Adverse Selection in Resale Markets for Securitized Assets

Martin Kuncl

Bank of Canada

Banque de France

October 23, 2015

Disclaimer: The views expressed in this paper are those of the author. No responsibility for them should be attributed to the Bank of Canada.
Motivation

*Prior to the recent financial crisis*

- securitization became popular, and a lot of risk was accumulated in securitized assets (especially MBS),
- nevertheless markets for securitized assets worked well.

*During the crisis*

- a sudden and extreme market dry-up: increase in spreads and drop in volumes [Graphs]

*How to explain accumulation of low quality investment and then sudden dry-up of markets?*

Motivation

Prior to the recent financial crisis

- securitization became popular, and a lot of risk was accumulated in securitized assets (especially MBS),
- nevertheless markets for securitized assets worked well.

During the crisis

- a sudden and extreme market dry-up: increase in spreads and drop in volumes

How to explain accumulation of low quality investment and then sudden dry-up of markets?


This behavior can be explained by a varying degree of asymmetric information about quality of securitized assets over the business cycle.
Main results

- DSGE model of financial intermediation through securitization with asymmetric information

Model predicts:

- In booms or mild recessions adverse selection on resale markets is limited → markets work well.

- In a deeper recession adverse selection becomes suddenly severe (in proportion to the length of the preceding boom) and may lead to partial market shutdowns.

- Financial crisis recessions are deeper and longer than normal ones

- Government policy of asset purchases may limit the negative effects of adverse selection on the real economy
Outline

1. Motivation
2. Overview of results
3. Model mechanism
4. Results of MS DSGE model
   a. Methodology
   b. Impulse responses
5. Conclusion
Model mechanism

- Continuum of financial firms face i.i.d. investment shock
- Need for financial intermediation
- Focus on securitization (sale of cash flows from projects)
Without frictions the solution is first-best
Introducing frictions:

- “skin in the game”
- asymmetric information in primary and resale markets
Introducing frictions

Introduce frictions:

- “skin in the game”
- asymmetric information in primary and resale markets
Asymmetric information on primary market

- Introduce asymmetric information about allocation of new projects to firms

Diagram:
- Seller
- Loan sale
- Primary market
- Quality?
- Buy
- Buyer
Asymmetric information in primary market

- Introduce asymmetric information about allocation of new projects to firms

Implicit guarantees enforced in a repeated game.

- **Separating equilibrium**: Sellers can signal the quality. Only high quality projects are financed.
- **Pooling equilibrium**: Sellers cannot differentiate, both types of projects are sold.
**Assumption:** Prohibitively costly to verify the quality of securitized assets traded on resale markets.

Implicit guarantees increase the price on resale markets through:

- **direct effect:** lower the effective difference in project cash flows,
- **indirect effect:** prevent private information acquisition → “blissful ignorance” equilibrium (Gorton and Ordoñez 2014).
In a “deep recession” there is **economy-wide default on implicit guarantees** → surge in adverse selection.

- **Liquidity sellers** (sell high and low qual. assets)
- **Informed sellers** (sell low qual. assets)

Drop in the price & lower investment and output in the economy.
May even cause partial market shutdowns.

- **liquidity sellers** (sell high and low qual. assets)
- **informed sellers** (sell low qual. assets)
Outline

1. Motivation
2. Overview of results
3. Model mechanism
4. Results of MS DSGE model
   a. Methodology
   b. Impulse responses
5. Conclusion
Adverse Selection in Resale Markets for Securitized Assets

Results of MS DSGE model

Methodology

Perturbation method for Markov-Switching DSGE

**Assumption:** Counter-cyclical dispersion in TFP of projects (following Bloom (2009) and Bloom et al. (2012))

Three Markov states:

- **Regime 1 - Expansion:** (high TFP, low dispersion → pooling equilibrium on primary market)
- **Regime 2 - Mild Recession:** (low TFP, higher dispersion → separating equilibrium on primary market)
- **Regime 3 - Deep Recession:** (low TFP, largest dispersion → separating equilibrium, default on outstanding implicit recourse)

I use perturbation method for Markov-switching DSGE models using methodology by Foerster et al. (2013)

- Can capture differences in equilibrium across regimes.
- Can be used for more complex space of state variables.
Adverse Selection in Resale Markets for Securitized Assets

Results of MS DSGE model

Methodology

Perturbation method for Markov-Switching DSGE

**Assumption:** Counter-cyclical dispersion in TFP of projects (following Bloom (2009) and Bloom et al. (2012))

**Three Markov states:**

- **Regime 1 - Expansion:** (high TFP, low dispersion → pooling equilibrium on primary market)
- **Regime 2 - Mild Recession:** (low TFP, higher dispersion → separating equilibrium on primary market)
- **Regime 3 - Deep Recession:** (low TFP, largest dispersion → separating equilibrium, default on outstanding implicit recourse)

I use perturbation method for Markov-switching DSGE models using methodology by Foerster et al. (2013)

- Can capture differences in equilibrium across regimes.
- Can be used for more complex space of state variables.
Adverse Selection in Resale Markets for Securitized Assets

Results of MS DSGE model

Methodology

**Perturbation method for Markov-Switching DSGE**

**Assumption:** Counter-cyclical dispersion in TFP of projects (following Bloom (2009) and Bloom et al. (2012))

**Three Markov states:**

- **Regime 1 - Expansion:** (high TFP, low dispersion → pooling equilibrium on primary market)
- **Regime 2 - Mild Recession:** (low TFP, higher dispersion → separating equilibrium on primary market)
- **Regime 3 - Deep Recession:** (low TFP, largest dispersion → separating equilibrium, default on outstanding implicit recourse)

I use **perturbation method for Markov-switching DSGE** models using methodology by Foerster et al. (2013)

- Can capture differences in equilibrium across regimes.
- Can be used for more complex space of state variables.
Adverse Selection in Resale Markets for Securitized Assets

Results of MS DSGE model

Impulse responses

Effects of defaults on implicit recourse on adverse selection

- fNIR
- qs
- K
- Z
- output
- \(\omega\)

- Red: Implicit guar. defaulted
- Blue: Implicit guar. honored
Introducing government policy of asset purchases

Motivated by the quantitative easing of the FED, I consider a policy of asset purchases

- exchange of secur. assets in resale markets for government bonds at advantageous conditions
- costs covered by lump sum taxes

Two effects:

- Cleans the market from low quality assets → eliminates adverse selection
- Moral hazard problem
Adverse Selection in Resale Markets for Securitized Assets

Results of MS DSGE model

Impulse responses

Government policy eliminates the effects of asset repurchases
The model proposes an explanation for:

- Accumulation of low quality securitized assets on financial system balance sheets prior to the crisis
- Smooth working of the market for securitized assets prior to the crisis
- Resale market collapse during the crisis
- Financial turmoil on securitization markets cause deeper and longer recession
- Benefits and costs of the government policy of asset purchases (similar to FED quantitative easing)
References

Selected references


Appendix
Separating equilibrium in recessions

- Firms with Low projects find mimicking High too costly
- Information becomes public

Assumption: Counter-cyclical dispersion in TFP of projects (following Bloom (2009) and Bloom et al. (2012))
Pooling equilibrium in boom stage

- Information remains private
- Both types of projects are financed

The longer the economy stays in the boom stage,
- the larger the share of low quality assets on balance sheets,
- and larger the stock of implicit guarantees.
TFP "shocks" are more dispersed in recessions- Bloom et al. (2011)

Notes: Constructed from the Census of Manufacturers and the Annual Survey of Manufacturing establishments using establishments with 25+ years to address sample selection. Grey shaded columns are share of quarters in recession within a year.
CDS for subprime MBS increased dramatically in 2007

Figure reproduced from Brunnermeier (2009); Source of data: LehmanLive
Drying-up of ABP markets in 2007

Source: Board of Governors of the Federal Reserve System (US)
Quantitative easing by the FED

Selected Federal Reserve Assets

Source: Board of Governors of the Federal Reserve System (US)/FRED
Introducing government policy of asset purchases

Motivated by the quantitative easing of the FED, I consider a policy of asset purchases:
- exchange of secur. assets in resale markets for government bonds at advantageous conditions
- costs covered by lump sum taxes

Two effects:
- Cleans the market from low quality assets → eliminates adverse selection
- Moral hazard problem

Simplifying assumptions:
- Triggered in “Deep Recession”: $r_{t+1}^B = E r_{t+1}^h$ and following periods target returns s.t. $q_{t+s+1}^B = q_{t+s+1}^s$
Perturbation method for MS DSGE

Model equilibrium conditions can be written as

\[ E_t f \left( y_{t+1}, y_t, x_{t+1}, x_t, \chi_{t+1}, \chi_t \right) = 0_{n_x+n_y}, \tag{8.1} \]

in a discrete Markov chain process indexed by \( s_t \) and with a state-independent transition matrix \( \mathcal{P} = (p_{s,s'}) \).

For unique steady state Foerster et al. (2013) use mean of parameters’ ergodic distribution

\[ \bar{\chi} = \sum_s p_s \chi_s. \]
The solution of the recursive model (8.1) is

\[ x_{t+1} = h(x_t, \psi, s_t), \]
\[ y_t = g(x_t, \psi, s_t), \]
\[ y_{t+1} = g(x_{t+1}, \psi, s_{t+1}), \]

The first order approximations \( h^{first} \) and \( g^{first} \) are

\[ h^{first}(x_t, \psi, s_t) - x_{ss} = Dh_{ss}(s_t) S_t, \]
\[ g^{first}(x_t, \psi, s_t) - y_{ss} = Dg_{ss}(s_t) S_t, \]

where \( S_t = \left[(x_t - x_{ss})^T \psi\right]^T \).
Literature review

- Securitization under asymmetric information (Gorton and Pennachi 1995, Paligorova 2009 etc.)

- **Implicit recourse** - can be sustained in a reputation equilibrium (Gorton and Souleles 2006); may signal quality (Higgins and Mason 2004, Calomiris and Mason 2004)
  
  "As the saying goes, the only securitization without recourse is the last." (Rosner and Mason 2007, p.38)

- Confidence banking (Ordoñez 2014), “Blissful ignorance” equilibrium (Gorton and Ordoñez 2014)