduced in the EU legislation for securitisation sponsors and originators.
  - For each tranche, information about: outstanding amounts, issuer and sponsor, offering date and maturity date, type of collateral.
  - Historical information on the S&P credit ratings for each product.
- Quarterly data on bank balance variables from *Capital IQ*

Empirical Analysis

- **Structure of the analysis:**

1. Analyse **changes in bank capital ratios** after securitisation
    1. For all issuances
    2. For all issuances, with heterogeneity across banks (funding liquidity)

2. Examine variations in bank capital ratios **for distinct types of securitisation,** subject to different regulatory regimes
    1. For distinct classes of products (asset/rating)
    2. For distinct classes of products, with heterogeneity across banks (funding liquidity)

Securitisation and Bank Capital
Empirical Setting

- **Baseline Specification:** Investigate the changes in bank capital ratios after securitisation

$$y_{it} = \alpha_i + \delta_t + \beta\, SECUR_{it-1} + \gamma\, BANKCONTROLS_{it-1} + u_{it}$$

- Dependent Variables: *CapRatio* = Total Capital/Risk Weighted Assets
  LevRatioCE = Total Common Equity/Total Assets

- *SECUR*= Outstanding Amount of Securitisation Issuances /Total Assets

- **Exploit Bank-level Heterogeneity:** Add an interaction term for bank funding liquidity position

$$y_{it} = \alpha_i + \delta_t + \beta_1\, SECUR_{it-1} + \beta_2\, SECUR_{it-1} * FUNDING_{it-1} + \gamma\, BANKCONTROLS_{it-1} + u_{it}$$

- Funding Liquidity: Ratio Liquid Assets/Deposits & Short-Term Borrowing

Table 1
Securitisation, Risk-based Capital and Leverage Ratios

	1999Q1-2010Q4			2003Q1-2007Q2			2007Q3-2010Q4		
DEPENDENT VARIABLES	CapRatio (1)	LevRatioCAP (2)	LevRatioCE (3)	CapRatio (4)	LevRatioCAP (5)	LevRatioCE (6)	CapRatio (7)	LevRatioCAP (8)	LevRatioCE (9)
MAIN EXPLANATORY									
Total Securitisation_1	0.271***	0.153***	- 0.0935**	0.119	0.0981	0.0208	0.482**	0.0668	- 0.0288
	(0.0882)	(0.0425)	(0.0469)	(0.209)	(0.0917)	(0.0849)	(0.217)	(0.0667)	(0.0719)
ECONOMIC EFFECT									
1 St. Dev. Increase in Total Secur_1	**+ 0.439*** **	**+ 0.248*** **	**- 0.151** **	+ 0.116	+ 0.096	+ 0.02	**+ 1.204** **	+ 0.167	- 0.072
Bank Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bank Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Quarter Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.651	0.517	0.464	0.326	0.631	0.575	0.729	0.651	0.714

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Very different variations for distinct definitions of bank solvency:

1) (Larger) **Increase** in **CapRatio**
2) (Smaller) Increase in LevRatioCAP
3) **Decrease** in **LevRatioCE**

During the crisis:

1) Very large **Increase** in **CapRatio**
2) No significant change in the Leverage ratios

In this table: LevRatioCAP = Total Capital/Total Assets

Table 2
Securitisation, Risk-based Capital and Leverage Ratios
Interaction with Funding Liquidity

	1999Q1-2010Q4		2003Q1-2007Q2		2007Q3-2010Q4	
DEPENDENT VARIABLES	CapRatio (1)	LevRatioCE (2)	CapRatio (3)	LevRatioCE (4)	CapRatio (5)	LevRatioCE (6)
MAIN EXPLANATORY						
Total Securitisation_1	0.833***	- 0.373***	0.277	-0.0591	1.563***	0.0562
	(0.199)	(0.108)	(0.358)	(0.152)	(0.332)	(0.122)
INTERACTION						
Tot Secur_1*LiqAssetsRatio_1	- 0.557***	0.271***	-0.142	0.0713	- 0.964***	-0.0828
	(0.174)	(0.0952)	(0.259)	(0.113)	(0.235)	(0.0861)
ECONOMIC EFFECT						
1 St. Dev. Incr. Total Secur_1						
For LiqAssetsRatio=Mean	**0.861*** **	**- 0.367*** **	0.194	-0.020	**1.983*** **	-0.025
For LiqAssetsRatio=25th Perc.	**1.209*** **	**- 0.536*** **	0.246	-0.046	**3.175*** **	0.078
For LiqAssetsRatio=75th Perc	**0.676*** **	**- 0.276*** **	0.15	0.003	**1.705*** **	-0.048
Bank Controls	YES	YES	YES	YES	YES	YES
Bank Fixed Effects	YES	YES	YES	YES	YES	YES
Quarter Fixed Effects	YES	YES	YES	YES	YES	YES
R-squared	0.675	0.487	0.329	0.578	0.790	0.725

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Less-liquid banks obtained:
- **larger increases in CapRatio**
- but also **wider decreases in LevRatioCE**

During the crisis less-liquid banks observed:
- **larger improvements in CapRatio**
- but no significant differences in **LevRatioCE**

Bank Funding Liquidity Matters for Regulatory Arbitrage Incentives?

Heterogeneity across Products
Different Classes of Securitisation and Financial Regulation

- Distinguish classes of securitisation, subject to distinct regulatory regimes.

➢ **Baseline Specification:** Estimate the variations in bank capital ratios following the issuances of different products

$$y_{it} = \alpha_i + \delta_t + \beta_1 SECUR\_X_{it-1} + \beta_2 SECUR\_Y_{it-1} + \cdots + \beta_n SECUR\_Z_{it-1} + \gamma\, CONTROLS_{it-n} + u_{it}$$

➢ **Interaction with Liquidity:** Estimate the variation for specific category of products and add an interaction term for bank funding liquidity.

$$y_{it} = \alpha_i + \delta_t + \beta_1 SECUR\_X_{it-1} + \beta_2 SECUR\_X_{it-1} * FUNDING_{it-1} + \gamma\, BANKCONTROLS_{it-1} + u_{it}$$

How the funding liquidity position of a bank may affect the capital management following the issuance of a certain type of securitisation?

Heterogeneity across Products
Securitisation Issuances Classified by Asset Types

- The ***type of underlying asset*** relevant to determine:
  - Collateral Eligibility
    - Simple **ABSs accepted as collateral**, while complex products like CDOs and CBOs not eligible
  - Prudential Requirements
    - The advantages of securitisation may depend on the **wedge between the risk weights** for the assets and for the securitisation position.

➢ **General Specification:**

$$y_{it} = \alpha_i + \delta_t + \beta_1 CBO_{it-1} + \beta_2 CDO_{it-1} + \beta_3 CLO_{it-1} + \beta_4 CommLoans_{it-1} + \beta_5 HomeEquity_{it-1} + \beta_6 PersLoans_{it-1} + \beta_7 ResidMort_{it-1} + \beta_8 CreditCard_{it-1} + \gamma\, BANKCONTROLS_{it-1} + u_{it}$$

➢ **Specification with Liquidity Interaction for Each Asset Type:**

$$y_{it} = \alpha_i + \delta_t + \beta_1\, SECUR\_ASSET\_TYPE_{it-1} + \beta_1\, SECUR\_ASSET\_TYPE_{it-1} * FUNDING_{it-1} + \gamma\, BANKCONTROLS_{it-1} + u_{it}$$

Table 3
Securitisation Issuances Backed by Different Asset Types

The Economic Effect of 1-Standard-Deviation Increase in the Securitisation Ratio

	VARIABLES		2003Q1-2007Q2		2007Q3-2010Q4	
			CapRatio	LevRatioCE	CapRatio	LevRatioCE
CDOs [Not Elig.]	**CBOs**	Econ. Eff.	**+ 0.791 *****	**+ 0.216*****	- 0.37	- 0.147
		Coeff.	[60.64***]	[16.57***]	[-25.41]	[-10.12]
	(Other) CDOs	Econ. Eff.	**+ 0.361 *****	+ 0.027	+ 1.177	+ 1.025***
		Coeff.	[2.816***]	[-0.210]	[5.527]	[4.815***]
ABSs [Elig.]	**Commercial Loans**	Econ. Eff.	+ 0.025	- 0.115*	- 0.011	+ 0.188*
		Coeff.	[0.0919]	[-0.424*]	[-0.0155]	[0.266*]
	Home Equity Loans	Econ. Eff.	+ 0.014	- 0.076	**+ 0.757 ****	+ 0.112
		Coeff.	[0.0355]	[-0.187]	[1.030**]	[0.153]
	Personal Loans	Econ. Eff.	**+ 0.229 *****	**+ 0.076***	- 0.026	- 0.057
		Coeff.	[27.42***]	[9.093*]	[-1.758]	[-3.806]
	Residential Mortgages	Econ. Eff.	+ 0.085	- 0.104	**+ 0.782 ****	**- 0.192***
		Coeff.	[0.198]	[-0.242]	[0.682**]	[-0.167*]
	Credit Card Receivables	Econ. Eff.	**- 0.860 *****	+ 0.208*	+ 0.074	+ 0.026
		Coeff.	[-23.72***]	[5.749*]	[4.607]	[1.613]

Regr. Coeff. in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Precrisis: larger increases in CapRatio for the issuances backed by riskier assets

Crisis: larger increases in CapRatio for the issuances of eligible ABSs

Table 4
Securitisation Issuances Backed by Different Asset Types
Interaction with Funding Liquidity

The Economic Effect of 1-Standard-Deviation Increase in the Securitisation Ratio

	Asset Types		2003Q1-2007Q2			2007Q3-2010Q4		
			Values of the LiqAssetsRatio			Values of the LiqAssetsRatio		
			Mean	25th Perc.	75th Perc.	Mean	25th Perc.	75th Perc.
CDOs [Not Elig.]	CBOs	CapRatio	**1.029*** **	**1.029*** **	**1.029*** **	**0.627** **	**1.38** **	**0.451** **
		LevRatioCE	0.069	0.013	0.117	0.009	0.070	-0.005
	(Other) CDOs	CapRatio	**0.939***	**0.939***	**0.939***	1.447	1.892	1.343
		LevRatioCE	0.037	-0.033	0.098	0.317	0.288	0.323
ABSs [Elig.]	Commercial Loans	CapRatio	**0.658***	**0.658***	**0.658***	**0.094** **	**0.804** **	**-0.072** **
		LevRatioCE	0.121	0.197	0.056	-0.058	-0.079	-0.053
	Home Equity Loans	CapRatio	-0.140	-0.099	-0.175	**0.956*** **	**1.806*** **	**0.758*** **
		LevRatioCE	-0.042	-0.079	-0.009	-0.041	-0.072	-0.033
	Residential Mortgages	CapRatio	-0.019	-0.051	0.009	**1.187*** **	**2.296*** **	**0.928*** **
		LevRatioCE	0.041	0.021	0.059	-0.022	0.101	-0.051

Regr. Coeff. in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Precrisis: funding liquidity not relevant for capital management of securitiser banks

Crisis: especially for the issuance of eligible ABS, less-liquid banks obtained larger increases in solvency

Heterogeneity across Products
Securitisation Issuances Classified by Credit Ratings

- ***Credit Ratings*** important to determine:
  - Collateral Eligibility
    - Only products with **at least single A rating** eligible **as collateral**, while others with lower rating not pledgeable
  - Prudential Requirements
    - Basel II: credit ratings determine risk weights for securitisation positions. **Higher rating ⇒ Lower risk weight**

➢ **General Specification:**

$$y_{it} = \alpha_i + \delta_t + \beta_1 AAA_{it-1} + \beta_2 AA\_A_{it-1} + \beta_3 BBB_{it-1} + \beta_4 BB\_B_{it-1} + \beta_5 CCC_{it-1} + \beta_6 CC\_C_{it-1} + \beta_7 D_{it-1} + \gamma\, BANKCONTROLS_{it-1} + u_{it}$$

➢ **Specification with Liquidity Interaction for Each Rating Bucket:**

$$y_{it} = \alpha_i + \delta_t + \beta_1\, SECUR\_RATING_{it-1} + \beta_2\, SECUR\_RATING_{it-1} * FUNDING_{it-1} + \gamma\, BANKCONTROLS_{it-1} + u_{it}$$

Table 5

Securitisation Issuances with Different Credit Ratings

The Economic Effect of 1-Standard-Deviation Increase in the Securitisation Ratio

	VARIABLES		2003Q1-2007Q2		2007Q3-2010Q4	
			CapRatio	LevRatioCE	CapRatio	LevRatioCE
Eligible	AAA	Econ. Eff.	**+ 0.849 *** **	**- 0.284** **	- 0.416	**+ 0.281*** **
		Coeff.	[1.386***]	[-0.463**]	[-0.382]	[0.258***]
	AA & A	Econ. Eff.	**- 0.613 *** **	+ 0.020	**+ 0.817 ** **	**-0.406*** **
		Coeff.	[-4.418***]	[-0.142]	[2.900**]	[-1.441***]
Not Eligible	BBB	Econ. Eff.	**- 0.333 ** **	+ 0.043	**- 1.276 *** **	-0.151
		Coeff.	[-13.34**]	[1.741]	[-11.08***]	[-1.315]
	BB & B	Econ. Eff.	- 0.08	**0.330*** **	**1.109*** **	**0.424*** **
		Coeff.	[-9.327]	[38.45***]	[4.986***]	[1.906***]
	CCC	Econ. Eff.	0.064	0.062	**0.598*** **	**0.126* **
		Coeff.	[135.7]	[132.6]	[2.276***]	[0.480*]
	CC & C	Econ. Eff.	-0.046	-0.012	0.241	**- 0.205*** **
		Coeff.	[-85.03]	[-21.49]	[1.609]	[-1.371***]
	D	Econ. Eff.	**- 0.168** **	**- 0.120** **	-0.035	**0.144* **
		Coeff.	[-159.8**]	[-114.2**]	[-0.558]	[2.274*]

Regr. Coeff. in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Precrisis: large increase in CapRatio and relevant decrease in LevRatioCE for issuances of AAA

Crisis: large increase in CapRatio and also decrease in LevRatioCE for issuances of AA & A (eligible)

Table 6

Securitisation Issuances with Different Credit Ratings Interaction with Funding Liquidity

The Economic Effect of 1-Standard-Deviation Increase in the Securitisation Ratio

Rating Groups		2003Q1-2007Q2			2007Q3-2010Q4		
		Values of the LiqAssetsRatio			Values of the LiqAssetsRatio		
		Mean	25th Perc.	75th Perc.	Mean	25th Perc.	75th Perc.
AAA	CapRatio	0.373	0.373	0.371	**-0.854****	**-0.324****	**-0.978****
	LevRatioCE	-0.005	-0.027	0.015	-0.0007	-0.057	0.014
AA	CapRatio	-0.285	-0.202	-0.357	**0.347***	**0.827***	**0.235***
	LevRatioCE	0.010	-0.021	0.037	-0.007	-0.080	0.011
A	CapRatio	**-0.487***	**-0.487***	**-0.487***	**1.746****	**1.746****	**1.746****
	LevRatioCE	0.013	-0.023	0.043	-0.170	-0.085	-0.190

Regr. Coeff. in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Precrisis: funding liquidity not relevant for capital management of securitiser banks

Crisis: When securitising some of the eligible products, less-liquid banks got better (or less worse) prudential solvency ratios

Summary of the Results

1. ***For all the issuances of securitisation:***

- Securitiser banks increased their **risk-based capital ratios**, while not changing their (common equity) **leverage ratios** or even reducing them.
- Banks with **ex-ante weaker liquidity positions** obtained larger increases in risk-based capital ratios (also wider decreases in leverage ratios).
- This effect for less-liquid banks was more relevant **during the crisis**.

2. ***For distinct categories of structured products:***

- Quantify the larger increases in risk-based capital ratios, observed over crisis for **products eligible as collateral and subject to low risk weights**
  - *Asset type:* ABS backed by residential mortgages & home equity loans
  - *Credit ratings:* High-rating ABS, especially AA and A tranches
- This effect was actually **larger for less-liquid banks**

Main Take-Aways of the Work

- Analyse the changes in the capital position of European securitiser banks before and during the crisis.

1. The **definition of prudential capital ratios** may change significantly the sign and the size of the variation in bank solvency after securitisation

2. The **funding liquidity position** plays a key role in the capital management by originator banks, potentially by reinforcing the incentives for regulatory arbitrage.

3. Compare the **regulatory arbitrage advantages** that banks could obtain from the issuance of **securitisation products of different types,** including the ones eligible as collateral for liquidity operations.

Policy Implications

- **Reforms of prudential regulation**

- **Leverage ratio**
  - It is complementary to the risk-weighted capital ratio, as it reveals some additional info not observable from risk-based ratios.
- **Solvency and liquidity requirements**
  - Banks interested in improving their liquidity positions may have stronger incentives for capital regulatory arbitrage

- **Monetary policy collateral framework for ABSs**
  - The eligibility of ABSs as collateral for central bank liquidity operations may have prudential implications because of the incentives regarding securitisation and capital management

APPENDIX

Credit Ratings and Risk Weights for Securitisation

RBA risk weights when the external assessment represents a long-term credit rating and/or an inferred rating derived from a long-term assessment

External Rating (Illustrative)	Risk weights for senior positions and eligible senior IAA exposures	Base risk weights	Risk weights for tranches backed by non-granular pools
AAA	7%	12%	20%
AA	8%	15%	25%
A+	10%	18%	35%
A	12%	20%	
A-	20%	35%	
BBB+	35%	50%	
BBB	60%	75%	
BBB-	100%		
BB+	250%		
BB	425%		
BB-	650%		
Below BB- and unrated	Deduction		

Figure 6: The regulatory treatment of securitisation positions in the the Ratings-Based Approach (Basel II). Source: Basel Committee (2006)