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The Proposed Revised Ratings-Based Approach

1. This technical paper describes the assumptions and methodology underlying the Revised Ratings-Based Approach (RRBA) as proposed in the Basel Committee's recent consultative paper "Revisions to the Basel Securitisation Framework."[1] The RRBA is calibrated to approximate tranche capital charges generated by the Modified Supervisory Formula Approach (MSFA) under the assumption that an external credit rating is a proxy for the tranche's expected loss rate (EL). Given an assumed risk profile for an underlying homogeneous pool of exposures ('pool') -- characterised by maturity, probability of default (PD), loss given default (LGD), and asset value correlation (AVC) -- a stylised EL-based credit rating model consistent with the MSFA is used to infer attachment and detachment points for hypothetical tranches having various ratings, seniorities and, for non-senior tranches, thicknesses. With these variables as inputs, the MSFA is used to estimate implied tranche capital charges. The RRBA is then calibrated to approximate the relationship between MSFA capital charges and a tranche's rating, seniority, maturity, and thickness.

2. The remainder of this paper is organised as follows. Section I summarises the current RBA framework and key objectives motivating the proposed RRBA. In Section II we review the basic structure of RRBA capital charges. The remainder of the paper then focuses on the methodology used to calibrate these charges. Section III summarises the stylised credit rating process and other key assumptions underpinning the RRBA. After outlining the technique used to create a dataset containing estimated MSFA capital charges associated with different tranche ratings, seniorities, maturities, and thicknesses, Section IV report parameter estimates and illustrative RRBA risk-weights based on these estimates. Some concluding remarks are presented in section V.

I. Current Ratings-Based Approach

3. The specification and calibration of the current RBA were heavily influenced by the generally favourable performance of securitisation markets prior to adoption of the Basel II Accord in June 2004, especially for tranches with high investment grade credit ratings. A key objective underlying the RBA was minimising implementation burden to banks in term of inputs and computational complexity, even if at the expense of reduced risk sensitivity. As shown in Table 1, the structure of the RBA depends on whether the underlying transaction is a 'securitisation' (ie the pool contains no tranched exposures) or a 'resecuritisation' (ie the pool contains at least one tranched exposure). Other things the same, the risk-weight for a resecuritisation exposure generally is materially higher than for a securitisation exposure.[2] In light of the especially poor performance of resecuritisations during the financial crisis, however, the proposed RRBA would not be applicable to this class of investments. Thus, the remainder of this paper focuses on securitisation exposures *per se*.

[1] Basel Committee on Banking Supervision (2012).

[2] Resecuritisations were not common in 2004, and the original RBA did not distinguish between securitisations and resecuritisations. Revisions to the RBA adopted by the Committee in 2009 (Basel 2.5) imposed the more conservative treatment for resecuritisations shown in the Table 1.

Table 1

Current RBA

	Securitisation Exposures			Re-Securitisation Exposures	
Long-Term	Senior, Granular	Non-Senior,	Non-Granular	Senior	Non-Senior
AAA	7	12	20	20	30
AA	8	15	25	25	40
A+	10	18	35	35	50
A	12	20	35	40	65
A-	20	35	35	60	100
BBB+	35	50	50	100	150
BBB	60	75	75	150	225
BBB-	100	100	100	200	350
BB+	250	250	250	300	500
BB	425	425	425	500	650
BB-	650	650	650	750	850
Below	1250				

Short-Term Rating	Securitisation Exposures			Re-Securitisation Exposures	
	Senior, Granular	Non-Senior,	Non-Granular	Senior	Non-Senior
A1	7	12	20	20	30
A2	12	20	35	40	65
A3	60	75	75	150	225
Below	1250				

4. Under the current RBA, the risk weight for a securitisation exposure depends on the tranche's external credit rating, whether the exposure is the securitisation's most senior tranche, and whether the underlying pool is granular (defined as representing an effective number of loans greater than or equal to six).[3] The calibration of the RBA was largely judgmental, and reflected not only the performance of securitisation markets historically, but also a presumption that sound credit rating, underwriting, due diligence, and control practices within the industry would prevail going forward. Two prominent feature of the RBA are (a) fairly low risk-weights for the highest investment-grade rated tranches, especially for senior tranches backed by granular pools; and (b) a steep increase in risk weights as ratings deteriorate below investment grade, culminating in a 1250% risk weight (ie 100% capital charge) for tranches rated below the equivalent of BB-.[4]

5. The specification and calibration of the RRBA is motivated by several regulatory concerns spawned by the financial crisis. First, in light of the loss experience of many AAA-rated senior tranches, regulators now view the current RBA's risk weights for such tranches as imprudently low. Second, the implied cliff effect as a tranche's rating deteriorates below investment grade appears excessive, and in some situations creates adverse incentives for banks to liquidate positions or undertake regulatory arbitrage. In addition, the inputs to the RBA exclude certain factors that, in addition to a credit rating, appear to be material risk drivers for securitisation tranches (ie a tranche's maturity and thickness). When addressing these concerns, a related objective has been to achieve greater internal consistency within the Basel securitisation framework's hierarchy of approaches.

6. The proposed RRBA differs from the current RBA in several dimensions. First, in contrast to RBA's largely judgmental calibration, the RRBA is calibrated to approximate results generated by a fully specified credit risk model. Key components of the RRBA calibration include the MSFA and its underlying modelling assumptions, an assumed credit rating model, and the assumed risk characteristics of the underlying pool. For technical details regarding the MSFA modelling framework, the reader is referred to "Foundations of the Modified Supervisory Approach", published by Basel Committee on Banking Supervision (2012a).

7. Second, although simplicity and minimal burden continue to be objectives, relative to the SFA, the RRBA incorporates two additional inputs identified as material risk factors in research studies: maturity (M) and, for non-senior securitisation exposures, tranche thickness (T) measured as a share of the current notional principal of the overall pool.[5] Even though rating agencies can be presumed to take account of maturity and thickness within their rating methodologies, these factors nevertheless are material for assigning capital charges to tranches within a coherent risk modelling framework. The framework herein assumes a credit rating to be a proxy for an instrument's *unconditional* expected loss rate (EL). In contrast, within standard regulatory capital modelling approaches (eg Value-At-Risk (VAR) or Expected Shortfall (ES)), an instrument's capital charges reflects its expected loss

3 The effective number of loans is defined as $= \frac{\left(\sum_i EAD_i\right)^2}{\sum_i EAD_i^2}$, where EAD_i denotes the exposure at default of the pool's i[th] loan. This formula for N corresponds to the inverse of the Herfindahl-Index for exposure concentrations within the pool.

4 As employed in this paper, references to particular rating designations are not meant to be associated with any particular credit rating agency.

5 See, for example, Peretyatkin-Perraudin (2004), Perraudin (2006), and Hamerle-Liebig-Schropp (2009). Although the paper by Hamerle-Liebig-Schropp focus on determinants of market prices for asset-backed securities, factors relevant for pricing (eg the systematic risk inherent in a tranche) also are important when evaluating capital adequacy.

rate (or other statistics) *conditional* on an assumed stress event In general, a tranche's unconditional expected loss rate, or credit rating, is not a sufficient statistic for determining its conditional expected loss rate. Within the MSFA modelling framework, which assumes an asymptotic single risk factor (ASRF) process driving pool credit losses, the mapping between unconditional and conditional loss rates depends on tranche maturity, thickness, and risk parameters for the underlying pool.

8. Third, use of the MSFA framework when calibrating the RRBA calibration avoids an implicit assumption within the current RBA that can lead to understating the systematic risk of securitised assets. As noted in Peretyatkin-Perraudin (2004) and Perraudin (2006), within the context of a mark-to-market credit risk model for securitisation exposures that incorporates assumptions for pool credit losses broadly consistent with the IRB wholesale framework, the current RBA calibration appears to presume a relatively low correlation between the systematic risk factors driving credit losses for the pool and for the bank's other assets.[6] The RBA appears to presume, in effect, that for the same IRB risk parameters (eg PDs, LGDs, and AVCs) the exposures backing a securitisation generally entail less systematic risk than similar assets held by a bank on its balance sheet. An implication is that if a small pro-rata portion of a securitised pool were held directly by the bank, the appropriate capital charge should be materially less than the IRB capital charge against those assets, ostensibly because a greater share of the investment's risk could be diversified away.

9. During the financial crisis, however, loans held on banks' balance sheets and similar exposures backing securitisation pools experienced high loss rates concurrently. Indeed, many securitisation investments held by banks were backed by assets virtually identical to those held by the firms directly. In contrast to the RBA, the MSFA framework used to calibrate the RRBA presumes there is no difference between the systematic risks associated with securitised exposures and exposures held directly by a bank; that is, the correlation between the underlying systematic risk factors is 100%.[7]

10. Lastly, when calibrating the RRBA, the assumed credit rating process is made explicit. As in Peretyatkin-Perraudin (2004), the RRBA assumes that a credit rating reflects a debt instrument's EL and that credit rating processes for tranches and corporate bonds are consistent so that identical ratings imply identical ELs across asset types.[8] In light of recent enhancements to rating processes, the rating model developed herein is not tied to the performance of securitisation ratings during the financial crisis. Rather, we assume that for a given maturity and rating grade, the implied tranche EL equals the historical loss rate for corporate bonds having that rating. We believe this to be a reasonable assumption which acknowledges industry efforts to address pre-crisis deficiencies in rating methodologies and other market practices, while also recognising the limited experience with the new practices.

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[6] Peretyatkin-Perraudin suggest a 60% correlation would roughly align the RBA with tranche capital charges estimated by their model.

[7] Another factor contributing to outsized credit losses at many banks during the financial crisis was large portfolio concentrations in asset-backed securities. Within the Basel framework, portfolio concentrations are addressed within Pillar 2, rather than Pillar 1. Thus, like the current RBA, the proposed RRBA presumes that a bank's overall portfolio comprises small investments in many financial instruments, and that apart from the influence of a single, global risk factor the risks of these instruments are idiosyncratic.

[8] Peretyatkin-Perraudin (2004) and Hamerle-Liebig-Schropp (2009) contrast rating approaches based on expected loss criterion with approaches based on an instrument's probability of default.

II. Structure of RRBA Equations

11. An important objective of the RRBA is that the approach should be implementable with minimal computational complexity using information readily available to a bank investing in an externally rated tranche. To facilitate using the MSFA framework later in the calibration process, the RRBA's inputs (apart from a tranche's credit rating) were chosen to encompass those MSFA inputs that reflect the most basic structural characteristics of a tranche, namely, seniority, thickness, and maturity. In the interest of simplicity, tranche thickness is not an RRBA input when computing required capital for senior tranches.

12. For a given tranche rating, the RRBA specifies the capital charge *per unit of tranche exposure* for senior and non-senior tranches, respectively, as[9]

(1) **Senior:** $K_{senior} = Alpha \cdot \left(1 + Beta \cdot (M-1)\right)$

(2) **Non-senior:** $K_{non-senior}$ = Greater of K_{senior} and $K = \min\left[Alpha0, \frac{a}{1+bT}\right] \cdot \left(1 + \left(\frac{c}{1+dT}\right) \cdot (M-1)\right)$.

where each RRBA parameter (ie *Alpha, Beta, Alpha0, a, b, c,* and *d*) is non-negative and depends on the tranche rating.

13. For a multi-year securitisation exposure, the capital charge is equal to the charge for a one-year exposure *multiplied by* a maturity adjustment that is a linear function of M. The simplifying assumption of linear maturity adjustments is consistent with the treatment of maturity within the IRB framework for wholesale exposures, and represents an approximation to the more complex determination of maturity adjustments within the MSFA. For a senior tranche, the $Alpha$ parameter represents the capital charge for a tranche having a one-year maturity.

14. For a non-senior tranche with a given rating, both the one-year charge and the maturity adjustment are related negatively to tranche thickness. That is, for a given credit rating, a thicker tranche will incur a smaller one-year charge as well as a smaller maturity adjustment. In order to mitigate potential arbitrage, the capital charge for a non-senior tranche is floored at what would prevail for a hypothetical senior tranche with the same rating and maturity. When this constraint is not binding, the one-year capital charge is given by $min[Alpha0, \frac{a}{1+bT}]$.

III. Rating Model and Other Key Assumptions

15. The RRBA parameters are calibrated to approximate the capital charges that would be implied by a version of the MSFA that does not incorporate prudential add-ons.[10] When applying the MSFA for this purpose, the MSFA's inputs (eg IRB parameters for the underlying pool and tranche attachment and detachment points) are designed to be consistent with the assumed credit rating. Underlying any external ratings-based approach to regulatory capital is an assumed model for how credit ratings are determined. The rating procedures of all the major rating agencies are complex and highly judgmental; thus, any

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[9] When applying the formulas below, a tranche's capital charge is capped at 100%.

[10] For the purpose of the RRBA calibration, we employ a version of the MSFA model that abstracts from model risk in the sense that the τ and ω regulatory parameters are set equal to infinity, the floor capital charge is set to zero, and there is no automatic 100% capital charges against tranche positions covering pool losses below K_{IRB}, the IRB charge against the underlying pool.

rating model is inherently stylised. As in Peretyatkin-Perraudin (2004), we assume that ratings are based on a debt instrument's EL, and that for a given rating grade the implied tranche EL equals the historical loss rate for corporate bonds with that rating and maturity.

16. The mapping between rating grades and ELs for different maturities was developed in three stages. First, based on Moody's historical corporate default data, we constructed the mapping between credit rating grades and historical one-year default rates for corporate borrowers shown in Table 2. Next, based on historical one-year rating transitions for corporate bonds, again based on Moody's data, we constructed the following simple model relating historical one-year default rates to M-year default rates:

$$(3)\ PDM = \frac{1}{1 + e^{-x-(5-0.15x)\cdot(M^{0.2}-1)}};$$

where $x = log\left(\frac{PD1}{1-PD1}\right)$, $PD1$ is the probability of default within the next year, and PDM is the probability of default within M years.[11]

Table 2

One-Year PD Associated with Rating Grade

Rating Grade	One-Year PD
AAA	0.005%
AA+	0.010%
AA	0.021%
AA-	0.029%
A+	0.041%
A	0.057%
A-	0.084%
BBB+	0.125%
BBB	0.186%
BBB-	0.349%
BB+	0.652%
BB	1.216%
BB-	1.922%
B+	3.024%
B	4.729%
B-	7.335%
CCC+	11.210%
CCC	16.762%
CCC-	27.864%
CC/C	42.559%

[11] The construction of Table 2 and derivation of equation (3) are summarised in Annex 1 of "Foundations of the Modified Supervisory Approach", published by Basel Committee on Banking Supervision (2013).

17. Lastly, drawing on published studies of historical bond recoveries and rating agency methodologies, we assumed a 55% average loss given default on senior, unsecured corporate bonds.[12] Combining these results, for a given rating grade G and maturity, the assumed EL target associated with that rating is calculated as $0.55 \cdot PDM_G$, where PDM_G is the M-year PD obtained by substituting the one-year PD from Table 2 into equation (3).

18. The MSFA requires as inputs the attachment and detachment points for the tranche of interest. Given the MSFA's implied model for pool credit losses (which depends on other inputs as well), the above credit rating model can be used to determine the attachment and detachment points associated with a tranche having a given rating grade, seniority, maturity, and thickness (for non-senior tranches). Specifically, we assume that pool credit losses are generated by the model underpinning the MSFA, and that the credit rating agency sets EL-based credit ratings consistent with this framework. Attachment and detachment points are calculated so that the tranche EL equals the assumed EL target for that rating grade and maturity, as described above. Importantly, the MSFA modelling framework assumes no tranche payouts until maturity and assumes no excess spread income is earned on the underlying securitised exposures. Thus, when calculating implied attachment and detachment points, the tranche EL is measured as the tranche's expected lifetime principal losses per unit of current tranche pool principal outstanding. For example, if current tranche principle was 100 Euros and the tranche's expected principal writedown through maturity (undiscounted) was 10 Euros, the tranche EL would be calculated as 10%. For simplicity, the RRBA calibration assumes a homogeneous underlying pool of exposures.

19. It is well known that a tranche's EL generally is not a sufficient statistic for calculating a tranche's expected loss rate conditional on a stress realisation of the systematic risk factor. Thus, the regulatory capital charge estimated by the MSFA, which is based on an ES risk measurement approach, generally will depend on the assumed risk parameters (eg PDs, LGDs, and AVCs) for the underlying securitised exposures.

20. Preliminary experimentation with the modelling framework suggested that for given tranche rating and maturity, the MSFA's estimated capital charge for a senior tranche tended to be an increasing function of LGD, the one-year PD, and the number of exposures in the pool. Since the version of the MSFA model used in this exercise suppresses supervisory add-ons, for RRBA calibration purposes we adopted somewhat conservative assumptions for these parameters. The number of corporate bonds in the pool was assumed to be infinite ('infinite granularity'), and LGD was set equal to 60%. The (one-year) PD assumption for the underlying exposures was set based on the tranche rating, as shown in Table 3. For tranche ratings of BB or better, the assumed PD was set at 4.73%, corresponding to the average one-year PD for B-quality corporate bonds shown in Table 2. For lower tranche ratings, the assumed PD for the underlying exposures corresponds to a rating three notches below the tranche rating. Thus, for a tranche rated BB-, the PD for the underlying exposures was assumed to be 7.335% (B-). The AVC among the exposures in the pool was set equal to the value specified in the IRB wholesale capital formula for the given PD.

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[12] On the basis of discounted recoveries for defaults over the period 1987-2011, the mean loss severity for senior unsecured corporate bonds is estimated at 52.5% by Moody's and 56.5% by Standard and Poor's.

Table 3

Relationship Between Tranche Rating and One-Year PD for Pool Exposures

Tranche Rating	Assumed One-Year PD for Exposures
AAA	4.729%
AA+	4.729%
AA	4.729%
AA-	4.729%
A+	4.729%
A	4.729%
A-	4.729%
BBB+	4.729%
BBB	4.729%
BBB-	4.729%
BB+	4.729%
BB	4.729%
BB-	7.335%
B+	11.210%
B	16.762%
B-	27.864%
Below B-	42.559%

IV. Calibration of RRBA Parameters

21. Using the assumptions described above, the RRBA parameters were calibrated using a three-step process. First, for each pool configuration discussed above, the credit rating model was used to estimate attachment and detachment points for hypothetical senior and non-senior tranches having notched tranche ratings from AAA to CCC, maturities ranging from one year to five years, and (for non-senior tranches) thicknesses ranging from 0.1% to 99% of pool notional.[13] Next, for each hypothetical tranche and pool specification, the MSFA was used to estimate the tranche's capital charge. Lastly, the RRBA parameters in equations (1) and (2) were calibrated to approximate the MSFA's estimated capital charges using a nonlinear least squares methodology.[14]

22. The resultant parameter estimates are shown in Table 4. Illustrative risk-weights implied by these estimates, along with risk-weights implied by the current RBA, are shown in Table 5 for selected tranche characteristics: credit rating, seniority, maturity, and, thicknesses (non-senior only). As can be seen, other things the same, RRBA risk weights are considerably higher than under the RBA, and cliff effects are greatly mitigated as tranche ratings worsen below investment grade.

Table 4

Calibrated RRBA Parameters

Tranche Rating	Alpha	Alpha0	a	b	Beta	c	d
AAA	0.0145	0.0145	0.0221	0.5321	0.5499	2.1670	4.3362
AA+	0.0259	0.0259	0.0397	0.5321	0.3258	1.5109	4.3362
AA	0.0409	0.0535	0.0580	0.5321	0.2246	0.8927	4.3362
AA-	0.0487	0.0822	0.0921	0.9527	0.2013	0.5861	4.3362
A+	0.0568	0.1224	0.1408	1.4910	0.1882	0.3835	4.3362
A	0.0650	0.1762	0.2060	2.1419	0.1828	0.2419	3.8442
A-	0.0748	0.2610	0.3089	3.2605	0.1828	0.1165	0.7483
BBB+	0.0845	0.3664	0.4312	4.0123	0.1828	0.0632	0.0000
BBB	0.0940	0.4871	0.5419	4.2225	0.1828	0.0404	0.0000
BBB-	0.1085	0.6841	0.6804	4.2225	0.1828	0.0382	0.0000
BB+	0.1225	0.8463	0.8290	4.2225	0.1828	0.0382	0.0000
BB	0.1358	0.9448	1.0432	4.6740	0.1828	0.0382	0.0000
BB-	0.1679	0.9842	1.2406	5.0846	0.1828	0.0382	0.0000
B+	0.2094	0.9972	1.4151	5.1545	0.1724	0.0330	0.0000
B	0.2564	0.9997	1.6164	5.1545	0.1281	0.0085	0.0000
B-	0.3109	1.0000	1.6758	5.1545	0.0730	0.0000	0.0000
CCC+/CCC/CCC-	0.3778	1.0000	1.7786	5.1545	0.0509	0.0000	0.0000

[13] For some parameter specifications, it was not possible to construct tranches having the desired the senior, maturity, and thickness.

[14] The estimation technique imposed two constraints on each parameter. All parameters were constrained to be non-negative. In addition, each parameter was constrained to be a monotonic function of the tranche rating. That is, as the tranche rating worsened progressively, changes in the parameter were constrained to be all non-negative or all non-positive.

Table 5

Illustrative RRBA Risk Weights

(percent, does not incorporate floor capital charge)

	SENIOR TRANCHE		NON-SENIOR TRANCHE							
			Thin		Thickness = 0.10		Thickness = 0.25		Thickness = 0.50	
	Maturity (years)		Maturity (years)		Maturity (years)		Maturity (years)		Maturity (years)	
Rating	1	5	1	5	1	5	1	5	1	5
AAA	18	58	18	175	18	128	18	94	18	68
AA+	32	75	32	228	32	169	32	126	32	94
AA	51	97	67	306	67	233	64	174	57	122
AA-	61	110	103	344	103	271	93	198	78	136
A+	71	124	153	388	153	317	128	223	101	150
A	81	141	220	433	212	360	168	250	124	166
A-	94	162	326	478	291	417	213	296	147	197
BBB+	106	183	458	574	385	482	269	337	179	225
BBB	118	203	609	707	476	553	330	383	218	253
BBB-	136	235	851	980	598	689	414	477	273	315
BB+	153	265	1036	1195	729	840	504	581	333	384
BB	170	294	1181	1250	889	1024	601	693	391	450
BB-	210	363	1230	1250	1028	1185	683	787	438	505
B+	262	442	1247	1250	1167	1250	773	875	494	560
B	321	485	1250	1250	1250	1250	883	913	565	584
B-	389	502	1250	1250	1250	1250	915	915	586	586
CCC+/CCC/CCC-	472	568	1250	1250	1250	1250	971	971	621	621

RBA Risk Weights

	SENIOR TRANCHE		NON-SENIOR TRANCHE							
			Thin		Thickness = 0.10		Thickness = 0.25		Thickness = 0.50	
	Maturity (years)		Maturity (years)		Maturity (years)		Maturity (years)		Maturity (years)	
Rating	1	5	1	5	1	5	1	5	1	5
AAA	7	7	12	12	12	12	12	12	12	12
AA+	8	8	15	15	15	15	15	15	15	15
AA	8	8	15	15	15	15	15	15	15	15
AA-	8	8	15	15	15	15	15	15	15	15
A+	10	10	18	18	18	18	18	18	18	18
A	12	12	20	20	20	20	20	20	20	20
A-	20	20	35	35	35	35	35	35	35	35
BBB+	35	35	50	50	50	50	50	50	50	50
BBB	60	60	75	75	75	75	75	75	75	75
BBB-	100	100	100	100	100	100	100	100	100	100
BB+	250	250	250	250	250	250	250	250	250	250
BB	425	425	425	425	425	425	425	425	425	425
BB-	650	650	650	650	650	650	650	650	650	650
B+	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
B	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
B-	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
CCC+/CCC/CCC-	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250

23. Charts 1 and 2 summarise the accuracy with which the RRBA approximates the MSFA capital charges for senior and non-senior tranches, respectively. In both charts, the R^2 between MSFA charges and the RRBA charges is around 99%.

Chart 1

Goodness-of-Fit: Senior Tranches

(tranche ratings of AAA to CCC; M=1, 2, 3, 4, and 5 years)

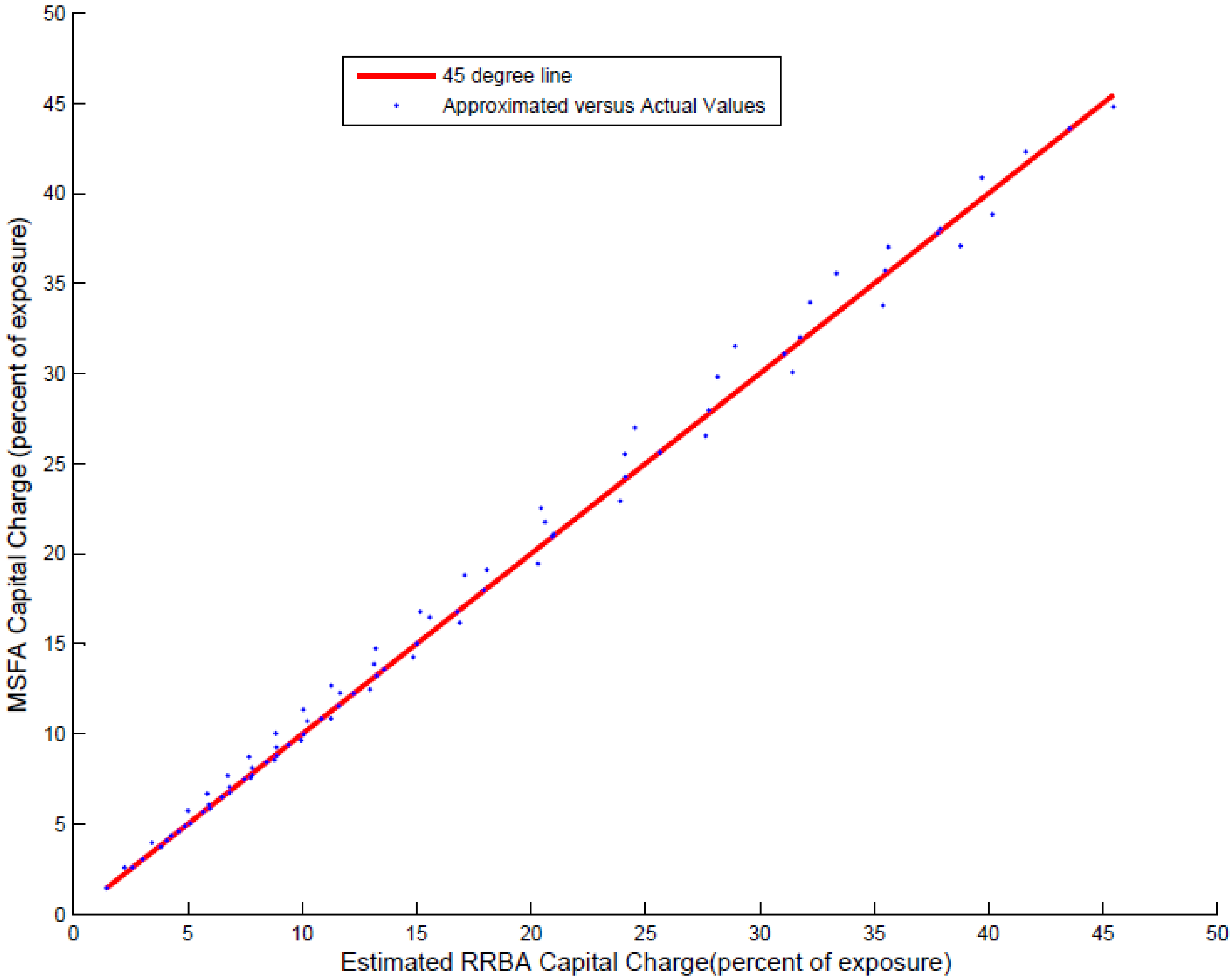
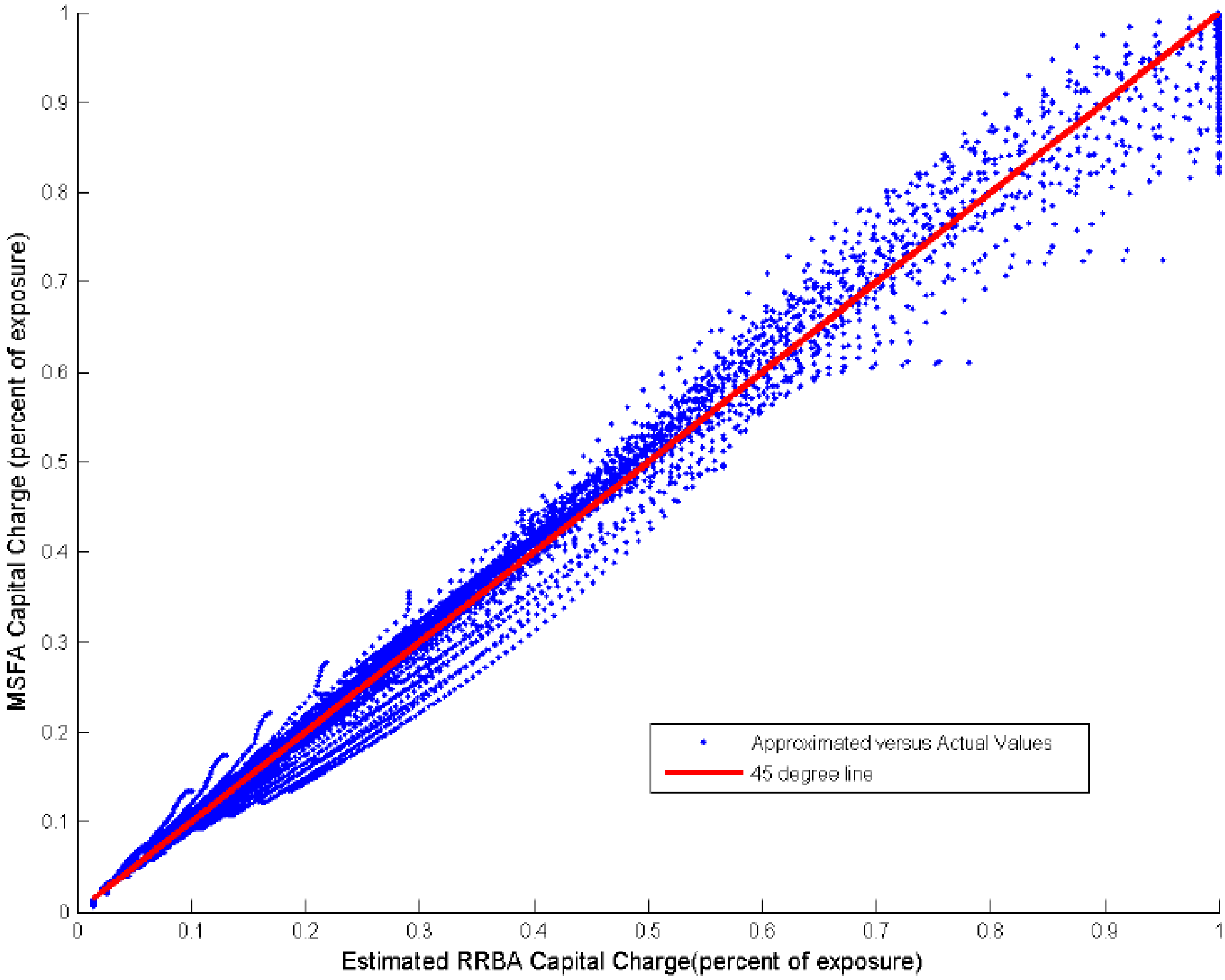


Chart 2

Goodness-of-Fit: Non-Senior Tranches

(tranche ratings of AAA to CCC; M=1, 2, 3, 4, and 5 years; thickness from 0.1% to 99%)



V. Concluding Remarks

24. As described above, the RRBA attempts to address a number of perceived shortcomings in the current RBA, including capital charges for high-investment grade tranches that are too low based on recent experience, pronounced cliff effects as a credit rating declines progressively below investment grade, and failure to account for maturity and thickness as material risk factors. Our basic strategy involved calibrating the RRBA to approximate the tranche capital charges that would be produced by a version of the MSFA that does not incorporate prudential add-ons, using assumptions for MSFA inputs consistent with a given tranche rating. To accomplish this, we also postulated a stylised credit rating model for securitisation exposures whereby rating grades are assumed to be based on an

instrument's expected loss rate and maturity. For calibration purposes, the RRBA also incorporates specific assumptions regarding the nature of the underlying exposures being securitised.

25. While differing in certain details, the above framework is broadly consistent with what other researchers have employed when evaluating a credit ratings-based standard for assigning capital to securitisation tranches.[15] The finding reported herein highlights the fact that a plausible, integrated modelling approach that is broadly consistent with the IRB framework for wholesale exposures can imply capital charges for rated securitisation exposures substantially above those generated by the current RBA, even for senior tranches with high investment grade ratings.

26. The multiple levels of modelling inherent in the RRBA entail considerable potential model risk. As noted by Heitfield (2008), risk estimates for securitisation tranches tend to be very sensitive to errors in modelling the process governing pool losses. By construction the RRBA incorporates the modelling assumptions, and hence any model risks, embedded within the MSFA framework.

27. Importantly, the RRBA calibration also is likely to be quite sensitive to the assumed credit rating process. In particular, not all post-crisis enhancements to credit rating methodologies are captured by our assumed rating model, such as criteria designed to impart greater stability to high investment grade ratings over time. But, while recent improvements in securitisation market practices have been noteworthy in both their magnitude and scope, the short period over which they have been implemented makes it difficult to assess their effectiveness and sustainability.

[15] As in Peretyatkin-Perraudin (2004).

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