
11 November 2015

Mapping of Axesor SA credit assessments under the Standardised Approach

1. Executive summary

1. This report describes the mapping exercise carried out by the Joint Committee to determine the ‘mapping’¹ of the credit assessments of Axesor SA (Axesor).
2. The methodology applied to produce the mapping is the one specified in the Implementing Technical Standards on the mapping of ECAIs’ credit assessments under Article 136(1) and (3) of Regulation (EU) No 575/2013 (Capital Requirements Regulation – CRR). These ITS employ a combination of the provisions laid down in Article 136(2) of Regulation (EU) No 575/2013.
3. The mapping neither constitutes the one which ESMA shall report on in accordance with Article 21(4b) of Regulation (EC) No 1060/2009 (Credit Rating Agencies Regulation - CRA) with the objective of allowing investors to easily compare all credit ratings that exist with regard to a specific rated entity² nor should be understood as a comparison of the rating methodologies of Axesor with those of other ECAIs. This mapping should however be interpreted as the correspondence of the rating categories of Axesor with a regulatory scale which has been defined for prudential purposes. This implies that an appropriate degree of prudence may have been applied wherever not sufficient evidence has been found with regard to the degree of risk underlying the credit assessments.
4. As described in Recital 12 of the Implementing Technical Standards on the mapping of ECAIs’ credit assessments under Article 136(1) and (3) of Regulation (EU) No 575/2013, in order to avoid causing undue material disadvantage on those ECAIs which, due to their more recent entrance in the market, present limited quantitative information, with the view to balancing prudential with market concerns, two mappings apply for these ECAIs, with the first mapping for a limited period of three years. Both mappings should take into account quantitative and qualitative factors. Compared to the second mapping, the quantitative factors for deriving the first mapping should be relaxed. This solution would allow ECAIs which present limited

¹ According to Article 136(1), the ‘mapping’ is the correspondence between the credit assessments of and ECAI and the credit quality steps set out in Regulation (EU) No 575/2013 (Capital Requirements Regulation – CRR).

² In this regard please consider http://www.esma.europa.eu/system/files/esma__2015-1473_report_on_the_possibility_of_establishing_one_or_more_mapping....pdf.

quantitative information to enter the market and would positively stimulate them to collect a sufficient number of quantitative information.

5. In accordance with the previous paragraph for a subset of ECAs two mappings are applicable, one applicable until 31.12.2018 and one applicable from 01.01.2019. Axesor belongs to the subset of ECAs that are provided two mappings. Updates to the mapping should be made whenever this becomes necessary, including in relation to the mapping to be applied after the three years, to reflect quantitative information collected during the three year-period. Nevertheless, in the absence of such a review, for the ECAs that are provided two mappings the one applicable from 01.01.2019 shall operate after the three years phase-in period.
6. The resulting mapping tables have been specified in Annex III of the Implementing Technical Standards on the mapping of ECAs' credit assessments under Article 136(1) and (3) of Regulation (EU) No 575/2013. Figure 1 below shows the result for the only ratings scale of Axesor, the Global rating scale, displaying the mapping applicable until 31.12.2018 and the one applicable starting from 01.01.2019.

Figure 1: Mapping of Axesor's Global rating scale

Credit assessment	Credit quality step Applicable until 31.12.2018	Credit quality step Applicable from 01.01.2019
AAA	1	2
AA	1	2
A	2	2
BBB	3	3
BB	4	4
B	5	5
CCC	6	6
CC	6	6
C	6	6
D	6	6
E (Default)	6	6

2. Introduction

7. This report describes the mapping exercise carried out by the Joint Committee (JC) to determine the 'mapping' of the credit assessments of Axesor SA (Axesor).
8. Axesor is a credit rating agency that has been registered with ESMA in 1 October 2012 and therefore meets the conditions to be an eligible credit assessment institution (ECAI)³.
9. The methodology applied to produce the mapping is the one specified in the Implementing Technical Standards on the mapping of ECAIs' credit assessments under Article 136(1) and (3) of Regulation (EU) No 575/2013 (Capital Requirements Regulation – CRR). These ITS employ a combination of the provisions laid down in Article 136(2) of Regulation (EU) No 575/2013. The information base used to produce the mapping is the same that has been employed when performing the first mapping proposal which was disclosed during the consultation period to these ITS. Three sources of information have been used. Firstly, the quantitative and qualitative information available in ESMA Central Repository (CEREP⁴) has been used to obtain an overview of the main characteristics of this ECAI and an initial estimate of the default rates of its credit assessments. Secondly, since the available data in CEREP for Axesor is scarce, an additional dataset regarding a (financial) credit scoring has been used. Finally, specific information has also been directly requested to the ECAI for the purpose of the mapping, especially the list of relevant credit assessments and detailed information regarding the default definition.
10. The following sections describe the rationale underlying the mapping exercise carried out by the Joint Committee (JC) to determine the mappings for both the applicable time periods. With respect to the quantitative requirements, in case of small and newly established ECAIs for which limited quantitative information is available, the same methodology has been applied across the two applicable time periods, although with two different levels of prudence. Section 3 describes the relevant ratings scales of Axesor for the purpose of the mapping. Section 4 contains the methodology applied to derive the mapping of Axesor's ratings scale. The mapping table is shown in Appendix 6 of this document and have been specified in Annex III of the Implementing Technical Standards on the mapping of ECAIs' credit assessments under Article 136(1) and (3) of Regulation (EU) No 575/2013.

³ It is important to note that the mapping does not contain any assessment of the registration process of Axesor carried out by ESMA.

⁴ CEREP is the central repository owned by ESMA to which all registered/certified CRAs have to report their credit assessments. <http://cerrep.esma.europa.eu/cerep-web/>.

3. Axesor credit ratings and rating scales

11. Axesor produces one type of credit ratings, the **Long-term corporate rating**, which may be used by institutions for the calculation of risk weights under the Standardised Approach (SA)⁵, as shown in column 2 of Figure 2 in Appendix 1.
12. Axesor assigns these credit ratings to the **Global rating scale** as illustrated in column 3 of Figure 2 in Appendix 1. Therefore, a specific mapping has been prepared for this rating scale. The specification of the Global rating scale is described in Figure 3 of Appendix 1.
13. Axesor also assigns credit scorings as part of the statistical assessment of the creditworthiness that is embedded in the final credit rating. The observed relationship between the credit rating and the credit scoring assigned by Axesor is reflected in Figure 4 of Appendix 2. Since it is only available for a relatively short period (October 2012 – July 2013), the theoretical relationship provided by Axesor has also been considered (see Figure 5 of Appendix 2).
14. The mapping of the Global rating scale is explained in Section 4 and it has been derived in accordance with the quantitative factors, qualitative factors and benchmarks specified in the ITS.

4. Mapping of Axesor's Global rating scale

15. The mapping of the Global rating scale has consisted of two differentiated stages where the quantitative and qualitative factors as well as the benchmarks specified in Article 136(2) CRR have been taken into account.
16. In the first stage, the quantitative factors referred to in Article 1 of the ITS have been taken into account to differentiate between the levels of risk of each rating category. The *long run default rate* of a rating category has been calculated in accordance with Article 6 of the ITS, as the number of credit ratings cannot be considered to be sufficient.
17. In a second stage, the qualitative factors proposed in Article 7 of the ITS have been considered to challenge the result of the previous stage, especially the additional information that can be obtained from the default experience of credit scorings assigned by Axesor.

4.1. Initial mapping based on the quantitative factors

4.1.1. Calculation of the long-run default rates

18. The information contained in CEREP on ratings and default data, shown in Figure 7 in Appendix 4, cannot be used for the calculation of the short and long run default rates specified in the Articles 3 – 5 ITS since it is only available since 2012 (i.e. it does not allow the calculation of 3-

⁵ As explained in recital 4 ITS, Article 4(1) CRA allows the use of the credit assessments for the determination of the risk-weighted exposure amounts as specified in Article 113(1) CRR as long as they meet the definition of credit rating in Article 3(1)(a) CRA.

year default rates). As a result, the allocation of the CQS has been made in accordance with Article 6 of the ITS, as shown in Figure 8 and Figure 9 of Appendix 4.

19. The long run default rate benchmark associated with the equivalent category in the international rating scale is a key qualitative factor that has been used for the mapping proposal.
20. For E (Default) rating category, no calculation of default rate has been made since it already reflects a 'default' situation.
21. Withdrawn ratings have been weighted by 50% as indicated in Article 4(3) of the ITS.
22. The default definition applied by Axesor, described in Appendix 3, has been used for the calculation of default rates.

4.1.2. Mapping proposal based on the long run default rate

23. As illustrated in the second column of Figure 15 and Figure 16 in Appendix 6, the assignment of the rating categories to credit quality steps has been initially made in accordance with Article 6 ITS. As no data on defaulted and non-defaulted rated items is available, the number of rated items was assumed zero and have been used with the prior expectation of the equivalent rating category of the international rating scale.

Mapping Tables applicable until 31.12.2018:

- **AAA/AA/A/BBB/BB/B:** the number of rated items in each of these categories is equal or larger than the respective minimum required number of observed items given the number of defaulted items in the rating category. Thus the credit quality step associated with the AAA/AA, A, BBB, BB, B rating categories in the international rating scale (CQS 1, CQS 2, CQS 3, CQS 4 and CQS 5 respectively) can be assigned.
- **CCC/CC/C and D:** since the CQS associated with the equivalent rating category of the international rating scale is 6, the proposed mapping for these rating categories is also CQS 6. To be noted, D rating category does not indicate default.

Mapping Tables applicable starting from 01.01.2019:

- **AAA/AA/BB/B:** the number of rated items in these categories is below the minimum required number of observed items so that the credit quality step associated with the AAA/AA, BB, B rating categories in the international rating scale (CQS 1, CQS 4 and CQS 5 respectively) cannot be assigned. Therefore the proposed credit quality steps for these rating categories are CQS 2, CQS 5 and CQS 6 respectively.
- **A/BBB:** the number of rated items in each of these categories is equal or larger than the respective minimum required number of observed items given the number of defaulted items in the rating category. Thus the credit quality step associated with the A and BBB

rating categories in the international rating scale (CQS 2 and CQS 3 respectively) can be assigned.

- **CCC/CC/C and D:** since the CQS associated with the equivalent rating category of the international rating scale is 6, the proposed mapping for these rating categories is also CQS 6. To be noted, D rating category does not indicate default.

4.2. Final mapping after review of the qualitative factors

24. The qualitative factors specified in Article 7 of the ITS have been used to challenge the mapping proposed by the default rate calculation. Qualitative factors acquire more importance in the rating categories where quantitative evidence is not sufficient to test the default behavior⁶, as it is the case for all Axesor's rating categories.

4.2.1. Credit scoring information

25. As described in the previous sections, a sufficient number of credit ratings is not available for Axesor's rating categories. However, Axesor also assigns **credit scorings** which represent a different measure of creditworthiness than can be used for mapping purposes according to Article 11(2) of the ITS. The empirical relationship between credit scorings and credit ratings (Figure 4) has been applied to the distribution of credit scorings (Figure 10) to estimate the distribution of hypothetical ratings in the scoring population. The result is shown in Figure 11, Figure 12 and the first columns of Figure 13 and Figure 14 in Appendix 5.

26. Once the (hypothetical) rating distribution has been calculated, the long term default rate associated with each rating category needs to be determined. The observed default rates are not available because defaulted and non-defaulted items cannot be distinguished during the assignment process to hypothetical rating categories. Therefore, the long run default rate⁷ of each rating category has been indirectly estimated by means of a set of informal tests:

- The long run default rate benchmarks corresponding to the CQS of the equivalent international rating categories have been initially assumed. In this case, AAA, AA, A, BBB, BB, B, CCC, CC, C and D have been associated with 0.10%, 0.10%, 0.25%, 1.00%, 7.50%, 20.00%, 34.00%, 34.00%, 34.00% and 34.00% hypothetical long run default rates respectively.
- An overall benchmark-implied long run default rate has been calculated for the scoring population. This number, 16.7%, has been compared to the actually observed default rate⁸ 2.7% (see for example Figure 13). The result reflects that the long run benchmark could constitute a conservative estimate of Axesor's rating categories' long term default rates

⁶ The default behavior of a rating category is considered to be properly tested if the quantitative factors for that rating category are calculated under Articles 3 – 5 ITS.

⁷ In this context we are not assessing long run default rates as specified in Article 1 of the ITS. Instead we are deriving proxy long run default rates through the usage of a different measure of creditworthiness.

⁸ Default rates have been calculated according to the requirements set out in Article 4 ITS.

because the implied default rate is well above the observed value. This result is reinforced by the fact that Axesor's scoring population has been observed during a recessionary period, where default rates should be expected to be higher than their long-term level.

- The same test has been performed at a more granular level:
 - Figure 13 shows the benchmark-implied default rates of the scoring population for each date within the observation period. The levels are in all cases (except D rating category) significantly above the observed default rates, especially during the first years where the economic crisis had not affected yet the Spanish firms.
 - Figure 14 shows a different breakdown of the scoring population, this time by scoring category. Again, the benchmark-implied default rates are clearly above the observed default rates (except for the AAA scoring category, which is not populated).

27. Although the tests described above do not address the default rate calculation for each individual rating category, they suggest that the mapping of Axesor's rating categories to the CQS of the equivalent rating categories in the international scale could be sufficiently prudent, at least on a portfolio basis⁹. This implies the following considerations:

- In case of the **Mapping Tables applicable until 31.12.2018** this factor confirms mapping based on Article 6, given also the consistency with the meaning and relative position of the rating categories. Thus no change is proposed to the mapping based on this factor.
- In case of the **Mapping Tables applicable starting from 01.01.2019** this factor suggests that BB and B can be mapped to CQS 4 and CQS 5 respectively. However, AAA and AA are mapped to CQS 2 (as suggested by the quantitative framework) given the reduced capital charge associated with CQS 1 and the lack of quantitative default evidence for individual rating categories.

4.2.2. Other qualitative factors

28. The **definition of default** applied by Axesor and used for the calculation of the quantitative factors has been analysed:

- The types of default events considered are shown in Appendix 3 and are consistent with point (a) of Article 4(4) of the ITS, i.e. bankruptcy filing or legal receivership. Rating category E is therefore consistent with letter (a) of the benchmark definition.
- The information provided by Axesor reveals that the share of bankruptcy-related events is equal to 90%. Therefore, in accordance with Article 8 ITS, the default rate is multiplied by

⁹ This assessment takes into account point (a) Article 138 CRR, according to which "an institution which decides to use the credit assessments produced by an ECAI for a certain class of items shall use those credit assessments consistently for all exposures belonging to that class". Therefore, given that Axesor only rates firms which belong to the exposure class 'Corporates' it could be argued that the mapping is sufficiently conservative, at least, on a portfolio basis.

180%¹⁰. Following the adjustment, the Axesor default rates are still significantly lower than the hypothetical default rates. Therefore, the initial mapping proposal is reinforced.

- 29.Regarding **the meaning and relative position of the credit assessments**, in case of the Mapping Tables applicable starting from 01.01.2019, it suggests a more favourable mapping of AAA and AA rating categories. However, the absence of empirical evidence does not allow a significant use of this factor to modify any of the proposed mappings. In the case of the E (Default) rating category, its meaning is consistent with the one of CQS 6 stated in Annex II ITS.
- 30.Regarding the **time horizon** reflected by the rating category, Axesor's rating methodology focuses on the long-term. Although this cannot be further supported by transition probabilities due to the low number of ratings, no change is proposed to the mapping.
- 31.Finally, it should be highlighted the use of the long run default rate benchmark associated with the equivalent category in the international rating scale as the **estimate of the long run default rate** for (1) the calculation of the quantitative factor of all rating categories under Article 6 ITS and (2) the assessment of the credit scoring (default) information.

¹⁰ The bankruptcy rate has to be increased by 100%, which is equivalent to multiplying the default rate by 180%.

Appendix 1: Credit ratings and rating scales

Figure 2: Axesor's relevant credit ratings and rating scales

SA exposure classes	Name of credit rating	Credit rating scale
Long-term ratings		
Corporates	Long-term corporate rating	Global rating scale

Source: Axesor

Figure 3: Long-term issuer credit rating scale

Credit assessment	Meaning of the credit assessment
AAA	Maximum credit quality Excellent company's capacity to meet its payment obligations. It is reliable with regards to timely payment of future financial obligations.
AA	It has a high capacity level to meet its credit obligations, even in the event of any potential changes in the financial environment.
A	Strong capacity to meet its credit obligations. However, this rating may deteriorate in the event of moderately adverse changes in the financial.
BBB	More than adequate capacity to meet its financial obligations. However, this capacity has a higher probability to deteriorate in the mid-long term than in higher categories.
BB	Adequate capacity to meet its financial obligations.
B	Although its capacity to meet payment obligations shows no difficulties at present, it may not last for long.
CCC	Low capacity to meet its financial obligations. It depends on a favorable financial environment.
CC	Poor credit rating. Its capacity to repay its financial obligations is uncertain. High probability of failure to meet some of its obligations. High sensitivity to financial environment changes.
C	Very poor credit rating. High risk of stopping or interrupting payments.
D	Very close to insolvency. High risk of payment failure.
E (Default)	The company is in default, has payment delays, has been declared insolvent or is currently undergoing insolvency proceedings. There is a possibility of default on its financial obligations.



Source: Axesor



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Appendix 2: Relationship between credit ratings and credit scorings assigned by Axesor

Figure 4: Observed relationship between credit scorings and credit ratings assigned by Axesor (October-2012 – July 2013)

Credit scoring Axesor	AAA	AA	A	BBB	BB	B	CCC	CC	C	D	E
Credit rating Axesor											
AAA											
AA											
A		4		4		1					
BBB			5	1	3						
BB			1	13	8	9		2	1		
B			1		10	7	6	2	2		
CCC				4		5	10	9		2	
CC							3	9	4		
C								2	1	3	
D							1			5	
E											8

Source: Axesor

Figure 4 shows the credit ratings and credit scorings assigned by Axesor to a set of firms between October 2012 and July 2013. The behaviour of rating shows that even if the final rating could diverge significantly from the credit scoring on single cases, there is empirical evidence that on average ratings are not more favourable than scorings.

Figure 5: Expected relationship between credit scorings and credit ratings assigned by Axesor

Financial risk	AAA	AA	A	BBB	BB	B	CCC
Business risk							
AAA	AAA	AA+	AA-	A+	A-	BBB	BB+
AA	AAA	AA	A+	A-	BBB+	BBB-	BB
A	AA+	AA-	A	A-	BBB-	BB+	BB-
BBB	AA-	A+	A-	BBB	BBB-	BB-	B+
BB	A+	A-	BBB+	BBB-	BB	BB-	B-
B	A	BBB+	BBB-	BB+	BB-	B	B-
CCC	A-	BBB	BB+	BB-	B+	B-	CCC

Source: Axesor

The credit ratings assigned by Axesor have a financial risk component (credit scoring) and a business risk component, each one weighted 60% and 40% respectively (with slight differences across economic sectors).

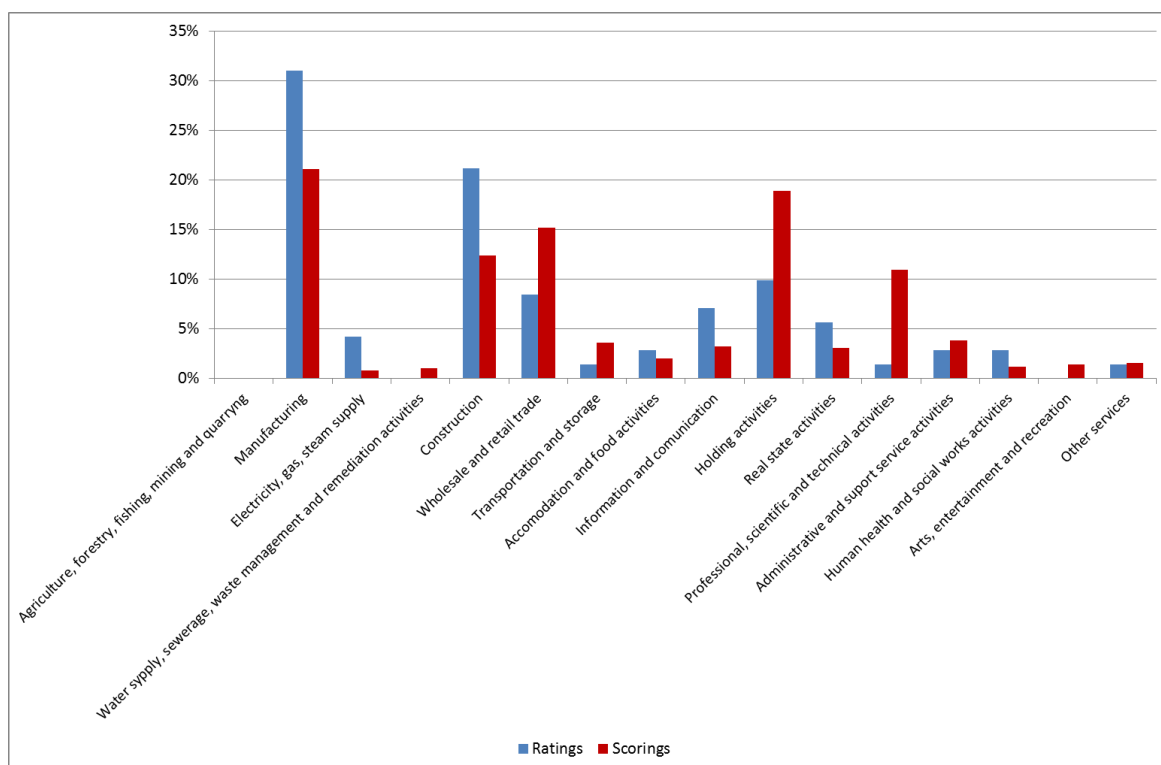
Figure 5 shows how each combination of these two components typically results in the final credit rating. The range of variation of the final rating for any given level of business risk is larger than for any given level of financial score. For example, whereas a A financial score implies a final rating within AA- and BB+, the final rating associated with a A business risk profile ranges between AA+ and BB-. Therefore, the higher relative importance of the financial score is confirmed by this table.

Figure 5 also shows, as expected, that scoring categories in the extremes of the scale have a potential for larger movements (i.e. downgrades and upgrades) than mid-range scoring categories, which show a smaller degree of variation. For example, a AA-scored firm may be upgraded only up to AA+ but downgraded down to BBB, whereas a B-scored firm may be upgraded up to BBB but downgraded only down to B-. However, it should be noted that there is frequently a high correlation between scores and ratings because, for example, good financial ratios are usually consequence of a high competitive position, adequate diversification or a conservative strategic plan (which are indicators of a strong business profile).

Figure 4 confirms the features described above. The ratings assigned so far by Axesor:

- are mostly contained within a narrow range of variation with respect to their financial score (they typically deviate 1 category).
- The upgrading (downgrading) frequency is relatively larger the high (low) risk scoring categories.

Figure 6: Industry sector distribution of scored and rated items



Source: Axesor

Figure 6 shows the sector distribution of firms rated by Axesor between October 2012 and June 2013 and scored between 2007 and 2009.

In both samples, cases the largest shares of rated items belong to the industry sectors “Manufacturing”, “Construction”, “Wholesale and retail trade” and “Holding activities”. These four industry sectors represent more than 60% of all rated items in both pools. Small differences are observable which mostly can be explained by the small number of rated items.

Appendix 3: Definition of default

According to Axesor, a default event happens when a company has not fulfilled an economic obligation of any kind or generates the certainty that such will occur. A company is deemed to be in a situation of default when any of the following circumstances occurs:

- The company is in a situation of default regarding any of its economic obligations.
- The company has been declared under administrative receivership or in a similar protective situation.

Axesor's definition of the concept includes the following actions and markers published in publicly accessible sources, referring to procedures under the Mercantile Law, as well as procedures with the Public Administration or under Civil and Social law in the following phases:

- Bankruptcy proceedings
- Bankruptcy
- Suspension of payments
- Write-off
- Insolvency notification
- Default notification

Source: Axesor

Appendix 4: Default rates of each rating category

Figure 7: Number of rated items

Date	AAA	AA	A	BBB	BB	B	CCC	CC	C	D
10/2012	0	2	4	10	11	12	11	10	4	6
07/2013	0	2	3	12	10	10	9	14	4	4

Source: Joint Committee calculations based on CEREP data

Figure 8: Mapping proposal for rating categories with a non-sufficient number of credit ratings, applicable until 31.12.2018

	AAA/ AA	A	BBB	BB	B	CCC-C	D
CQS of equivalent international rating category	CQS 1	CQS 2	CQS 3	CQS 4	CQS5	CQS 6	CQS 6
N. observed defaulted items	0	0	0	0	0	0	0
Minimum N. rated items	0	0	0	0	0	n.a.	n.a.
Observed N. rated items	0	0	0	0	0	0	0
Mapping proposal	CQS 1	CQS 2	CQS 3	CQS 4	CQS 5	CQS 6	CQS 6

Source: Joint Committee calculations based on CEREP data

Figure 9: Mapping proposal for rating categories with a non-sufficient number of credit ratings, applicable starting from 01.01.2019

	AAA/ AA	A	BBB	BB	B	CCC-C	D
CQS of equivalent international rating category	CQS 1	CQS 2	CQS 3	CQS 4	CQS5	CQS 6	CQS 6
N. observed defaulted items	0	0	0	0	0	0	0
Minimum N. rated items	496	0	0	10	5	n.a.	n.a.
Observed N. rated items	0	0	0	0	0	0	0
Mapping proposal	CQS 2	CQS 2	CQS 3	CQS 5	CQS 6	CQS 6	CQS 6

Source: Joint Committee calculations based on CEREP data

Appendix 5: Calculation of the hypothetical credit rating distribution

Figure 10: Distribution of scoring categories

Date	AAA	AA	A	BBB	BB	B	CCC	CC	C	D	E
2007	7	19	52	139	203	178	73	26	4	1	n.a.
2008	0	10	25	91	185	167	107	50	15	3	n.a.
2009	0	11	63	201	350	349	190	94	16	9	n.a.

Source: Joint Committee calculations based on Axesor data

In order to include a firm in the scoring sample, Axesor requires the following criteria:

- The firm should be Spanish;
- The firm should have an annual turnover between 10 million and 1,500 million €;
- The firm should have audited financial accounts;
- The firm should have publicly available complete financial reports.

In addition to the selection criteria, the sample includes all the companies that are available in Axesor's database. In that sense, in 2009 the Axesor's database increased significantly due to the acquisition of additional financial accounts after the entry in force of new Spanish accounting law (Plan General Contable) which represented a higher quality standard and greater commercial interest for financial information.

Figure 11: Distribution of hypothetical credit ratings (observation year 2007)

Credit scoring Axesor	AAA	AA	A	BBB	BB	B	CCC	CC	C	D	Total
Hypothetical credit rating Axesor											
AAA	0	0	0	0	0	0	0	0	0	0	0
AA	0	0	0	0	0	0	0	0	0	0	0
A	0	19	0	25	0	8	0	0	0	0	52
BBB	0	0	37	6	29	0	0	0	0	0	72
BB	0	0	7	82	77	73	0	2	1	0	242
B	0	0	7	0	97	57	22	2	1	0	186
CCC	0	0	0	25	0	40	37	10	0	0	112
CC	0	0	0	0	0	0	11	10	2	0	23
C	0	0	0	0	0	0	0	2	1	0	3
D	0	0	0	0	0	4	0	0	1	4	0
Total	0	19	52	139	203	178	73	26	4	1	695

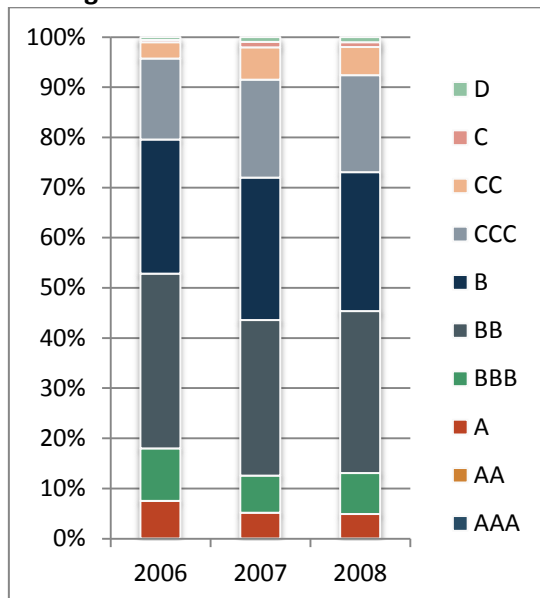
Source: Joint Committee calculations based on CEREP and Axesor data

Figure 11 reflects the estimation of the hypothetical credit rating distribution for the population of scored items available in 2007 (see Figure 10). In order to derive the number of scorings that would fall in each rating category, the relationship described in Figure 4 between the rating and scoring measures has been used (the similarity of the sector distribution in the rating and scoring populations shown in Figure 6 suggests that such relationship can be applied to the scoring population, although it is acknowledged that other factors may also be relevant).

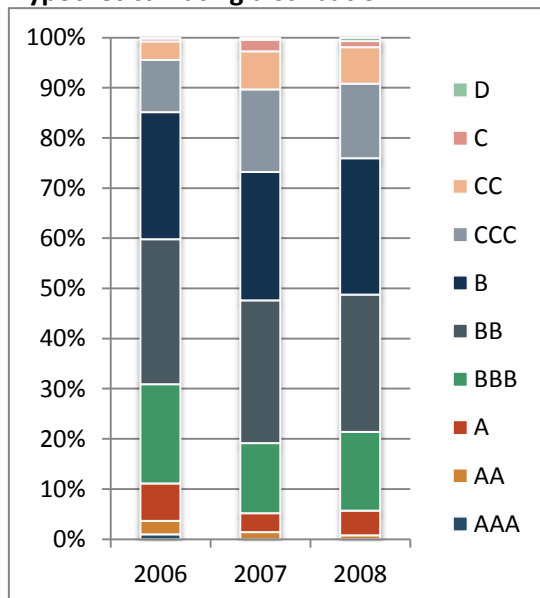
For example, 100% of the 19 AA-scored items would have been (hypothetically) assigned to the A rating category. This corresponds to the share of AA-scored items that have been rated as A by Axesor between October 2012 and July 2013 (all 4 scored items were rated A).

Figure 12: Observed differences between credit scorings and hypothetical credit ratings distributions (2007-2009)

Scoring distribution



Hypothetical rating distribution



Source: Joint Committee calculations based on CEREP and Axesor data

Figure 12 shows the differences in the distribution of scoring and the distribution of hypothetical ratings which were derived based on the relationship described in Figure 4 between the rating and scoring.

As can be seen on the charts, the main differences are a decrease in the share of BBB credit assessments and an increase in the share of BB and CCC credit assessments. At the same time, no hypothetical ratings are allocated to the AAA and AA assessment categories. Overall the conversion of scorings to ratings shows a general downgrade of credit assessments.

Figure 13: Distribution of hypothetical credit ratings by observation date and hypothesis testing of benchmark long run default rates

Hypothetical credit rating Axesor	AAA	AA	A	BBB	BB	B	CCC	CC	C	D	Benchmark- implied default rate	Observed 3- year default rate
Date												
2007	0	0	52	72	242	186	112	23	3	4	15.03%	1.00%
2008	0	0	34	48	202	185	127	42	7	7	17.63%	2.31%
2009	0	0	63	104	413	355	248	71	12	14	17.22%	3.83%
Total	0	0	149	225	857	726	487	136	22	25	16.74%	2.70%

Source: Joint Committee calculations based on CEREP and Axesor data

The rows in the first columns show the result of the process described in Figure 11 for each available period (e.g. row 2007 reflects the (hypothetical) rating distribution calculated in the last column of Figure 11). The aggregate result is shown in the last row.

The column '**Benchmark-implied default rate**' reflects the estimated default rate of the scoring pool under the assumption that the default rate of the rating categories is equal to the long run default rate benchmarks (0.10%, 0.10%, 0.25%, 1.00%, 7.50%, 20.00% and 34.00% respectively). The column '**Observed 3-year default rate**' reflects the actually observed 3-year default rate of the scoring population in each date of the period from 2007 to 2009.

Figure 14: Distribution of hypothetical credit ratings by scoring category and hypothesis testing of benchmark long run default rates

Hypothetical credit rating Axesor	AAA	AA	A	BBB	BB	B	CCC	CC	C	D	Benchmark- implied default rate	Observed 3- year default rate
Credit scoring Axesor												
AAA	0	0	0	0	0	0	0	0	0	0		0.00%
AA	0	0	39	0	0	0	0	0	0	0	0.25%	0.00%
A	0	0	0	100	20	20	0	0	0	0	4.64%	0.00%
BBB	0	0	78	20	254	0	78	0	0	0	10.70%	0.23%
BB	0	0	0	105	281	351	0	0	0	0	12.52%	0.68%
B	0	0	32	0	284	221	158	0	0	0	17.17%	2.02%
CCC	0	0	0	0	0	111	185	56	0	19	29.80%	5.95%
CC	0	0	0	0	14	14	63	63	14	0	30.63%	10.65%
C	0	0	0	0	4	9	0	17	4	0	27.19%	17.39%
D	0	0	0	0	0	0	2	0	4	6	34.00%	41.67%
Total	0	0	149	225	857	726	487	136	22	25	16.74%	2.70%

Source: Joint Committee calculations based on CEREP and Axesor data

The first columns display the distribution of (hypothetical) credit ratings by scoring category. The aggregate result is shown in the last row.

The column '**Benchmark-implied default rate**' reflects the estimated default rate of the scoring pool under the assumption that the default rate of the rating categories is equal to the long run default rate benchmarks (0.10%, 0.10%, 0.25%, 1.00%, 7.50%, 20.00%, 34.00%, 34.00%, 34.00% and 34.00% respectively). The column '**Observed 3-year default rate**' reflects the actually observed 3-year default rate of the scoring population in each scoring category (during the entire period 2007-2009).

Appendix 6: Mappings of each rating scale

Figure 15: Mapping of Axesor's Global rating scale, applicable until 31.12.2018

Credit assessment	Initial mapping based on LR DR (CQS)	Review based on SR DR (CQS)	Final review based on qualitative factors (CQS)	Main reason for the mapping
AAA	1	n.a.	1	The quantitative factors are representative of the final CQS.
AA	1	n.a.	1	
A	2	n.a.	2	
BBB	3	n.a.	3	The quantitative factors are representative of the final CQS.
BB	4	n.a.	4	The quantitative factors are representative of the final CQS.
B	5	n.a.	5	The quantitative factors are representative of the final CQS.
CCC	6	n.a.	6	The quantitative factors are representative of the final CQS.
CC	6	n.a.	6	
C	6	n.a.	6	
D	6	n.a.	6	The quantitative factors are representative of the final CQS.

E (Default)	n.a.	n.a.	6	The meaning and relative position of the rating category is representative of the final CQS.
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Figure 16: Mapping of Axesor's Global rating scale, applicable starting from 01.01.2019

Credit assessment	Initial mapping based on LR DR (CQS)	Review based on SR DR (CQS)	Final review based on qualitative factors (CQS)	Main reason for the mapping
AAA	2	n.a.	2	The quantitative factors are representative of the final CQS.
AA	2	n.a.	2	
A	2	n.a.	2	
BBB	3	n.a.	3	The quantitative factors are representative of the final CQS.
BB	5	n.a.	4	The quantitative factors are representative CQS 5. Based on credit scoring information, CQS 4 is proposed.
B	6	n.a.	5	The quantitative factors are representative CQS 6. Based on credit scoring information, CQS 5 is proposed.
CCC	6	n.a.	6	The quantitative factors are representative of the final CQS.
CC	6	n.a.	6	

C	6	n.a.	6	
D	6	n.a.	6	The quantitative factors are representative of the final CQS.
E (Default)	n.a.	n.a.	6	The meaning and relative position of the rating category is representative of the final CQS.