

Rating Transition Matrix for Securitized Products (FY2000-FY2015)

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Table of Contents

	Page
Introduction	3
Rating Transition Matrix	3
Rating Transition Matrix by Fiscal Year	3
Rating Transition Matrix by Months Passed	4
Default Rates	6
Study Methodology	7
Data Tables	10

Introduction

This report has been prepared to promote greater understanding of R&I credit ratings for securitized products and illustrates, as rating transition matrices, the results of a study of rating transitions pertaining to securitized products for which R&I has assigned a credit rating. This year's report is the 14th review in the series, which R&I has prepared annually since 2003. The conclusion that can be drawn from the study results is that on average, 90% or more of samples in BBB or higher rating categories are rated equal to or above their ratings at the beginning of a fiscal year after a one-year period, suggesting the stability of credit ratings for securitized products.

In this study, securitized products are financial instruments that are issued to raise funds or transfer risk, with the risk of underlying assets divided among two or more classes by means of a senior/subordinate structure. The number of rating transitions is counted in units of classes with different risks (hereinafter tranche). A rating transition matrix shows how credit ratings assigned to certain tranches have changed at the end of a measurement period. Aside from a credit rating, a tranche may be in the status of "Default" or "Redeemed" (including withdrawals) at the end of a measurement period. R&I has defined a payment shortfall and a rating transition to the CC category or lower as default in this study. In addition to rating transition matrices, it calculates average cumulative default rates by credit rating for securitized products.

R&I has not made any changes to its study methodology since the previous report.

Rating Transition Matrix

Rating Transition Matrix by Fiscal Year

Table 1 shows the rating transition matrix for FY2015. In FY2015, ratings as a whole moved higher. Because there was no event that significantly harmed the performance of underlying assets, downward transitions did not occur. The percentages of ratings upgraded from the AA category to AAA, from the A category to the AA category and from the BBB category to the A category were 4.9%, 0.7% and 9.5%, respectively. With the percentages of ratings upgraded from the AA category to AAA and from the A category to the AA category lower than past mean values (Table 2), the overall number of rating changes was small. The rating upgrades in FY2015 are all for RMBS (residential mortgage-backed securities) and attributable to a gradual rise in credit enhancement levels over time and the continuous good performance of underlying assets.

The rate of AAA ratings that remained at AAA after one year was 100% for four consecutive years. No default occurred in FY2015.

Table 1 Rating Transition Matrix for Securitized Products (FY2015) (Unit: %)

		Rating at end of fiscal year							Default	Sample
		AAA	AA	A	BBB	BB	B	CCC		
Rating at beginning of fiscal year	AAA	100.0								628
	AA	4.9	95.1							103
	A		0.7	99.3						605
	BBB			9.5	90.5					21
	BB									0
	B									0
	CCC									0

Source: R&I

* "Sample" is obtained by subtracting the number of tranches that were redeemed or had their credit ratings withdrawn by the end of the fiscal year from the total number of tranches that had ratings at the beginning of the fiscal year.

The comparison of rating transitions between securitized products and Japanese corporate issuers is provided below in terms of past mean values. In the A rating category or higher with a decent number of samples, ratings for securitized products moved higher than those for Japanese corporate issuers (Tables 2 and 3). This is because ratings for securitized products tend to be upgraded as credit enhancement levels increase over time, as long as the performance of underlying assets is in line with the standard scenario assumed when the tranche was initially issued.

Table 2 Mean Values of Rating Transition Matrices by Fiscal Year for Securitized Products¹ (FY2000-FY2015) (Unit: %)

		Rating at end of fiscal year							Default	Sample
		AAA	AA	A	BBB	BB	B	CCC		
Rating at beginning of fiscal year	AAA	99.2	0.8							6,648
	AA	13.4	83.2	3.3	0.1					1,651
	A	0.8	1.7	96.3	0.9	0.1			0.1	6,619
	BBB	0.8	2.1	8.4	85.3	2.4	0.8	0.1		716
	BB				4.9	83.6	8.2		3.3	61
	B					2.3	75.0	18.2	4.5	44
	CCC							60.7	39.3	28

Source: R&I

* "Sample" is obtained by subtracting the number of tranches that were redeemed or had their credit ratings withdrawn by the end of the fiscal year from the total number of tranches that had ratings at the beginning of the fiscal year.

 Table 3 Mean Values of Rating Transition Matrices by Fiscal Year for Japanese Corporate Issuers² (FY2000-FY2015) (Unit: %)

		Rating at end of fiscal year							Default	Sample
		AAA	AA	A	BBB	BB	B	CCC		
Rating at beginning of fiscal year	AAA	81.1	18.9							143
	AA	0.3	96.3	3.3	0.1					1,963
	A		1.3	96.2	2.4	0.1			0.0	4,612
	BBB		0.0	4.2	93.8	1.7	0.0		0.2	2,775
	BB			0.7	7.8	84.0	4.3		3.2	281
	B					15.2	63.0		21.7	46
	CCC						25.0	75.0		8

Source: R&I

* "Sample" is obtained by subtracting the number of tranches that were redeemed or had their credit ratings withdrawn by the end of the fiscal year from the total number of tranches that had ratings at the beginning of the fiscal year.

Rating Transition Matrix by Months Passed

Unlike corporate bonds, which are issued to raise funds and are backed by the firm's ongoing operations, securitized products are backed by the cash flow generated by specific assets. R&I evaluates credit enhancement measures matching that cash flow. Credit enhancement mechanisms vary, but generally changes in securitized product credit ratings are expected to increase with each passing month because of the tendency for the cash flow and the credit enhancement level to deviate from those upon initial rating assignment over time (Tables 4, 5 and 6).

Under the credit enhancement mechanism, there are tranches for which the credit enhancement level becomes relatively higher over time as well as tranches for which the credit enhancement level remains constant. In general, however, the credit enhancement level will tend to become relatively higher over time if the performance of underlying assets is in line with the standard scenario assumed when the tranche was initially issued. In such case, tranches will be upgraded. The tranches that were actually upgraded extended across a range of products including RMBS, CMBS (commercial mortgage-backed securities), CLO (collateralized loan obligations), CBO (collateralized bond obligations), synthetic CDO (collateralized debt obligations), and those that have non-performing loans or individual installment loan receivables as underlying assets. For many of these tranches the cash flow generated by the underlying assets was allocated in order beginning from the highest ranking tranche.

The Data Tables provided later in this report include detailed transition matrices for ratings with a plus (+) or minus (-) sign indicating a notch difference. These matrices show that there are a large number of products whose ratings were either upgraded or downgraded by 1-2 notches from the initial credit rating among those rated between AA- and A-. These were mostly the first-to-default-type or synthetic CDO-type credit linked products which transfer credit risks arising in the corporate portfolio comprised of a few companies to approximately 100 companies through credit default swap (CDS). Since the ratings of these

¹ The values calculated by adding up all the matrices for the number of rating transition cases over 16 years from FY2000 through FY2015 and dividing the results by the number of total samples over 16 years.

² For a detailed definition of default as used in the table, see "Japanese Corporate Default Rates and Rating Transition Matrices (FY1978-FY2015)" dated June 30, 2016.

products are reviewed frequently depending on the credit rating change of the portfolio components or a shorter remaining term to maturity, the ratings tend to change only by 1 notch at a time. Although small in numbers, first-to-default and other types of credit linked products with no credit enhancements are sometimes downgraded drastically or even default due to the substantial deterioration of the directly-related corporate creditworthiness. At any rate, when there are several credit linked products related to a company whose credit rating has changed, a change of one company's rating tends to turn out as rating changes of multiple securitized products in the rating matrix. In Tables 4, 5 and 6, the default cases that occurred from the A rating category are all caused by one default case of a single company.

As regards the products other than credit linked products with no credit enhancements, drastic downgrades and defaults occurred among less diversified CDO products including CBOs, CLOs and synthetic CDOs and real estate related products such as CMBSs compared to other securitized products with credit enhancement. Even with such less diversified products, ratings can be upgraded after being downgraded if their credit enhancement level improves as they come closer to maturity as pointed above. In such case, the products mostly end up being redeemed safely.

Table 4 Rating Transition Matrix by Months Passed (12 months) (Unit: %)

		Rating after 12 months							Default	Sample
		AAA	AA	A	BBB	BB	B	CCC		
Initial Rating	AAA	99.9	0.1							1699
	AA	0.6	91.1	8.4						347
	A	0.2	0.1	99.0	0.5	0.1			0.1	1,607
	BBB	0.6		2.8	96.7					181
	BB				4.5	90.9	4.5			22
	B						86.7	13.3		15
	CCC							100.0		3

Source: R&I

* For tranches that were redeemed or had their credit ratings withdrawn before 12 months passed, credit ratings immediately prior to such redemption or withdrawal were counted.

Table 5 Rating Transition Matrix by Months Passed (24 months) (Unit: %)

		Rating after 24 months							Default	Sample
		AAA	AA	A	BBB	BB	B	CCC		
Initial Rating	AAA	99.6	0.4	0.1						1624
	AA	3.5	82.7	13.0	0.9					347
	A	0.7	0.9	96.3	1.6		0.1		0.4	1,518
	BBB	2.2	2.2	8.3	83.4	3.9				181
	BB				4.5	86.4	9.1			22
	B					6.7	66.7	26.7		15
	CCC							66.7	33.3	3

Source: R&I

* For tranches that were redeemed or had their credit ratings withdrawn before 24 months passed, credit ratings immediately prior to such redemption or withdrawal were counted.

Table 6 Rating Transition Matrix by Months Passed (36 months) (Unit: %)

		Rating after 36 months							Default	Sample
		AAA	AA	A	BBB	BB	B	CCC		
Initial Rating	AAA	98.6	1.4	0.1						1548
	AA	8.1	77.2	13.3	1.4					347
	A	2.0	2.0	93.0	2.4		0.1		0.4	1,432
	BBB	3.9	3.3	9.9	77.3		1.7			181
	BB				4.5	81.8	9.1	4.5		22
	B					6.7	60.0	26.7		15
	CCC								100.0	3

Source: R&I

* For tranches that were redeemed or had their credit ratings withdrawn before 36 months passed, credit ratings immediately prior to such redemption or withdrawal were counted.

Default Rates

Table 7 provides average cumulative default rates by credit rating for securitized products, using the same method as those for corporate bonds. Securitized products are generally designed to prevent failure to meet financial obligations or to be remote from possible legal bankruptcy which can be caused by such failure. The definition of default for securitized products is therefore 'payment shortfall,' not 'failure to meet financial obligations.'

There are no defaults in the securitized products which were in the AAA and AA rating categories. In the A rating category, one defaulted within a year because of the default of a product-related entity whose credit rating is linked to the rating of the securitized product. Accordingly, the default rate of the A category is higher than that of the BBB category after one year. From the second year and after, however, the default rate of the BBB rating category surpassed that of the A category. In the BBB rating category and lower, the default rate was partly lower in the BB category than in the BBB category. Nevertheless, default rates are generally higher in lower ratings.

Securitized products are structured with a target rating. Consequently, the distribution of their credit ratings greatly varies from that of corporate bonds. Ratings for securitized products are biased towards AAA, where most instruments' target ratings are set. Target ratings are rarely set to the BBB rating category or lower; therefore, it is worth noting that the results for the BBB rating category or lower are based on a remarkably small number of samples compared with those for the A rating category or higher.

Table 7 Average Cumulative Default Rates of Securitized Products by Credit Rating (Unit: %)

	1 yr	2 yrs	3 yrs	4 yrs	5 yrs	6 yrs	7 yrs	8 yrs	9 yrs	10 yrs
AAA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A	0.07	0.08	0.11	0.14	0.18	0.18	0.18	0.18	0.18	0.18
BBB	0.00	0.43	0.98	1.72	2.40	2.40	2.40	2.40	2.40	2.40
BB	2.08	2.08	2.08	2.08	2.08	-	-	-	-	-
B	3.39	12.59	21.63	37.31	61.42	87.14	100.00	-	-	-
CCC	37.93	63.49	85.40	96.35	100.00	-	-	-	-	-
All	0.11	0.21	0.33	0.48	0.67	0.82	0.94	0.94	0.94	0.94

Source: R&I

Study Methodology

Securitized Products Covered

The securitized products covered are structured finance products (1) that have divided the risk of the underlying assets among two or more tranches by means of a senior/subordinate structure, in principle; (2) for which R&I has assigned a Long-term Issue Rating; and (3) which R&I is monitoring continuously (the words "securitized products" when used in this report have this same meaning)³. Guaranteed bonds are not included.

Of the securitized products covered, those for which R&I has publicly released⁴ a credit rating are products that had been assigned a credit rating as of April 1, 1998 and products that were rated between April 1, 1998 and March 31, 2016. Securitized products with a non-public credit rating include products that had been assigned a credit rating as of January 1, 2003 and products that were rated between January 1, 2003 and March 31, 2016.

Criteria for Counting the Number of Rated Tranches

As a rule, R&I considers all of the tranches having a pari passu ranking for distribution of the cash flow generated from the same underlying assets to be one tranche⁵ when counting the number of rated tranches (the word "tranche" when used in this report has this same meaning).

In principle, the tracking start date for the tranche credit rating was assumed to be the later of the issue date (or trust execution date^{6 7}) or the rating determination date. The tracking expiration date⁸ was assumed to be the date when the outstanding tranche balance was repaid or the date when the tranche credit rating was withdrawn.

Definition of Default

Securitized products are generally designed to prevent failure to meet financial obligations or to be remote from possible legal bankruptcy which can be caused by such failure. As such, it is inappropriate to identify 'a situation where financial obligations are not fulfilled' as default. Therefore R&I defines 'payment shortfall,' not 'failure to meet financial obligations,' as default for securitized products. The payment shortfall refers to a situation where payments from the instrument fall short of the amount agreed upon in the contract, with no prospects for the given shortfall being covered and the degree of the given shortfall being material. As regards securitized products, R&I identifies instruments in a 'payment shortfall' and instruments rated CC or below as default. Instruments rated CC or below are identified as default because there is extremely strong concern of falling short of payments in the future.

Rating Transition Matrix by Fiscal Year

A rating transition matrix by fiscal year summarizes how the credit rating distribution at the beginning and end of each fiscal year changed, which is obtained by calculating the credit ratings of the tranches covered by the survey at each fiscal year-end. In the table on the next page, the credit ratings arrayed in

³ Securitized products do not include bonds issued by real estate investment trusts (REITs) and project finance, but do include Japan Housing Finance Agency (JHF) bonds and former GHLC bonds secured by mortgage loans trust, and securities under the securitization support program (guarantee model) by JHF.

⁴ In addition to securitized products for which R&I publicly announced at the time as an R&I News Release the fact it had assigned a credit rating, this also includes those products only described in the rating lists on the R&I homepage publicly.

⁵ When there are multiple tranches each of which provides for lump-sum redemption at different maturity and the cash flow from the underlying assets is distributed in order from the tranche with the earliest redemption date, R&I bundles together products whose redemption method is switched to a pass-through when the servicer is replaced and whose cash flow is distributed proportionately in the same order in accordance with the outstanding tranche balances (so-called soft bullet maturity) and counts them as one tranche.

⁶ As used here, trust execution date means the date when the trust was executed for the main underlying assets.

⁷ For issues organized as a master trust, R&I will assign a credit rating for the new trust beneficial interest whenever new underlying assets are set up on a trust, but when bundling trust beneficial interests that were assigned credit ratings at different times into a single tranche, R&I used the trust execution date for the first trust beneficial interest assigned a credit rating by R&I as the tracking start date.

⁸ When bundling trust beneficial interests that have different redemption dates into a single tranche, R&I used the last redemption date as the tracking expiration date.

descending order in the left-hand column represent the credit ratings at the beginning of the fiscal year. The credit ratings at the end of the fiscal year are shown in the uppermost row. When there was more than one rating action for a tranche during the same fiscal year, the credit rating at the end of the fiscal year was covered by the survey. For example, at the beginning of the fiscal year, there were a total of 600 tranches with a AAA rating. Of these, 504 still had a AAA rating at the end of the fiscal year, none were rated AA+, and one tranche was rated AA, with no tranches rated CCC or CCC- or in default. There were also 95 tranches that had been redeemed. The column for redemptions also includes tranches whose outstanding balance was repaid in full prior to the scheduled redemption date for reasons such as early redemption or repayment as a result of purchase, as well as those whose credit rating was withdrawn.

FYyyyy	AAA	AA+	AA	. . .	CCC	CCC-	Default	Redeemed	Total
AAA	504		1	. . .				95	600
AA+	4	3		. . .				4	11
AA	3	2	90	. . .				6	101
.
.
.
CCC				. . .			1		1
CCC-				. . .					

Rating Transition Matrix by Months Passed

A rating transition matrix by months passed summarizes how the distribution of the credit ratings for tranches covered by the survey had changed corresponding to the number of months passed since the tracking start date. In the table below, the credit ratings arrayed in descending order in the left-hand column represent the credit ratings on the tracking start date. The credit ratings n months later are shown in the uppermost row. For example, among the tranches that were still outstanding n months after issuance or that had been redeemed during that period, a total of 1,111 tranches had been rated AAA when issued. Of these, 1,106 tranches still had a AAA rating after n months, three tranches were rated AA+, and one tranche was rated AA, with no tranches rated CCC or CCC- or in default. The figures in parentheses represent tranches redeemed during n months. The table below shows that, of 1,106 tranches with a AAA credit rating, 36 had been repaid. The number of tranches redeemed includes tranches whose outstanding balance was repaid in full prior to the scheduled redemption date for reasons such as early redemption or repayment as a result of purchase, as well as those whose credit rating was withdrawn.

After n months	AAA	AA+	AA	. . .	CCC	CCC-	Default	Total
AAA	1106 (36)	3 (0)	1 (0)	. . .				1111 (36)
AA+	2 (0)	24 (3)		. . .				26 (3)
AA	9 (2)	3 (0)	157 (4)	. . .				172 (6)
.
.
.
CCC				. . .			1 (0)	1 (0)
CCC-				. . .				

Average Cumulative Default Rate by Credit Rating

The average cumulative default rate by credit rating (hereinafter average default rate) is determined by first calculating the rate of tranches that defaulted during a certain number of years from the beginning of each fiscal year, and then averaging the results for all fiscal years. In average default rate calculations, a group composed of tranches that had an R&I credit rating at the beginning of each fiscal year is called a cohort. First, the one-year survival rates (non-default rate) for all the numbers of years passed since the cohort was composed are calculated for each cohort. For tranches with credit rating i belonging to cohort c, the one-year survival rate between t and t-1 years after the cohort was composed is expressed as S(c,i,t), which is calculated by the following mathematical expression:

$$S(c,i,t) = 1 - \frac{d(c,i,t)}{u(c,i,t-1)}$$

In this expression, $d(c,i,t)$ is the number of tranches that had credit rating i when the cohort was composed and defaulted during a period between t and $t-1$ years. $u(c,i,t-1)$ is the number of tranches that had credit rating i when the cohort was composed and was still surviving after $t-1$ years (i.e. the number of tranches that had neither defaulted nor been redeemed until then).

To determine the average one-year survival rate for each of the number of years passed, the one-year survival rates of all cohorts obtained above for each of the number of years passed are averaged with weights proportional to the number of tranches which was used to calculate each one-year survival rate. The average cumulative survival rate is then obtained by multiplying the average one-year survival rates, and finally, the average default rate is determined by subtracting this result from 1. For tranches with credit rating i , the average one-year survival rate for a period between t and $t-1$ years, which is expressed as $S(i,t)$, and the average default rate for t years, $D(i,t)$, are calculated from the following expressions:

$$S(i, t) = \frac{\sum_{c \in \{1998, 1999, \dots, \text{most recent year}-t\}} u(c, i, t-1) \times S(c, i, t)}{\sum_{c \in \{1998, 1999, \dots, \text{most recent year}-t\}} u(c, i, t-1)}$$

$$D(i, t) = 1 - \prod_{s=1}^t S(i, s)$$

Users of this statistic must note carefully the fact this average default rate does not illustrate the default rate at any given time in the past.

Items to Note

To promote understanding of credit ratings for securitized products, R&I might sometimes change the data, calculation methodology or computation method used as the basis for rating transition matrices. As a result of such changes, the past rating transition matrices using the most recent data might differ from those described in reports published in the past, even when their fiscal years and elapsed months, among others, are the same. In such cases R&I does not retroactively update the content of the descriptions in the reports published in the past. The most recent report will describe data that reflects the changes mentioned above, spanning the entire measurement period. Therefore please read the most recent report when using the rating transition matrices.

Data Tables

Rating Transition Matrices by Fiscal Year

FY2000	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total	
AAA	45			1																	3	49	
AA+		3																					3
AA			1																				1
AA-				1																			1
A+																							
A						11				1													12
A-							2																2
BBB+																							
BBB									7														8
BBB-													1										
BB+																							
BB																							
BB-																							
B+																							
B																							
B-																							
CCC+																							
CCC																							
CCC-																							

FY2001	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total	
AAA	91	2																			9	102	
AA+		6																				6	6
AA			4																			4	4
AA-				3																		3	3
A+																							
A						10																3	16
A-							3																3
BBB+																							
BBB									10														
BBB-										1													2
BB+																							
BB																							
BB-													1										1
B+																							
B																							
B-																							
CCC+																							
CCC																							
CCC-																							
FY2002	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total	
AAA	151																				27	178	
AA+		9																			1	10	
AA			7																		2	9	
AA-				5																	1	6	
A+					3																	3	
A						17															5	22	
A-							2														2	4	
BBB+																							
BBB									11												4	15	
BBB-										1											1	2	
BB+																							
BB																							
BB-												1									1	2	
B+													2										2
B																							
B-																							
CCC+																							
CCC																							
CCC-																							

FY2003	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	208																				38	246
AA+		14																			4	18
AA	2		12																		2	16
AA-				10																	1	11
A+	1				8																	9
A	1	1				72															3	77
A-							9															9
BBB+																						
BBB									11												5	16
BBB-	1									2											1	4
BB+																						
BB												2									1	3
BB-													1								2	3
B+																						
B																						
B-																						
CCC+																						
CCC																						
CCC-																						
FY2004	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	258																				41	299
AA+		11																			2	16
AA	1		16																		3	20
AA-	1			15																		16
A+					13																1	14
A			2			152															9	163
A-							12			1											1	14
BBB+								3														3
BBB	1				1	1			8												3	14
BBB-										8												8
BB+																						
BB												3									1	4
BB-													1									1
B+																						
B																						
B-															1							1
CCC+																						
CCC																						
CCC-																						

FY2005	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	341																				45	386
AA+	1	13																			1	15
AA	4	2	14																		3	23
AA-	1			17																	2	20
A+	1				12																1	14
A	3		4			249															9	265
A-							13														5	18
BBB+								4													2	6
BBB			1			1			11												5	18
BBB-										9											1	10
BB+																						
BB													2								1	3
BB-																					1	1
B+																						
B																						
B-																2						2
CCC+																						
CCC																						
CCC-																						
FY2006	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	427																				81	508
AA+	2	10																			4	16
AA	4		23																		3	30
AA-				19																	4	23
A+					6																6	12
A	4		1			360															11	376
A-							16														3	20
BBB+								6														6
BBB									1	27											2	30
BBB-											14											14
BB+												1										1
BB													1	5								6
BB-																						
B+																						
B															1							1
B-											1											3
CCC+																						
CCC																						
CCC-																						1

FY2007	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	505																				95	600
AA+	4	3																			4	11
AA	3	2	90																		6	101
AA-	4	2	3	16	2																6	33
A+	3				1																2	6
A	1		1	8	4	462	1														29	506
A-	2	1	1	3	1	2	20	1													6	37
BBB+							2	11													2	15
BBB			3		2	3	8	5	47												6	74
BBB-	2		1	2			2			8											3	18
BB+											4											4
BB												7									1	8
BB-																						
B+														2								2
B															2							2
B-																3						3
CCC+																	2					2
CCC																					1	1
CCC-																						

FY2008	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	545	1	3																		124	673
AA+	3	5																				8
AA	3	11	117	1	1	1															8	142
AA-		1	4	22	21	6		2													7	63
A+				3	30	9															1	43
A	33		1	1	3	499	20	1												1	44	603
A-			2		1	2	39	15	1											4	2	66
BBB+								13	6													19
BBB							1	2	48	4											4	59
BBB-				1				1		7			1								1	11
BB+											3										2	5
BB												5									2	7
BB-																						1
B+															3						2	5
B																					2	2
B-																1						5
CCC+																	2					3
CCC																		4				
CCC-																			1			

FY2009	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	606	5	1																		114	726
AA+		16	1			1																18
AA	2	1	121	2			2														5	133
AA-		1		19	5	4	4														1	34
A+					65	8	1	1													1	76
A	1					486	10	1	1				1								113	613
A-							56	10	1	3												70
BBB+								26	2	1	1		1								5	36
BBB									48	1	2	2		2							3	58
BBB-										6		3				1					2	12
BB+											1		1								1	3
BB												2									4	6
BB-																				1		1
B+														1			2					3
B																					1	1
B-																						1
CCC+																					3	6
CCC																						1
CCC-																						1
Default																					2	1
Redeemed																						
Total																						

FY2010	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	599		1																		125	725
AA+	1	17																			8	26
AA	5	1	139			1															6	152
AA-	1		1	20																		22
A+					69																2	71
A	3				2	533	5					1									78	622
A-	2				2	8	50	5				1									6	74
BBB+	1						3	31									2				2	39
BBB	1		1					1	42							1	1				6	53
BBB-								2	5												4	11
BB+								1		1	3											5
BB												1					2				4	7
BB-																					2	3
B+														1							2	3
B															1							
B-																					2	3
CCC+																						3
CCC																						1
CCC-																						1
Default																					1	1
Redeemed																						
Total																						

FY2011	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	521	38																			146	705
AA+	2	11																			5	18
AA	21	17	96																		9	145
AA-	1		5	6	4			2													3	21
A+			2	3	42	6	10		1	1											11	76
A	1		6	7	8	536	11	1	1												90	661
A-				2	1	3	37			1											16	60
BBB+					1		4	19													16	40
BBB		1				1	2	6	30			1	1								5	47
BBB-										3											1	4
BB+											1										1	3
BB												1									1	3
BB-																						
B+																						
B																						
B-																					1	2
CCC+																						
CCC																						
CCC-																					5	8
Default																					1	4
Redeemed																						
Total																						

FY2012	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	491																				146	637
AA+	26	40	1																		1	68
AA	63		43																		4	110
AA-	4		8	3																	5	20
A+			7	3	10			5	2												32	59
A			17		516	10	4														106	653
A-			2		1	7	17	1	3				4								34	69
BBB+			2			1	1	9					1								13	27
BBB			2			11		14													6	33
BBB-						1			4												1	6
BB+										1											1	2
BB											1										1	3
BB-												2										
B+																						
B																						
B-																						
CCC+																						
CCC																						
CCC-																					3	6
Default																						
Redeemed																						
Total																						

FY2013	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	598																				122	720
AA+	1	39																				40
AA	2		92																			94
AA-				2																	4	6
A+					6																6	12
A			5			575															66	646
A-							16														18	34
BBB+								14													2	16
BBB									20												4	24
BBB-										2											3	5
BB+																					1	1
BB																					2	2
BB-																					4	5
B+																						
B																						
B-																					1	1
CCC+																					1	1
CCC																						
CCC-																						

FY2014	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	582																				96	678
AA+		37																			2	39
AA	52		41																		4	97
AA-				1																	1	2
A+			3		3																	6
A						583															57	664
A-							1	10	2												3	16
BBB+			1				4	2	5	1											1	14
BBB							5			15												20
BBB-																					2	2
BB+																						
BB																						
BB-																						
B+																						
B																						
B-																						
CCC+																					1	1
CCC																						
CCC-																						

FY2015	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Redeemed	Total
AAA	628																				81	709
AA+		35																			2	37
AA		5	63																		1	69
AA-																					1	1
A+					3																1	4
A			4			591															88	683
A-							7														5	12
BBB+								5													3	8
BBB						2			14													16
BBB-																					1	1
BB+																						
BB																						
BB-																						
B+																						
B																						
B-																						
CCC+																					1	1
CCC																						
CCC-																						

Rating Transition Matrices by Months Passed

(The numbers shown in parentheses are the numbers of products that had already been redeemed by the number of months passed.)

After 12 months	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Total
AAA	1697 (18)	2 (0)																			1699 (18)
AA+		28 (2)																			28 (2)
AA	2 (1)	2 (0)	214 (4)																		220 (5)
AA-				71 (3)	1 (0)																99 (4)
A+	1 (0)				19 (1)	8 (0)	1 (0)														70 (1)
A	3 (0)		2 (0)		4 (0)	1415 (6)	15 (0)	1 (0)				1 (0)								1 (1)	1441 (7)
A-						5 (0)	85 (5)	6 (0)													96 (5)
BBB+								19 (1)	3 (0)												22 (1)
BBB						4 (0)			120 (3)	2 (0)											126 (3)
BBB-	1 (0)						1 (1)			31 (3)											33 (4)
BB+										1 (0)	5 (1)										6 (1)
BB											1 (0)	12 (0)									13 (0)
BB-													2 (1)								3 (1)
B+														5 (0)							5 (0)
B															3 (0)						3 (0)
B-																5 (0)					7 (0)
CCC+																	2 (0)				2 (0)
CCC																		2 (0)			7 (0)
CCC-																			1 (0)		1 (0)

After 24 months	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Total
AAA	1617 (45)	5 (0)	1 (0)				1 (0)														1624 (45)
AA+	2 (0)	26 (3)																			28 (3)
AA	9 (2)	4 (0)	203 (7)	2 (0)	1 (0)				1 (0)												220 (9)
AA-	1 (0)	3 (0)	2 (0)	47 (5)	34 (2)	10 (0)		2 (0)													99 (7)
A+	1 (0)				52 (1)	10 (0)	2 (0)	4 (0)							1 (0)						70 (1)
A	9 (2)	2 (0)	5 (1)	6 (0)	4 (0)	1290 (38)	30 (0)	2 (0)	1 (0)	2 (0)									1 (1)		1352 (42)
A-			1 (0)		2 (1)	5 (0)	67 (6)	16 (0)												5 (5)	96 (12)
BBB+							1 (0)	14 (5)	7 (1)												22 (6)
BBB	3 (1)		4 (0)		2 (0)	1 (0)	7 (0)	5 (0)	97 (9)	4 (0)		2 (0)	1 (0)								126 (10)
BBB-	1 (0)				1 (0)	1 (0)	2 (1)		1 (0)	23 (5)	3 (0)		1 (0)								33 (6)
BB+										1 (0)	4 (1)	1 (0)									6 (1)
BB											1 (0)	11 (1)									13 (1)
BB-													2 (1)								3 (2)
B+														3 (1)							5 (1)
B											1 (0)				2 (0)						3 (0)
B-																3 (0)					7 (0)
CCC+																	3 (0)				2 (0)
CCC																		1 (0)			1 (0)
CCC-																				1 (0)	1 (0)

After 36 months	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Total
AAA	1526 (232)	17 (2)	3 (0)	1 (0)		1 (0)															1548 (234)
AA+	4 (1)	23 (4)	1 (0)																		28 (5)
AA	21 (3)	12 (0)	181 (20)	3 (0)	1 (1)	1 (0)		1 (0)													220 (24)
AA-	3 (0)	4 (0)		44 (8)	31 (3)	12 (1)	1 (0)		1 (1)												99 (13)
A+	1 (0)				49 (3)	11 (0)	5 (0)	3 (0)							1 (0)						70 (3)
A	28 (4)	1 (0)	17 (2)	6 (0)	7 (0)	1160 (75)	38 (1)	3 (0)	2 (1)	3 (1)										1 (1)	1266 (85)
A-			2 (0)	3 (0)	1 (1)	3 (0)	58 (11)	23 (0)		1 (0)										5 (5)	96 (17)
BBB+							2 (1)	16 (8)	4 (1)												22 (10)
BBB	5 (3)		3 (0)	2 (0)	1 (0)	4 (0)	9 (0)	7 (0)	88 (13)	2 (0)	1 (0)	3 (2)	1 (0)								126 (18)
BBB-	2 (0)			1 (0)			2 (1)	1 (0)		22 (9)			2 (1)								33 (14)
BB+										1 (0)	4 (1)								1 (1)		6 (2)
BB											1 (0)	11 (6)								1 (1)	13 (7)
BB-													2 (2)								3 (3)
B+														2 (1)							5 (2)
B															1 (1)						3 (0)
B-											1 (0)					3 (1)					7 (0)
CCC+																	2 (0)				2 (0)
CCC																					1 (0)
CCC-																					1 (0)

After 48 months	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Total
AAA	1398 (502)	34 (4)	4 (2)																		1436 (508)
AA+	8 (3)	20 (6)																			28 (9)
AA	34 (9)	11 (0)	158 (25)	2 (0)	1 (1)	1 (0)			1 (0)												208 (35)
AA-	8 (0)	4 (0)	1 (0)	33 (13)	28 (5)	13 (1)	6 (0)	1 (0)	2 (1)			1 (1)				2 (0)					99 (21)
A+	4 (0)			1 (0)	38 (5)	12 (1)	6 (0)	4 (0)	1 (0)	1 (0)							1 (1)				68 (7)
A	47 (14)	2 (1)	11 (5)	6 (0)	7 (0)	1034 (91)	41 (4)	3 (0)	4 (2)	3 (3)		1 (0)								1 (1)	1160 (121)
A-	3 (0)	1 (1)	1 (1)	2 (0)	1 (1)	4 (0)	47 (19)	26 (2)	5 (0)	1 (0)										5 (5)	96 (29)
BBB+							2 (1)	14 (11)	5 (2)		1 (0)										22 (14)
BBB	8 (8)	1 (0)	5 (2)			3 (0)	9 (0)	7 (0)	77 (21)	2 (1)		5 (3)	1 (1)				1 (0)				119 (36)
BBB-	2 (1)	1 (0)		4 (0)	1 (0)		2 (1)	2 (1)		15 (11)			2 (1)			3 (3)				1 (1)	33 (19)
BB+										1 (1)	4 (2)						1 (1)				6 (4)
BB											1 (1)	11 (8)				1 (1)					13 (10)
BB-													2 (2)								3 (3)
B+														1 (1)							5 (2)
B											1 (1)				2 (1)						3 (2)
B-																1 (1)	4 (0)			1 (0)	7 (2)
CCC+																					2 (2)
CCC																					1 (1)
CCC-																					1 (1)

After 60 months	AAA	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	CCC+	CCC	CCC-	Default	Total
AAA	1355 (940)	36 (4)	4 (4)																		1395 (948)
AA+	14 (6)	14 (10)																			28 (16)
AA	51 (13)	20 (1)	130 (34)	3 (1)	1 (1)	1 (1)									1 (0)						207 (51)
AA-	13 (3)	5 (2)	1 (0)	26 (16)	13 (7)	13 (4)	18 (9)		4 (2)	1 (0)		1 (1)	2 (2)			2 (2)					99 (48)
A+	6 (4)			2 (0)	22 (10)	14 (5)	8 (0)	1 (0)	1 (0)	1 (0)			5 (2)		1 (0)		1 (1)				62 (22)
A	61 (21)	2 (1)	14 (5)	10 (0)	13 (0)	905 (340)	37 (17)	4 (2)	9 (6)	4 (3)		1 (0)	3 (0)							2 (2)	1065 (397)
A-	3 (2)	4 (3)	2 (1)	2 (2)	2 (1)	2 (2)	39 (26)	23 (13)	4 (2)	3 (1)	2 (0)	1 (0)	1 (0)	1 (0)						5 (5)	94 (58)
BBB+							2 (1)	15 (12)	4 (2)				1 (0)								22 (15)
BBB	12 (11)		6 (4)			4 (0)	10 (0)	8 (0)	66 (30)	1 (1)	1 (0)	7 (4)	1 (1)			1 (0)				1 (1)	118 (52)
BBB-	6 (4)			1 (0)	1 (0)		3 (1)	1 (1)		14 (13)			2 (1)			3 (3)	1 (0)			1 (1)	33 (24)
BB+										1 (1)	4 (4)						1 (1)				6 (6)
BB	1 (1)										1 (1)	10 (10)				1 (1)					13 (13)
BB-													2 (2)		1 (1)						3 (3)
B+														1 (1)		4 (1)					5 (2)
B	1 (1)										1 (1)				1 (1)						3 (3)
B-												1 (1)				1 (1)	2 (0)	1 (0)			7 (4)
CCC+																					2 (2)
CCC																					1 (1)
CCC-																					1 (1)

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