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Ratings based capital adequacy for securitizations

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ABSTRACT

This paper develops a framework to measure the exposure to systematic risk for pools of asset securitizations and measures empirically whether current ratings-based rules for regulatory capital of securitizations under Basel II and Basel III reflect this exposure. The analysis is based on a comprehensive US dataset on asset securitizations for the time period between 2000 and 2008. We find that the shortfall of regulatory capital during the Global Financial Crisis is strongly related to ratings. In particular, we empirically show that insufficient capital is allocated to tranches with the highest rating. These tranches account for the greatest part of the total issuance volumes. Furthermore, this paper is the first to calibrate risk weights which account for systematic risk and provide sufficient capital buffers to cover the exposure during similar economic downturns. These policy-relevant findings suggest a re-calibration of RBA risk weights and may contribute to the current efforts by the Basel Committee on Banking Supervision and others to re-establish sustainable securitization markets and to improve the stability of the financial system.

1. Introduction

1.1. Motivation and contributions

Asset securitizations are attractive to the financial industry as a source of funding, risk intermediation and asset and liability management.[3] The merits of securitization, despite the controversial public discussion, are recognized by regulators. As a consequence of the Global Financial Crisis (GFC) 2007–2009 where many financial institutions worldwide suffered from tremendous losses due to investments in these products, the Basel Committee on Banking Supervision (2011) noticed a sharp decline of issuance volumes (e.g., in the US, from about US$ 2 trillion in 2007 to around US$ 400 billion in 2008). Therefore, regulators are working on re-establishing sustainable securitization markets. This paper contributes to these efforts by analyzing the rules for the ratings-based calculation of regulatory capital in relation to the financial risks of asset securitizations.

Asset securitizations include asset-backed securities (ABSs), collateralized debt obligations (CDOs), commercial and residential mortgage-backed securities (CMBSs and RMBSs) and home equity loan securitizations (HELs). These instruments have been a major source of financial losses to investors and institution failures during the GFC. In hindsight, the ratings-based regulatory capital requirements for securitizations were often insufficient to cover losses during the GFC. The high default rates of structured financial instruments during the GFC indicate that securitization exposures are particularly sensitive to systematic risks.

Credit rating agencies (CRAs) consider probabilities of default (PDs) or expected losses (i.e., PDs weighted by losses given default) as key rating criteria. The structure of the credit rating models for securitizations used by the major rating agencies is quite similar. CDO evaluation models are VECTOR from Fitch rating agency (compare Fitch Ratings, 2006), CDOROM from Moody's Investors Service (compare Moody's Investors Service, 2006) and CDO Evaluator from Standard & Poor's (compare Standard & Poor's, 2005). Rating agencies estimate expected losses or default probabilities of the

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different tranches as a result of these quantitative models. In these models, the default and loss rates for the individual tranches are derived from expected future cash flows generated by the underlying asset pool for different scenarios using Monte Carlo simulations. Copula or factor models are used to model the joint distribution of the default processes of the underlying individual assets. Cumulative portfolio loss rates are based on the combination of probabilities of default, recovery rates and asset correlations.

The current numbers of rating changes from rating agencies for structured products may indicate that ratings are very limited in terms of economic informativeness. From 2008 to 2011, the bulk of rating changes were downgrades. In 2010, Standard & Poor's reports for European securitizations 617 upgrades and 2663 downgrades and for US securitizations 662 upgrades and 18,461 downgrades. For January to September 2011, for European securitizations 410 upgrades and 2177 downgrades and for the US securitizations 1427 upgrades and 12,971 downgrades were reported. The other main rating agencies Moody's Investors Service and Fitch Ratings report similar numbers (compare, e.g., Association of Financial Markets in Europe, 2011). The large number of recent downgrades may be explained by a revision of rating agency expectations, poorer collateral performances and by changes in the rating methodologies, to address underestimated concentration- and correlation risks (compare European Central Bank, 2011). The bunching of rating downgrades during economic downturns questions whether rating agencies thoroughly discriminate between systematic and non-systematic risk and whether the systematic risk of securitized products is sufficiently incorporated in the corresponding rating grades of all single tranches of a securitized exposure.

The current regulatory framework of risk-based capital provision for structured financial instruments strongly relies on the quality of a bank's internal or external rating. Financial institutions have two ways to determine regulatory capital for securitized assets: the Ratings Based Approach (RBA) and the Supervisory Formula Approach (SFA). A bank is generally obliged to apply the RBA for securitization exposures if a credit rating is available.

The RBA for securitizations is attractive for its simplicity. It consists of two look-up tables displaying risk weights for long-term and short-term rated securitization tranches. The risk weights for the tranches increase with the external rating grades and vary according to the seniority of a specific tranche, the granularity of the underlying pool, and whether securitizations are included in the collateral pool (i.e., transaction is a re-securitization). The mapping tables have been crafted to match the default and loss performance of ratings prior to the GFC and their validity has not been scrutinized since this time.

The adequacy of regulatory capital requirements for securitizations under the RBA generally relies on the accuracy of external ratings. Earlier papers argue that (a) ratings-based capital adequacy basically depends on the ability of rating agencies to measure and include systematic risk in their ratings, see Iannotta and Pennacchi (2011) and (b) securitized tranches are highly exposed to systematic risks, see Coval et al. (2009). If external ratings do not include the systematic risk accurately then capital requirements may be insufficient during periods of stress. Based on this hypothesis, the analyzed research questions and contributions of this paper are as follows.

Firstly, this paper develops a framework to empirically measure the exposure to systematic risk of the asset portfolio underlying a securitization. Existing approaches capture the systematic risk of securitized tranches, while the model underlying the calibration of risk weights for the RBA is based on the systematic risk of the asset portfolio. The accuracy of this framework is tested in Monte Carlo simulation studies.

Secondly, this paper calculates the conditional expected tranche loss (CEL) as a measure for capital based on the empirical exposure to systematic risk for securitization categories, granular and non-granular exposures, and re-securitization exposures. A comprehensive dataset of asset securitizations, which includes five different transaction types with over 200,000 annual tranche observations is analyzed. We specify the impact of the effects from systematic risk of the asset portfolios on securitization exposures.

Thirdly, we compare the actual RBA capital and our calibrated 'systematic risk implied' CEL counterpart. As a result, the paper uncovers areas on the rating scale which provide insufficient capital coverage based on this comparison. We show that the capital shortfall from the underestimation of systematic risk predominantly relates to the tranches with higher ratings. This observation is exacerbated as the higher-rated tranches count for the larger part of issuance volumes. This is consistent with prior literature as Benmelech and Dlugosz (2010) argue that nearly 50% of the securitized tranches rated by Moody's in 2008 were Aaa-rated. Erel et al. (2011) show that the largest write-downs and losses related to highly-rated tranches. Furthermore, the higher rated tranches are regarded as most sensitive to systematic shocks (compare, e.g., Coval et al., 2009).

Fourthly, this paper discusses ways to mitigate the gap between RBA and implied expected tranche loss. CRAs may consider changing their rating approach. Alternatively, capital regulation may have to account for the systematic risk of securitizations. This paper analyzes both alternatives and proposes that it should be capital regulation which needs to account for the higher systematic risk as it is practically challenging to influence the methodology of the rating agencies. Therefore, a re-calibration of the risk weights for securitizations in order to avoid unexpected losses to financial institutions during economic downturns is suggested. The proposed risk weights exceed the current risk weights for the higher-rated tranches.

The remainder of the paper proceeds as follows. Section 1.2 gives a brief overview of the relevant literature. Section 2 provides an empirical analysis of ratings-based capital adequacy for securitizations. Section 2.1 introduces and describes the dataset of asset securitizations used in the empirical investigation and Section 2.2 develops the model framework to measure the exposure to systematic risk of pools of asset securitizations. Section 3 presents the main results and conclusions from our empirical analysis. Section 4 provides robustness tests. Finally, in Section 5 prudential regulatory policy implications are discussed.

1.2. Related literature

This paper relates to three streams in the literature. The first stream focuses on the theoretical framework of the regulatory approaches for securitizations. The RBA is based on an analytical model for calculating capital charges based on conditional expected losses (CEL) for tranches of securitized large portfolios (so called 'pools') by Pykhtin and Dev (2002, 2003). The model is related to a single-factor model for individual asset returns by Merton (1974), and is also known as the 'Gaussian factor copula model'. In order to develop a simple industry standard Peretyatkin and Perraudin (2004) have employed the Pykhtin–Dev model to calibrate risk weights for tranches of structured financial instruments. Their simulation results were considered when determining the current risk weights in the Basel documents.[4] The risk weights range from 7% which is the floor for Aaa-rated tranches up

[4] The current modified risk weight tables can be found at the web site of the Basel Committee on Banking Supervision, e.g., Basel Committee on Banking Supervision (2009).