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8th Meeting of the Working Group on Alternative Reference Rates in Mexico (GTTR)

May 2023



Publicada-Usu General

Información que ha sido publicada por el Banco de México

Introduction

- At the previous meeting of the Working Group on Alternative Reference Rates in Mexico (GTTR) on March 7th, the results of the public consultation regarding **the transition of TIE rates with tenors greater than one business day (term TIE) were presented.** (Amendments to Circulars 3/2012 and 14/2007).
- These amendments were approved by the Board of Governors of Banco de Mexico in their March 31st, 2023 meeting; and they were published on the Official Journal of the Federation on April 13, 2023.
- In the publication, the timeline for the transition of term TIE was confirmed:
 - The use of term TIE in new contracts will be prohibited after the established dates (**from January 2024 for tenors of 91 and 182 days; and January 2025 for the 28 days tenor**).
 - **Changes in the methodology used for the calculation of term TIE after the deadlines.** It is important to mention that these rates will only be used on legacy contracts, once the use of Term TIE is prohibited in new contracts.
- Moving forward with the essential actions for the transition, this meeting seeks to define conventions in the use of reference rates in new contracts, as well as the next steps in the transition.

Topics

1 **OIS Products referenced to Overnight TIE Funding rate**

2 **Compounding interest rates**

3 **Debt issuance referenced to Overnight TIE Funding rate**

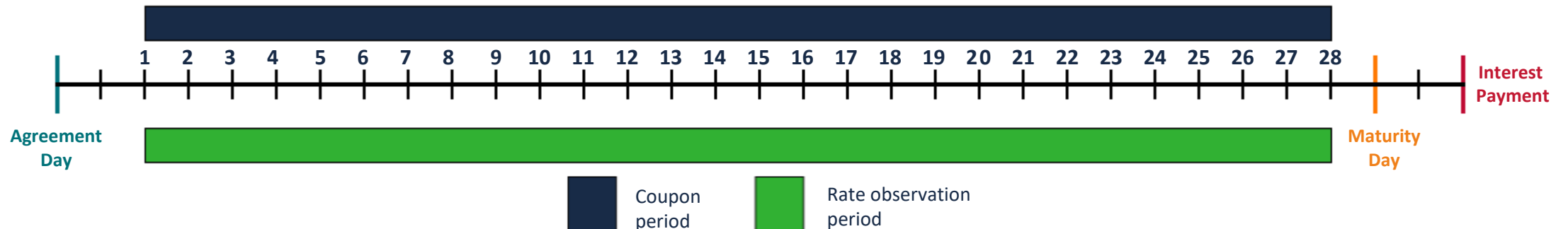
4 **Banking products and Overnight TIE Funding rate**

OIS Products referenced to Overnight TIIE Funding rate

! A fundamental step to develop an OIS market in Mexican pesos is to have a convention across its participants. After the meeting with the derivatives subgroup of the GTTR on April 27, **the participants agreed to the following convention:**

🌐 **International OIS convention:** The interest for the period is calculated using an “in Arrears” methodology without compounding on non-business days. Under this convention, accrued interest is paid 2 days after the coupon’s maturity date. Additionally, it was agreed that the **coupon periods will be of 28 days.**

Day N-2	...	Day N (first day of coupon period)	Day N+1	...	Day T-3	Day T-2	Day T-1 (last day of coupon period)	T-Day Expiration (first day of the following coupon period)	...	Day T+2	Composition of interest on non-business days
Agreement date	...	Use the N-Day ON TIIE	Use the ON TIIE of Day N+1	...	Use the ON TIIE of Day T-3	Use the ON TIIE of Day T-2	Use the ON TIIE of Day T-1		...	Interest Payment Date	It does not include non-working days

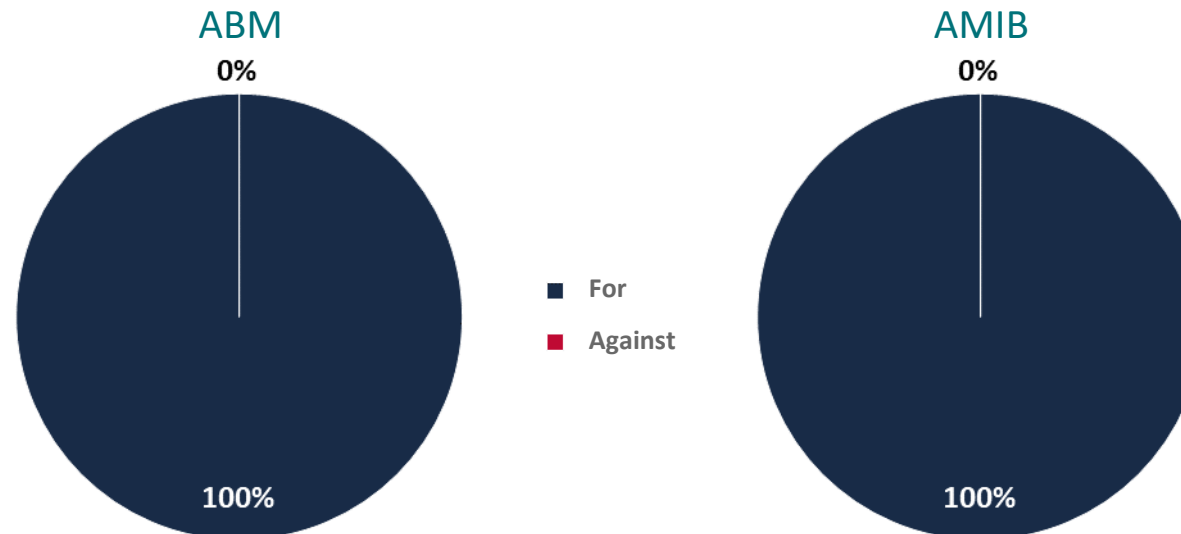


OIS Products referenced to Overnight TIIE Funding rate

During the last meeting of the GTTR's derivatives subgroup, the ABM (banks' association), and the AMIB (brokerage houses' association) commit to raise a survey among its members regarding for and against comments on the convention achieved during the subgroup meeting.

In both surveys, by an unanimous decision, the international OIS convention (presented in the previous slide) was approved.

Results on the survey about the convention on the characteristics that an OIS referenced to Overnight TIIE Funding rate must have



Source: ABM and AMIB.

Note: The ABM determined that the absence of comments by any bank, was considered as a positive vote on the proposal. In addition, AMIB received comments of seven banks, all of them for the proposal.

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Overnight TIE Funding Index

 Several jurisdictions have published indexes to measure the cumulative impact of accruing the near to risk free rates (RFRs) over time. Some examples of these indexes are **SOFR Index, SONIA Compounded Index, Compounded €STR Index, among others.**

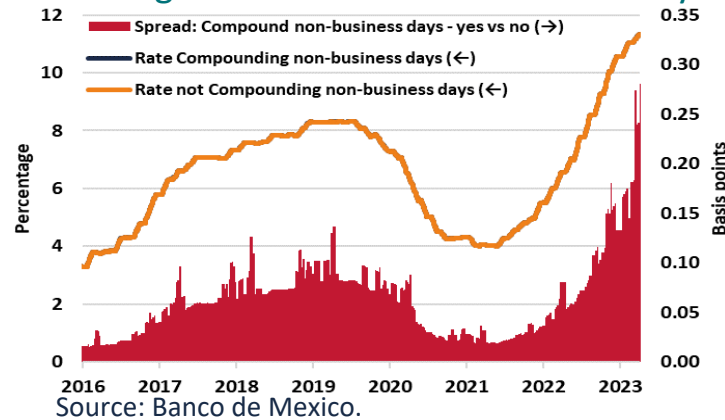
 These indexes have been useful to standardized the calculation of interests of financial products.

 In Mexico, since Bondes F and Bondes G compound interests in non-business days, the Overnight TIE Funding Index (ON TIE Funding Index) needs to have this characteristic. However, it is possible that an additional Index will be needed which will not compound interests in non-business days to be consistent with the selected standard methodology for the OIS contracts.

Overnight TIE Funding Index

- ✓ Overall, for 28 days periods (the most used tenor in the Mexican financial system) **both methodologies will estimate similar interest rates**, with differences in the last seven years not greater than 0.3 bp.

Differences between compounding or not interests on non-business days when calculating the “in arrears” rate of a 28 days coupon



Statistics of the spread between compounding or not interests on non-business days when calculating the “in arrears” rate of a 28 days coupon (Basis points)

Min	Max	Median	RMSE ^{1/}
0.01	0.28	0.06	0.002

? Therefore, the next questions are raised:

- To standardize the calculation of interests. Would it be convenient to publish an ON TIE Funding Index showing the accruing impact of compounding the ON TIE Funding rate over time (Annex 2 and 3)?
- If such Index is required. Would the publication of two indexes be needed to fill both conventions of compounding interests (Annex 2 and 3)?

^{1/} Root mean square error. Note: To see the results for the same exercise for 91 and 182 days tenors, refer to Annex 6.

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Debt issuance referenced to Overnight TIIE Funding rate



On August 8, 2022 the CNBV (National Banking Commission) modified the general regulations applied to the securities' issuers and other securities market's participants.



Thus, Article 69 of said regulation cites: "Issuers will be obliged to inform the institution for the deposit of securities in which they are deposited, regarding the payment of their titles or the calculation of the corresponding interest rate, directly or through the common representative, **at least with one business day prior to expiration**", **before, this information needed to be provided with at least two business days prior to expiration.**



Given this possibility and to move forward with the standardization of the interests' calculation:^{1/}

➤ **Which should be the standard for debt issuance?:**

- **Similar to Bondes F/G:** For each day of the coupon period, the **ON TIIE Funding rate published that day** is used and settles the coupons the day after the last day of the coupon period (i.e., on the expiration date).
- **Similar to FIRA bonds:** For each day of the coupon period, the **ON TIIE Funding rate published the previous day** is used and settles the coupons the day after the last day of the coupon period.
- **Third alternative:** For each day of the coupon period, the **ON TIIE Funding rate published two previous days** is used and settles the coupons the day after the last day of the coupon period.

^{1/} It is assumed that bonds pay interests with an *in arrears* composition, similar to Bondes F.

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Banking products and Overnight TIE Funding rate

 According to the international experience, the market of banking products is the less developed, because it requires the development of other markets.

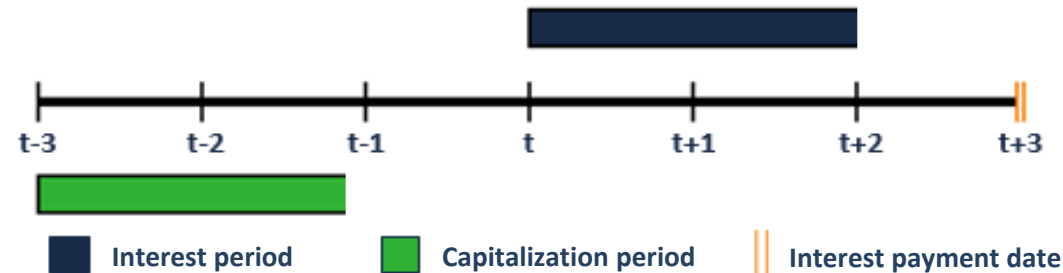
 Furthermore, some market participants have expressed that banking products require to know the interest rate at the beginning of the period of interest calculation. Therefore, a reference rate known at the beginning of the period might be needed, the options are:

- I. ON TIE Funding rate compounded in advance (*TIE average*, similar to *SOFR Average*).
- II. ON TIE Funding rate with derivatives' market information (*Term TIE*, similar to *Term SOFR*).

 If these interests rates were to be published, the recommendation would be to be used exclusively in banking products.

I. ON TIE Funding rate compounded in advance (*TIE average*)

- ✓ ON TIE Funding rate compounded in advance would compound all the ON TIE Funding rates during the previous 28, 91, and 182 calendar days, according to the tenor of the rate. This methodology would be similar to the one of SOFR *Average*¹. *As previously reviewed, it would be important to decide the adequacy of compounding interests or not in non-business days.*



Advantages

- ✓ Market interest rate.
- ✓ Consistent with the international experience.
- ✓ Known at the beginning of the period.
- ✓ Low volatility.
- ✓ The publication can start soon.

Disadvantages

- ✗ Calculation with information from the previous period.
- ✗ Does not take into account the monetary policy expectations.

1/ Refer to Annexes 4 and 5 for more information.

II. ON TIE Funding rate with derivatives' market information (*Term TIE*)

- ✓ This option would use information from financial derivatives referenced to the ON TIE Funding rate. This methodology would be similar to the one of *Term SOFR*. Nonetheless, the derivatives' market of the ON TIE Funding rate is not yet fully developed. Therefore, its publication would need to be delayed.

Advantages

- ✓ Market interest rate.
- ✓ Consistent with the international experience.
- ✓ Known at the beginning of the period.
- ✓ Takes into account the monetary policy expectations in the calculation.

Disadvantages

- ✗ The publication would be delayed (the derivatives' market is not yet sufficiently liquid).
- ✗ This interest rate could not be used as a reference rate in the derivatives market and it could only be used to structure banking products, such as credits.

Methodology to use in new contracts

1. For the banking products referenced to the ON TIIE Funding rate, would it be necessary to know the interest rate at the beginning of the calculation period of the interests?
 - a. Yes
 - b. No

2. If yes, given that it is considered practical to publish only one reference rate to avoid fragmenting the market, and taking into account that the chosen interest rate will not change after this is set, which methodology would be the best for instruments referenced to ON TIIE Funding rate?
 - a. ON TIIE Funding rate compounded in advance (TIIE average, similar to SOFR Average).
 - b. ON TIIE Funding rate with derivatives' market information (Term TIIE, similar to Term SOFR), taking into account that the publication of this interest rate would be delayed because of the current low volume of futures referenced to the ON TIIE Funding rate.

3. Would it be essential to publish the three tenors for the term TIIE (i.e. 28, 91, and 182 days)?

Transition developments: discussion topics

- Are there any other relevant conventions that would be deemed necessary to take into account for instruments referenced to ON TIE Funding rate?
- Are there any additional comments regarding the actions taken towards the transition of term TIE?
- Is there anything additional that the authorities could do to facilitate this transition?



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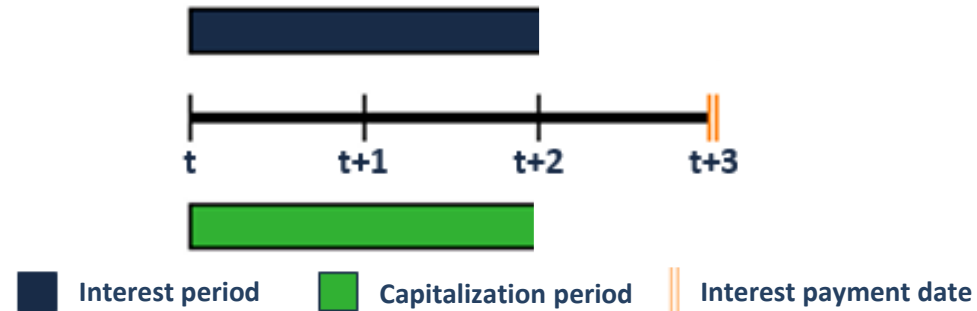
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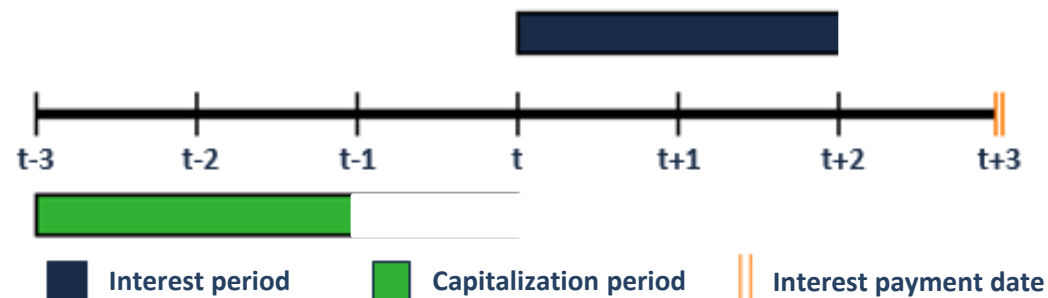
Información que ha sido publicada por el Banco de México

Annex 1: Compounded *in arrears* vs *in advance*


- 1) The *compounded in arrears rate* methodology capitalizes, on a daily basis, the observed overnight rate throughout the **interest payment period**, so the obtained information is aligned with the computation period (similar to **Bondes F, Bondes G**).



- 2) The *compounded in advance rate* methodology capitalizes, on a daily basis, the observed overnight rate throughout the **period prior** to the interest payment period, so the obtained information has a lag (similar to **SOFR Average**).



Annex 2: ON TIE Funding Index (compounding non-business days)

 To keep promoting the use of the ON TIE Funding rate, it is possible to publish an **ON TIE Funding Index**, for all business days. This Index measures the accruing impact of compounding the ON TIE Funding rate since January 2, 2006 through time.

 The formula to calculate the ON TIE Funding Index for the business day D is as follows:


$$ON\ TIE\ Funding\ Index_D = \begin{cases} 100,000, & \text{if } D = \text{January 2, 2006} \\ 100,000 \times \left[\prod_{i=\text{January 2, 2006}}^{D-1} \left(1 + \frac{FT_i}{36000} \right)^{d_i} \right], & \text{if } D \geq \text{January 3, 2006} \end{cases}$$

Where:

$D - 1$ = Immediate previous day to the ON TIE Funding rate date.

FT_i = ON TIE Funding rate published in the i -day expressed in percent points.

d_i = Number of calendar days for which the published ON TIE Funding rate of the i -day is applicable.

 The **ON TIE Funding Index will allow to calculate the compounded interest rate for any period between two dates in which the Index is published.** The formula would be as follows:

$$ON\ TIE\ Funding\ rate\ compounded\ between\ D_1\ and\ D_2 = \left(\frac{ON\ TIE\ Funding\ Index_{D_2}}{ON\ TIE\ Funding\ Index_{D_1}} - 1 \right) \times \frac{36000}{\delta}.$$

Where:

D_1 = Start date, corresponds to the day of the first rate considered in the interest compounding.

D_2 = Last or maturity date, which corresponds to the immediate business date to the last ON TIE Funding rate considered to compound interests.

δ = Difference in the number of calendar days between date D_2 and D_1 .

Annex 3: ON TIE Funding Index without compounding non-business days (similar to SOFR Index)

 Also, it could be published an ON TIE Funding Index without compounding interests in non-business days.

 The formula to calculate the ON TIE Funding Index without compounding on non-business days, for the published business day D is as follows:

$$ON\ TIE\ Funding\ Index_D = \begin{cases} 100,000, & \text{if } D = \text{January } 2, 2006 \\ 100,000 \times \left[\prod_{j=\text{January } 2, 2006}^{D-1} \left(1 + \frac{TF_j \times d_j}{36000} \right) \right], & \text{if } D \geq \text{January } 3, 2006 \end{cases}$$

Where:

$D - 1$ = Immediate previous day to the ON TIE Funding rate date.

TF_j = ON TIE Funding rate published in the j -day expressed in percent points.

d_j = Number of calendar days for which the published ON TIE Funding rate of j -day is applicable.

 This ON TIE Funding Index will also allow the calculation of an compounded interest rate for any period between two published dates, using the same formulas as the previous Index:

$$ON\ TIE\ Funding\ rate\ compounded\ between\ D_1\ and\ D_2 = \left(\frac{ON\ TIE\ Funding\ Index_{D_2}}{ON\ TIE\ Funding\ Index_{D_1}} - 1 \right) \times \frac{36000}{\delta}.$$

Where:

D_1 = Start date, corresponds to the day of the first rate considered in the interest compounding.

D_2 = Last or maturity date, which corresponds to the immediate business date to the last ON TIE Funding rate considered to compound interests.

δ = Difference in the number of calendar days between date D_2 and D_1 .

Annex 4: ON TIE Funding rate compounded in advance (compounding on non-business days)



Another informative reference rate that could be published is the ON TIE Funding rate compounded in advance with an in advance methodology, in other words, with a similar methodology as SOFR Average, but compounding interests in non-business days (as it is done with Bondes F and G).^{1/}



For any published date, the ON TIE Funding rate compounded in advance incorporates all the published values of the ON TIE Funding rate during the 28, 91 and 182 previous calendar days to the publication of this gauge, depending on the required tenor.



The formula to calculate the ON TIE Funding rate compounded in advance in its different tenors would be as follows:

$$ON\ TIE\ Funding\ rate\ compounded\ in\ advance\ for\ T\ days = \left[\prod_{i=1}^T \left(1 + \frac{ONTIIE_i}{36000} \right) - 1 \right] \times \frac{36000}{T},$$

Where:

$ONTIIE_i$ = ON TIE Funding rate published on i -day, expressed in percent points. If it is a non-business day, it will be used the ON TIE Funding rate published on the immediate previous business day.

T = Number of calendar days from the calculation period (i.e., 28, 91 or 182 days).

^{1/} Refer to Annex 1 for the comparison between *in advance* and *in arrears* methodologies.

Annex 5: ON TIE Funding rate compounded in advance without compounding in non-business days (similar to *SOFR Average*)



Another informative reference rate that could be published is the ON TIE Funding rate compounded in advance with an *in advance* methodology, similar to the one shown in Annex 4, but without compounding in non-business days.^{1/}



For any published date, the ON TIE Funding rate compounded in advance incorporates all the published values of the ON TIE Funding rate during the last 28, 91 and 182, depending on the required tenor.



The formula to calculate the ON TIE Funding rate compounded in advance in its different tenors would be as follows:

$$ON\ TIE\ Funding\ rate\ compounded\ in\ advance\ for\ T\ days = \left[\prod_{i=1}^{d_h} \left(1 + \frac{ONTIE_i \times d_i}{36000} \right) - 1 \right] \times \frac{36000}{T},$$

Where:

$ONTIE_i$ = ON TIE Funding rate published on i -day, expressed in percent points.

d_h = Number of business days during the calculation period.

d_i = Number of calendar days for which the published ON TIE Funding rate of the i -day is applicable.

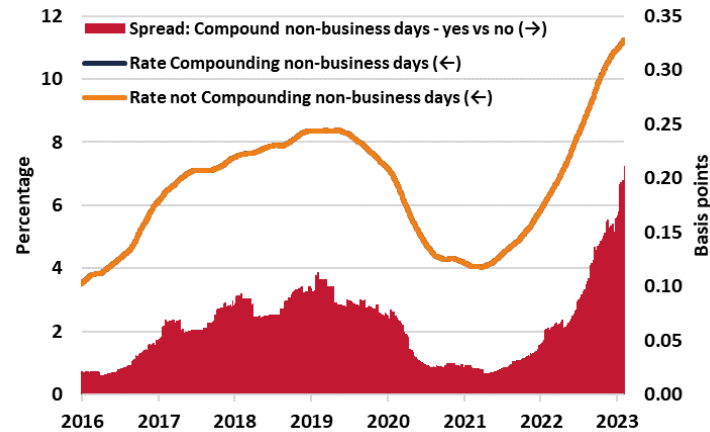
T = Number of calendar days from the calculation period (i.e., 28, 91 or 182 days).

^{1/} Refer to Annex 1 to see the comparison between *in advance* and *in arrears* methodologies.

Annex 6: Differences between compounding or not interests in non-business days for tenors of 91 and 182 days.

Comparing the *in arrears* rates compounding interests in non-business days vs when they do not for tenors of 91 and 182 days, it could be observed that the results are similar to the ones observed in the tenor of 28 days. The differences are not beyond 0.22 basis points.

Differences between compounding or not interests on non-business days when calculating the “in arrears” rate of a 91 days coupon



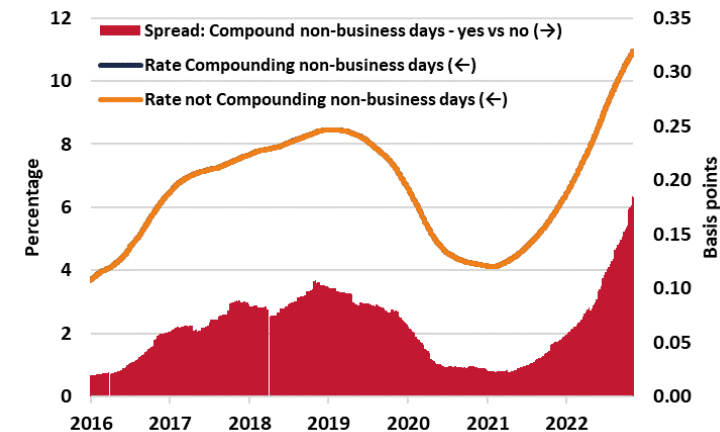
Statistics of the spread between compounding or not interests on non-business days when calculating the “in arrears” rate of a 91 days coupon (Basis points)

Min	Max	Median	RMSE ^{1/}
0.02	0.21	0.07	0.002

Source: Banco de México.

1/ Root Mean Square Error.

Differences between compounding or not interests on non-business days when calculating the “in arrears” rate of a 182 days coupon



Statistics of the spread between compounding or not interests on non-business days when calculating the “in arrears” rate of a 182 days coupon (Basis points)

Min	Max	Median	RMSE ^{1/}
0.02	0.19	0.06	0.002

Source: Banco de México.