Asymmetric information and the securitisation of SME loans

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Motivation

Securitisation (OTD model) is considered to be able to support lending supply, in particular to SME, in particular when banking sector is troubled

"*Because of their size, SMEs generally cannot issue bonds.[. . .] securitisation can help to connect SME financing needs with the funds of bank and non-bank investors*" (Mersch, 22/10/2014)

The "originate to distribute" model

On the other hand, securitizations have often been blamed for causing the excesses that led to the financial crisis

$\Longrightarrow$ loss of confidence in ABS & severe tightening of regulation (Basel III, Solvency 2...)

$\Longrightarrow$ securitisation volumes remain subdued in Europe

What can go wrong with the "originate to distribute" model?

- **Adverse selection** Banks rely on *soft information* to grant and manage loans. Since this information can not be credibly transmitted to the market when loans are securitized, banks will tend to sell loans that, for given observable characteristics, are of lower (unobservable) quality
- **Moral hazard** As banks lose the skin in the game, once a loan is sold, the bank lacks incentives to keep monitoring the borrower

Note: *causality* between quality and securitisation goes in the opposite direction

HOWEVER: banks have ways to mitigate asymmetric information (both AS and MH)
$\Longrightarrow$Securitize low (observable) risk loans
$\Longrightarrow$Signal the quality through adequate retention of risk
$\Longrightarrow$Build-up reputation for not selling lemons

Two opposite views

Is the OTD model inherently flawed with asymmetric information or not?

still unresolved

THEORY:

- It is: Parlour, Plantin (JF, 2008), Gorton (2010) via adverse selection; Mishkin (2008), Stiglitz (2010) via moral hazard
- It may not be: Chemla and Hennessi (JF, 2014) via signalling through retention of junior tranches

EMPIRICS:

- It is: Keys et al. (QJE; 2010) and Purnanandam (RFS; 2011) for RMBS; Bord and Santos (JMCB; 2015) for corporate ABS
- It is not: Albertazzi et al. (JME; 2014) for RMBS; Benmelech et al. (JFE; 2012), Jiang et al (2014), Kara et al (2015wp) for corporate ABS

Our contribution to the literature

We empirically test the relevance of these information frictions

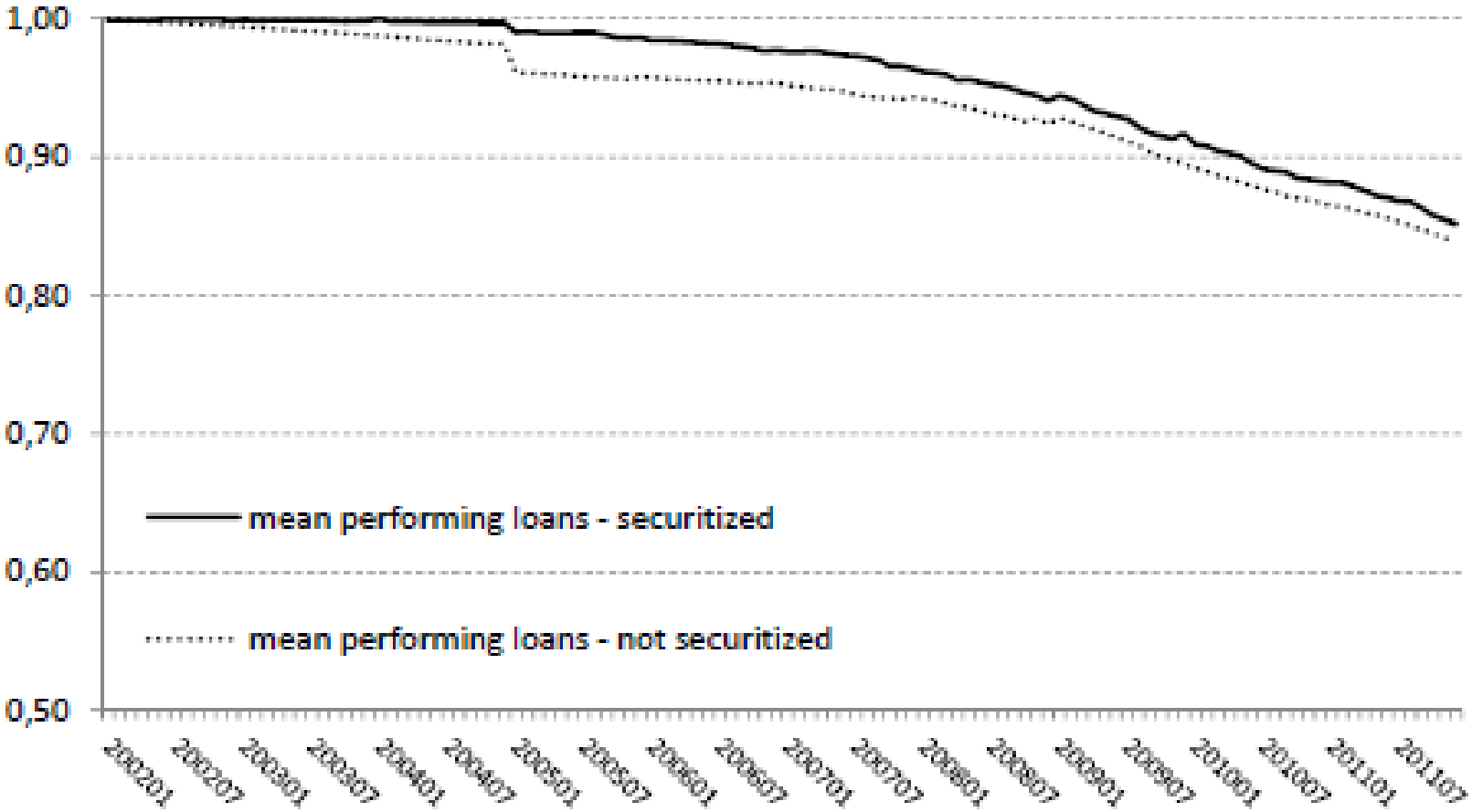
- Focus on securitization of SME loans, so far neglected because of data availability
- Provide a clean test of moral hazard VS adverse selection, taking advantage of multiple lenders & panel dimension

Our data

Description of data

- Source: Italian Credit Register
- Large sample of loans to firms (mostly SMEs) orginated in the pre-crisis period in Italy
- For each of them we observe if and when it has defaulted and if and when it was securitised
- Only pre-crises securitisatoins; loan performance tracked until end 2011
- For each firm we observe all lending relationships
- We end up with a panel where each row is bank/borrower/month. The whole sample comprising about 700k firms, 800 banks (including small cooperatives), totalling to 14 mlns obs.

Dataset: securitized vs non securitized loans



Securitised loans in the sample constantly ouperformed non-securitised loans.

Empirical methodology

Step 1: testing for asymmetric information (with no distinction between AS & MH)

Choice of methodology inspired by the similarity between insurance and securitisation markets

Insurance market $\rightarrow$ securitization market

Idea: both markets tansfer risk across agents in the economy, asymmetric inf. problems

Insurer $\rightarrow$ market Insured party $\rightarrow$bank

We follow the approach proposed by Chiappori and Salanié (JPE 2000) for testing asymmetric information in insurance markets:
$\Longrightarrow$ *securitization is affected by asymmetric information if, given the characteristics observable by the investors (insurers), there is a positive correlation between the choice of "selling" a loan and the probability that it defaults*

Step 2: disentangling moral hazard and adverse selection

key (identification) hypothesis: moral hazard and adverse selection have different impact on risk across the lenders of a given borrower

- Adverse selection is about borrower's characteristics which influence the PD and as such are relevant for all the lenders exposed to the given borrower

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  - *any activity on the side of the bank to enforce the likelihood of repayments of its own exposure: monitoring of checking accounts, exerting pressure, actions to preserve value of collateral*

Defining the investor's information set

The investors' information set is difficult to assess: we assume they know all banks' characteristics (time varying and invariant, captured by bank*time FE), and firm time-invariant characteristics (captured by firm FE).

Examples:

- Originating bank's identity & location
- Originating bank's balance sheet
- Firm's size
- Firm's identity & location
- Firm's sector of activity
- Firm's (average) risk/rating

We test the robustness of the results to alternative hypotheses, both less and more demanding for the investors

The model

Following Chiappori Salanie (JPE, 2000), the **sign test** can be implemented by

1. estimating a pair of probit (linear specification for computational reasons):

$$\begin{cases} Sec_{fbt} = info\ set + residual^{\text{sec}} = [b_{bt} + \eta_f] + residual^{\text{sec}} \\ Det_{fbt} = info\ set + residual^{\text{det}} = [b'_{bt} + \eta'_f] + residual^{\text{det}} \end{cases}$$

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2. Testing the sign of the correlation: H_0: corr($residual^{sec}$, $residual^{det}$)$>0 \rightarrow$ (total) asymmetric information

The model

By saturating with all possible combinations of fixed effects, we can decompose the residual components as follows

$$\begin{cases} Sec_{fbt} = [b_{bt} + \eta_f] + \alpha_{ft} + \mu_{fbt} \\ Det_{fbt} = \underbrace{[b'_{bt} + \eta'_f]}_{\text{Info set}} + \underbrace{\alpha'_{ft}}_{\text{AS}} + \underbrace{\mu'_{fbt}}_{\text{MH}} \end{cases}$$

- corr(α_{ft} , α'_{ft}): correlation between all time varying (i.e. unobservable) factors that matters for both probabilities and which are specific to the firm but common across all lenders exposed to such firm $\longrightarrow$ adverse selection
- corr(μ_{fbt} , μ'_{fbt}): correlation between all time varying (i.e. unobservable) factors that matters for both probabilities and which are specific to the given bank-firm pair $\longrightarrow$ moral hazard

The model

To sum-up, we estimate the following model:

$$\begin{cases} Sec_{fbt} = [b_{bt} + \eta_f] + \alpha_{ft} + \mu_{fbt} \\ Det_{fbt} = \underbrace{[b'_{bt} + \eta'_f]}_{\text{Info set}} + \underbrace{\alpha'_{ft}}_{\text{AS}} + \underbrace{\mu'_{fbt}}_{\text{MH}} \end{cases}$$

and then test the following correlations

- H_0: corr($\alpha_{ft}+\mu_{fbt}$, $\alpha'_{ft} + \mu'_{fbt}$)>0 $\rightarrow$ (total) asymmetric information (Chiappori and Salanié (2000))
- H_0: corr(α_{ft} , α'_{ft})>0 $\rightarrow$ adverse selection
- H_0: corr(μ_{fbt} , μ'_{fbt})>0 $\rightarrow$ moral hazard
- H_0: corr(η_f , η'_f)<0 $\rightarrow$ selection on observables

The results

Baseline

	selection on observables	adverse selection	moral hazard
	$\text{corr}(\eta_f\ ,\ \eta'_f)$	$\text{corr}(\alpha_{ft}\ ,\ \alpha'_{ft})$	$\text{corr}(\mu_{fbt}\ ,\ \mu'_{fbt})$
baseline, whole sample	-0.0261***	0.019***	-0.0060***
number of obs		3,179,615	

- Selection on observables: borrowers that are more likely to be securitized - on the basis of time-invariant features - are also less likely to deteriorate.
- adverse selection: we cannot reject the null of adverse selection.
- moral hazard: overall there is no moral hazard from part of the banks after the securitization

Relationshtip vs transaction lending

- Intensity of relationship can be expected to matter for moral hazard: if I keep lending to the same borrower it makes sense to keep monitoring
- To test our conjecture, we separate borrowers in "transaction" and "relationship" borrowers. We expect (more) moral hazard for the former group. Here we sort firms by size:

	selection on observables	adverse selection	moral hazard
	$corr(\eta_f , \eta'_f)$	$corr(\alpha_{ft} , \alpha'_{ft})$	$corr(\mu_{fbt} , \mu'_{fbt})$
relationship lending (only SME firms; total assets $<$ 43 bn)	-0.0381***	0.0025***	-0.0061***
number of obs		1,816,311	
transaction lending (only larger firms)	-0.1142***	0.0155***	0.0295***
number of obs		109,280	

Moral hazard appears for transaction borrowers only, in line with our conjecture

Benchmark: overall assessment

The last step of the analysis is to calculate the overall effect of asymmetric information and the total informational effect (including that stemming from the selection of loans based on the observables) on the securitization market.

	selection on obs	adverse selection	moral hazard	total asymm. information	total effect
	$corr(\eta_f, \eta'_f)$	$corr(\alpha_{ft}, \alpha'_{ft})$	$corr(\mu_{fbt}, \mu'_{fbt})$	$corr(\alpha_{ft}+\mu_{fbt}, \alpha'_{ft}+\mu'_{fbt})$	$corr(\eta_f+\alpha_{ft}+\mu_{fbt}, \eta'_f+\alpha'_{ft}+\mu'_{fbt})$
whole sample	-0.0261***	0.019***	-0.0060**	0.0036***	-0.0059***
number of obs			3,179,615		

We document the presence of asymmetric information, however its negative effects are more than compensated by the positive selectionthat takes place at the bank and at the firm level

Extensions

- Result on Moral hazard for transaction borrowers holds for several proxies (size of the loan, number of lenders, share from the main lender and distance) even when considered together
- Weighted regressions
- Clustering
- Information set
- Model selection: Probit; Duration
- Results on lending growth after securitisation

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- We document the presence of asymmetric information
  - mainly in the form of adverse selection
  - moral hazard is limited to credit exposures characterized by weak relationship ties between the borrower and the lender
- the selection of securitized loans based on observables is such that it largely compensates the effects of asymmetric information (the unconditional quality of securitized loans significantly better than that of non-securitized ones)

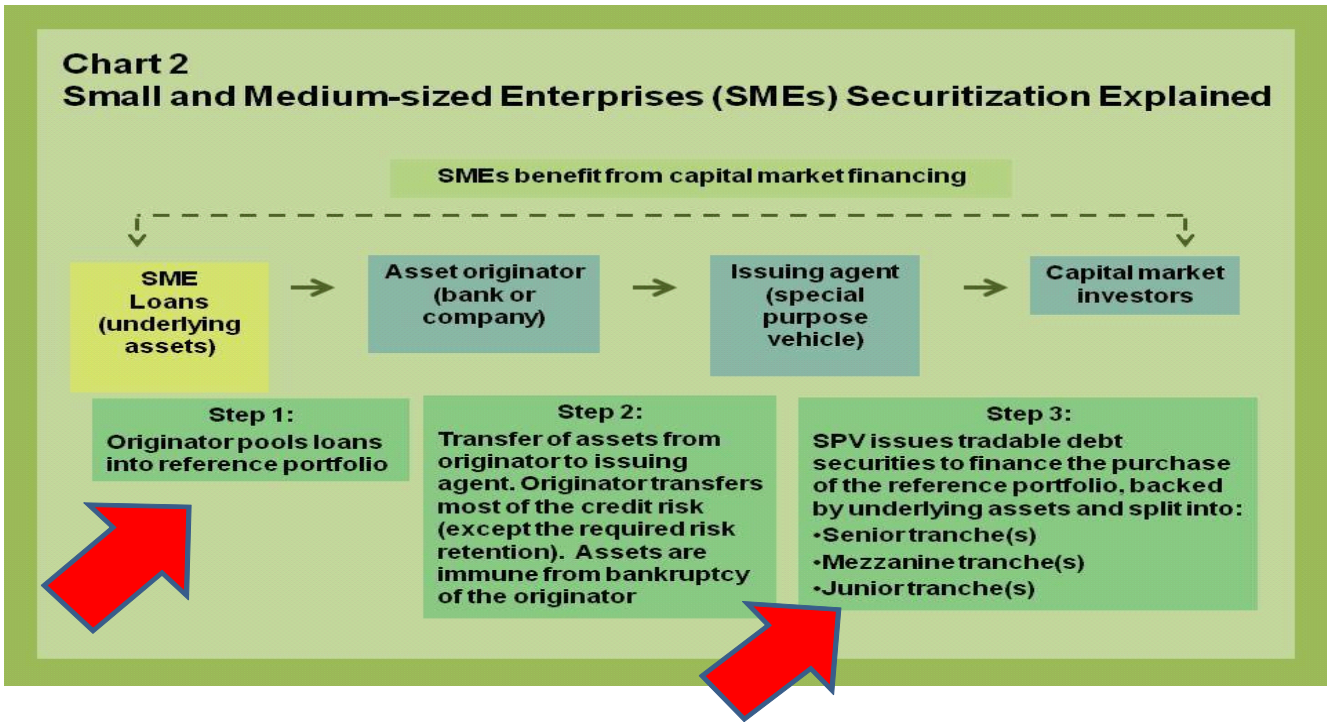
Policy considerations and conclusions

- Overall, Italian securitizations of SME loans worked smoothly, though with some heterogeneity
- Regulations on minimum retention makes sense for larger firms (in fact there, we find moral hazard)
- For smaller firms,
  - regulating retention may not be advisable: since there the problem is adverse selection, endogenously chosen levels of retention may allow banks to better signal the quality of their securitized loans
  - Improving transparency, availability of granular information may be the way to go (cfr. Loan level initiative / Anacredit)
- Securitisations of (very opaque) NPL likely to command a (very large) lemon discount (opacity related to large uncertainty on LGD, conditional on being impaired)

Thanks!

Background slides

The "originate to distribute" model



Source:http://blog-imfdirect.imf.org/2015/05/07/securitization-restore-credit-flow-to-revive-europes-small-businesses/

Construction of the dataset

We collect credit relationships for banks most active in the securitization market (50 banks, cover >80% of market); we select those

- outstanding at 2001:12 (and originated after 1997:12)
- originated over the period 2002:01 -2007:06

We integrate this with the credit relations entertained, over the same period, by these borrowers with other (non securitising) banks, and we track these relationships until either the amount borrowed is repaid; or the amount borrowed is written-off; or until 2011:12

We observe which of these loans have been securitised, by how much and when, restricting to the deals occurred over the period 2002:01-2007:06

We then add bank and firm information (Supervisory Records & CERVED)

Lending growth after securitisation

Relationship lending variables (calculated in the pre-securitization period)	Dependent variable: exposure after securitization (only securitized loans), as a ratio of the average pre-securitization firm-level exposure towards all lenders (%)			
	(i)	(ii)	(iii)	(iv)
Dummy large firm (1)	-8.88***	-8.88	1.26	1.26
	0.78	5.67	0.84	5.56
Dummy for low main share (2)	-4.37***	-4.37**	-5.76***	-5.76***
	0.36	2.15	0.34	2.02
Transaction lending (high number of lenders) (3)	-7.98***	-7.98***	-10.22***	-10.22***
	0.32	2.09	0.31	1.98
Dummy informational distance (4)	6.77***	6.77***	4.74***	4.74**
	0.24	1.85	0.27	1.96
Age of the relationship in years	0.17***	0.17***	0.13***	0.13***
	0.00	0.02	0.01	0.04
Other controls (5)				
Number of observations	195,345	195,345	195,345	195,345
Adj. R-squared	0.05	0.05	0.15	0.15
Fixed effects	No	No	bank*time	bank*time
Cluster (6)	No	firm: firm*bank	No	firm: firm*bank

Spillovers? (and indentificaion of MH vs AS)

- Our identification assumptoin is correct even in the presence of positive spillovers of monitoring activity by one bank on other lenders' exposures with the same firm, as long as these are not one-to-one (i.e. monitoring by one bank reduces PD of all lenders and by the same amount)
- In general the presence of spillovers matter for quantification not for identification.
- With negative spillovers (more likely) identification is enhanced
- Quantification of total asymmetric info independent from such assumption
- Quantification of MH also independent on assumption about info set