SFB 649 Discussion Paper 2009-018

Transparency through Financial Claims with Fingerprints – A Free Market Mechanism for Preventing Mortgage Securitization Induced Financial Crises

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This research was supported by the Deutsche Forschungsgemeinschaft through the SFB 649 "Economic Risk".

http://sfb649.wiwi.hu-berlin.de
ISSN 1860-5664

SFB 649, Humboldt-Universität zu Berlin
Spandauer Straße 1, D-10178 Berlin

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Financial support from Deutsche Forschungsgemeinschaft
via the SFB 649 „Economic Risk“ is gratefully acknowledged

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First draft: March 2, 2009; this draft: March 30, 2009
Comments welcome

Abstract

Lack of transparency in securitization transactions significantly contributed to the severe financial crisis of 2007–2009. To increase transparency we—based on a recent idea by Markowitz (2009)—propose an incentive compatible mechanism for future securitization transactions: financial claims with fingerprints. They would allow market participants at each stage of the securitization process to obtain easily full information about the underlying original risks and the superior claims that need to be satisfied before receiving their own payoffs. The fingerprint mechanism would considerably enhance transparency in securitization transactions at the expense of some transaction costs, while reducing the need for government involvement in securitization markets.

JEL Codes: D53, E44 F34, G14, G18, G21, G24, G28
Keywords: Financial Crisis, Securitization, Mortgage-Backed Securities, Transparency, Opaqueness

1 Introduction

In 2007 the U.S. housing market bubble burst, triggering a financial crisis that has resulted in a worldwide recession. Among the problems that contributed to the crisis, securitization of mortgages and repackaging or tranching of mortgage-backed securities (MBS) into collateralized debt obligations (CDO) is often named.[1] MBS and especially CDO seem to exhibit a large degree of opaqueness, i.e., market participants in many cases have limited information about the true nature of the risks of the underlying mortgages. With every additional repackaging there is significant potential for information loss. This led the market for these securities dry up. Furthermore, banks holding these opaque securities faced major refinancing problems.

The apparent collapse of the market for MBS has led to demand for stricter regulation of transactions, compulsory trading of asset-backed securities at stock exchanges by many policymakers and commentators. Some have called for complete bans on MBS.

We propose an incentive compatible mechanism that takes fingerprints of the original mortgages and of MBS transactions. By fingerprints we mean a complete record of information related to the original mortgage transactions and all subsequent securitizations of those mortgages. This would solve many of the problems of these markets without the need for stricter regulation and without impeding the potential for innovations in the markets for securitization. We believe that our mechanism produces advantages at all stages of the securitization process at the expense of possibly mild transaction costs. Our mechanism is related to a recent proposal by Franke and Krahnen (2008) and by the Issing Committee (Issing et al., 2008, 2009) to create a global risk map and a global credit register, and the proposal by Brunnermeier (2008) to set up a clearing house in order to support regulatory authorities. While the ideas by the Issing Committee, Franke and Krahnen (2008) and Brunnermeier (2008) especially seem to address systemic risks stemming from interbank relationships, counterparty risk, and the opaqueness of financial institutions, our proposal is targeted at the specific, but important market segment, mortgage-backed securities, that has experienced market failure. Furthermore, our proposal does not entail stricter regulation for MBS, instead it creates incentives for market participants to enhance transparency, thus

[1] For a in-depth overview of the crisis and its causes see, e.g., Brunnermeier (2009), Dowd (2008), Franke and Krahnen (2008), Gorton (2008), Hellwig (2008).

keeping the free market and its innovative forces alive. Despite the non-regulatory approach developed here, our mechanism could be an integral part of a global risk map system.

Our proposal is based on an idea put forward by Harry Markowitz (2009). As part of regulatory actions to overcome the immediate problems of the financial crisis, Markowitz suggests setting up a regulatory body that would perform an in-depth census of institutions owning securitized assets. The information collected would encompass detailed information on security claim structures and underlying mortgage risks. Markowitz (2009) suggests using this information to solve severe problems of the current financial crisis—no confidence in financial institutions already holding securitized assets and no trade in "toxic assets." We show that a systematic collection of securitization transaction data could actually become the cornerstone of an incentive compatible mechanism used in future securitization transactions and thus allowing for a revival of securitization markets, while at the same time requiring no new regulation.

In section 2, we use an example to sketch the opaqueness problem inherent in the MBS market. Section 3 outlines our proposal to create more transparency in the MBS market. Finally, in Section 4, we discuss limitations of our approach as well as possible extensions.

2 A Simple MBS/CDO-Transaction and its Informational Problems

In order to illustrate our proposal we start with the description of a simple fully-funded MBS/CDO-transaction as shown in Figure 1.

Figure 1: Mortgage-Backed Securitization at Present

-- *Figure 1 about here* --

We consider two financial institutions, Originators O1 and O2, both of whom provide mortgages to homeowners. The loan characteristics of the borrowers are described by matrix L. Each row of the matrix, for instance, L_1^{O1}, represents the characteristics of one lender-borrower relationship. This information is gathered by the originator during credit scoring and subsequent credit monitoring activities. Entries include various information such as loan characteristics (principal debt, interest rate – fixed or variable, duration, currency

denomination), borrower characteristics (income, employment status, financial assets and liabilities, fico score, delinquency and foreclosure status), and collateral characteristics (ZIP code, house type, size, age, value).

Each originator now plans to securitize its mortgage portfolio. In order to do this each portfolio is cut into three different tranches: a senior, a mezzanine and an equity tranche, according to a desired risk and return profile.[2] The nominal terms (principal, interest, duration) of each tranche are described by vectors N. The cash flows coming from the mortgage portfolios C^{O1} and C^{O2} are then distributed to the different tranches according to the waterfall principle. This means that the senior tranche has the first claim, followed by the mezzanine tranche and, finally, the equity tranche, also called the first loss piece, having the residual claim.

Next, the securitization transaction is completed by selling all or some of the tranches to different investors. In order to signal quality, originators obtain a rating from a rating agency. For the sake of simplicity, we follow only the path of the mezzanine tranches of both originators, M^{O1} and M^{O2}. We assume, without loss of generality, that these tranches are bought by Intermediary A. In the next step, Intermediary A repackages the cash flows C^{MO1} and C^{MO2}, and forms another three tranches which he sells to investors or intermediaries. Such securities are called collateralized debt obligations (CDO). As before, a rating is obtained from a rating agency to facilitate these transactions. The new mezzanine tranche, M^{A}, is bought by Investor B. His information problem, and also the problem of the rating agency involved, is that already at this second stage of bundling and tranching risks, it will often not be possible to know the precise nature of the original home loans and to observe their performance as time progresses (Gorton, 2008).

With every step of repackaging cash flows from different sources and the respective payoff functions are combined into MBS which increases opaqueness. This is one of the roots of the present financial crisis. Rating agencies proved to be wrong about their rating assessments resulting in the lack of trust and credibility in the securitization market that has led to market

[2] Without loss of generality, we omit the involvement of a special purpose vehicle typically assisting these transactions.

failure. Securitization might be advantageous for contract partners but is seriously hindered by the informational problems described above.[3]

3 A Proposal to Overcome the Lack of Transparency in the MBS-Market

The goal of our proposal is to overcome opaqueness in the MBS market. This can be achieved if investors, intermediaries and rating agencies are able to have a direct look at the original risks at every single stage of securitization or repackaging. The central element of our concept is a data center which is called "Global Mortgage Data Center", depicted in Figure 2.

Figure 2: Securitization with a Global Mortgage Data Center

-- *Figure 2 about here* --

As in Markowitz (2009), our proposed data center would collect two types of data: mortgage characteristics and securitization related information. The mortgage characteristics L and results from subsequent monitoring activities are reported by originators.[4] The contract characteristics of all securitization and rebundling activities are reported, both by originators and intermediaries. The latter, again, consists of two information subcategories. The first category comprises the nominal terms of the tranches, N, i.e., the tranche principal, the interest rate promised, contract duration, time structure of payments. The second category consists of the claims functions. Here, the payoff functions of the tranches are reported to the data center. In order to assure high quality for the information reported, it might be necessary for the participating institutions to obtain some kind of certification by the data center and to comply with a standardized format and reporting intervals for the reports, or even to contract

[3] In light of the information problems described above, one might question why the market for securitization of mortgages evolved rapidly and apparently functioned well for several years. For example, Brunnermeier (2009), Dowd (2008), Franke and Krahnen (2008), Gorton (2008), Hellwig (2008) provide an explanation – low interest rates encouraged lending, home prices continually increased, and there was significant liquidity in the market. Market participants may even have known about the problems with the pricing of mortgage credit risk, but may have factored in an implicit government backing of Fannie Mae and Freddie Mac, the two main players in the U.S. mortgage market. Other possible explanations include the overconfidence of investors in this new market, executive compensation schemes rewarding high risk strategies, as well as regulatory and ratings arbitrage. There might even have been a rational interest in opaqueness on the part of some market participants in order to deprive firms and, in the end, society (Akerlof and Romer, 1993).

[4] In practice, information data centers already exist that allow market participants to share information regarding certain risks. For instance, the MIB Group, Inc., collects medical care data on insured individuals in North America. The data can be accessed by member insurance companies to support underwriting decisions and fraud detection.

on such terms. For the mezzanine tranches, examples for such functions are given in Figure 2 in the right corner of the data center box. These reports exclusively refer to information available to the reporting institutions, information that is typically given in a prospectus.

Consider for example Intermediary A's report: He reports the payoff function, C^{MA}, containing the sources of cash flows to be repackaged, C^{MO1} and C^{MO2}, the nominal promises he makes for the mezzanine tranche, N^{MA}, which again depends on the terms of the senior tranche, N^{SA}, also to be reported by A.[5] All the information that Intermediary A reports to the data center, constitutes the "fingerprint" of A's intermediation activities. Fingerprints are centrally collected and can for a fee be accessed by other market participants, thus allowing for full transparency.

An important advantage of this system is that all parties that need information about the cash flow from A's mezzanine tranche, C^{MA}, in our case Investor B or the rating agency, do not have to rely solely on information provided by Intermediary A. Via the data center, they can directly analyze the original risks. This is done by purchasing information from the data center. If we take the payoff formula C^{MA}, then the variables C^{MO1} and C^{MO2}, making up the cash flow well for C^{MA}, are substantiated by the originators' reports which also provide information about the original risks C^{O1} and C^{O2}, going back to the single mortgages, described by L.

The payoff function C^{MA} now provides the opportunity for Investor B, a rating agency or a regulator to kick their tires, i.e., make their own calculations. They get full information about both the underlying loan portfolio and the superior claims that need to be satisfied before receiving their own payoffs. They can simulate the original mortgage cash flows under different distributional and dependency assumptions; they can perform stress tests as they like; or, they can use updated information about mortgage risks. The data center enhances understanding of the risks being assumed.

What guarantees a high quality of the information reported to the data center? While there is no guarantee that a complete and accurate information will be provided by all, there will be a

[5] Also, the information which part of the first loss piece an originator keeps on his balance sheet could be reported. As Franke and Krahnen (2008) emphasize, a substantial retention of the first loss piece in the originator's book contributes to the mitigation of moral hazard problems by inducing a strong incentive for the originator to be cautious in his underwriting activities.

strong incentive for all market participants to report their information according to standards defined by the data center: The originators know that it is crucial for the success of their securitization that the bond buyers will be able pass the risks on in order to achieve their desired risk-return profile. This, however, will depend on the transparency of the contract data on the next levels of risk transfer, provided by data center information. This line of reasoning applies to all buyers and sellers in the risk transfer chain.[6]

If there are in the end missing links in the information chain, the consequence will be that opaqueness must be compensated by the bond sellers through higher risk premiums (interest rate payments) or the MBS will not be able to be transferred in the market.[7] It might also turn out that the chain of repackaging seems to be too long and dendritic, comprising risks, e.g., in areas of the world where the potential bond buyer has no professional expertise. In this case, again, knowing about the original risks and the sequence of payoff functions is of advantage, and gives rise to higher return requirements or to turning down the offer.

Both parties, buyers and sellers of MBS, obviously are better off as a result of sharing the information in the data center. Consequently, it should be possible to finance the development and operation of the data center by fees paid by market participants, especially potential investors or rating agencies buying information. Significantly, our proposal does not imply more regulation to enhance transparency; rather it is a market solution to achieve this end.

Finally, the proposed mechanism would be advantageous to homeowners seeking a mortgage. Of course, part of the transaction costs of the fingerprint mechanism will be rolled over to them. But, the ability of mortgage market intermediaries to securitize or repackage the original risks more easily should result in greater availability of capital for mortgages and lower interest rates.

4 Discussion of the Proposal and Possible Extensions

A major hurdle for the proposed fingerprint mechanism is financing its inception. A free-rider problem may arise: the first market participants using this mechanism would incur most of the

[6] Furthermore, by not complying with the standards of the data center the market participant involved would be contractually liable to the data center.
[7] This is the classical „Market for Lemons“ argument of Akerlof (1970).

fixed costs for founding and early operation of the risk data center, whereas subsequent participants would in general only need to contribute a small share to the costs of operation. However, we believe that the enormous advantages of the mechanism–re-launching the market for securitization and avoiding over-regulation–should be a strong incentive for intermediaries to engage in a joint effort to establish the data center. One could also think of an existing institution, such as the Bank for International Settlements for instance, creating and operating the data center.

Another aspect is the financing structure for the risk data center. In Section 3 we assumed that information has to be purchased by market participants. It might also be possible to run the system on a club basis, with no marginal costs for data access. Here, each institution that wants to participate in fingerprinted transactions would need to pay some kind of annual fee to the data center. Which of the two financing methods would prove to be superior we presently have to leave to further research.

Informational asymmetries are not an issue solely related to the MBS securitization market. Thus, it might also be a good idea to use the fingerprint mechanism in non-mortgage related areas. We believe that the transfer of our idea to other market segments would require the ability to provide standardized information to the data center. This seems likely in the area of car loans, for instance, but may be a problem in areas where the underlying risk is less standardized, like tailored loans to corporations (encompassing various covenants or options).

A further aspect to consider is the possible need for confidentiality. A homeowner or originator may not want information provided to the data center. The homeowner's agreement to have information reported to the data center could be obtained as part of the mortgage contract. Since our mechanism is not compulsory, we might observe two market segments, fingerprint transactions with low interest rates and a low level of confidentiality, and non-fingerprint transactions with high interest rates and high level of confidentiality and opaqueness.

Finally, it is an open question whether fingerprinting is possible in structures involving synthetic collateralized debt obligations (CDO) and credit default swaps (CDS). In general, information relating to risks of the underlying loans and payoff functions that would need to be provided to the data center would be similar in synthetic transactions. However, one issue

that would need to be resolved in this case would be how to handle and report counterparty risk. To address such problems, Brunnermeier (2008) suggests the creation of a clearing house.

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Figure 1: Mortgage-Backed Securitization at Present

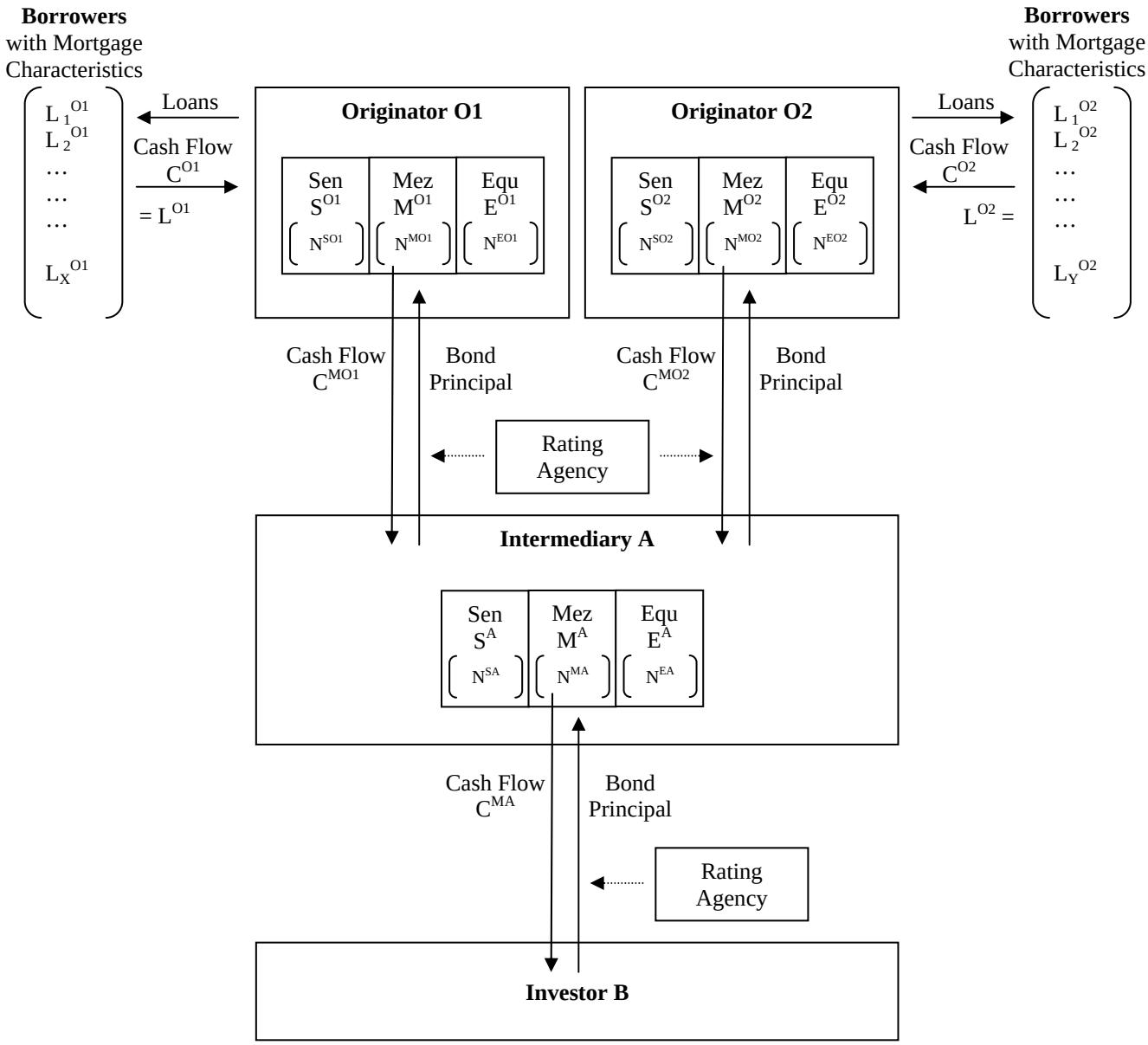
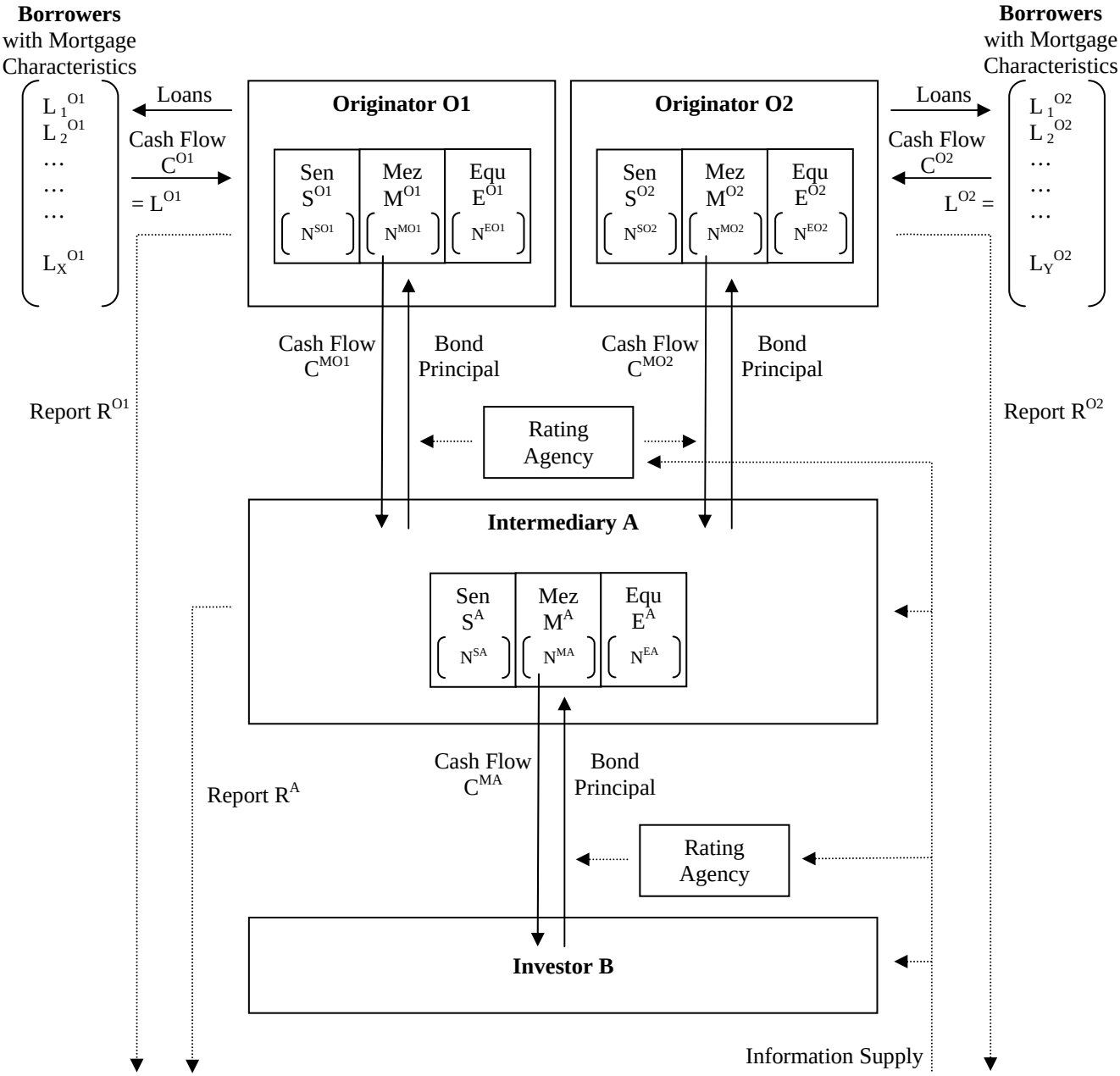


Figure 2: Securitization with a Global Mortgage Data Center



Global Mortgage Data Center

Mortgage Characteristics

L_1^{O1} L_2^{O1} … … … L_X^{O1}

L_1^{O2} L_2^{O2} … … … L_Y^{O2}

Bond Characteristics

Nominal amounts and timing

$\{ N^{SO1}, N^{MO1}, N^{EO1}, N^{SO2}, N^{MO2}, N^{EO2}, N^{SA}, N^{MA}, N^{EA} \}$

with

$\{ N^{SO1} = [N^{SO1}_{t1}, N^{SO1}_{t2}, \ldots] \}$ $\{ \ldots \}$

Claims functions (here only shown for mezzanine tranches, ignoring timing)

$C^{MA} = \min\{N^{MA}, \text{sum}(C^{MO1}, C^{MO2}) - \min\{\text{sum}(C^{MO1}, C^{MO2}), N^{SA}\}\}$

$C^{MO1} = \min\{N^{MO1}, C^{O1} - \min\{C^{O1}, N^{SO1}\}\}$
$C^{MO2} = \min\{N^{MO2}, C^{O2} - \min\{C^{O2}, N^{SO2}\}\}$

C^{O1} = sum(Cash flows from O1's mortgage portfolio L^{O1})
C^{O2} = sum(Cash flows from O2's mortgage portfolio L^{O2})

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This research was supported by the Deutsche Forschungsgemeinschaft through the SFB 649 "Economic Risk".