

**Contacts****Ricardo Gallegos**

Senior Executive Director of Public Finance and Sovereign Debt  
ricardo.gallegos@hrratings.com

**Alvaro Rodriguez**

Public Finance Associate Director  
alvaro.rodriguez@hrratings.com

**Daniel Espinosa**

Public Finance Manager  
daniel.espinosa@hrratings.com

**Alfonso Sales**

Methodological Criteria Associate Director  
alfonso.sales@hrratings.com

**Mauricio Prieto**

Methodological Criteria Sr. Analyst  
mauricio.prieto@hrratings.com

**Pedro Latapi**

Chief Credit Officer  
pedro.latapi@hrratings.com

This methodology is the exclusive property of HR Ratings and will be applicable starting ...

This methodology describes the process used by HR Ratings to assess the willingness and ability of the municipalities that operate in the Mexican United States to service their unsecured debt obligations in due time and form.

### Description of the Methodology

The HR Ratings rating process begins with a quantitative assessment, which includes six metrics that analyze the balance sheet, the extent of the liabilities and the periodic burden of the entity's debt service. Subsequently, the methodology incorporates a number of qualitative considerations where environmental, social and governance (ESG) criteria are considered that impact the assessment and, therefore, the assigned rating. The quantitative assessment is carried out using the Unsecured Risk Model (URM) that requires projections of both a Base Scenario and a Stress Scenario. The entity's financial statements are used to develop the first scenario, which represents the performance that the entity will most likely have given the context observed and, subsequently, a scenario under stress conditions so as to assess the impact on the key metrics under adverse financial and economic conditions. The metrics used in the URM, which are developed for each scenario, are as follows:

- a) Adjusted Primary Balance to Total Revenue;
- b) Net Debt to Unrestricted Revenue;
- c) Unsecured Debt to Total Debt;
- d) Current Liabilities to Unrestricted Revenue;
- e) Total Debt Service to Unrestricted Revenue;
- f) Unsecured Debt Service to Unrestricted Revenue.

The financial metrics are calculated in terms of a calendar year and are weighted by scenario to obtain the quantitative result. This represents the basis of the entity's credit rating. Subsequently, the analysis of the ESG criteria allows an adjustment of up to three notches, upwards or downwards, by identifying the impact that these could have on the credit quality of the entity.

The ESG analysis, qualitative by nature, consists in identifying the risks to which the assessed entity is exposed, as well as the mechanisms available to it to mitigate or manage said risks. HR Ratings will assign a label to each of the three ESG categories that are as follows: Superior, Average and Limited to describe its assessment regarding the identified risk, which will be described in detail in the analysis report. The environmental category is based on the analysis of the factors related to vulnerability to climate change and natural phenomena, as well as of the contingencies related to the solid waste collection and water distribution services. The social factors assessed refer to multidimensional poverty and the insecurity faced by the population. Lastly, the governance factors assess risks such as those related to changes in public administration, contingent liabilities and the quality and transparency of the information.

For this ESG analysis, HR Ratings may draw on information available from multiple sources and public surveys. HR Ratings can also use the assessment that it generates after its analysis process and meetings with the municipality.

### Introduction

This methodology describes the process used by HR Ratings to assess the ability and willingness of the municipalities of the United Mexican States to service their unsecured debt obligations. In this regard, this document does not apply to the Mexican States or federal, state or local agencies that may operate or provide services in the assessed municipality.

In its analysis, HR Ratings uses quantitative and qualitative tools to determine the credit rating of the assessed municipalities. The first step consists of a quantitative analysis based on the Unsecured Risk Model (URM) that weights three types of metrics: the first metric refers to the study of the balance sheet, the second to various liability measurements, and the third to the debt service. The aforementioned metrics will be projected under two scenarios: The Base Scenario, that reflects the most likely conditions, given the historical financial information and HR Ratings' vision on the economic and local conditions for the next periods; and a Stress Scenario, that reflects the financial development of the rated entity by materializing the risks to which it is exposed.

These metrics will be weighted to capture both the importance of the historical information and the projections of HR Ratings. The different projection scenarios also incorporate current macroeconomic factors and those estimated by HR Ratings.

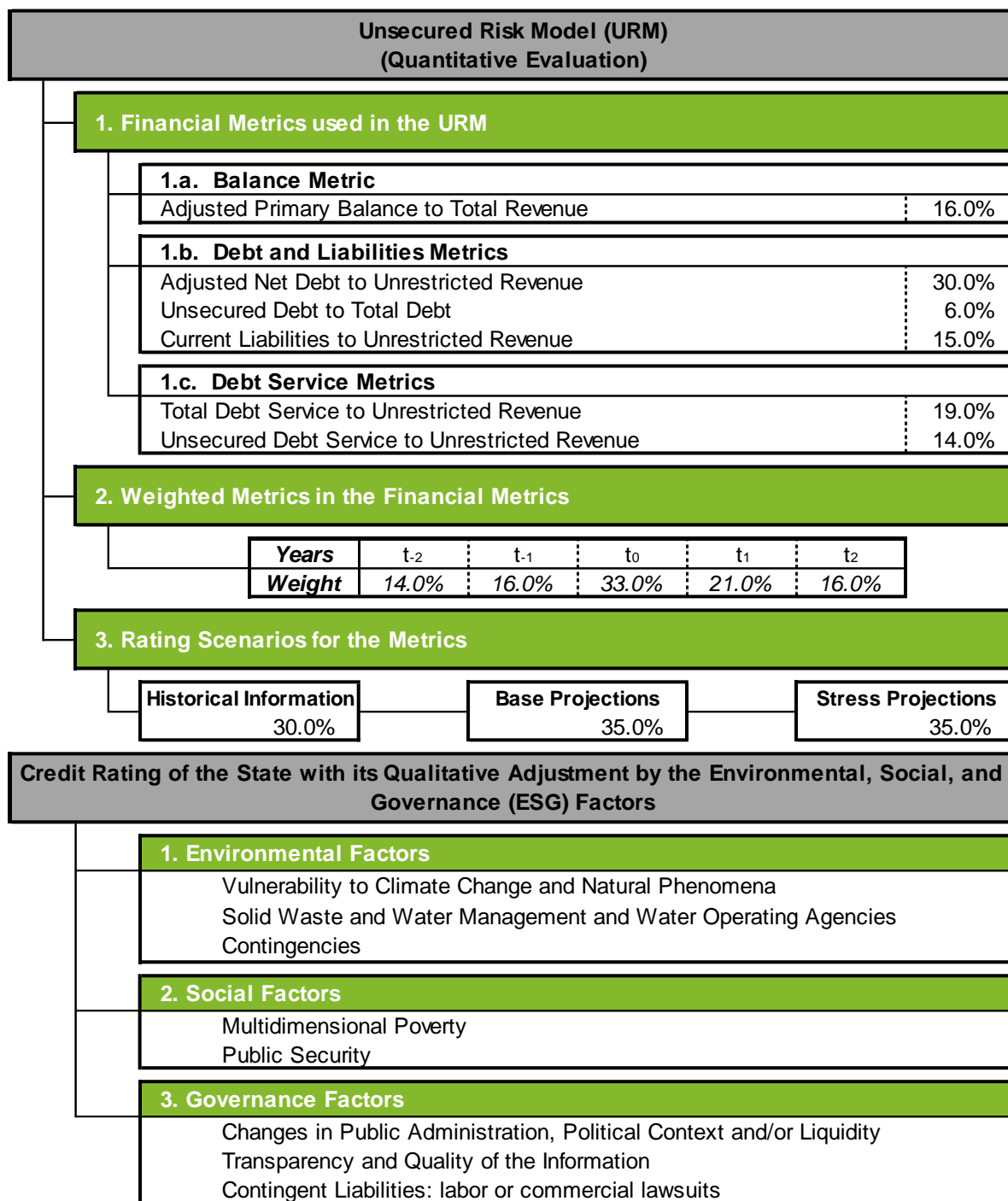
The qualitative analysis presented in this methodology is carried out based on an ESG approach, that incorporates environmental, social and governance-related criteria. The analysis in this section is based on the entity's vulnerability to these factors and the contingency or mitigation measures available to it; the approach is related to the ability of these factors of impacting the current or future progress of the entity, and thus, its credit quality. The qualitative adjustment is limited to adding or subtracting up to three notches for each entity with respect to the rating determined through the URM.

With respect to the environmental factors, criteria such as the vulnerability of each entity to climate change and natural phenomena are analyzed, as well as the management of solid waste and potential financial contingencies of the Water Operating Agency (OOA, Spanish acronym) or corresponding department. The section on social factors assesses the multidimensional poverty of the population and the current situation regarding public security. The governance factors measure the risks related to changes in public administration, the political context, and the quality and timeliness of the information provided, as well as the existence of contingent liabilities that are not recorded on the balance sheet. For this analysis, HR Ratings may draw on the work meetings held with the entity and quantitative tools. The latter includes different indicators and metrics that are obtained from surveys and public information.

The quantitative section of this document describes the URM. This Model includes four parts, the first part describes some of the assumptions used when preparing the projections, the second describes in detail the construction and weight of the six metrics, the third sets out the parameters per year and for each scenario and, the last part provides an example of a rating. Further down, this document describes the ESG factors that are assessed, beginning with the environmental analysis, followed by the social analysis, and ending with the governance analysis of the municipality.

Figure 1 shows the general structure of the methodology, including the metrics used and the weightings associated with each one.

**Figure 1: General Structure of the Methodology**



Source: HR Ratings.

### Quantitative Assessment of the Mexican Municipalities

The quantitative analysis is carried out using the Unsecured Risk Model (URM) that assesses the financial performance of the entity, in accordance with its historical performance and the projections carried out by HR Ratings for a Base Scenario and a Stress Scenario. The URM consists of weighting six metrics for different years and for each scenario to assign a value that ranges from 1 (lowest) and 19 (highest) based on which the result (weighted average between these metrics) of the URM will be obtained.

#### 1. Assumptions used when preparing the Scenarios

In order to develop the URM, HR Ratings needs to process the municipality's historical information. The financial conditions are reflected in the public accounts and accounting adjustments will be applied that will allow to standardize the information to model and project the future behavior under both scenarios. Some of the assumptions of the analysis used to develop the scenarios, as well as some of the most relevant concepts within the public accounts, are described below:

##### a. Revenues

Revenues are divided into two main categories: Federal Revenue and Municipality-Generated Revenue. Federal Revenues, in turn, are divided into the following accounts: Participations (Ramo 28), Contributions (Ramo 33) and, other Federal and State Revenues; the latter show historical volatility.

After analyzing and putting together the information, 100% of the Participations is recorded, including earmarked and pledged revenues as a source of payment for a structured debt. Subsequently, earmarked revenues are subtracted through expenditure accounts.

Within the municipality-generated revenues accounts, taxes, fees, yields, public use taxes and other revenues are considered, the source of which does not come from the Federal Government or the respective State Government. Revenues include Unrestricted Revenues (UR), which represent the revenues that can be used to service the debt and are calculated as the sum of the Participations and the Municipality-Generated Revenue. Lastly, cash flows received for indebtedness are not recognized as revenue, and the revenue from the remnants of the trusts of its structured debt are not included.

##### b. Expenditures

Among the expenditure accounts, two categories are identified: current and non-operating expenditures. The methodology divides current expenditures into the following accounts: staff services, materials and supplies, general services, financial cost, transfers and subsidies, and other current expenditures.

The debt service (DS) account is made up of the interest on any type of debt and the amortizations of the structured debt. Amortizations of the unsecured debt, as well as the revenues derived from the financing, are not recorded in the statement of income and expenditures. Therefore, the Primary Balance metric is used to determine the Balance Sheet, excluding the payments required due to past indebtedness.

### c. Projections

The historical information will be based on the public account and its ancillary documents provided by the municipalities, which could be subject to adjustments to improve their comparability, especially if virtual items are identified. The purpose of the foregoing is to ensure that the projections are consistent and comparable across all the entities.

The projections of revenue and expenditures consider the historical information, behavioral trends and the perception of HR Ratings regarding the future economic and political context of the subnational entity. In the case of financial costs, the entity needs to provide detailed information regarding its debt obligations, specifically the agreed interest rates and amortization schedules for at least the next three years.

In the event of a financial deficit position, HR Ratings will develop an assumption regarding the future financing structure. In order to project debt drawdowns, the applicable legal provisions that limit long-term indebtedness, as well as the repayment of short-term obligations, should be considered at all times, which could restrict the possibility of incurring additional indebtedness by some municipalities.

An assessment of current liabilities will be carried out to determine to what extent they should be accumulated and if they can be considered as an additional financing option, which will depend on the context of each entity and the behavior and historical treatment of these accounts. For example, there are municipalities that frequently use withholdings and contributions as financing, or some administrations increase their liabilities with suppliers and contractors.

The projections will also capture the entity's level of liquidity, in this regard, the seasonality and revolving unsecured debt in the assessed periods will be considered.

## 2. Elements used in the URM

This section describes the financial metrics that HR Ratings calculates in its rating process. It also describes how these metrics are weighted as part of the credit rating.

### 2.1. Metrics and weights in the URM

This section provides first the construction of each metric, and later shows the figure that describes the ranges that HR Ratings expects to observe for the different rating levels.

#### a) Adjusted Primary Balance (APB) to Total Revenue (TR); (16.0% of the URM)

This metric captures the immediate performance of the entity by considering the relationship between revenue and expenditures during the assessed period. It is important to clarify that the primary balance is used to exclude financial costs, which means that only the difference between revenues and expenditures is considered, and the structured amortizations and financial costs are excluded. Revenues include all the resources earmarked that can be used to back the repayment of debt. Expenditures do not consider revenues that have been earmarked and transferred to trusts related to a structured debt.

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The methodology uses an adjustment on the Primary Balance that consists of discounting in any year any changes in the restricted cash with respect to the prior year<sup>1</sup>. Therefore, the metric is calculated as follows:

$$APB_t = \frac{\text{Primary Balance Result in the LTM} - (\text{Earmarked Assets in the LTM} - \text{Earmarked Assets in the LTM before})}{\text{Sum of all Revenues in the LTM}}$$

The incorporation of the adjustment in the Primary Balance allows discounting the effect of the earmarked resources that it receives through Federal transfers that have yet to be exercised. It is important to clarify that a significant percentage of the revenues of the municipalities comes from these types of transfers, the allocation of which is restricted. In this regard, HR Ratings values the fact that the entity can demonstrate that it has the ability to react to possible unexpected changes in the flow of Federal revenues or from the State to which it belongs. Total revenues are shown as the sum of the last twelve months (LTM), which represents the revenues accrued over the course of the assessed fiscal year.

### b) Adjusted Net Debt (ND) to Unrestricted Revenue (UR) (30.0% of the URM)

This metric begins with the calculation of the total debt, which refers to the obligations that include the structured debt and the unsecured debt. The former is debt that is backed by specific sources of revenue that have been earmarked or pledged, such as participations. Earmarking a source of revenue is generally carried out through the process of transferring these resources to a trust that is responsible for using these resources to service the structured debt.

$$ND \text{ to } URn_t = \frac{(\text{Adjusted Direct Debt} - \text{Unrestricted Cash}) \text{ by the end of the year}}{\text{Sum of the Net Unrestricted Revenues in the LTM}}$$

As described above, Unrestricted Revenue is revenue that has not been earmarked for a specific expenditure and can be used to service the debt.

### c) Unsecured Debt (UD) to Total Debt (TD): (6.0% of the URM)

The second debt metric used analyzes the unsecured debt (UD) ratio to the total debt. The structured debt is included in the analysis process since it can limit the ability to meet the payment obligations of the UD. Therefore, it is relevant to measure the percentage of the total debt that is UD, in the understanding that the higher the percentage, the greater the entity's unsecured credit risk will be. The corresponding formula for the year  $t$  of this metric is as follows:

<sup>1</sup> Restricted Cash refers to resources labeled for a specific expenditure, that cannot be used for debt service.



$$UD \text{ to } TD_t = \frac{\text{Unsecured Debt by the end of the year}}{\text{Total Debt by the end of the year}}$$

**d) Current Liabilities to UR**  
**(15.0% of the URM)**

The last debt metric supplements the analysis by assessing the entity's ability to meet all of its obligations that according to HR Ratings do not represent an event of default in case it shows a delay in its payment. This calculation is relevant due to the fact that current liabilities could become a significant burden for the entity, limiting its ability to meet its unsecured debt obligations. It is important to clarify that this metric analyzes the breakdown of these liabilities, whereby accounting effects could be identified, as well as liabilities not recorded in the balance sheet.

The corresponding formula for the year t of this metric is as follows:

$$CL \text{ to } URn_t = \frac{\text{Current Liabilities by the end of the year}}{\text{Sum of all Net Unrestricted Revenues in the LTM}}$$

**e) Total Debt Service (DS) to UC**  
**(19.0% of the URM)**

The debt service metrics allow to measure the periodic financial weight of the debt and the cost of the resources allocated to service it, as well as to understand the historical financial behavior of the municipality. They are of vital importance due to the fact that they reflect the current consequences of the indebtedness of previous periods.

The first debt service metric includes the municipality's total debt service, which refers to the sum of the unsecured debt and the structured debt. This is to give a weight to the financial burden that represents the total debt of the entity. It is important to clarify that, to calculate the metric, the amortization of the short-term debt contracted and paid within the same fiscal year is not considered, only the interest generated in the period for such contracted debt. The corresponding formula for the year t of this metric is as follows:

$$TDS \text{ to } URn_t = \frac{\text{Sum of the Debt Service in the LTM}}{\text{Sum of the Net Unrestricted Revenues in the LTM}}$$

**f) Unsecured Debt Service (UDS) to UR net of the Structured Debt Service (SDS)**  
**(14.0% of the URM)**

The second metric of the debt service measures the relationship between the UDS and the UR, to which on this occasion the amount of the SDS is discounted. In preparing the UDS, it is assumed that all the unsecured debt is settled in the immediately following fiscal year. The objective of this metric, unlike the one above, is to measure the entity's ability to meet only its unsecured obligations considering that the structured debt isolates the revenue to cover its service. The corresponding formula for the year t of this metric is as follows:

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$$UDS \text{ to } URn_t = \frac{\text{Sum of the Debt Service in the LTM}}{\text{Sum of (Net Unrestricted Revenues - Structured Debt Service) in the LTM}}$$

Lastly, this section includes Figure 2, which shows both the weight of each metric and the range that HR Ratings expects it to take for each rating level:

**Figure 2: Rating Ranges and Weights for each Metric**

<b>Metric</b>	<b>Adj. Primary Balance to Total Revenue</b>	<b>Net Debt to Unrestricted Revenue</b>	<b>Unsecured Debt to Total Debt</b>
<b>Weight</b>	<b>16.0%</b>	<b>30.0%</b>	<b>6.0%</b>
HR AAA	[ 3.50% , ∞ )	( -∞ , 5.00% ]	( -∞ , 0.00% ]
HR AA (+/-)	[ 2.97% , 3.50% )	( 5.00% , 9.19% ]	( 0.00% , 3.29% ]
HR A (+/-)	[ 1.56% , 2.97% )	( 9.19% , 23.31% ]	( 3.29% , 12.11% ]
HR BBB (+/-)	[ -0.79% , 1.56% )	( 23.31% , 46.86% ]	( 12.11% , 26.81% ]
HR BB (+/-)	[ -3.03% , -0.79% )	( 46.86% , 69.28% ]	( 26.81% , 40.83% ]
HR B (+/-)	[ -4.22% , -3.03% )	( 69.28% , 81.74% ]	( 40.83% , 48.27% ]
HR C (+/-)	( -∞ , -4.22% )	( 81.74% , ∞ )	( 48.27% , 100.0% ]
<b>Metric</b>	<b>Current Liabilities to Unrestricted Revenue</b>	<b>Total Debt Service to Unrestricted Revenue</b>	<b>Unsecured Debt Service to Unrestricted Revenue</b>
<b>Weight</b>	<b>15.0%</b>	<b>19.0%</b>	<b>14.0%</b>
HR AAA	[ -∞ , 8.00% ]	[ 0.00% , 1.25% ]	[ 0.00% , 0.25% ]
HR AA (+/-)	( 8.00% , 12.27% ]	( 1.25% , 1.59% ]	( 0.25% , 0.46% ]
HR A (+/-)	( 12.27% , 26.74% ]	( 1.59% , 3.89% ]	( 0.46% , 1.90% ]
HR BBB (+/-)	( 26.74% , 50.97% ]	( 3.89% , 10.10% ]	( 1.90% , 5.80% ]
HR BB (+/-)	( 50.97% , 73.95% ]	( 10.10% , 15.77% ]	( 5.80% , 9.36% ]
HR B (+/-)	( 73.95% , 87.29% ]	( 15.77% , 17.70% ]	( 9.36% , 10.57% ]
HR C (+/-)	( 87.29% , ∞ )	( 17.70% , ∞ )	( 10.57% , ∞ )

Source: HR Ratings.

## 2.2. Periods considered and their weighting

The financial metrics described in the section above are calculated for the historical years analyzed and for the projections of the current year and two years in the future, this for a Base Scenario and a Stress Scenario. These years are weighted, as shown in Figure 3, and allow generating a weighted average by metric.



**Figure 3: Weight per Year**

Year	Weight	Description of Data
$t-2$	14.0%	Two fiscal years past.
$t-1$	16.0%	The fiscal year prior.
$t_0$	33.0%	The current fiscal year.
$t_1$	21.0%	The next fiscal year.
$t_2$	16.0%	Two fiscal years in the future.

Source: HR Ratings.

In the case of Municipalities, the years considered correspond to the fiscal year. HR Ratings considers that the analysis should be carried out in these periods to formally integrate the effects of the budget and the approved revenue law. Thus, the feasibility of the financial strategies is assessed based on the legal and fiscal tools available to the Municipality.

### 3. General Structure of the URM and an example of its application

The general structure of the URM consists of: (1) calculating the six financial metrics for the years considered, (2) weighting each metric according to its weight per year, (3) calculating an integer value (IV) between 1 (lowest) and 19 (highest) for each metric with the result of this weighted average, (4) weighting, in turn, the IVs to obtain a rating in the Base Scenario and another rating in the Stress Scenario, (5) the direct average of both scenarios results in the credit rating of the Municipality expressed in a value between 1 and 19. Figure 4 provides an example of how these equations are applied in the URM to arrive at the credit rating:

Figura 4: Ejemplo del MRQ

Example of a Base Scenario for a Municipality									
Metrics	Weight	t <sub>-2</sub>	t <sub>-1</sub>	t <sub>0</sub>	t <sub>1</sub>	t <sub>2</sub>	Intertemporal Average	IV per Metric	Rating by Metric
		14.0%	16.0%	33.0%	21.0%	16.0%			
Adj. PB to TR	16.0%	-2.01%	-2.15%	-2.07%	-2.54%	-2.71%	-2.28%	8	HR BB
ND to UR	30.0%	24.10%	26.47%	29.21%	31.41%	33.35%	29.18%	12	HR BBB+
UD to TD	6.0%	18.11%	17.17%	18.45%	19.74%	19.01%	18.56%	11	HR BBB
CL to UR	15.0%	36.74%	36.52%	38.47%	38.98%	40.10%	38.28%	11	HR BBB
TDS to UR	19.0%	7.84%	7.45%	8.12%	8.45%	9.85%	8.32%	10	HR BBB-
UDS to UR	14.0%	2.05%	2.45%	2.88%	3.04%	3.45%	2.82%	12	HR BBB+
Rating of the Base Scenario								10.77	HR BBB
Example of a Stress Scenario for a Municipality									
Metrics	Weight	t <sub>-2</sub>	t <sub>-1</sub>	t <sub>0</sub>	t <sub>1</sub>	t <sub>2</sub>	Intertemporal Average	IV per Metric	Rating By Metric
		14.0%	16.0%	33.0%	21.0%	16.0%			
Adj. PB to TR	16.0%	-2.01%	-2.15%	-2.28%	-3.05%	-3.25%	-2.54%	7	HR BB-
ND to UR	30.0%	24.10%	26.47%	32.13%	37.69%	40.02%	32.53%	11	HR BBB
UD to TD	6.0%	18.11%	17.17%	20.30%	23.69%	22.81%	20.60%	11	HR BBB
CL to UR	15.0%	36.74%	36.52%	42.32%	46.78%	48.12%	42.47%	10	HR BBB-
TDS to UR	19.0%	7.84%	7.45%	8.93%	10.14%	11.82%	9.26%	10	HR BBB-
UDS to UR	14.0%	2.05%	2.45%	3.17%	3.65%	4.14%	3.15%	11	HR BBB
Rating of the Stress Scenario								10.02	HR BBB-
URM Rating								10	HR BBB-

Source: an Example of HR Ratings.

In this figure, the *Intertemporal Average* column shows the weighted average of each metric according to the weight that corresponds to each year. The “IV per Metric ” column shows the integer value between 1 (lowest) and 19 (highest) that corresponds to the average per year of each metric. The weighted average of the IVs in the Base Scenario is 10.77, while the weighted average of the IVs in the Stress Scenario is 10.02. The average of both scenarios is 10.40 and is rounded to the nearest integer, in this case 10. Annex 2 shows the corresponding figure between the and the credit rating.

The credit rating for this example is “HR BBB-”; however, a qualitative adjustment of up to three notches, upwards or downwards, may be applied to it based on the ESG criteria that are described in the following section.

Following the URM assessment and ESG analysis, there is still one last qualitative adjustment that could be assigned to a Municipality's credit rating. These refer to various versions of default, as defined in the respective section of the HR Ratings General Methodological Criteria.

### Environmental, Social and Governance (ESG) Analysis

The purpose of this section is to incorporate into the unsecured rating of any Municipality the impact that the environmental, social, and governance-related criteria may have on its credit quality. The multiple factors that can be assessed in this section could have a quantitative impact in the mid or long term, therefore, to a certain extent, they can be incorporated into the projections that HR Ratings makes in the URM. However, the ESG criteria tend to change to the extent that they relate to social trends and governance standards, therefore they need to be treated in a qualitative manner.

Not all entities are exposed to the same ESG risks; therefore, the analysis of HR Ratings focuses on identifying these risks and considers the extent to which the entity is capable of mitigating and/or managing them. Environmental and/or social criteria could have an impact in an unpredictable timeframe and the public policies designed to mitigate them could have costs that cannot be appropriately anticipated.

The HR Ratings methodology allows an adjustment of up to three *notches*, upwards or downwards, to incorporate these factors. The extent of the adjustment may be due to the combination of various risks or exclusively to the impact that a specific risk may have on the entity. In any case, HR Ratings will describe in detail in its analysis report the criteria that were incorporated into the Municipality's credit rating.

Therefore, it is important to emphasize that, although HR Ratings identifies vulnerabilities to different ESG risks in its assessment, the adjustment should only consider the ability of these risks to affect, upwards or downwards, the entity's credit rating. That is why, even though based on the analysis it is identified that the entity is exposed to various ESG risks, the qualitative adjustment can only reflect the impact on the entity due to the need to use resources in an extraordinary manner to mitigate or adapt to these risks.

The process described in this section is based on a labelling system that will be assigned to the environmental analysis as a whole, another to the social analysis, and one last one to the governance analysis. The labels refer to the entity's level of exposure and incorporate its ability to adapt to the risks derived from the ESG concepts.

In this sense, a *Superior* label will be assigned in the cases in which the Municipality does not show that it is impacted by the set of factors analyzed or that, despite the risk, it has sufficient adaptation mechanisms to mitigate any credit impact. An *Average* label refers to the existence of risks that do not have adequate adaptation mechanisms, but that are considered to be low-incidence risks, or this label may also refer to potential and moderate impacts on the Municipality's credit quality. Lastly, a *Limited* label refers to risks that cannot be mitigated and that could, in the short or long term, have an impact on the credit quality of the assessed Municipality.

This process is implemented to facilitate the detection and monitoring of risks, vulnerabilities and the ability to adapt to the ESG factors. Typically, a combination of *Superior* labels would reflect a favorable qualitative adjustment, as would a combination of *Limited* labels that would merit an adjustment in the opposite direction. However, the status of any single factor within any of the ESG categories could be sufficient to assign a qualitative adjustment, upwards or downwards. In these cases, HR Ratings will clarify its criteria in its analysis report.

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The following sections describe the environmental, social and governance factors that are analyzed for each Municipality and some of the tools that HR Ratings uses to analyze and monitor these factors are also described.

### 1. Analysis of Environmental Factors

This section focuses on the assessment of natural phenomena and the impact that these could have on the public policies of the Municipality, as well as how they could alter the incidence of turning to higher spending or extraordinary transfers. In this regard, the HR Ratings analysis must recognize the difference between immediate phenomena and those that could show progress in the long term; such issues will be reflected in the assignment of the environmental label.

In its analysis, HR Ratings evaluates different sources of risk such as those listed in this section; however, it is important to clarify that these are not the only sources that can be identified in the analysis process:

#### a. Vulnerability of the Municipality to climate change and other natural phenomena

HR Ratings seeks to identify if population settlements are exposed to natural phenomena such as landslides, droughts, and floods, among others. The risks to which the different productive activities and the infrastructure of the municipality are exposed to are also considered. It also seeks to identify the frequency with which these risk factors have occurred, since this variable is the basis for potential future occurrences.

It also measures the extent to which the Municipality can mitigate or adapt to these events, which involves identifying the tools it has to manage any potential risks; these tools may be its own or may represent a support from another level of government. These considerations are relevant to the extent that early action will reduce the cost of these events and that various fiscal strategies will allow, with a low operating cost, to allocate resources to counteract these events and not have any impact on the cash allocated to service the entity's debt.

#### b. Solid Waste Management and Water Operating Agencies (OOAs, Spanish acronym) Contingencies

In this section, HR Ratings seeks to identify the municipality's ability to effectively manage solid waste, this refers not only to whether it is capable of collecting it as often as necessary, but also whether it can dispose of it and give it proper treatment. The volume of waste generated could have an extremely high demand in terms of current expenditure and could also reveal the need to incur significant investments for the development of infrastructure or acquisition or rental of appropriate spaces for the final disposal of waste.

For the OOAs, the analysis focuses on identifying whether its operation and management could generate any contingency for the municipality. As an example of the above, debts with the National Water Commission (CONAGUA, Spanish acronym) or the Federal Electricity Commission (CFE, Spanish acronym), this analysis is done in the same manner if there is no agency, but it is a department that belongs to the municipality.

### 1.1. Assignment of the Environmental Factor label

Figure 5 shows what is typically assessed by HR Ratings for each factor to assign its label to the environmental category:

**Figure 5: ESG Label Descriptions for the Environmental Factors**

Factors / Labels	Superior	Average	Limited
<b>Vulnerability to Climate Change and Natural Phenomena</b>	After the visit to the entity and with the available public data, it has been determined that the entity faces low vulnerability against climate change and natural phenomena. These entities usually have contingency plans for these occurrences, and also available resources to face any eventuality that could affect the population of the entity.	After the visit to the entity and with the available public data, it has been determined that the entity faces vulnerability to climate change and natural phenomena. However, there is no identifiable extraordinary events that can affect credit quality in the recent past. These entities usually display a low level of planning against this type of contingencies, but these entities also hold some resources or a moderate fiscal capacity to deal with these events.	After the visit to the entity and with the available public data, it has been determined that the entity faces a high level of vulnerability to climate change or to natural phenomena, and that this could directly impact the entity's credit quality. These entities usually display no level of planning against these contingencies. The liquidity of these entities would be affected or limited in these events.
<b>Solid Waste and Water Management and Water Operating Agencies Contingencies</b>	The entity has the infrastructure needed to collect, dispose and treat the residues generated by its population. There are minor to non issues regarding the collection of Urban Solid Residues (RSU, by its acronym in Spanish), this also applies to the system of provision and water treatment. All of these includes operating capacities and transfers or the retention of resources or funds that could hinder its credit quality.	The entity has the infrastructure needed to collect, dispose and treat the residues generated by its population. However, the coverage is not complete. There are issues regarding the collection of Urban Solid Residues or the distribution or treatment of water. The Water Operating Agency has several retention for the payment of water services. This will not be enough to hinder the operation of the entity.	The entity has non or insufficient infrastructure to collect, dispose and treat residues generated by its population. There are significant problems regarding the collection of solid residues and/or the water distribution or treatment systems. In the case of the Water Operating Agencies, there are significant retention over federal transfers to ensure the correct function of the agency. There could also be legal covenants or even trials that could harm the operation of the entity.

Source: HR Ratings.

### 1.2. Tools for assessing environmental factors

For this analysis, HR Ratings will draw on public information available from official sources such as the National Atlas of Vulnerability to Climate Change, developed by the Ministry of the Environment and Natural Resources (SEMARNAT, Spanish acronym) and the National Ecology and Climate Change Institute (INECC, Spanish acronym), and the National Risk Atlas, developed by the National Center for Disaster Prevention (CENAPRED, Spanish acronym); these tools allow to capture the vulnerability to, and the frequency of, natural phenomena. The information available from the OOA's of the assessed entity or, where appropriate, from the internal office of the municipality, must also be incorporated, to identify contingent liabilities that could accrue off the balance sheet of the rated entity. It is important to clarify that these are not the only sources that can be used. Lastly, and as part of its analysis process, HR Ratings will capture the pertinent information during its visit to the entity and in the interviews related to the process.

## 2. Analysis of Social Factors

The analysis of social factors of HR Ratings focuses largely on the population's quality of life; in this regard, higher quality facilitates economic activities and the taxable capacity of its base, and to capture public use taxes and other sources of revenue. This section seeks to identify whether factors such as: poverty and income inequality, and access to education and food have any impact on demographic trends or other factors that could eventually have an impact on the entity's credit quality.

Other aspects that are also assessed include the municipality's ability to provide the basic goods and services that correspond to it, its ability to provide security and mitigate crime and violence, as well as the social perception in this area. The social factors that will be assessed in this section include the following:

### a. Multidimensional Poverty Analysis

HR Ratings seeks to identify the percentage of the population living in a state of poverty. For this exercise, poverty is not only considered in terms of the income available to satisfy basic needs such as food, but also the population's access to various services. In this regard, housing services are considered to be: access to water, sanitation, electricity, etc. Access to public or private health services, social security and educational lagging are also incorporated.

This analysis is relevant to the extent that it reveals the stability of the tax base, considering the constant movements between the formal and informal labor market, and potential immigration flows. These factors could affect the Municipality's revenue collection or impact the Federal Transfers it receives. All these factors could have an impact on the need to acquire debt to cover current expenditures, and eventually impair the ability to service its debt obligations.

### b. Public Security

This methodology considers factors such as the perception of insecurity, homicide rates, the presence of organized crime, etc., that may have an impact on the productive activity of the Municipality, its expenditure needs and, on its ability to capture revenues. As in the items above, the analysis of HR Ratings focuses on the fact that entity's need to prioritize its expenditures to cover these items could impact its ability to pay.

## 2.1. Assignment of the Social Label

Figure 6 shows what is typically assessed by HR Ratings for each factor to assign its label to the social category:

Figure 6: ESG Label Descriptions for the Social Factors			
Factors / Labels	Superior	Average	Limited
<b>Multidimensional Poverty</b>	The entity's population mostly has the sufficient income to satisfy basic needs. Housing basic services are accessible, and as a consequence, it is expected that the entity will face no challenges regarding its credit quality.	There is a significant percentage of the population that its not capable of acquiring the sufficient income to cover all of its basic needs, also at least one of the basic housing services is not regularly accessible to families. These situations could limit the tax collecting capacity of the entity or cause higher current expenditures. However, the entities with this label still hold a certain degree of fiscal flexibility.	A significant percentage of the population does not have the required income to cover its basic needs regarding feeding and housing, at least three of the basic housing services are no accessible in the entity. This pressures its tax collection and implies a higher level of current expenditures that could harm the entity's credit quality in the short-term.
<b>Public Security</b>	Based on the visit and the available data and indicators, the label implies that the entity does not hold any need to increase its expenditures related to public safety; hence, it is expected that this factor will not hold any effect over the entity's credit quality.	Based on the visit and the available data and indicators, the label implies that the entity constantly incurs in moderately higher expenses related to public safety than similar states. This could have an effect over the entity's credit quality in the medium to long term.	Based on the visit and the available data and indicators, this label reflects that the entity incurs in extraordinary expenses related to public safety. This could imply that the entity has structural problems that could limit its fiscal flexibility and har its credit quality.

Source: HR Ratings.

### 2.2. Tools for assessing social factors

For this section, HR Ratings may draw on public surveys and information. In the case of quality housing, access to services and vulnerabilities, and anything related to multidimensional poverty, the information from National Council for the Evaluation of Social Development Policy (CONEVAL, Spanish acronym) may be used.<sup>2</sup> In the case of security, among other tools, the National Survey on Urban Public Security (ENSU, Spanish acronym) from the National Statistics and Geography Institute (INEGI) can be used, which captures the perception of the respondents regarding their perception of security<sup>3</sup>. The National Survey on Standards and Professional Police Training (ENECAP, Spanish acronym) from the INEGI may also be considered, which offers information regarding the distribution of police forces in the republic.

### 3. Analysis of Governance Factors

This section evaluates factors that are common in the analysis of HR Ratings for any entity, such as transparency, information quality and willingness and payment history. Contingent liabilities are also considered, which on many occasions are recorded off the balance sheet of the entity, for example, labor or commercial arbitration awards.

These factors, based on the experience of HR Ratings, are the ones that can most impact the credit quality of the entity. Any deterioration or improvement of any of these factors alone could merit a qualitative adjustment.

The factors related to governance that this section will assess are as follows:

#### a. Risks related to changes in public administration, political context and/or liquidity

Among the factors considered, emphasis is placed on the stated intention of implementing policies that HR Ratings considers could have an unfavorable effect on the credit quality of the municipality, but that cannot yet be incorporated in the URM. In addition, HR Ratings assesses whether any eventual change in public administration or electoral contests could give rise to debts or off-balance-sheet liabilities. In this regard, there could be an impact on the Municipality's liquidity that, due to the nature of the conditions that cause this stress, it cannot be incorporated in the URM.

#### b. Transparency and quality of the information

For this item, HR Ratings will assess at all times the information provided by the rated entity in terms of truthfulness, clarity and promptness. It will also assess that it complies with the accounting standards to which all the municipalities are bound by.

<sup>2</sup> National Council for the Evaluation of Social Development Policy (CONEVAL): <https://www.coneval.org.mx/Paginas/principal.aspx>

<sup>3</sup> National Statistics and Geography Institute (INEGI, Spanish acronym): <https://www.inegi.org.mx/>



### c. Contingent liabilities: labor or commercial lawsuits

This factor seeks to identify any potential unbudgeted risks such as arbitration awards, contingencies related to social security, lawsuits in process of any kind, and the recognition of historical debts that may lead to additional withholdings to the entity's revenue. Due to the nature of these contingencies, they are not included in the URM.

### 3.1. Assignment of the governance label

Figure 7 shows what is typically assessed by HR Ratings for each factor to assign its label to the governance category:

**Figure 7: ESG Label Descriptions for the Governance Factors**

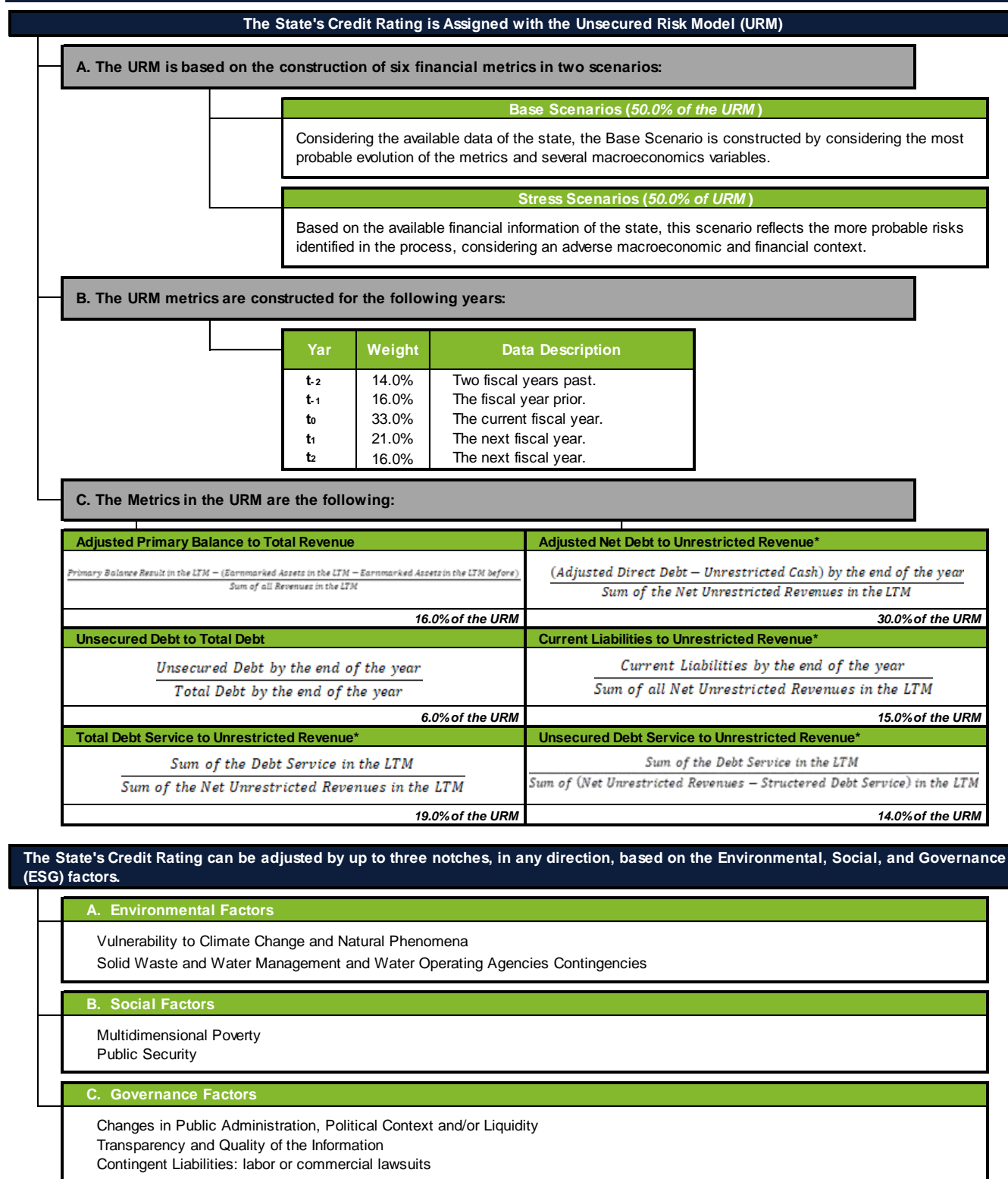
Factors / Labels	Superior	Average	Limited
<b>Changes in Public Administration, Political Context and/or Liquidity</b>	The change of administration, because of its political context, has allowed or will continue to allow for stability in terms of its operating capacities; the implementation of public policies is consistent with a long-term strategy and the entity displays a solid fiscal discipline. There is no pressure identified for complying with its short-term debt obligations.	Past changes of administration, because of the political context, has led to a certain degree of uncertainty and instability in terms of its operating capacity. There is a some pressure to meet short-term debt payments before the administration change that could lead to a reduction of current expenditure that may harm other indicators related to the payment to providers. However, this may not be enough to compromise the operating capacity of the entity.	The change of administration, because of the political context, implies a high level of uncertainty in terms of its public and financial policies carried up to that time. There are several weaknesses in the process of planning and implementing strategies to comply with short-term obligations or mitigate liquidity risks, this will limit the operating capacities of the entity.
<b>Transparency and Quality of the Information</b>	The entity delivers the information required for the process in time and it complies with the accounting standards. The information is representative of the entity's current financial situation.	The entity continuously delivers its financial information for the rating process, but not always in its timely manner. The financial information shows minor issues.	The financial information provided by the entity does not comply with basic accountant standards or it was not delivered on time for the rating process. There could be inconsistencies in the financial information such as unregistered liabilities or contingencies outside the balance.
<b>Contingent Liabilities: labor or commercial lawsuits</b>	The entity is not facing any commercial or labor lawsuits, and it has no liabilities outside its balance that could lead to extraordinary current expenditures increases. There are no extraordinary retentions or embargos of any type.	Some contingencies and/or liabilities outside the balance have been identified, despite these implying a certain amount of costs in the future, they will have a moderate effect over the credit quality of the entity.	There are identifiable contingencies and liabilities outside the balance that will represent extraordinary and substantial expenses. However, it is not possible to determine its full financial impact over the entity. In these cases, there are sentences dictaminated that could lead to the embargo of some of the entity's accounts that will lead to a lesser credit quality.

Source: HR Ratings.

### 3.2. Tools for assessing governance factors

For the analysis of these factors, HR Ratings must draw on the perception generated after its interaction with the assessed entity. In this regard, the history of its public policies, as well as the policies it plans to implement in the future, the improvements in the quality of the information produced by the entity, the credit history in terms of compliance and the habit of tapping the debt market to cover different expenditure items or accruing liabilities with different suppliers to maintain its cash flow.

Figure Annex 1: The Methodology to Rate Mexican States



Source: an Example of HR Ratings.

### Annex 2: Integer Values to Credit Ratings

This methodology has described the HR Ratings rating process, which consists of weighting the metrics with the years considered, and then converting that average into an integer value (IV) that ranges from 1 (lowest) to 19 (highest). These values are also averaged to obtain an IV for each Scenario and for a final value that represents the credit rating of the entity. The following figure shows the relationship between the IV and the credit rating.

Figure Annex 2	
Integer Value	Rating
19	HR AAA
18	HR AA+
17	HR AA
16	HR AA-
15	HR A+
14	HR A
13	HR A-
12	HR BBB+
11	HR BBB
10	HR BBB-
9	HR BB+
8	HR BB
7	HR BB-
6	HR B+
5	HR B
4	HR B-
3	HR C+
2	HR C
1	HR C-

Source: HR Ratings.



# Methodology for Rating Mexican Municipalities

## Unsecured Debt of Public Finances

April 2021

**Mexico:** Guillermo González Camarena No. 1200, Piso 10, Colonia Centro de Ciudad Santa Fe, C.P. 01210, Álvaro Obregón, CDMX. Tel 52 (55) 1500 3130.  
**U.S.:** One World Trade Center, Suite 8500, New York, New York, ZIP Code 10007, Tel +1 (212) 220 5735.

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### Contacts

**Ricardo Gallegos**

Senior Executive Director of Public Finance and Sovereign Debt  
ricardo.gallegos@hrratings.com

**Alvaro Rodriguez**

Public Finance Associate Director  
alvaro.rodriguez@hrratings.com

**Daniel Espinosa**

Public Finance Manager  
daniel.espinosa@hrratings.com

**Alfonso Sales**

Methodological Criteria Associate Director  
alfonso.sales@hrratings.com

**Mauricio Prieto**

Methodological Criteria Sr. Analyst  
mauricio.prieto@hrratings.com

**Pedro Latapi**

Chief Credit Officer  
pedro.latapi@hrratings.com

This methodology is the exclusive property of HR Ratings and will be applicable starting ...

### Description of the Methodology

The HR Ratings rating process begins with a quantitative assessment, which includes six metrics that analyze the balance sheet, the extent of the liabilities and the periodic burden of the entity's debt service. Subsequently, this methodology incorporates qualitative considerations with an environmental, social and governance (ESG) criteria; this analysis is qualitative and is limited to the assignment of up to three notches, upwards or downwards, thereby generating the credit rating of the assessed entity.

The quantitative assessment is carried out using the Unsecured Risk Model (URM) that requires projections of both a Base Scenario and a Stress Scenario. The entity's financial statements are used to develop the first scenario, which represents the performance that the State will most likely have given the context observed and, subsequently, a scenario under stress conditions to assess the impact on the key metrics under adverse financial and economic conditions. The metrics used in the URM, which are developed for each scenario, are as follows:

- a) Adjusted Primary Balance to Total Revenue,
- b) Adjusted Net Debt to Unrestricted Revenue,
- c) Unsecured Debt to Total Debt,
- d) Current Liabilities to Unrestricted Revenue,
- e) Total Debt Service to Unrestricted Revenue,
- f) Unsecured Debt Service to Unrestricted Revenue.

The metrics and years considered in the URM will receive the same weighting for all the assessed entities. It is also important to clarify that in the HR Ratings financial analysis of a state, the obligation to transfer a portion of the resources it receives from the Federal Government for its municipalities must be included.

The qualitative analysis is based on identifying the risk that the ESG criteria may have on the state's credit quality. It is important to clarify that this assessment considers the mechanisms available and that have been historically applied to mitigate said risks. The factors assessed include the state's vulnerability to climate change and other natural phenomena, as well as to water stress and the protection of natural areas. Social factors consider the vulnerability of the population to income scarcity, access to health and education services, and public security. Governance factors assess the risks brought about by changes in public administration, the quality of the reported information, previous debt defaults, and the potential financial risks of contingent liabilities that are not recognized in the entity's balance sheet.

The credit rating that HR Ratings will assign to the assessed states will be based on the results of the URM and may be adjusted based on the qualitative ESG risks identified in the process.

# Rating Methodology for Mexican States

## Public Finance Unsecured Debt

April 2021

### Introduction

This methodology measures the willingness and ability of the Mexican States to service their financial obligations, including any future obligations contracted by them<sup>1</sup>. Although this methodology does not include the assessment of the ability and willingness to service the debt related to structured products (which is the objective of another methodology), these concepts are included in many of the analytical metrics used. The methodology assumes that the structured debt based on pledged revenues impacts the willingness and ability of a state to properly service its unsecured obligations.

In its analysis, HR Ratings uses quantitative and qualitative tools to determine the credit rating of the assessed states. The first step consists of a quantitative analysis based on the Unsecured Risk Model (URM) that weights three types of metrics: the first metric refers to the study of the balance sheet, the second to various liability measurements, and the third to the debt service. The aforementioned metrics will be projected under two scenarios: the Base Scenario, that reflects the most likely conditions, given the historical financial information and HR Ratings' vision on the economic and local conditions for the next periods; and a Stress Scenario, that reflects the financial development of the rated entity by materializing the risks to which it is exposed.

These metrics will be weighted to capture both the importance of the historical information and the projections of HR Ratings. The different projection scenarios also incorporate current macroeconomic factors and those estimated by HR Ratings.

The qualitative analysis presented in this methodology is carried out based on an ESG approach that incorporates environmental, social, and governance-related criteria. The analysis in this section is based on the entity's vulnerability to these factors and the contingency or mitigation measures available to it; the approach is related to the ability of these factors of representing a credit quality risk and that, due to their nature, they cannot be incorporated into the quantitative analysis. Furthermore, these criteria describe risks that are not common to all entities or reflect that not all the entities are exposed to the same extent. The qualitative adjustment is limited to adding or subtracting up to three notches for each entity.

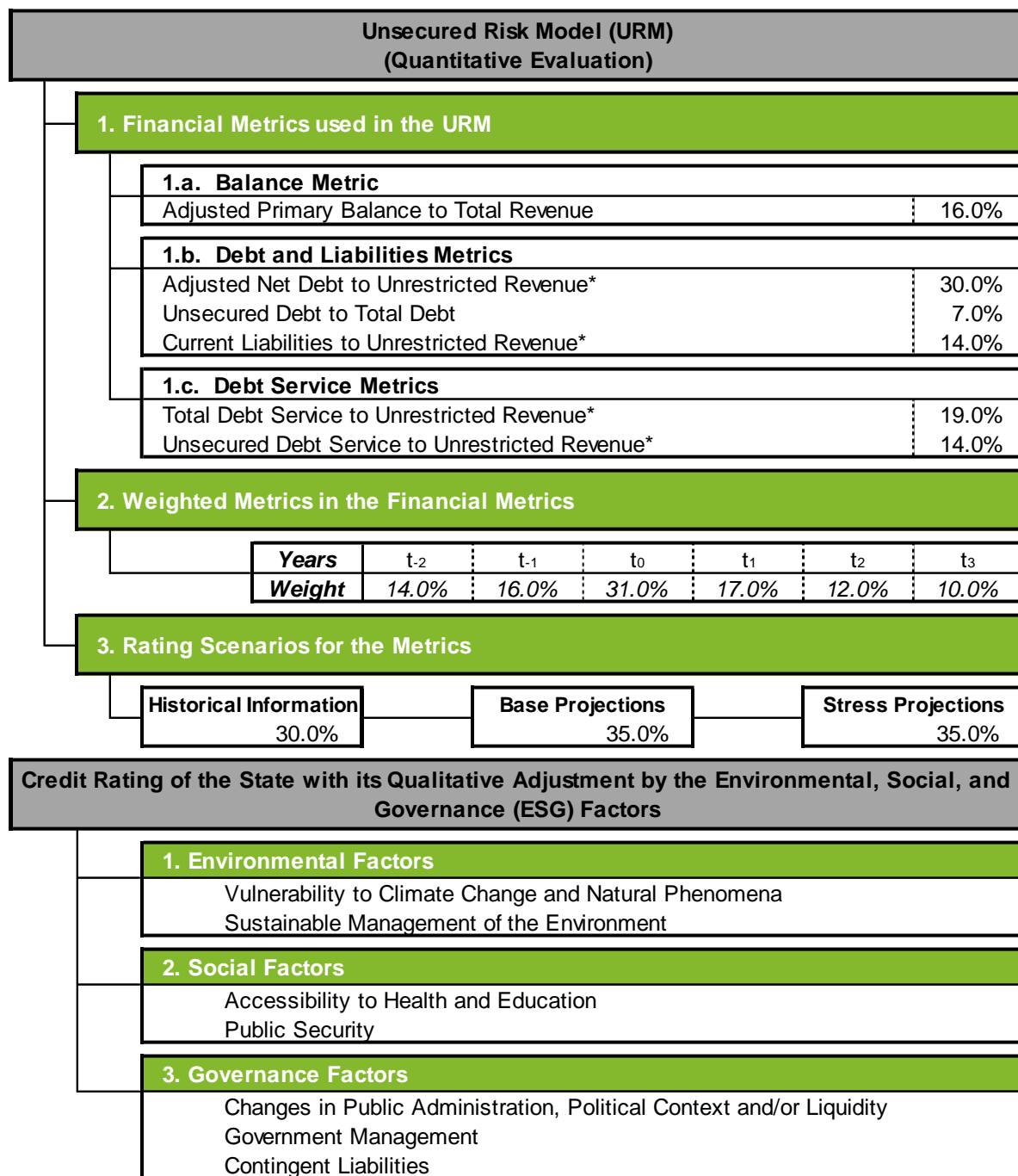
For this analysis, HR Ratings may draw on the data and/or plans it obtains at the meetings with the entities and analytical tools. The latter includes different indicators, databases and metrics obtained from surveys and public information.

The quantitative section of this document describes the URM. This Model includes four parts, the first part describes some of the assumptions used when preparing the projections, the second describes in detail the construction and weight of the six metrics, the third sets out the parameters per year and for each scenario and, the last part provides an example of a rating. After explaining the concepts of the URM, this document describes the ESG factors that are assessed, beginning with the environmental analysis, followed by the social analysis, and the section ends with the governance analysis of the State.

Figure 1 shows the general structure of the methodology, including the metrics used and the weights associated with each one.

<sup>1</sup> In accordance with the General Methodological Criteria of HR Ratings (available at the following link: <https://www.hrratings.com/methodology/>), non-payment, or "default", refers only to mandatory payments (interest and principal repayments) and does not include affirmative and negative obligations ("covenants").

**Figure 1: General Structure of the Methodology**



Source: HR Ratings.

\*The Unrestricted Revenues (UR) account for the transfers to municipalities from the states.



# Rating Methodology for Mexican States

## Public Finance Unsecured Debt

April 2021

### Quantitative Assessment of the Mexican States

The quantitative analysis is carried out using the Unsecured Risk Model (URM) that assesses the financial performance of the entity, in accordance with its historical behavior and the projections carried out by HR Ratings for a Base Scenario and a Stress Scenario. The URM consists of weighting six metrics for different years and for each scenario; at the end they are converted to an integer value between a range of 1 (lowest) and 19 (highest) based on which the result (weighted average between these metrics) of the URM will be obtained.

#### 1. Assumptions used when preparing the Scenarios

To develop the URM, HR Ratings needs to process the state's historical information. The financial conditions are reflected in the public accounts and, if necessary, accounting adjustments will be applied that will allow to standardize the information to model and project the future behavior under both scenarios. Some of the assumptions of the analysis used to develop the scenarios, as well as some of the most relevant concepts within the public accounts, are described below:

##### a. Revenues

Revenues are divided into two main categories: Federal Revenue and State-Generated Revenue. Federal Revenues, in turn, are divided into the following accounts: Participations (Ramo 28), Contributions (Ramo 33) and, other Federal and State Revenues; the latter shows historical volatility.

After analyzing and putting together the information, 100% of the Funding is recorded, including pledged revenues as a source of payment for a structured debt. Subsequently, pledged revenues are subtracted through expenditure accounts.

The State-generated revenues include the following accounts: taxes, fees, yields, public use taxes, and other state-generated revenues. Revenues include Unrestricted Revenues (UR), which represent the revenues that can be used to service the debt and are calculated as the sum of the Participations and the State-Generated Revenue. Lastly, cash flows received for indebtedness are not recognized as revenue, and the revenue from the remnants of the trusts of its structured debt are not included.

With the UR variable, its net form (URn) can be calculated, which subtracts transfers to municipalities. This new variable is incorporated into the calculation of key metrics such as those involving debt and debt service.

##### b. Expenditures

The expenditures account includes two main categories: current and non-operating expenditures. The methodology divides current expenditures into the following accounts: staff services, materials and supplies, general services, financial cost, transfers and subsidies, and other current expenditures.

The debt service (DS) account is made up of the interest on any type of debt and the amortizations of the structured debt. Amortizations of the unsecured debt, as well as the revenues derived from the financing, are not recorded in the statement of income and

# Rating Methodology for Mexican States

## Public Finance Unsecured Debt

April 2021

expenditures. Therefore, the Primary Balance metric is used to determine the Balance Sheet, excluding the payments required due to past indebtedness.

The Transfers to Municipalities account includes the portion of federal revenue that the state transfers to municipal entities. In general terms, these transfers represent approximately 20% of the Participations. For Contributions, the percentage that corresponds to each municipality will depend on each case. These transfers are incorporated into various metrics used in this methodology.

Regarding public works expenditures, the methodology requires, to the extent possible, that expenditures be recorded in the year in which they are disbursed and not at the time the works are completed.

### c. Projections

The historical information will be based on the public account and its ancillary documents, which could be subject to adjustments to improve their comparability, especially if virtual items are identified. The purpose of the foregoing is to ensure that the projections are consistent and comparable across all the entities.

The projections of revenue and expenditures consider the historical information, behavioral trends, and the perception of HR Ratings regarding the future economic and fiscal context of the state. In the case of financial costs, the entity needs to provide detailed information regarding its debt obligations, specifically the agreed interest rates and amortization schedules for at least the next four years.

In the event of a financial deficit position, HR Ratings will develop an assumption regarding the future financing structure. To project debt drawdowns, the applicable legal provisions that limit long-term indebtedness, as well as the repayment of short-term obligations, should be always considered, which could restrict the possibility of incurring additional indebtedness by some states.

An assessment of current liabilities will be carried out to determine to what extent they should be accrued and if they can be considered as an additional financing option, which will depend on the context of each entity and the behavior and historical treatment of these accounts.

The projections will also capture the entity's level of liquidity, in this regard they will reflect the short-term credit risks, highlighting the seasonality factor with respect to the volume and revolving unsecured debt in the assessed period.

## 2. Elements used in the URM

This section describes the financial metrics that HR Ratings calculates in its rating process. It also describes how these metrics are weighted as part of the credit rating.

### 2.1. Metrics and their weight in the URM

This section provides first the construction of each metric, and later shows the figure that describes the ranges that HR Ratings expects to observe for the different rating levels.

# Rating Methodology for Mexican States

## Public Finance Unsecured Debt

April 2021

### a) Adjusted Primary Balance (APB) to Total Revenue (TR); (16.0% of the URM)

This metric captures the immediate performance of the entity by considering the relationship between revenue and expenditures during the same period. It is important to clarify that the primary balance is used to exclude financial costs, which means that only the difference between revenues and expenditures is considered, excluding structured amortizations and financial costs. Revenues include all the resources pledged that can be used to back the service of the debt. Expenditures do not consider revenues that have been pledged and transferred to structured debt trusts.

This methodology uses an adjustment on the Primary Balance that consists of discounting in any year any changes in the restricted cash with respect to the prior year<sup>2</sup>. Therefore, the formula for the year  $t$  is as follows:

$$APB_t = \frac{\text{Primary Balance Result in the LTM} - (\text{Earmarked Assets in the LTM} - \text{Earmarked Assets in the LTM before})}{\text{Sum of all Revenues in the LTM}}$$

The incorporation of the adjustment in the Primary Balance allows discounting the effect of the earmarked resources that it receives through Federal transfers that have yet to be exercised. It is important to clarify that a percentage of the revenues comes from federal transfers, which means that its financial performance is not only subject to its own decisions. In this regard, HR Ratings values the fact that the entity can demonstrate that it can react to possible unexpected changes in the flow of Federal revenues. Total revenues are shown as the sum of the last twelve months (LTM), which represents the revenues accrued over the course of the assessed fiscal year.

### b) Adjusted Net Debt (ND) to Unrestricted Revenue (UR); (30.0% of the URM)

This metric begins with the calculation of the total debt, which refers to the obligations that include the structured debt and the unsecured debt. The former is debt that is backed by specific sources of revenue that have been earmarked, such as participations. Earmarking a source of revenue is generally carried out through the process of transferring these resources to a trust that is responsible for using these resources to service the structured debt.

$$Ad. ND to URn_t = \frac{(\text{Adjusted Direct Debt} - \text{Unrestricted Cash}) \text{ by the end of the year}}{\text{Sum of the Net Unrestricted Revenues in the LTM}}$$

The adjustment to the ND refers to the fact that the debt acquired through zero-coupon bonds will not be considered in such. Unrestricted Revenue (UR) is revenue that has not been earmarked or pledged for a specific expenditure and can be used to service the debt. It is also important to clarify that, for purposes of this methodology, the UR is net of the transfers to the municipalities.

<sup>2</sup> Restricted Cash refers to cash that, although it is held by the entity, it cannot be used since it is reserved to be used in specific projects, typically infrastructure works that are not executed in the originally planned period.

# Rating Methodology for Mexican States

## Public Finance Unsecured Debt

April 2021

### c) Unsecured Debt (UD) to Total Debt (TD); (7.0% of the URM)

The second debt metric used analyzes the unsecured debt (UD) ratio to the total debt. The structured debt is included in the analysis process since it can limit the ability to meet the payment obligations of the UD. Therefore, it is relevant to measure the percentage of the total debt that is UD, in the understanding that the higher the percentage, the greater the entity's unsecured credit risk will be. The corresponding formula for the year  $t$  of this metric is as follows:

$$UD \text{ to } TD_t = \frac{\text{Unsecured Debt by the end of the year}}{\text{Total Debt by the end of the year}}$$

### d) Current Liabilities to UR (14.0% of the URM)

The last debt metric supplements the analysis by assessing the entity's ability to meet all its obligations that do not represent, strictly speaking, an event of default since they were not paid. This calculation is relevant because current liabilities could become a significant burden for the entity, limiting its liquidity and ability to meet its unsecured debt obligations. It is important to clarify that this metric analyzes the breakdown of these liabilities, whereby accounting effects could be identified, as well as liabilities not recorded in the balance sheet. Also, if it is identified that factoring is being used, it will be considered as part of the short-term debt and not as current liabilities. The corresponding formula for the year  $t$  of this metric is as follows:

$$CL \text{ to } URn_t = \frac{\text{Current Liabilities by the end of the year}}{\text{Sum of all Net Unrestricted Revenues in the LTM}}$$

### e) Total Debt Service (DS) to UC (19.0% of the URM)

Debt service metrics focus on measuring the periodic financial burden of the debt and the opportunity cost of the resources used to service it; as well as knowing the historical financial behavior of the state. Their importance lies in the fact that they reflect the current consequences of the indebtedness of previous periods.

The first debt service metric includes the state's total debt service, which refers to the sum of the unsecured debt and the structured debt. This is to give a weight to the financial burden that represents the total debt of the entity. It is important to clarify that, to calculate the metric, the amortization of the short-term debt contracted and serviced within the same fiscal year is not considered, only the interest generated in the period for such contracted debt. The corresponding formula for the year  $t$  of this metric is as follows:

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$$TDS \text{ to } URn_t = \frac{\text{Sum of the Debt Service in the LTM}}{\text{Sum of the Net Unrestricted Revenues in the LTM}}$$

f) **Unsecured Debt Service (UDS) to UR without the Structured Debt Service (SDS)**  
(14.0% of the URM)

The last metric that is considered measures the relationship between the UDS and the UR, to which on this occasion the amount of the SDS is discounted. In preparing the UDS, it is assumed that all the unsecured debt is settled in the immediately following fiscal year. The objective of this metric, unlike the one above, is to measure the entity's ability to meet only its unsecured obligations considering that the structured debt isolates the revenue to cover its service. The corresponding formula for the year  $t$  of this metric is as follows:

$$UDS \text{ to } URn_t = \frac{\text{Sum of the Debt Service in the LTM}}{\text{Sum of (Net Unrestricted Revenues - Structured Debt Service) in the LTM}}$$

Lastly, this section includes Figure 2, which shows both the weight of each metric and the range that HR Ratings expects it to take for each rating level:

Figure 2: Rating Ranges and Weights for each Metric			
Metric	Adj. Primary Balance to Total Revenue	Adj. Net Debt to Unrestricted Revenue*	Unsecured Debt to Total Debt
Weight	16.0%	30.0%	7.0%
HR AAA	[ 1.25% , ∞ )	( -∞ , 17.5% ]	( -∞ , 1.8% ]
HR AA	[ 0.52% , 1.25% )	( 17.5% , 43.2% ]	( 1.8% , 10.3% ]
HR A	[ -1.11% , 0.52% )	( 43.2% , 70.6% ]	( 10.3% , 18.8% ]
HR BBB	[ -3.83% , -1.11% )	( 70.6% , 123.7% ]	( 18.8% , 27.3% ]
HR BB	[ -6.30% , -3.83% )	( 123.7% , 168.5% ]	( 27.3% , 35.8% ]
HR B	[ -7.61% , -6.30% )	( 168.5% , 184.6% ]	( 35.8% , 44.3% ]
HR C	( -∞ , -7.61% )	( 184.6% , ∞ )	( 44.3% , 100.0% )
Metric	Current Liabilities to Unrestricted Revenue*	Total Debt Service to Unrestricted Revenue*	Unsecured Debt Service to Unrestricted Revenue*
Weight	14.0%	19.0%	14.0%
HR AAA	[ -∞ , 10.0% ]	[ 0.0% , 2.5% ]	[ 0.0% , 1.3% ]
HR AA	( 10.0% , 13.7% ]	( 2.5% , 5.1% ]	( 1.3% , 2.5% ]
HR A	( 13.7% , 20.8% ]	( 5.1% , 10.5% ]	( 2.5% , 5.8% ]
HR BBB	( 20.8% , 32.8% ]	( 10.5% , 18.8% ]	( 5.8% , 10.0% ]
HR BB	( 32.8% , 42.9% ]	( 18.8% , 24.5% ]	( 10.0% , 12.8% ]
HR B	( 42.9% , 48.6% ]	( 24.5% , 26.8% ]	( 12.8% , 14.2% ]
HR C	( 48.6% , ∞ )	( 26.8% , ∞ )	( 14.2% , ∞ )

Source: HR Ratings.

\*The Unrestricted Revenues (UR) account for the transfers to municipalities from the states.

### 2.2. Periods considered and their weighting

The financial metrics described in the section above are calculated for the historical years analyzed and for the projections of the current year and three years in the future, this for a Base Scenario and a Stress Scenario. These years are weighted, as shown in Figure 3, and allow generating a weighted average by metric.

**Figure 3: Weight per Year**

Year	Weight	Description of the Data
t-2	14.0%	Two fiscal years past.
t-1	16.0%	The fiscal year prior.
t <sub>0</sub>	31.0%	The current fiscal year.
t <sub>1</sub>	17.0%	The next fiscal year.
t <sub>2</sub>	12.0%	Two fiscal years in the future.
t <sub>3</sub>	10.0%	Three fiscal years in the future.

Source: HR Ratings.

In the case of States, the years considered correspond to the fiscal year. HR Ratings considers that the analysis should be carried out in these periods to formally integrate the effects of the approved budget and the revenue law. Thus, the feasibility of the financial strategies is assessed based on the legal and fiscal tools available to the State.

### 3. General Structure of the URM and an example of how it is applied

The general structure of the URM consists of: (1) calculating the six financial metrics for the years considered, (2) weighting each metric according to its weight per year, (3) calculating an integer value (IV) between 1 (lowest) and 19 (highest) for each metric with the result of this weighted average, (4) weighting, in turn, the IVs to obtain a rating in the Base Scenario and another rating in the Stress Scenario, (5) the direct average of both scenarios results in the credit rating of the State expressed in a value between 1 and 19. Figure 4 provides an example of how these equations are applied in the URM to arrive at the credit rating:

Figure 4: Example of the URM

Figure 4: Example of the URM										
Metrics	Weighs	Example of a State in a Base Scenario								
		t-2	t-1	t0	t1	t2	t3	Intertemporal Average	IV per Metric	Rating by Metric
		14.0%	16.0%	31.0%	17.0%	12.0%	10.0%			
Adj. PB to TR	16.0%	-1.03%	-0.98%	-1.04%	-1.02%	-1.06%	-1.01%	-1.03%	13	HR A-
Adj. ND to UR	30.0%	28.20%	29.73%	32.01%	33.51%	35.04%	37.01%	32.23%	16	HR AA-
UD to TD	7.0%	12.24%	12.98%	13.25%	14.27%	14.98%	15.87%	13.71%	14	HR A
CL to UR	14.0%	18.45%	17.88%	18.21%	19.01%	19.98%	20.87%	18.81%	13	HR A-
TDS to UR	19.0%	5.72%	6.01%	6.77%	7.24%	7.99%	8.76%	6.93%	14	HR A
UDS to UR	14.0%	2.44%	2.89%	3.25%	3.89%	4.22%	4.85%	3.46%	14	HR A
					Rating of the Base Scenario				14.30	HR A
Metrics	Weights	Example of a State in a Stress Scenario								
		t-2	t-1	t0	t1	t2	t3	Intertemporal Average	IV per Metric	Rating By Metric
		14.0%	16.0%	31.0%	17.0%	12.0%	10.0%			
Adj. PB to TR	16.0%	-1.03%	-0.98%	-1.14%	-1.53%	-2.12%	-2.02%	-1.37%	12	HR BBB+
Adj. ND to UR	30.0%	28.20%	29.73%	35.21%	50.27%	70.08%	74.02%	43.98%	14	HR A
UD to TD	7.0%	12.24%	12.98%	14.58%	21.41%	29.96%	31.74%	18.72%	13	HR A-
CL to UR	14.0%	18.45%	17.88%	20.03%	28.52%	39.96%	41.74%	25.47%	11	HR BBB
TDS to UR	19.0%	5.72%	6.01%	7.45%	10.86%	15.98%	17.52%	9.59%	13	HR A-
UDS to UR	14.0%	2.44%	2.89%	3.58%	5.84%	8.44%	9.70%	4.89%	13	HR A-
					Rating of the Stress Scenario				12.86	HR A-
					URM Rating				14	HR A

Source: an Example of HR Ratings.

In this figure, the *Intertemporal Average* column shows the weighted average of each metric according to the weight that corresponds to each year. The “IV per Metric” column shows the integer value between 1 (lowest) and 19 (highest) that corresponds to the average per year of each metric. The weighted average of the IVs in the Base Scenario is 14.30, while the weighted average of the IVs in the Stress Scenario is 12.86. The average of both scenarios is 13.58 and is rounded to the nearest integer, in this case 14. Annex 2 shows the corresponding figure between the IV and the credit rating.

The credit rating for this example is “HR A”; however, a qualitative adjustment of up to three notches, upwards or downwards, may be applied to it based on the ESG factors that are described in the following section.

Following the URM assessment and ESG analysis, there is still one last qualitative adjustment that could be assigned to a State's credit rating. These refer to various versions of default, as defined in the respective section of the HR Ratings *General Methodological Criteria*.

## Environmental, Social and Governance (ESG) Analysis

The purpose of this section is to incorporate into the unsecured rating of any State the impact that the environmental, social, and governance-related criteria may have on its credit quality. The multiple factors that can be assessed in this section could have a quantitative impact in a future period, therefore, to a certain extent, they can be incorporated into the projections that HR Ratings makes in the URM. However, the ESG



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criteria tend to change to the extent that they relate to social trends and new market and governance standards, therefore they need to be treated in a qualitative manner.

Not all entities are exposed to the same ESG risks; therefore, the analysis of HR Ratings focuses on identifying these risks and considers the extent to which the entity is capable of mitigating and/or managing them. Environmental and/or social factors could have an impact in an unpredictable timeframe and the costs of the public policies designed to mitigate them cannot be appropriately anticipated; also, due to the complexity of the ESG factors, the policies implemented to address these risks may have the desired effect in the short term, and at the same time maintain uncertainty regarding their ability to generate the desired results in the long term.

The HR Ratings methodology allows an adjustment of up to three notches, upwards or downwards, to incorporate these factors. The extent of the adjustment may be due to the combination of various risks or exclusively to the impact that a specific risk may have on the entity. In any case, HR Ratings will describe in detail in its analysis report the criteria incorporated into the State's credit rating. Therefore, it is important to emphasize that, although HR Ratings identifies vulnerabilities to different ESG risks in its assessment, the adjustment should only consider the ability of these risks to affect, upwards or downwards, the entity's credit rating. This is due to the need to use resources in an extraordinary manner to mitigate or adapt to these risks.

The process described in this section is based on a labelling system that will be assigned to the environmental analysis, another to the social analysis, and a last one to the governance analysis. The labels refer to the entity's level of exposure and incorporate its ability to adapt to the risks derived from the ESG concepts.

In this sense, a *Superior* label will be assigned in the cases in which the State does not show that it is impacted by the set of factors analyzed or that, despite the risk, it has sufficient adaptation mechanisms to mitigate any credit impact. An *Average* label refers to the existence of risks that do not have proper adaptation mechanisms, but that are low-incidence risks; this label may also refer to potential and moderate impacts on the State's credit quality. Lastly, a *Limited* label refers to risks that cannot be mitigated and that could, in the short or long term, have an impact on the credit quality of the assessed State.

This process is implemented to facilitate the detection and monitoring of risks, vulnerabilities, and the ability to adapt to the ESG factors. Typically, a combination of *Superior* labels would reflect a favorable qualitative adjustment, as would a combination of *Limited* labels that would merit an adjustment in the opposite direction. However, the status of any single factor within any of the ESG categories could be sufficient to assign a qualitative adjustment, upwards or downwards. In these cases, HR Ratings will clarify its criteria in its analysis report.

The following sections describe the environmental, social and governance factors that are analyzed for each State and some of the tools that HR Ratings uses to analyze and monitor these factors are also described.

### 1. Analysis of Environmental Factors

This section focuses on the assessment of natural phenomena and the impact that these could have on the public policies of the State, as well as how they could alter the incidence of turning to higher spending or extraordinary transfers. In this regard, the HR Ratings

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analysis must recognize the difference between immediate phenomena and those that could show progress in the long term; such issues will be reflected in the assignment of the environmental label.

Unlike the analysis of municipalities, for the states the availability of resources is also considered, and in the same manner, different sources of risk are assessed, such as those listed in this section; however, it is important to clarify that these are not the only risks that can be identified in the analysis process:

### **a. Vulnerability of the state to climate change and natural phenomena**

HR Ratings seeks to identify if population settlements are exposed to natural phenomena such as landslides, droughts, and floods, among others. The risks to which the different productive activities and the state infrastructure are exposed to are also considered. Lastly, it seeks to identify the frequency with which these risk factors have occurred, since this variable is the basis for potential future occurrences.

It also seeks to measure the extent to which the State can mitigate or adapt to these events, which involves identifying the tools it has to manage any potential risks; these tools may be its own or may represent Federal support. These considerations are relevant to the extent that early action will reduce the cost of these events and that various fiscal strategies will allow, with a low operating cost, to allocate resources to counteract these events and not have any impact on the resources allocated to service the entity's debt.

Within this concept, the cost of implementing regulations could also be incorporated, which, although it is aimed at mitigating exposure to climate change in the long term, it could have an impact on the entity's current expenditure in the short term.

### **b. Sustainable Management of the Environment**

In this section, HR Ratings seeks to identify whether the State can meet the population's demand for various resources; this refers to whether the resource is sufficient or whether the infrastructure exists to extract and distribute it. Among these factors, the analysis focuses on variables such as: water stress, wastewater treatment, natural protected areas in the territory, loss of areas covered with trees, volume of solid waste generated, adequate disposal of these solid wastes, etc.

In addition, it assesses whether the current consumption trend, of any resource, is sustainable over time and if it can generate additional costs in the future that will limit the State's ability to serve debt obligations.

## **1.1. Assignment of the Environmental Factor label**

Figure 5 shows what is typically assessed by HR Ratings for each factor to assign its label to the environmental category:

Figure 5: ESG Label Descriptions for the Environmental Factors

Factors / Labels	Superior	Average	Limited
<b>Vulnerability to Climate Change and Natural Phenomena</b>	After the visit to the entity and with the available public data, it has been determined that the entity faces low vulnerability against climate change and natural phenomena. These entities usually have contingency plans for these occurrences, and also available resources to face any eventuality that could affect the population of the entity.	After the visit to the entity and with the available public data, it has been determined that the entity faces vulnerability to climate change and natural phenomena. However, there is no identifiable extraordinary events that can affect credit quality in the recent past. These entities usually display a low level of planning against this type of contingencies, but these entities also hold some resources or a moderate fiscal capacity to deal with these events.	After the visit to the entity and with the available public data, it has been determined that the entity faces a high level of vulnerability to climate change or to natural phenomena, and that this could directly impact the entity's credit quality. These entities usually display no level of planning against these contingencies. The liquidity of these entities would be affected or limited in these events.
<b>Sustainable Management of the Environment</b>	The label implies that the entity faces a low level of water stress, typically measured by excess demand. Also that the entity's infrastructure is capable of handling a high level of waste waters. The entity is capable of handling properly its solid residues.	The label reveals that the entity faces a certain level of water stress that could lead to an increment in the current expenses in the medium or long term. The label could also imply that the waste water infrastructure is not sufficient or it will become so in the coming years. The management of solid residues faces similar challenges.	The label reveals that the entity faces high level of water stress, that leads to a constant increase in expenditures to satisfy demand. This extraordinary necessity to constantly increase expenses is also reflected by the needs to provide water waste and management of solid residues services.

Source: HR Ratings.

## 1.2. Tools for assessing environmental factors

For this analysis, HR Ratings will draw on public information available from official sources such as the National Atlas of Vulnerability to Climate Change, developed by the Ministry of the Environment and Natural Resources (SEMARNAT, Spanish acronym) and the National Ecology and Climate Change Institute (INECC, Spanish acronym), and the National Risk Atlas, developed by the National Center for Disaster Prevention (CENAPRED, Spanish acronym); these tools allow to capture the vulnerability to, and the frequency of, natural phenomena. In the case of the availability of resources, information from national agencies such as the National Statistics and Geography Institute (INEGI, Spanish acronym) may be used<sup>3</sup>, or even from international agencies. For example, in the case of water stress measurements, data from the *World Resources Institute* can be used; or in the case of reforestation, information from *Global Forest Watch* can be used.

## 2. Analysis of Social Factors

The HR Ratings analysis of social factors focuses largely on the population's quality of life; in this regard, higher quality facilitates economic activities and the taxable capacity of its base, and to capture public use taxes and other sources of revenue. This section seeks to identify whether factors such as poverty and income inequality, and access to education and food have any impact on demographic trends or other factors that could eventually have an impact on the entity's credit quality.

The vulnerability of the state's population in terms of income and lack of basic services should also be assessed. The entity's ability to provide security and mitigate crime and violence are important, as well as the social perception in this area. The social factors that will be assessed in this section, include the following:

### a. Analysis of Health and Education in the State

For HR Ratings, the analysis of the quality of life of the population in the State is an indicator related to expenditure needs. In this section, quality is measured through variables that indicate access to health or education. To a large extent, these factors can describe the

<sup>3</sup> National Statistics and Geography Institute (INEGI, Spanish acronym): <https://www.inegi.org.mx/>

State's ability to capture revenues. For this year, forms of poverty that reflect the percentage of the population that do not have access to market baskets that guarantee a certain level of nutrition can be considered. Education levels, access to health services and even the average life expectancy of the population can also be measured.

This analysis is relevant to the extent that it reveals the stability of the tax base, considering the constant movements between the formal and informal labor market, and potential immigration flows. These factors could affect the State's own revenue collection or impact the Federal Transfers it receives. All these factors could have an impact on the need to acquire debt to cover current expenditures, and eventually impair the ability to service its debt obligations.

### b. Public Security

This methodology considers factors such as the perception of insecurity, homicide rates, presence of organized crime, level of violent crimes, etc. In this regard, the need for the entity to prioritize its expenditures to cover these aspects and the impact that this could have on its ability to service the debt and capture revenues is assessed.

## 2.1. Assignment of the Social Label

Figure 6 shows what is typically assessed by HR Ratings for each factor to assign its label to the social category:

**Figure 5: ESG Label Descriptions for the Social Factors**

Factors / Labels	Superior	Average	Limited
<b>Accessibility to Health and Education</b>	A substantial part of the population of the entity receives enough income to satisfy its feeding necessities, it also holds a high life expectancy; factors that suggest a reduced need for extraordinary expenses in public health. The entity holds high levels of literacy, high levels of education and its labor market is highly formalized.	The percentage of the population that is unable to satisfy its nutrition necessities, as well as the current life expectancy and other death related indicators, suggest that the entity could face fiscal stress in the medium to long term related to health services. The current levels of illiteracy, education and informality reveal opportunities for improving the entity's tax collection.	The low levels of income and life expectancy imply a higher level of health services expenses compared to other states with similar amounts of population. The illiteracy levels are high, as well as the education levels, and the informal labor market is extensive, limiting the ability of the entity is limited.
<b>Public Security</b>	Based on the visit and the available data and indicators, the label implies that the entity does not hold any need to increase its expenditures related to public safety; hence, it is expected that this factor will not hold any effect over the entity's credit quality.	Based on the visit and the available data and indicators, the label implies that the entity constantly incurs in moderately higher expenses related to public safety than similar states. This could have an effect over the entity's credit quality in the medium to long term.	Based on the visit and the available data and indicators, this label reflects that the entity incurs in extraordinary expenses related to public safety. This could imply that the entity has structural problems that could limit its fiscal flexibility and har its credit quality.

Source: HR Ratings.

## 2.2. Tools for assessing social factors

For this section, HR Ratings may draw on public surveys and information. In the case of quality housing, access to services and vulnerabilities, and anything related to multidimensional poverty, the information from National Council for the Evaluation of Social Development Policy (CONEVAL, Spanish acronym) may be used<sup>4</sup>. In the case of security,

<sup>4</sup> National Council for the Evaluation of Social Development Policy (CONEVAL): <https://www.coneval.org.mx/Paginas/principal.aspx>

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among other tools, the National Survey on Victimization and Perception of Public Security (ENVIPE, Spanish acronym) or the National Survey on Urban Public Security (ENSU, Spanish acronym), both from the INEGI can be used. International organizations such as *Vision of Humanity* that develops the *Global Peace Index* and the *Mexico Peace Index*<sup>5</sup> can also be considered.

### 3. Analysis of Governance Factors

This section evaluates factors that are common in the analysis of HR Ratings for any entity, such as transparency, information quality, and willingness and payment history. Aspects related to contingent liabilities are also considered, which on many occasions are recorded off the balance sheet of the entity.

These factors, based on the experience of HR Ratings, are the ones that can most impact the credit quality of the entity. Any deterioration or improvement of any of these factors alone could merit a qualitative adjustment. The factors related to governance that this section will assess are as follows:

#### a. Risks related to changes in public administration, political context and/or liquidity

This section assesses the orientation and history of the State's public policies that HR Ratings believes could have an adverse impact on the credit quality, but that cannot yet be incorporated into the URM. In addition, HR Ratings assesses whether any eventual change in public administration or electoral contests could give rise to debts, off-balance-sheet liabilities, or operational deficiencies. In this regard, there could be an impact on liquidity that, due to the nature of the conditions that cause this stress, it cannot be incorporated in the URM.

#### b. Government Management

In this area, in addition to the quality, transparency and representativeness of the entity's information, the electronic means available to facilitate the interaction of the population with the government is assessed. The institutional and regulatory tools available to the entity to provide services and guarantees such as property registration and the ease of opening private businesses are also analyzed.

#### c. Contingent liabilities

This factor seeks to identify any potential unbudgeted risks and contingencies related to social security; lawsuits in process of any kind; and the recognition of historical debts that may lead to additional withholdings to the entity's revenue. Due to the nature of these contingencies, they are not included in the URM.

<sup>5</sup> The *Mexico Peace Index* can be found at the following link: <https://www.visionofhumanity.org/maps/mexico-peace-index/#/>

### 3.1. Assignment of the governance label

Figure 7 shows what is typically assessed by HR Ratings for each factor to assign its label to the governance category:

**Figure 7: ESG Label Descriptions for the Governance Factors**

Factors / Labels	Superior	Average	Limited
<b>Changes in Public Administration, Political Context and/or Liquidity</b>	The change of administration, because of its political context, has allowed or will continue to allow for stability in terms of its operating capacities; the implementation of public policies is consistent with a long-term strategy and the entity displays a solid fiscal discipline. There is no pressure identified for complying with its short-term debt obligations.	Past changes of administration, because of the political context, has led to a certain degree of uncertainty and instability in terms of its operating capacity. There is a some pressure to meet short-term debt payments before the administration change that could lead to a reduction of current expenditure that may harm other indicators related to the payment to providers. However, this may not be enough to compromise the operating capacity of the entity.	The change of administration, because of the political context, implies a high level of uncertainty in terms of it public and financial policies carried up to that time. There are several weaknesses in the process of planning and implementing strategies to comply with short-term obligations or mitigate liquidity risks, this will limit the operating capacities of the entity.
<b>Government Management</b>	The entity provides reliable and precise information regarding its finances and budget, and it is publicly available by electronic and accessible means. The entity also displays institutional strength that allows for services like registering property or opening businesses in an efficient manner.	The financial and budgetary information of the entity is accurate but it holds the opportunity to improve. This is also the case for the institutional strength and regulatory capacity of the entity.	The entity provides information that might no the be accurate regarding its financial and budgetary position and it is not accessible or available by electronic means. The entity also displays institutional weaknesses and it is unable to provide services like registering property or opening businesses.
<b>Contingent Liabilities</b>	The entity is not facing any commercial or labor lawsuits, and it has no liabilities outside its balance that could lead to extraordinary current expenditures increases. The social security and pensions systems is viable in the long-term.	Some contingencies and/or liabilities outside the balance have been identified, despite these implying a certain amount of costs in the future, they will have a moderate effect over the credit quality of the entity. The current expenses will continue to grow in the future to cover pensions, but the entity holds the financial flexibility to maintain its balance.	There are identifiable contingencies and liabilities outside the balance that will represent extraordinary and substantial expenses. However, it is not possible to determine its full financial impact over the entity. In these cases, there are clear pressures over the expenditures regarding pensions and social securities, that could significantly compromise its operating capacities and credit quality.

Source: HR Ratings.

### 3.2. Tools for assessing governance factors

For the analysis of these factors, HR Ratings must draw on the perception generated after its interaction with the assessed entity. In this regard, the history of its public policies, as well as the policies it plans to implement in the future, the improvements in the quality of the information produced by the entity, the credit history in terms of compliance and the habit of tapping the debt market to cover different expenditure items or accruing liabilities with different suppliers to maintain its cash flow. Public tools may also be drawn on such as the INEGI's National Survey on Governmental Quality and Impact (ENCIG, Spanish acronym), which provides information regarding the population's evaluation regarding procedures, payments, public services, and interactions with the authorities.

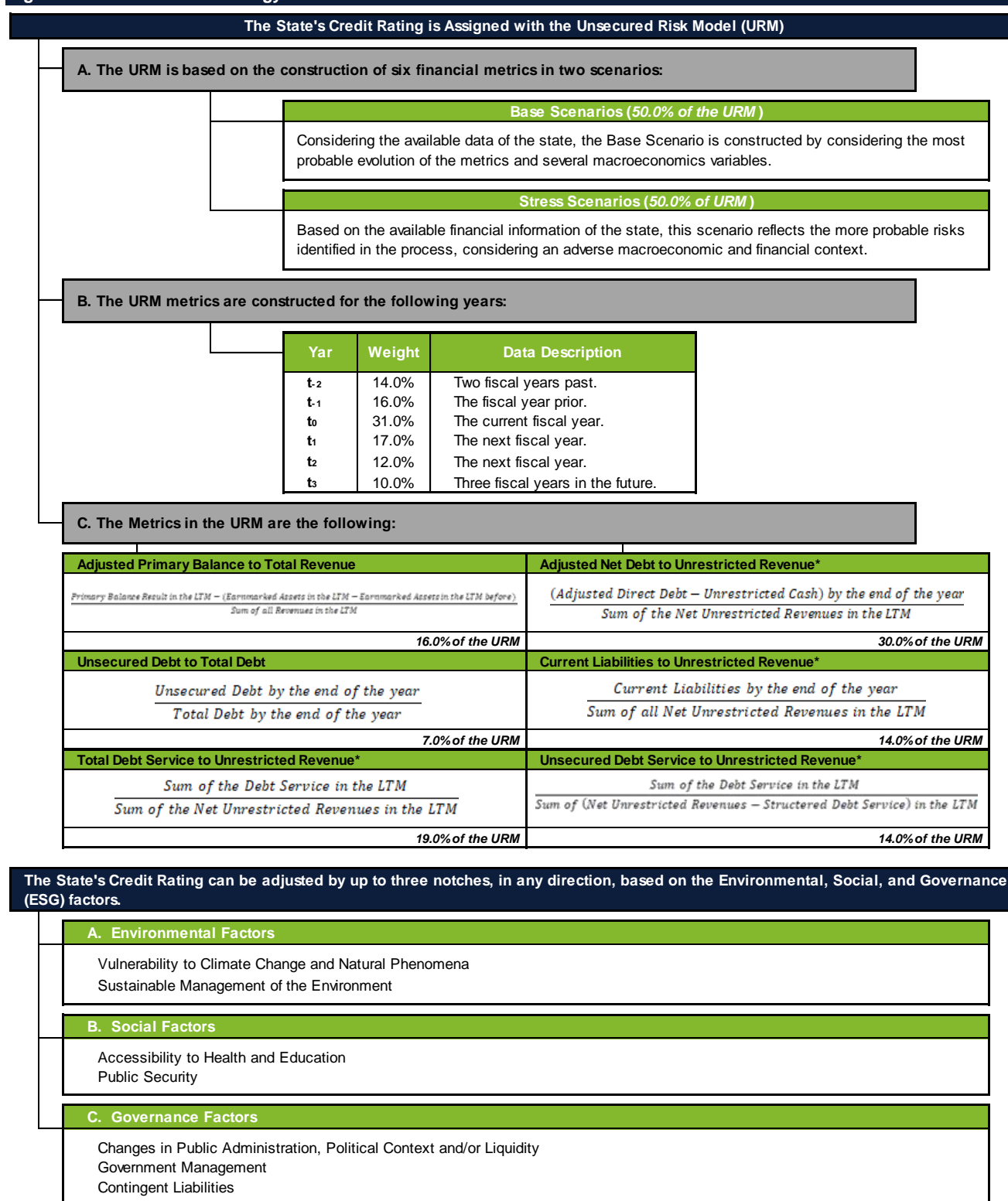


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Figure Annex 1: The Methodology to Rate Mexican States



Source: an Example of HR Ratings.

\*The Unrestricted Revenues (UR) account for the transfers to municipalities from the states.



### Annex 2: Integer Values to Credit Ratings

This methodology has described the HR Ratings rating process, which consists of weighting the metrics with the years considered, and then converting that average into an integer value (*IV*) that ranges from 1 (lowest) to 19 (highest). These values are also averaged to obtain a (*IV*) for each Scenario and for a final value that represents the credit rating of the entity. The following figure shows the relationship between the (*IV*) and the credit rating.

Figure Annex 2	
Integer Value	Rating
19	HR AAA
18	HR AA+
17	HR AA
16	HR AA-
15	HR A+
14	HR A
13	HR A-
12	HR BBB+
11	HR BBB
10	HR BBB-
9	HR BB+
8	HR BB
7	HR BB-
6	HR B+
5	HR B
4	HR B-
3	HR C+
2	HR C
1	HR C-

Source: HR Ratings.



Credit  
Rating  
Agency

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**Mexico:** Guillermo González Camarena No. 1200, Piso 10, Colonia Centro de Ciudad Santa Fe, C.P. 01210, Álvaro Obregón, CDMX. Tel 52 (55) 1500 3130.  
**U.S.:** One World Trade Center, Suite 8500, New York, New York, ZIP Code 10007, Tel +1 (212) 220 5735.

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Credit  
Rating  
Agency

# Methodology for Rating Mexican Municipalities

## Unsecured Debt of Public Finances

February 2021

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## METHODOLOGIES

### Current versions of previously sent methodologies

	Methodology	
1	Methodology for the Evaluation of Charter School Debt ( <i>Long Term and Short Term Global Rating Scales</i> ).	<a href="https://www.hrratings.com/docs/metodologia/New%20Charter%20Schools%20Methodology%20R.pdf">https://www.hrratings.com/docs/metodologia/New%20Charter%20Schools%20Methodology%20R.pdf</a>
2	General Methodological Criteria.	<a href="https://www.hrratings.com/docs/metodologia/GMC%20March%202019.pdf">https://www.hrratings.com/docs/metodologia/GMC%20March%202019.pdf</a>
3	HR Ratings' Corporate Debt Credit Risk Evaluation ( <i>Long Term and Short Term Local Rating Scales</i> ).	<a href="https://www.hrratings.com/docs/metodologia/Corporate%20Debt%20Credit%20Risk%20Evaluation%20Final.pdf">https://www.hrratings.com/docs/metodologia/Corporate%20Debt%20Credit%20Risk%20Evaluation%20Final.pdf</a>
4	U.S. State Government General Obligations Methodology Addendum ( <i>Long Term and Short Term Global Rating Scales</i> ).	<a href="https://www.hrratings.com/docs/metodologia/General%20Obligation%20States%20Methodology%20March%202014_final.pdf">https://www.hrratings.com/docs/metodologia/General%20Obligation%20States%20Methodology%20March%202014_final.pdf</a>
5	Sovereign Debt Methodology ( <i>Long Term and Short Term Global Rating Scales</i> ).	<a href="https://www.hrratings.com/docs/metodologia/0Sovereign%20Debt%20Methodology.pdf">https://www.hrratings.com/docs/metodologia/0Sovereign%20Debt%20Methodology.pdf</a>
6	U.S Local Government General Obligations Methodology ( <i>Long Term and Short Term Global Rating Scales</i> ).	<a href="https://www.hrratings.com/docs/metodologia/General%20Obligation%20Methodology%20Nov2013_final.pdf">https://www.hrratings.com/docs/metodologia/General%20Obligation%20Methodology%20Nov2013_final.pdf</a>
7	Methodology for Infrastructure ( <i>Structured Finance Rating Scale</i> ).	<a href="https://www.hrratings.com/docs/metodologia/0Metodologia%20para%20Infraestructura%20(eng)%20limpio1.pdf">https://www.hrratings.com/docs/metodologia/0Metodologia%20para%20Infraestructura%20(eng)%20limpio1.pdf</a>
8	Hybrid Instruments Credit Methodology ( <i>Long Term Local Rating Scales</i> )	<a href="https://www.hrratings.com/docs/metodologia/Hybrid%20Instruments%20Credit%20Methodology.pdf">https://www.hrratings.com/docs/metodologia/Hybrid%20Instruments%20Credit%20Methodology.pdf</a>
9	Addendum - Rating Methodology for Subordinated Debt ( <i>Long Term and Short Term Local Rating Scales</i> ).	<a href="https://www.hrratings.com/docs/metodologia/3.2.2.%20Rating%20Methodology%20for%20Subordinated%20Debt.pdf">https://www.hrratings.com/docs/metodologia/3.2.2.%20Rating%20Methodology%20for%20Subordinated%20Debt.pdf</a>
10	Rating Methodology for Non-Bank Financial Institutions ( <i>Long Term and Short Term Local Rating Scales</i> ).	<a href="https://www.hrratings.com/docs/metodologia/3.2.3.%20Non%20Bank.pdf">https://www.hrratings.com/docs/metodologia/3.2.3.%20Non%20Bank.pdf</a>
11	Addendum - Rating Methodology for Credit Unions ( <i>Long Term and Short Term Local Rating Scales</i> ).	<a href="https://www.hrratings.com/docs/metodologia/3.2.4.%20Rating%20Methodology%20for%20Credit%20Unions.pdf">https://www.hrratings.com/docs/metodologia/3.2.4.%20Rating%20Methodology%20for%20Credit%20Unions.pdf</a>
12	Addendum - Rating Methodology for Leasing Companies ( <i>Long Term and Short Term Local Rating Scales</i> ).	<a href="https://www.hrratings.com/docs/metodologia/3.2.5.%20Leasing%20Agents.pdf">https://www.hrratings.com/docs/metodologia/3.2.5.%20Leasing%20Agents.pdf</a>
13	Rating Methodology for Brokerage Firms ( <i>Long Term and Short Term Local Rating Scales</i> ).	<a href="https://www.hrratings.com/docs/metodologia/3.2.6.%20Brokerage%20Firms.pdf">https://www.hrratings.com/docs/metodologia/3.2.6.%20Brokerage%20Firms.pdf</a>
14	Rating Methodology for Investment Funds ( <i>Credit and Market Rating</i> ).	<a href="https://www.hrratings.com/docs/metodologia/Investment%20Funds%20Methodology%202019.pdf">https://www.hrratings.com/docs/metodologia/Investment%20Funds%20Methodology%202019.pdf</a>

15	Addendum – Rating Methodology for Bonded Warehouses ( <i>Long Term and Short Term Local Rating Scales</i> ).	<a href="https://www.hrratings.com/docs/metodologia/HR290816NP%208.%20Adendum%20AGD3%20(eng).pdf">https://www.hrratings.com/docs/metodologia/HR290816NP%208.%20Adendum%20AGD3%20(eng).pdf</a>
16	Partial Guarantees for Structured and Unsecure Debt Issues .	<a href="https://www.hrratings.com/docs/metodologia/Partial%20Guarantees%20Methodology.pdf">https://www.hrratings.com/docs/metodologia/Partial%20Guarantees%20Methodology.pdf</a>
17	Water Operating Agencies: Debt Evaluation Methodology for Mexican Entities (Long Term and Short Term Local Rating Scales).	<a href="https://www.hrratings.com/docs/metodologia/Mexican%20Water%20Operating%20Agencies%20Methodology.pdf">https://www.hrratings.com/docs/metodologia/Mexican%20Water%20Operating%20Agencies%20Methodology.pdf</a>
18	Special-Tax Bonds Methodology (Long Term and Short Term Global Rating Scales).	<a href="https://www.hrratings.com/docs/metodologia/Special-Tax%20Bonds%20Methodology%20(MP).pdf">https://www.hrratings.com/docs/metodologia/Special-Tax%20Bonds%20Methodology%20(MP).pdf</a>
19	Debt backed by Federal Transfers to the Municipalities Addendum (Structured Finance Rating Scale).	<a href="https://www.hrratings.com/docs/metodologia/Federal%20Transfers%20Backed%20Debt%20Addendum%20(Municipalities).pdf">https://www.hrratings.com/docs/metodologia/Federal%20Transfers%20Backed%20Debt%20Addendum%20(Municipalities).pdf</a>
20	Debt backed by Federal Transfers to the States (Structured Finance Rating Scale)	<a href="https://www.hrratings.com/docs/metodologia/Federal%20Transfers%20Backed%20Debt%20Methodology%20(States).pdf">https://www.hrratings.com/docs/metodologia/Federal%20Transfers%20Backed%20Debt%20Methodology%20(States).pdf</a>
21	Revenue Sharing Obligations for Mexican States and Municipalities: Debt Backed by Sub-National Entities Own Revenues (Structured Finance Rating Scale).	<a href="https://www.hrratings.com/docs/metodologia/Own-Revenues%20Backed%20Debt%20Addendum%20(States%20and%20Municipalities).pdf">https://www.hrratings.com/docs/metodologia/Own-Revenues%20Backed%20Debt%20Addendum%20(States%20and%20Municipalities).pdf</a>
22	Methodology for Rating Banks ( <i>Long Term and Short Term Local Rating Scales</i> ).	<a href="https://www.hrratings.com/docs/metodologia/03.2.1.%20Banks.pdf">https://www.hrratings.com/docs/metodologia/03.2.1.%20Banks.pdf</a>

## Updated versions of previously sent methodologies

23	Methodology for Rating Mexican States	<a href="https://www.hrratings.com/docs/metodologia/0Methodology_to_Rate_Mexican_States_(April_2021).pdf">https://www.hrratings.com/docs/metodologia/0Methodology_to_Rate_Mexican_States_(April_2021).pdf</a>
24	Methodology for Rating Mexican Municipalities	<a href="https://www.hrratings.com/docs/metodologia/Methodology_to_Rate_Mexican_Municipalities_(April_2021).pdf">https://www.hrratings.com/docs/metodologia/Methodology_to_Rate_Mexican_Municipalities_(April_2021).pdf</a>

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## MODELS

### Current versions of qualitative and quantitative Models

#### a) Banks / SOFIPOS / SOCAPS Model

- *Version: Nov.20*
- *File Name: Bancos (Entidad\_Año).Nov.20*
- *Approved (Model): November 24, 2020.*
- *Methodology: Methodology for Rating Banks, February 2021.*
- *Approved (Methodology): December 8, 2020.*
- *Developed by: HR*

**Description:** The model identifies two areas of risk, the first one through the Financial Model that provides a quantitative analysis of the main metrics of efficiency, profitability, solvency, and liquidity. The second area is regarding a qualitative analysis of Environmental, Social and Governance (ESG) factors.

#### b) Non-Bank Financial Institutions (IFNBs) / Bonded Warehouses

- *Version: Jul.20*
- *File Names: IFNB\_(Entidad\_Año).Jul.20*
- *Approved (Model): July 15, 2020.*
- *Methodology: Rating Methodology for Non-Bank Financial Institutions, May 2009. Rating Methodology for Bonded Warehouses, March 2010.*
- *Approved by HR: March 14, 2018.*
- *Developed by: HR*

**Description:** The model explains the principal risk factors present in these entities. Starting from the business model. Its purpose is to justify and give a different weighting to the qualitative and quantitative risk factors for the assignment of the rating by HR Ratings. Among the most important quantitative factors to consider are the historic and projected financial statements and the analysis of the operating efficiency

#### c) Credit Unions

- *Version: Jul.20*
- *File Names: Uniones de Crédito (Entidad\_Año).Jul.20*
- *Approved (Model): July 15, 2020.*
- *Methodology: Rating Methodology for Credit Unions, August 2011.*
- *Approved by HR: March 14, 2018.*
- *Developed by: HR*

**Description:** The model explains the principal risk factors present in these entities. Starting with a qualitative analysis of the industry risk, the management, operational and regulatory aspects. In the quantitative analysis the model considers de historical information of the balance sheet, the income statement, and the cash flow to produce its projections.

#### d) Brokerage Firms Model

- *Version: Jul.20*
- *File Name: Casa de Bolsa (Entidad\_Año).Jul.20*

- *Approved (Model): July 15, 2020.*
- *Methodology: Rating Methodology for Brokerage Firms, June 2009.*
- *Approved (Methodology): March 14, 2018.*
- *Developed by: HR*

**Description:** The model identifies the principal risk indicators within each category of credit risk affecting the firm evaluated; both those that are inherent to the entity and those arising from external factors. Regarding the ability to pay, the principal sources of risk are identified that could cause delay and even default on the settlement of any liability.

## e) Mutual Funds Model – SIID.

- *Version: Jul.20*
- *File Name: Calculadora de Fondos de Inversión (Fondo\_Año).Jul.20*
- *Approved (Model): July 15, 2020.*
- *Methodology: Rating Methodology for Investment Funds, May 2019.*
- *Approved (Methodology): February 2019.*
- *Developed by: HR*

**Description:** This model has two principal aspects: Credit Risk and Market Risk. Credit Risk is based on the credit quality of the assets that form the portfolio of the mutual fund, while Market Risk measures movements in the valuation of the fund because of changes in market interest rates and other variables, such as the exchange rate, inflation, and market volatility. The methodology incorporates a secondary aspect, the evaluation of the Management Quality of the fund for both ratings.

## f) Pure Leasing Companies Model

- *Version: Jul.20*
- *File Name: Arrendadoras Puras (Entidad\_Año).Jul.20*
- *Approved (Model): July 15, 2020.*
- *Methodology: Rating Methodology for Financial Leasing Agents and Pure Leasing Agents, January 2010.*
- *Approved (Methodology): March 14, 2018.*
- *Developed by: HR*

**Description:** The model is based upon quantitative and qualitative factors that evaluates credit risks such as the possibility that the entity will be unable to collect future rents or leasing contracts and the lessor will not be able to recover the asset in a timely manner. So, it analyses the tools and processes used to collect the financial income earned and recover the leased product.

## g) Models used for Sovereign Debt

- *Version: Jul.20*
- *File Name: Sovereign Debt (Country\_Year).Jul.20*
- *Approved (Model): July 15, 2020.*
- *Methodology: Sovereign Debt Methodology, May 19, 2017.*
- *Approved (Methodology): March 14, 2018.*
- *Developed by: HR*



**Description:** The model is based upon the interaction of four analytic dimensions that represent economic growth, fiscal accounts, monetary policy, and external accounts. The model also accounts for metrics that evaluate the institutional quality of the sovereign. The model uses HR Ratings forecasts for both a base and a stress model. It also incorporates data from the IMF, the World Bank, and the UN.

## h) Models used for U.S. General Obligations Ratings

### 1. Local Governments

- *Version: Nov.13*
- *File Name: GOLocal\_Blank (Entidad\_Año).Nov13*
- *Approved (Model): November 27, 2013.*
- *Methodology: U.S. Local Government General Obligations Methodology, November 27, 2013.*
- *Approved (Methodology): March 14,2018.*
- *Developed by: HR*

**Description:** The model is based upon the General Obligation Quantitative Risk Model which accounts for the financial balance, the primary balance, debt metrics and debt servicing metrics, all as share of total revenues or unrestricted revenues. These metrics are projected for both a base and a stress scenario. The qualitative considerations account for a liquidity analysis, a general fund analysis, pensions liabilities, state regulation and support, among others.

### 2. States

- *Version: Mar.13*
- *File Name: GOStates\_Blank (Entidad\_Año).Mar.14*
- *Approved (Model): March 28, 2014.*
- *Methodology: U.S. State Government General Obligations Methodology (Addendum to Methodology), March 28, 2014.*
- *Approved (Methodology): March 14,2018.*
- *Developed by: HR*

**Description:** The model is based upon the General Obligation Quantitative Risk Model which accounts for the financial balance, the primary balance, debt metrics and debt servicing metrics, all as share of total revenues or unrestricted revenues. These metrics are projected for both a base and a stress scenario. The qualitative considerations account for a liquidity analysis, a general fund analysis, pensions liabilities, business type activities, among others.

## i) Models used for Corporate Debt Ratings

- *Version: Jul.20*
- *File Name: Corporativos (Entidad\_Año).Jul.20*
- *Approved (Model): July 15, 2020.*
- *Methodology: Corporate Debt Credit Risk Evaluation Methodology, May 21, 2014.*
- *Approved by HR: March 14,2018.*
- *Developed by: HR*

**Description:** The model is based upon four metrics that are derived from the entity's financial statements. First the DSCR derived from the entity's period flows, then the same coefficient but adding the cash reserves

to the numerator. The third measures the years required for the entity to serve its debt. And the last one measures the value of their marketable assets as a percent of the entity's total liabilities. Qualitative considerations are incorporated to account for industry risks.

## j) Models used for Charter Schools ratings

- *Version: Feb. 15*
- *File Name: CharterSchool (Entidad\_Año).Feb. 15*
- *Approved (Model): February 13, 2015.*
- *Methodology: Charter Schools Credit Risk Evaluation Methodology, February 13, 2015.*
- *Approved (Methodology): March 14, 2018.*
- *Developed by: HR*

**Description:** The Charter Schools quantitative model is based upon the corporate debt methodology. However, the qualitative analysis accounts for the specific states laws regarding the permissions to operate and the ADA (Average Daily Attendance) and the WADA (Weighted Average Daily Attendance) upon which the state transfers are condition.

## k) Models used for Rating for Debt backed by the operation of highways, toll ways and bridges.

- *Version: Jul.20*
- *File Name: Concesion\_Peaje (Proyecto\_Año).Jul.20*
- *Approved (Model): July 15, 2020.*
- *Methodology: Methodology for Infrastructure, November 6, 2015.*
- *Approved (Methodology): March 14, 2018.*
- *Developed by: HR*

**Description:** The model is based upon the TEA rate which accounts for the stress the revenues from users' fees can withstand without the DSCR dropping below one throughout the debt structure. The methodology also incorporates demand risks derived from economic performance of the region around the project and for diverse risks that can affect maintenance cost.

## l) Models used for Water Operating Agencies for Mexican entities

- *Version: Jul.20*
- *File Name: OOA (Entidad\_Año).Jul.20*
- *Approved (Model): July 15, 2020*
- *Methodology: Water Operating Agencies: Debt Evaluation Methodology for Mexican Entities July 2019*
- *Approved (Methodology): July 2019*
- *Developed by: HR*

**Description:** This model has two principal aspects: The operating metrics of the WOA, that measure efficiency in terms of charging customers and delivering water to residences, industrial complex, or local business. The second aspect measures the financial performance of the WOA based on coverage metrics, the years that would take the free cash flow to cover the debt net and the weight of non-debt liabilities.

## m) Models used for Ratings of Partial Guarantees

### 1. Infrastructure

- *Version: Jul.20*
- *File Name: Garantías Parciales\_Infraestructura (Entidad\_Año).Jul.20*
- *Approved (Model): July 15, 2020.*
- *Methodology: Partial Guarantees for Structured and Unsecured Debt Issues: Debt Methodology.*
- *Approved (Methodology): March 2019.*
- *Developed by: HR*

### 2. Unsecured

- *Version: Jul.20*
- *File Name: Garantías Parciales\_Quirografarias (Entidad\_Año).Jul.20*
- *Approved (Model): March 2019.*
- *Methodology: Partial Guarantees for Structured and Unsecured Debt Issues: Debt Methodology.*
- *Approved (Methodology): March 2019.*
- *Developed by: HR*

**Description:** For infrastructure, the partial guarantees model measures the average number of debt services that could be paid by using the guarantee, providing strength in terms of liquidity. Depending on the estimated average, certain number of notches will be awarded to the rating. For unsecured ratings, the model measures the percentage of the outstanding debt covered by the guarantee; however, the model controls for the Credit Rating of the entity providing the guarantee. According to certain values of coverage, notches will be awarded to the rating.

## n) Model used for Rating Special-Tax Bonds of U.S.A. Local Entities

- *Version: Jul.20*
- *File Name: Special-Taxes Model (Entity\_Bond).Jul.20*
- *Approved (Model): July 15, 2020*
- *Methodology: Special-Tax Bonds Methodology.*
- *Approved Methodology: April 2020.*
- *Developed by: HR Ratings*

**Description:** The model rates Special-Tax Bonds of U.S.A. Local entities with four set of key factors. The first one consists in an economic analysis of the elasticities of the taxed goods & services, and the concentration and strength of the tax base. The second set studies the historical performance of the trend and volatility of the pledge. The third set measures two coverage metrics and the fourth the Additional Bond Test and the Debt Service Reserve Fund requirements. Lastly, the model allows qualitative adjustments based on very specific factors and limited by concepts.

## o) Models used for Mexican Structured Credit ratings.

### 1. States and municipalities (Federal Income)

- *Version: Jul.20*
- *File Name: Deuda Estructurada (Entidad\_Banco\_Clave).Jul.20*

- *Approved (Model): July 23, 2020.*
- *Methodologies: Structured Debt of Mexican States: Federal-Transfers Backed Debt Methodology (September 2020); Structured Debt of Mexican Municipalities: Addendum to the Federal-Transfers Backed Debt Methodology (September 2020).*
- *Approved (Methodology): August 5, 2020.*
- *Developed by: HR*

**Description:** The model is based upon the relationship of the Mexican economic growth and the revenue sharing obligations (“Ramo” 28) that the Federal Government transfers to the states and municipalities. Given an estimated income from said transfers, the minimum DSCR is determined along the debt structure. The revenues will be stressed through a TOE rate that will ultimately reduce the DSCR (always above one) in a critical period in such a way that the reserve funds can be reestablished in a previously determined post-critical period.

## 2. Municipalities (Own income, FEFOM)

- *Version: Jul.20*
- *File Name: DE Programa Especial FEFOM (Entidad\_Banco\_Clave).Jul.20*
- *Approved (Model): July 23, 2020.*
- *Methodology: Structured Debt of Subnational Entities and OPDs: Addendum to the Own-Revenue Backed Debt Methodology (September 2020)*
- *Approved (Methodology): August 5, 2020.*
- *Developed by: HR*

**Description:** The model is also based upon the TOE rate and the capacity of the revenues to reestablish the reserve funds in the post-critical period. However, in this methodology, the ability to successfully isolate the source of revenue from the entity through a trust fund is of major importance.

## Updated Methodologies

### p) Models used for Mexican General Obligation ratings

#### 1. States

- *Version: Feb.21*
- *File Name: Estados (Entidad\_Año).Feb.21*
- *Approved (Model): February 22, 2021.*
- *Methodology: Methodology for Rating Mexican States.*
- *Approved (Methodology): February 22, 2021.*
- *Developed by: HR*

**Description:** The rating is based upon a quantitative model, the Unsecured Risk Model (URM), that incorporates six financial metrics that measure the risks derived from the primary balance, the amount of debt and other liabilities, and the debt service; these metrics incorporate the transfers to municipalities. The URM weights six metrics for historical data and a Base and Stress projection scenario. The model then incorporates the impact of environmental, social and governance (ESG) factors that can add or subtract up to three notches to the rating initially determined by URM.

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## 2. Municipalities

- *Version: Feb.21*
- *File Name: Municipios (Entidad\_Año).Feb.21*
- *Approved (Model): February 22, 2021.*
- *Methodology: Methodology for Rating Mexican Municipalities.*
- *Approved (Methodology): February 22, 2021.*
- *Developed by: HR*

**Description:** The rating is based upon a quantitative model, the Unsecured Risk Model (URM), that incorporates six financial metrics that measures the risks derived from the primary balance, the amount of debt and other liabilities, and the debt service. The URM weights six metrics for historical data and a Base and Stress projection scenario. The environmental, social and governance (ESG) factors that are incorporated can add or subtract up to three notches to the rating initially determined by URM. While the financial metrics for the URM remain the same for states and municipalities, the ESG factors account for differences regarding their respective responsibilities.