A NRSRO Rating*

Structured Debt of Subnational Entities and OPDs

Addendum to the Own-Revenue Backed Debt Methodology

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This addendum describes the process followed by HR Ratings to evaluate the credit quality of the Structured Debt of the Mexican states, municipalities and decentralized public bodies (OPDs) backed by their own revenues.

This methodology addendum outlines the process used in the evaluation of the credit quality of the debt of the states, municipalities and decentralized bodies of the United Mexican States acquired through irrevocable trusts (as Structured Debt) and that are paid by own revenues. The credit risks evaluation model maintains the main assumptions put forward in the Master Methodology: *Federal Transfers Backed Debt Methodology (States).*

Description of the Master Methodology

The model that describes the Master Methodology is based mainly on a quantitative exercise that measures, in a specific period, the maximum reduction resisted by the revenue pledged to the SD under the condition of meeting all its payment obligations. This reduction determines the credit rating, although under specific circumstances, the rating may vary in terms of notches due to Qualitative Adjustments.

With the projection of the pledged revenues, considering HR Ratings' Macroeconomic Scenarios and the debt service in each period; the model identifies the minimum debt coverage, and based on this, applies an additional stress to the projected revenues over a period of thirteen months. The Target Stress Rate (*TSR*) measures the maximum reduction that the structure will withstand in said period. The model also considers the use of all the funds available in the trust, but establishes the condition that the funds used shall be replenished with the funds remaining from the later operation.

Description of this Methodology Addendum

In this addendum, the own revenues of the state will be used as a payment source of the debt service. These revenues are projected based on economic factors that refer to the sensitivity of the payment source to changes in the income of the target population subject to the tax or duty, or changes to consumption patterns due to fluctuations in the prices of different goods and services. Regarding financial factors, the historical trends of the sources of payment are analyzed, as well as a volatility and seasonality analysis. The operating capacities of decentralized bodies to provide service and their collection capacities are analyzed. Several operating or administrative factors that may have an impact on the credit rating of the SD are also included in the analysis. These factors include failures in the coordination mechanisms that enable the state or a third party to collect the revenue pledged and transfer it to the payment trust that serves the debt. Factors such as the periodic compatibility of the deposits into the trust and the dates stipulated for the debt service are also considered.

As part of the quantitative analysis, a specific treatment is offered for the SD of municipalities that use any type of funds generated by the state entity as a secondary payment source. This process would also be applicable to any SD with a payment source from any own revenue generated by another state and in the cases in which the origination of said funds is not clearly defined.

Lastly, Qualitative Adjustments may be included based on the unsecured rating of the state, municipality or any third party capable of contributing funds to the trust or may have any effect on the isolation of the payment source.

Introduction

This addendum is based on the Master Methodology: *Federal Transfers Backed Debt Methodology (States)*, which describes the process used by HR Ratings to evaluates the debt structures acquired through irrevocable trusts with Federal funds as a payment source[1].

This addendum describes the evaluation process of Structured Debt (SD), also based on irrevocable trusts, but those in which the flow pledged by the debt service comes from the own revenues of the states, municipalities, decentralized public bodies and semi-state companies.

HR Ratings' rating process for these SD is like the process described in the Master Methodology. The minimum Primary Hedging is identified with the revenue pledged and the debt service projected, and the Critical Stress Scenario is constructed in said period. In this period, revenue will be reduced through Target Balance Stress Rate (TOE^E) with which the structure reaches the limit point at which it may comply with its payment obligations. The TOE^E, which solves the problem of optimization, guarantees that the reserve fund will be replenished after use in a specific time that the methodology identifies as the Post-Critical Stress Period.

In conceptual terms, the difference from the Master Methodology refers to the process through which HR Ratings projects pledged revenue for the debt service. In this case, the revenue does not come from Federal Participations or Contributions, but from all the funds that the state can tax or collect, such as taxes or duties, considerations for the operation of any decentralized body and even from the distribution to state funds to the municipalities. The most common sources of revenue that may be evaluated with this addendum are listed as follows:

- Payroll taxes;
- Vehicle taxes;
- Income from the operation of Federal or state concessions;
- The State Municipal Strengthening Fund (FEFOM) of the State of Mexico.

HR Ratings will project the source of Revenue, as well as the debt service, the reserve funds involved, sundry expenses and any other component included in the SD under different scenarios. The macroeconomic variables included in them are developed by HR Ratings and typically use: the Gross Domestic Product (GDP); the National Consumer Prices Index (INPC), its growth and the value of the Investment Unit (UDI) and several interest rates such as the $TIIE_{28}$ and the $TIIE_{91}$ Interbank Equilibrium Interest Rates.

The scenarios can also incorporate assumptions on the growth of the payment source pledged. Due to the diversity of the sources of payment available, HR Ratings does not offer a mechanism in this document to project every possible source. Instead it describes the analysis of the characteristics and the process to establish the assumptions to be made to develop its projections.

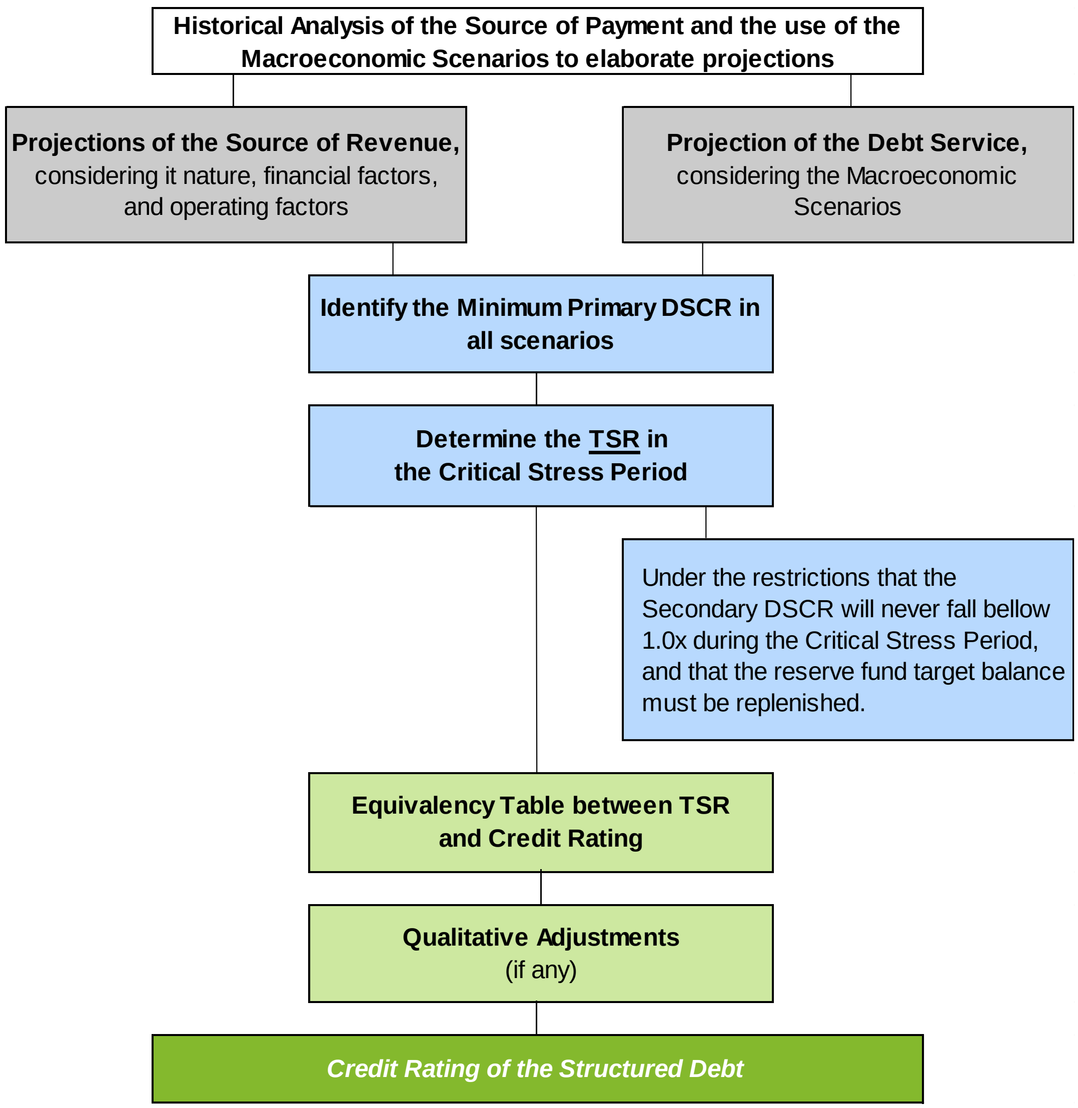
Typically, HR Ratings starts from a historical analysis of the payment source, focusing on trends, volatility and seasonality. The evaluation must also include an analysis of the nature of the tax or duty, the revenue, and the demographic mobility of the population subject to

[1] The Master Methodology: Federal Transfers Backed Debt Methodology (States), as well as the addendum applicable to the structured debt of Mexican municipalities, can be found at the following link: https://www.hrratings.com/methodology/.

collection, the tax rate, the object taxes, the mechanisms and the revenue flow movement, the frequency of payment, among other factors.

Figure 1 shows the general structure of this methodology addendum, which begins with the analysis of the macroeconomic, financial and operative factors that may influence the projection of a payment source:

Figure 1: HR Ratings' Evaluation Process



Source: HR Ratings

All these factors are considered in the development of the projections under the conditions of diverse Macroeconomic Scenarios, such as the Low Growth and Low Inflation Scenario or the Stagflation Scenario, and the one that, given the conditions of the source of payment, offers the highest possible stress in terms of coverage will be used.

With projection of the pledged revenue, the debt service projection and the TOE^E that results from the problem of optimization; HR Ratings determines the credit rating of the SD evaluated. But, in the same way as the Master Methodology, this addendum allows qualitative adjustments, in terms of notches, based on specific factors that cannot be quantified.

The factors that may merit a qualitative adjustment refer to the specific weaknesses of the payment source; for example, an operative aspect that may affect the transfer capacity of the funds to the payment trust. The unsecured rating of the state, municipality, decentralized body is also considered, as well as the entity responsible for generating the fund pledged as a payment source. These concepts may even be considered simultaneously. This analysis is relevant because in periods of economic or political stress, incentives may be generated to undermine the isolation of the source or payment or eliminate it, such as in the cases of a tax or fee pledged.

HR Ratings considers as part of the analysis process to determine the credit rating a legal review on the documentation governing the structured transaction, with the aim of ensuring that the legal documents and legal elements are valid, enforceable, opposable to third parties and have the necessary instrumentation. This assessment can be carried out by HR Ratings, a third party or an independent external law firm, depending on the case and is carried out in accordance with the provisions of our General Methodological Criteria.

Quantitative Analysis Process

This first section outlines the macroeconomic concepts that will be common in the construction of scenarios to project the payment source, the debt service and other items such as the reserve fund and relevant expenses. The aspects specific to the operation of the SD and that may have a negative effect on the flow of funds to the fund to service the debt will be described. Lastly, the quantitative process to determine the TOE^E and the credit rating of SD is described, as explained in the Master Methodology. Additionally, the addendum describes the specific treatment of the SD used as part of its payment source to the State Municipal Strengthening Fund (FEFOM) of the State of Mexico.

The Economic and Financial Factors Considered in the Construction of the Base Scenario and the Stress Scenario

The procedures stipulated in the Master Methodology are inherited in the determination of the flow of pledged revenue and the debt service. These relate to the following variables: 1) rate of inflation, 2) Gross Domestic Product (GDP), and3) interest rates. These variables are projected by HR Ratings for a Base Scenario, a Low Growth and Low Inflation Scenario or a Scenario of Stagflation. The variables included in these scenarios will be used only in the cases where they are relevant and their use will be justified in the analysis report, as well as the main risks relating to these projections.

The historical trend of each payment source will be analyzed with an emphasis on identifying the behavior of the source in previous periods of stress. An analysis is also conducted of the volatility of the revenue, emphasizing two factors: the annual growth in different periods (monthly, quarterly, half-yearly and annually) and the predictability of seasonality.

There are aspects that may be specific to one payment source. In the case of a tax or fee on a good or service, the sensitivity of a consumption pattern when faced with changes in the revenue of the target population must be identified, or changes in the population itself. If changes in the prices of certain goods that may be revealed as substitutes or complements have any effect on taxation must also be identified.

In cases in which the revenue is originated by a decentralized body, its capacity to generate earnings must be evaluated. This includes the efficiency of collection and ensuring coverage to the target population. The analysis report will list each factor included in the projection of the payment source and will detail the impact that each one may on the respective scenario.

The Operative Factors Considered in the Construction of the Base Scenario and the Stress Scenario

This section outlines some of the factors that apply only to the debt structure and that may have a direct effect on the flow of funds received by the payment trust directly.

For example, the collection mechanisms of the payment source will be evaluated. These are particularly relevant in cases in which any figure not related to the state generates the revenue or if the payment source is originated or collected by more than one state. The operative and administrative coordination mechanisms must be clearly documented, as well as the route the payment source will follow. If HR Ratings considers that the mechanisms are not viable in operative and administrative terms or are not clearly stipulated in the legal documentation, the performance of the source or payment may be projected with an unfavorable bias.

In the same manner, the rules, the legislation or the contracts that allow the funds to be generated will be monitored continuously to determine if any change may have any effect on the volume or the flow of the payment source. This refers to the political risk that may be quantified in HR Ratings' projections.

The compatibility between the collection periods and the debt service periods is also relevant. If the trust receives the funds sufficiently in advance, the operative risks that affect the flow of the source itself may be mitigated. This is particularly relevant in cases in which there is one or more third parties not related to the state, who are responsible for collecting the payment source.

In the case of fees or taxes in which the user may pay through financial Institutions of self-service establishments, the feasibility that the source or payment arrives promptly and completely to the trust the services the SD must be evaluated based on the historical performance and operating capacity of these institutions.

As stipulated in the preceding section, the analysis report will list each fact incorporated in the projection of the payment source and will detail the impact that each may have on the projection of the payment source in the scenarios.

Determination of the Target Stress Rate (*TSR*, Spanish acronym)

The Debt Service Coverage Ratio (DSCR) is obtained once the revenue pledged and the debt service are determined. The analysis of this items is conducted based on the Master Methodology.

The *TSR* is calculated using the optimization process, which, like the Master Methodology, has the *TSR* as a variable "target". The full payment of the respective debt service is a restriction, which would be reflected in a Secondary Coverage (those that include the reserves) equal to or greater than 1.0x. The second condition is this process is that the reserve fund is replenished to its target balance within a set period after its use. The macroeconomic variables that will be use in this process will be those used in the Stress Scenario that reflects the most adverse financial conditions for the SD.

The *TSR* represents the maximum-possible stress that the payment source pledged, in favor of the SD, may withstand without falling into default and allowing the replenishment of the reserve in accordance with the conditions stipulated by the Master Methodology. If SDs are identified in which no reserve fund is contemplated, the metrics of the Primary and Secondary Coverages will be matched and would be stressed until the lower of their values reach the unit.

The TSR^E allows, through an assignment curve, the Credit Rating of the SD of be determined. This curve is shown in the addendum: *Federal Transfers Backed Debt Addendum (Municipalities)*. This curve will also apply to the SD that has multiple sources of payment, provided that the primary source is Own Revenue. Additionally, if in an annual review or during the follow-up process, it is identified that the *TSR* has changed to another rating range as a result of the analysis conducted, HR Ratings may maintain the rating or modify its attribute by considering the evolution expected of the *TSR*. Said situation will be justified in the analysis report by presenting the financial strengths or weaknesses produced by our projection model.

The analysis process is conducted throughout the period in which there is an outstanding balance of the debt acquired pending payment[2]. However, in order to incorporate the sensitivity of creditor faced with the weakness of a structure in coming periods, the timeline in which the payment period will sought with the minimum Primary DSCR will be reduced. This timeline is extended over the next two macroeconomic cycles taking as a basis the scenarios generated by HR Ratings. Under the criteria set in the Master Methodology, the analysis will be extended to the rest of the term of the SD.

The State Municipal Strengthening Fund (FEFOM) of the State of Mexico

This section describes the calculation of the *TSR* for the SD contracted for the municipalities of the State of Mexico when the primary payment source is Federal Participations from Branch 28 (or any of its sub-accounts) and the secondary or subsidiary source are funds from the State Municipal Strengthening Fund (FEFOM), which are generated by the State of Mexico itself.

In contrast with the funds from Branch 28 and/or Branch 33, which are transferred by the Mexican Federal Government (HR AAA, on the local scale) to the 32 States of the Republic, the FEFOM funds are originated, allocated and transferred by the State of Mexico to each of its municipalities. The origin of the funds and the distribution method are determined by the State of Mexico in accordance with internal standards and criteria, which may be modified year to year. Therefore, no municipality has control over the amount of these funds.

[2] In terms of the determination of the outstanding balance of the SD, HR Ratings shall confirm with the borrower if the amount contracted was the same as that actually drawn-down. If this information is not available, for the purposes of model, a draw-down of 100.0% of the amount contracted will be assumed. If the amount drawn-down is confirmed as being less that the amount contracted, future draw-downs must be monitored in case that the draw-down period is still valid.

Due to that the FEFOM is originated by the State of Mexico, the credit quality of which below that of the Federal Government, HR Ratings' analysis incorporates an additional stress factor through a modification in the *TSR* calculation method. The resulting problem of optimization is as follows:
Calculate the TSR^E

Subject to:

1) $(1-TSR)\sum_{t=1}^{13} FGP_t + (1-Z)\sum_{t=1}^{13} FEFOM_t + FR_{t=1} \geq \sum_{t=1}^{13} SD_t$
2) $Y = f(TSR)$
3) $Z = TSR + Y$
4) $FR_{T+n} = SO_{T+n}$

Where:
TSR: Percentage of reduction applicable to PPS (Primary Payment Source).
Y: Additional stress factor of FEFOM (Subsidiary Payment Source).
Z: Percentage of reduction applicable to FEFOM (Subsidiary Payment Source).
FGP_t: Pledged Revenue of PPS in month t.
$FEFOM_t$: Pledged Revenue of FEFOM in month t.
T: Number of months of Critical Stress Period (13 months).
FR_t: Reserve fund in month t.
SD_t: Debt service in month t.
SO_T: Target Balance of Reserve Fund in month T.
n: Number of months of Post-Critical Stress Period.

In the same manner as in the rest of the structures, the month with the minimum Primary DSCR expected in the cyclical stress period will be determined. The Critical Stress Period will be established around this month, in which a differentiated reduction will be applied as follows:

a) the reduction for the Primary Payment Source (PPS) will be calculated using the *TSR* model. This reduction will determine the additional stress factor to be applied to the Secondary or Subsidiary Payment Source (FEFOM),

b) once the additional stress factor is determined, the reduction on the FEFOM will be defined as the sum of the level of reduction of the PPS, plus the additional stress factor. In such a manner that the reduction of the FEFOM will depend on the reduction of the PPS.

The TSR^E is the maximum percentage of reduction that solves the problem. It is important to mention that its value must guarantee the replenishment of the target balance of the reserve fund once the Critical Stress Period ends, in accordance with the Master Methodology. Based on the foregoing, the credit rating of the SD will be based on the differentiated reduction applied to the PPS and the FEFOM. The value of "$Y = f(TSR)$" may vary based on the value of "TSR^E", as shown as Figure 2.

Figure 2: Values if Y = f(*TSR*)

Ratings	Min. V	Range of TSR	Y=f(*TSR*)
HR AAA (E)	85.0%	[85.0% , 100%]	0.070
HR AA+ (E)	78.0%	[78.0% , 85.0%)	0.070
HR AA (E)	71.0%	[71.0% , 78.0%)	0.070
HR AA- (E)	64.0%	[64.0% , 71.0%)	0.070
HR A+ (E)	56.4%	[56.4% , 64.0%)	0.076
HR A (E)	48.8%	[48.8% , 56.4%)	0.076
HR A- (E)	41.2%	[41.2% , 48.8%)	0.076
HR BBB+ (E)	33.6%	[33.6% , 41.2%)	0.076
HR BBB (E)	26.0%	[26.0% , 33.6%)	0.076
HR BBB- (E)	18.4%	[18.4% , 26.0%)	0.076
HR BB+ (E)	16.0%	[16.0% , 18.4%)	0.024
HR BB (E)	14.0%	[14.0% , 16.0%)	0.020
HR BB- (E)	12.0%	[12.0% , 14.0%)	0.020
HR B+ (E)	10.0%	[10.0% , 12.0%)	0.020
HR B (E)	8.0%	[8.0% , 10.0%)	0.020
HR B- (E)	6.0%	[6.0% , 8.0%)	0.020
HR C+ (E)	4.0%	[4.0% , 6.0%)	0.020
HR C (E)	2.0%	[2.0% , 4.0%)	0.020
HR C- (E)	0.0%	[0.0% , 2.0%)	0.020

Source: HR Ratings

The problem of optimization explained in this section shall be applicable to any SD with a secondary payment source generated by the own revenue of another state (for example, through budgetary items). Under these circumstances, it is probable that neither the amount not the distribution method is known or are under the control of the municipality, but instead are defined by the state itself.

Credit Rating and Qualitative Adjustments

There are relevant factors that cannot be incorporated quantitatively into the analysis; therefore, they are considered as Qualitative Adjustments within the process. These factors are atypical and there are specific guidelines for them to be considered in the credit rating of the SD.

Typically, the Qualitative Adjustments incorporate the analysis of the unsecured rating of the state and the possibility that the state contributes funds directly to the trust. The existence of funds from the state may be considered in the case of the municipalities, and in the case of decentralized bodies, funds from the state or any municipality may be considered, as applicable.

The isolation of the payment source must be considered in the case for debt backed by own revenues; i.e., measuring the capacity to alter the operation of the trust in accordance with the terms of the initial contract. An evaluation is conducted to ensure that the state or municipality maintains the power or intention to channel the funds pledged to any other activity, or if applicable, to change the nature of the revenue used as a payment source.

The interaction of these three variables (funds, unsecured rating and isolation of the payment source) allows the evaluation of the quality of the revenue pledged and the possible incentives that a state may have to make use of these funds in any stress situation.

In terms of the existence of the funds from the state, its credit rating and the adequate isolation of the payment source, three cases may be considered:

Case 1: If the payment source has been determined as adequately isolated, the states involved do not offer any type of fund, the unsecured rating of the state in question is equal to or greater than HR BBB. Then the credit rating will tend to be that determined through the TSR^E.

Case 2: If the payment source has been determined as adequately isolated, at least one of the states involved offers some type of mechanism to contribute funds to the trust, if necessary, said state will be grated a rating equal to or greater than BBB. Then the minimum value of the credit rating of the SD will be equivalent to the maximum of the unsecured ratings that offer funds, subject to the state in question being able to cover the respective debt service correctly and promptly.

Case 3: If the payment source has been determined as adequately isolated, but the unsecured rating of the state is below HR BBB. Then, considering the state's fund as a non-relevant variable, the pressure that said state perceives to restructure its debt given the pledged revenue must be evaluated. This would be reflected in an unfavorable adjustment of one notch on the credit rating of the SD.

Unlike the Master Methodology, the reference value for the qualitative adjustments due to the unsecured rating of the state is HR BBB, one notch above that stipulated to reflect the additional risk that the payment source does not come from Federal transfers. This will also apply in cases in which there are multiple payment sources, even when some of them come from Federal transfers.

HR Ratings may also assign a favorable qualitative adjustment of one notch to an SD that has a source of revenue composed of own revenues and a Federal transfer. In order to be able to assign this adjustment, two conditions must be met simultaneously: (i) the first refers to the strength or weakness of the source of revenue, which are aspects that cannot be captured through the quantitative model. For example, if the source refers to a tax the collection and isolation of which, that depends on the state itself, shows operative clarity and efficiency. (ii) The second point requires that at least 20.0% of the revenue come from a Federal source.

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