

3º Workshop Duxus de Risco

Uma questão de controle.

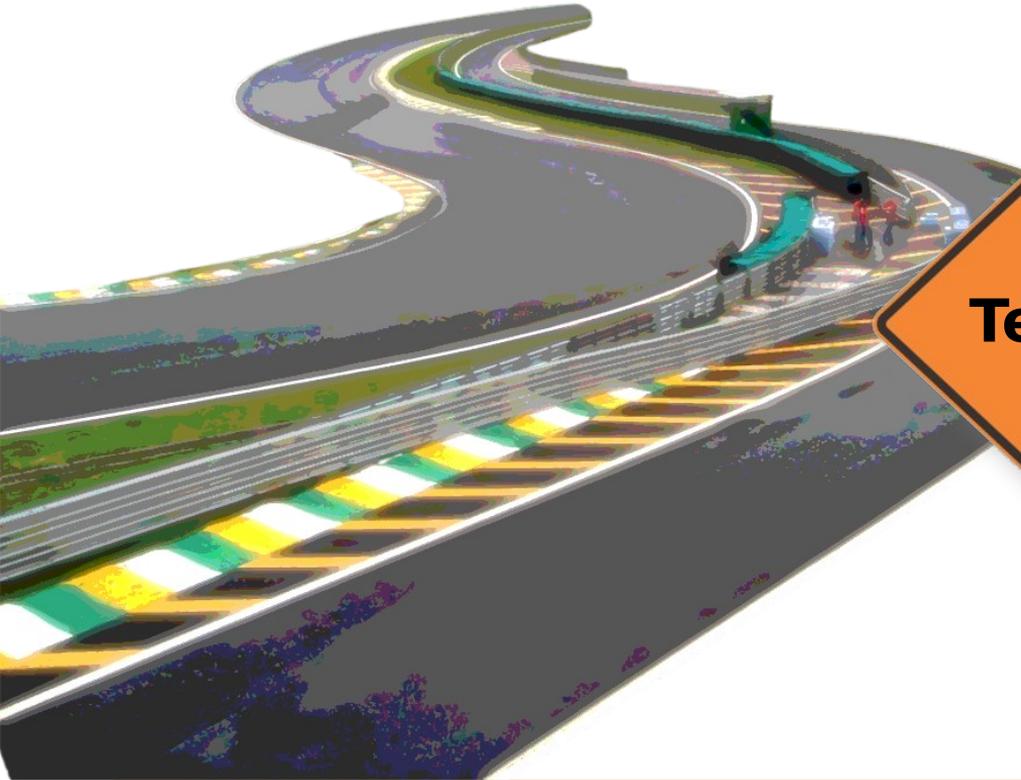


Curvas de Mercado

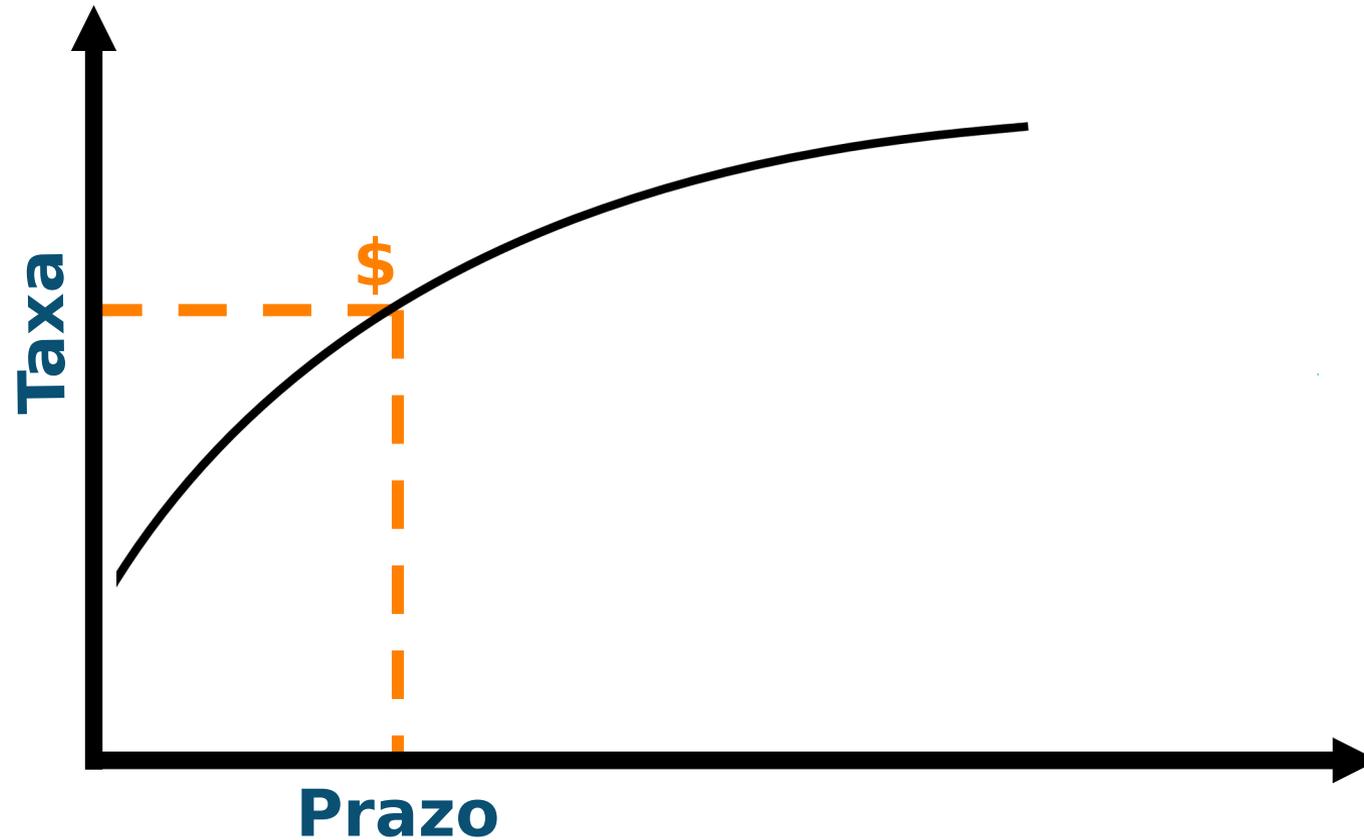
Samuel Rodrigues Rios



Tipos de Curva



Curva a Termo



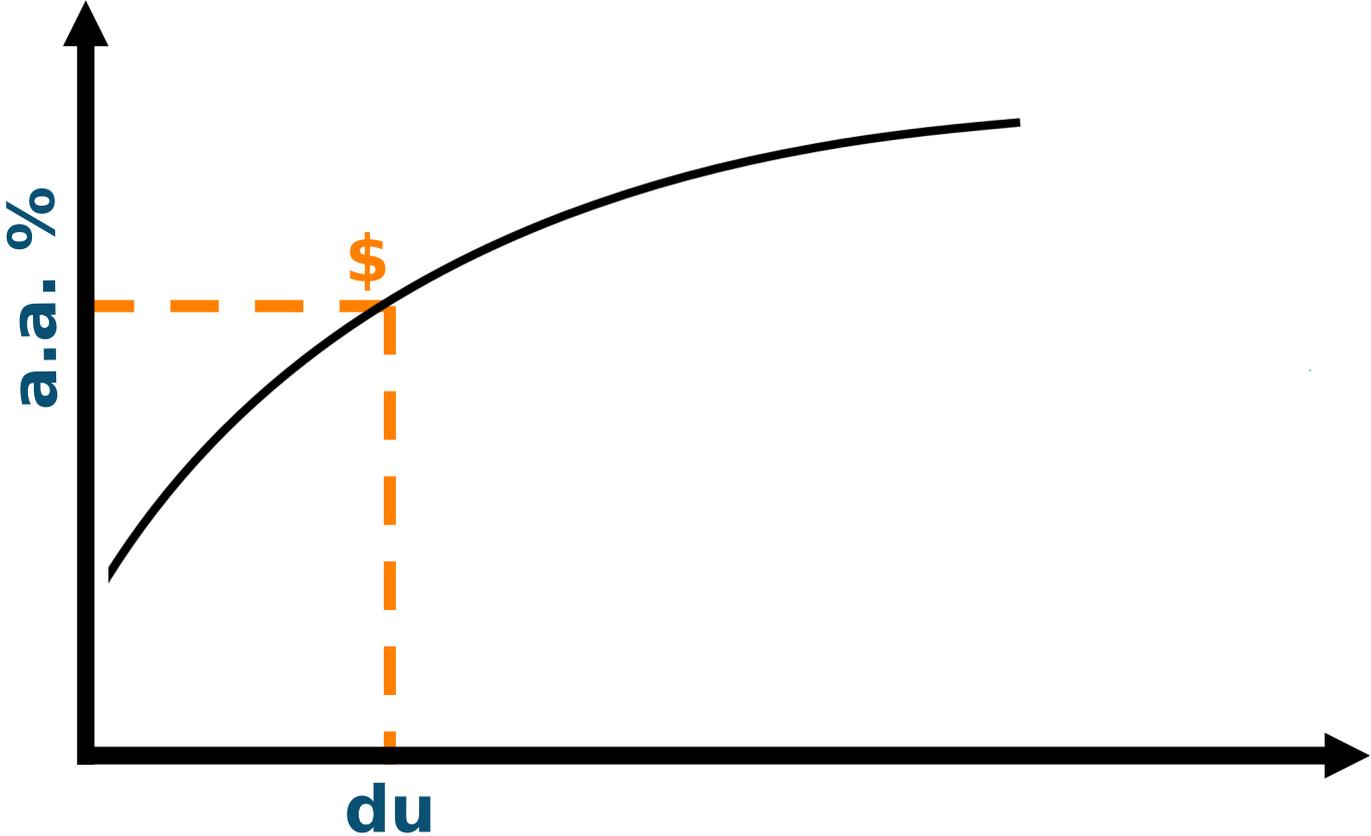
Fator de Risco

Prazo

Base

a.a. %

Curva Pré-fixada



Pré

Prazo = du

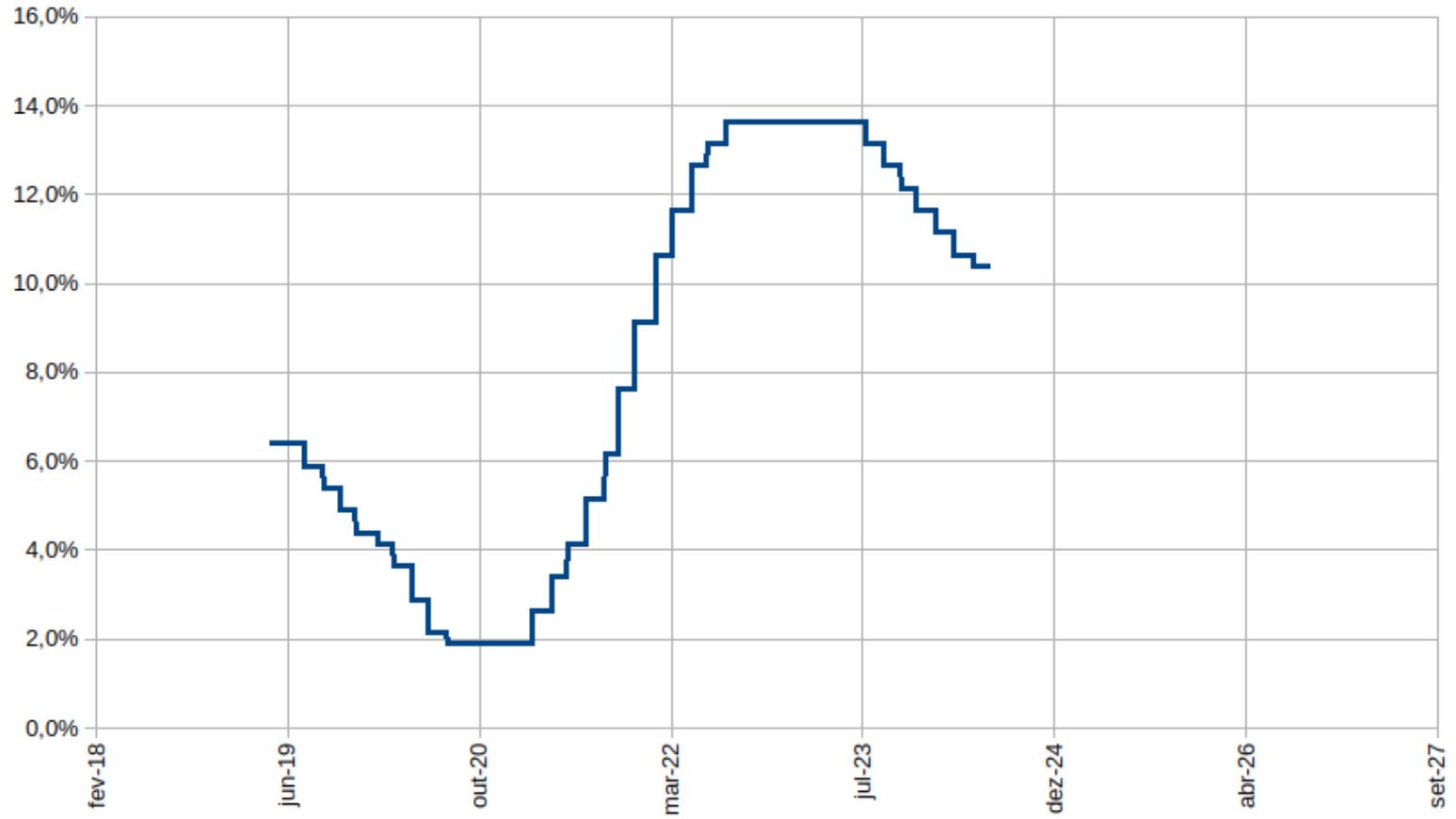
Efetiva 252

a.a. %

\$ = VP

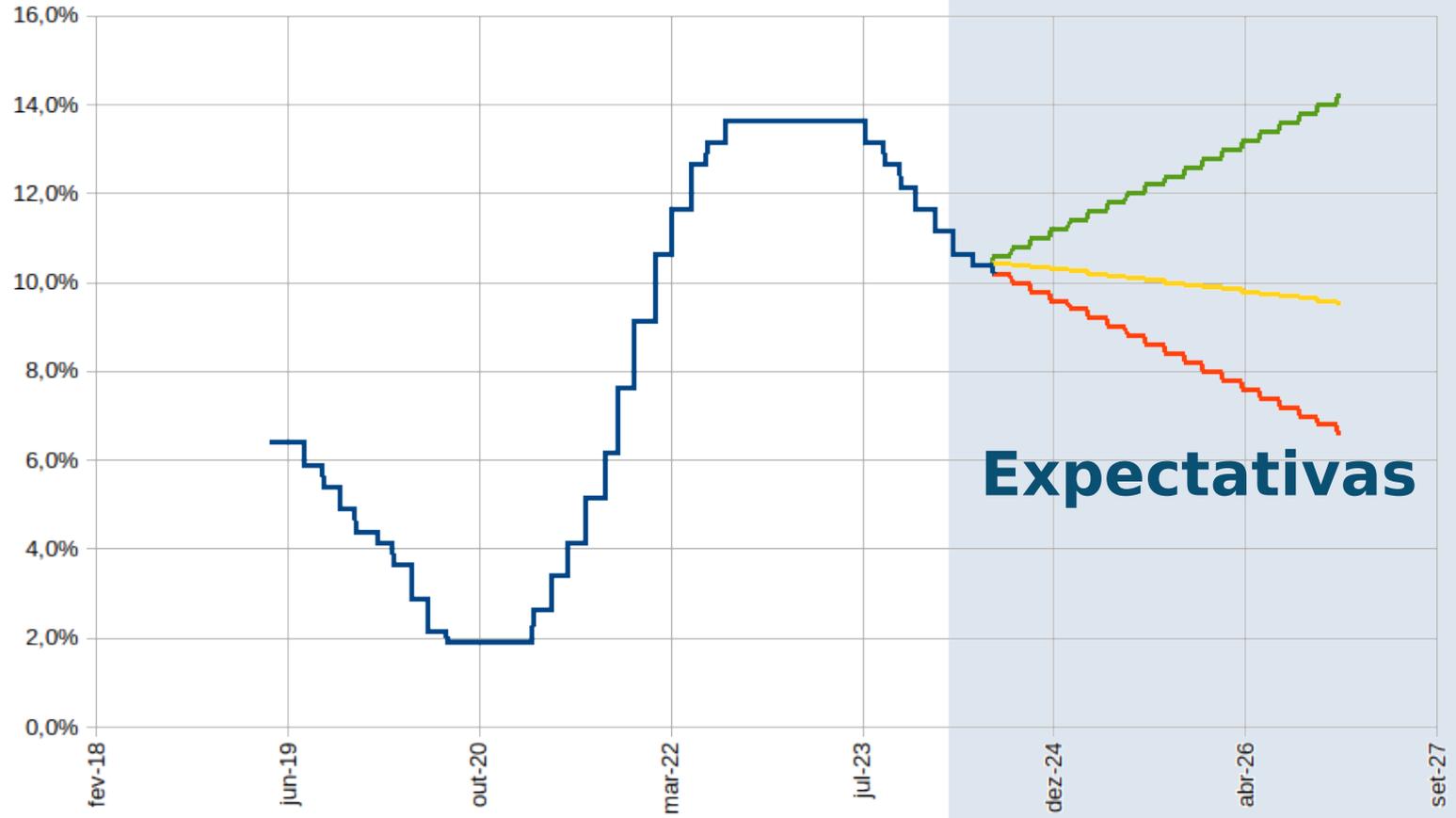
Curva Spot

SELIC Histórica



Curva Spot

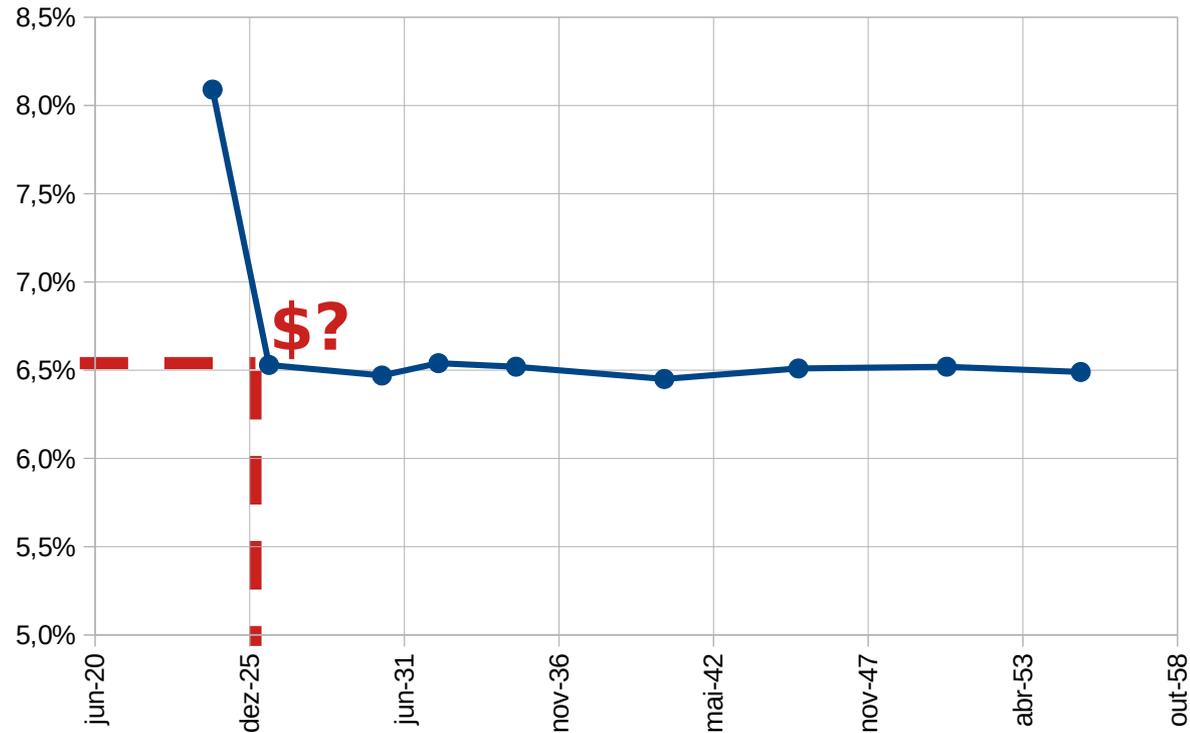
SELIC



Expectativas

Curva TIR

NTN-B



Cupom de IPCA

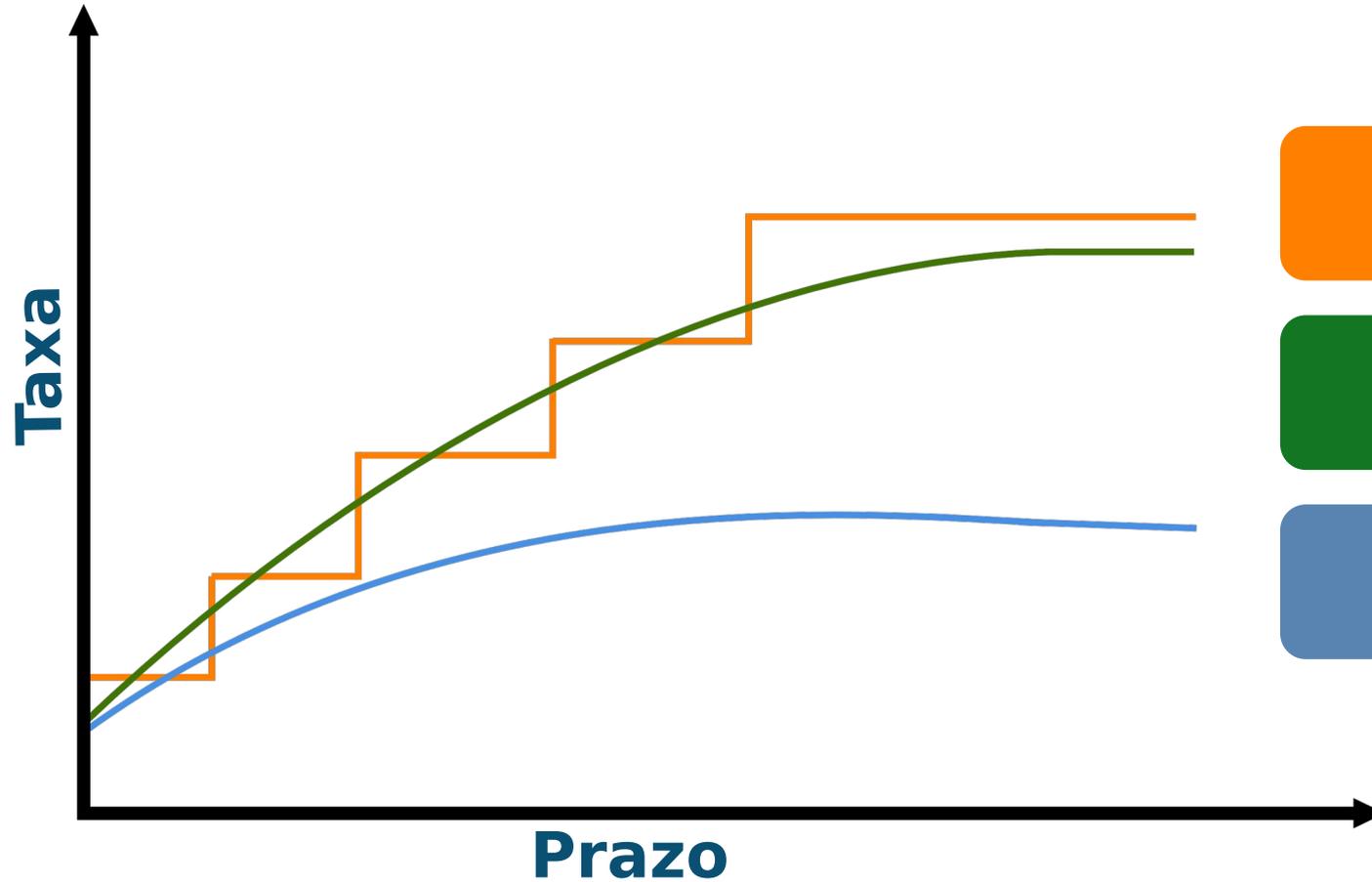
Prazo = Vcto

Efetiva 252

a.a. %

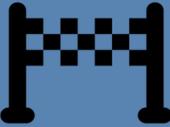
\$ ≠ VP

Equivalência – Tipos de Curva

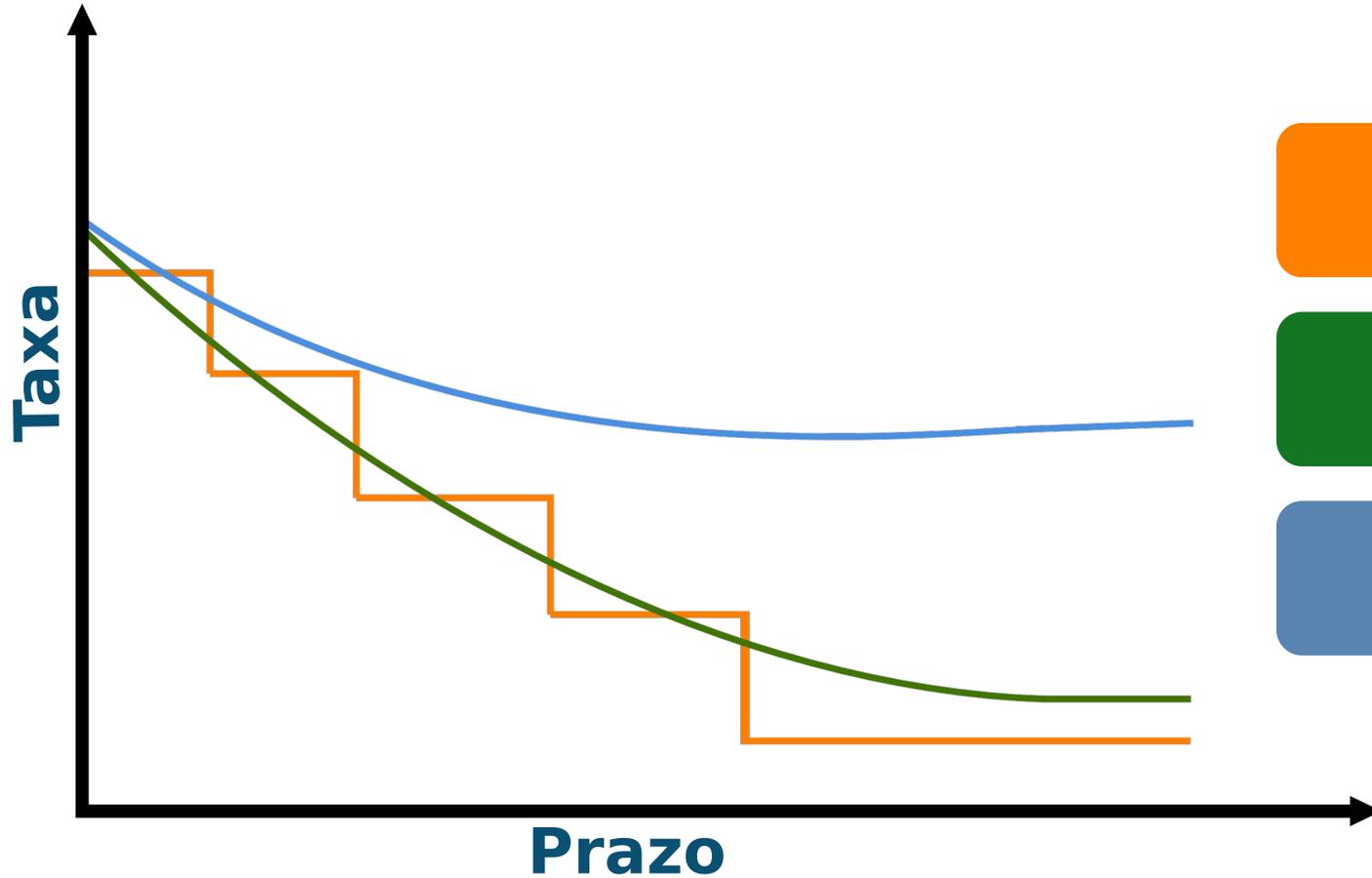


Spot 

Termo 

TIR 

Equivalência – Tipos de Curva



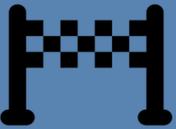
Spot



Termo



TIR



Etapas de Construção

Fonte



Seleção e
Validação



Tratamento



Limpeza e
Ajustes



Metodologia



Cálculos



Fontes

[B]³


ANBIMA

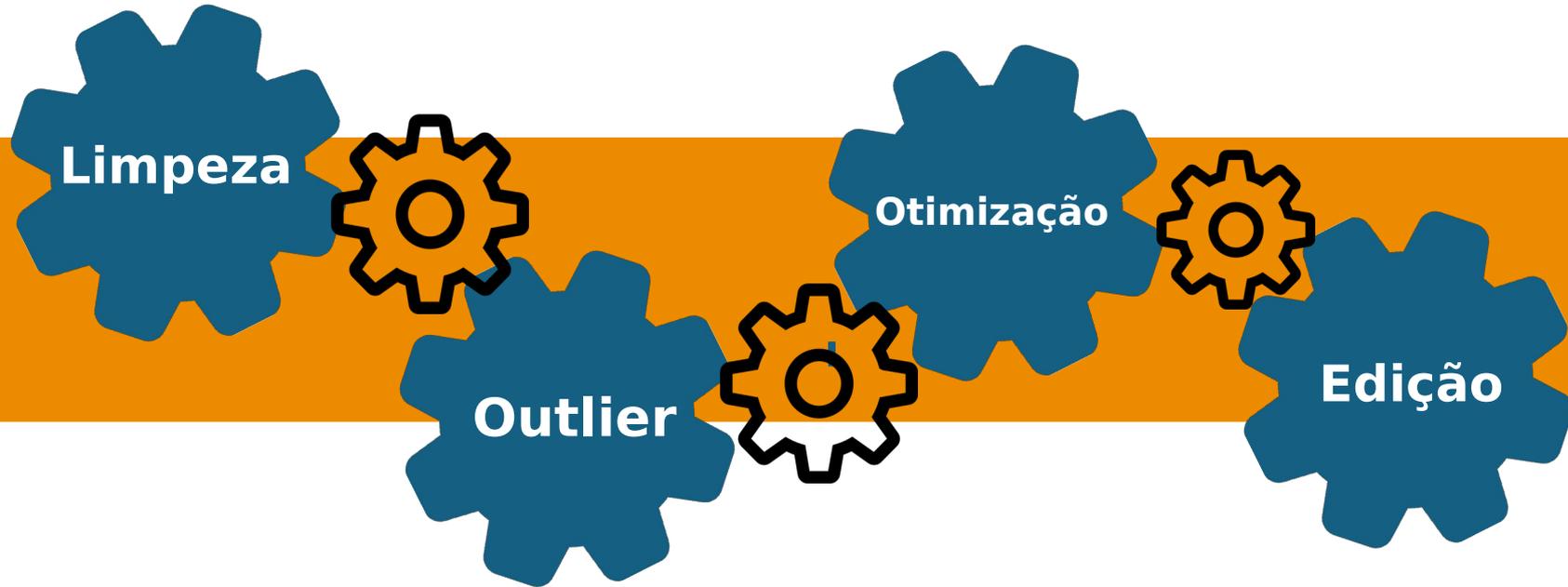
cetip^o


BANCO CENTRAL
DO BRASIL



ESALQ

Tratamento



Metodologia - Interpolação

Exponencial

- Juros compostos

252

Linear

- Juros simples

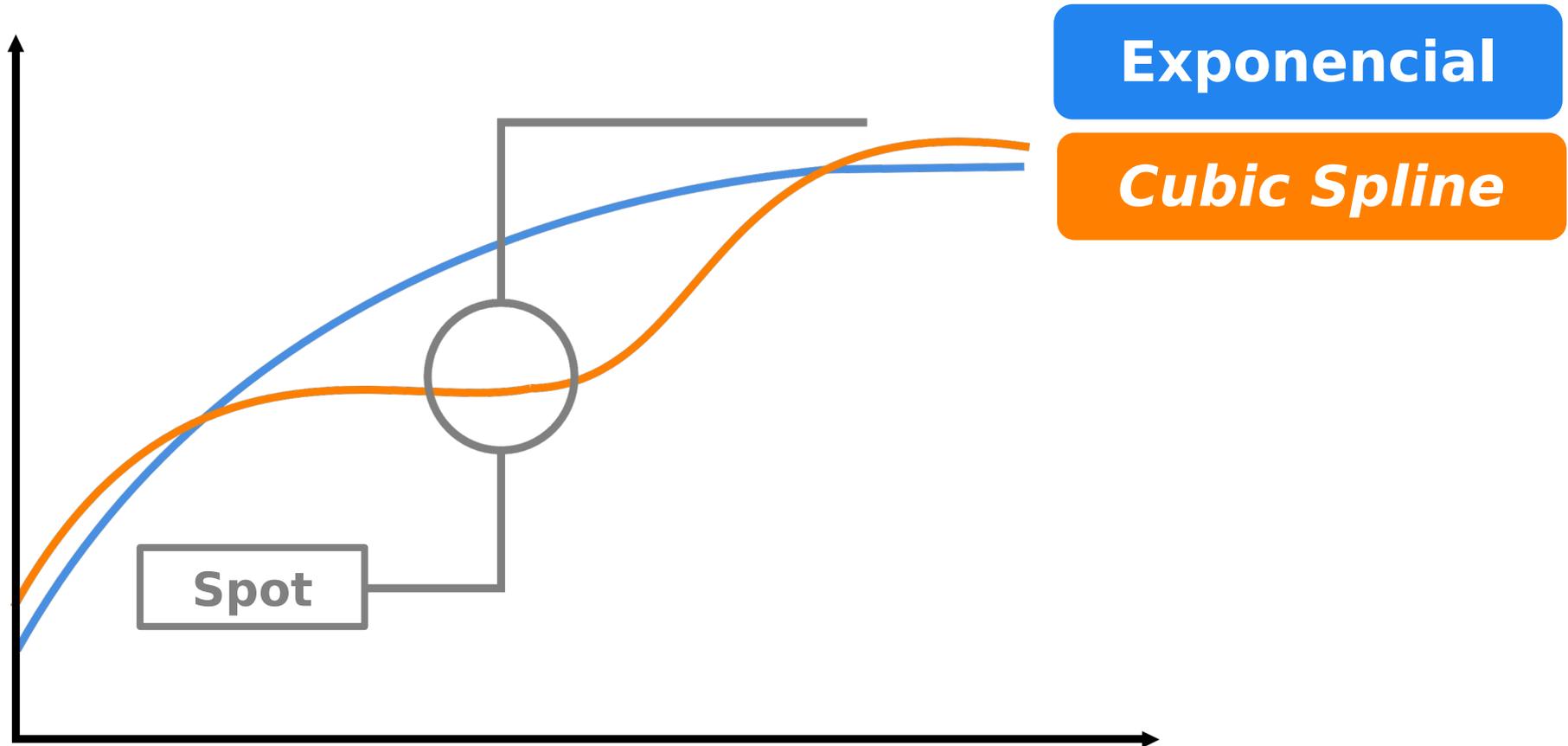
360

Cubic Spline

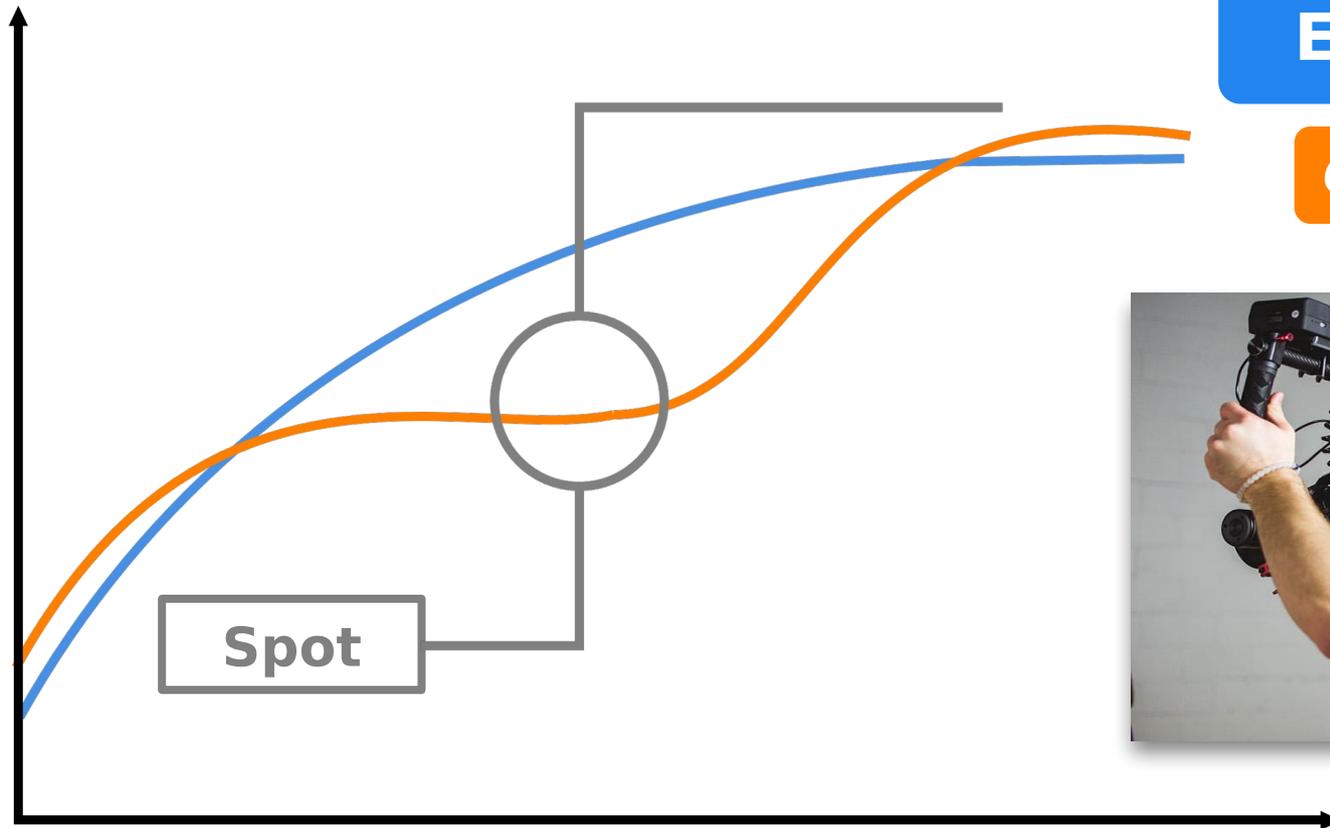
- Juros compostos com suavização de transição

252

O que é *Cubic Spline*?



O que é *Cubic Spline*?



Exponencial

Cubic Spline



Metodologia - Limpeza

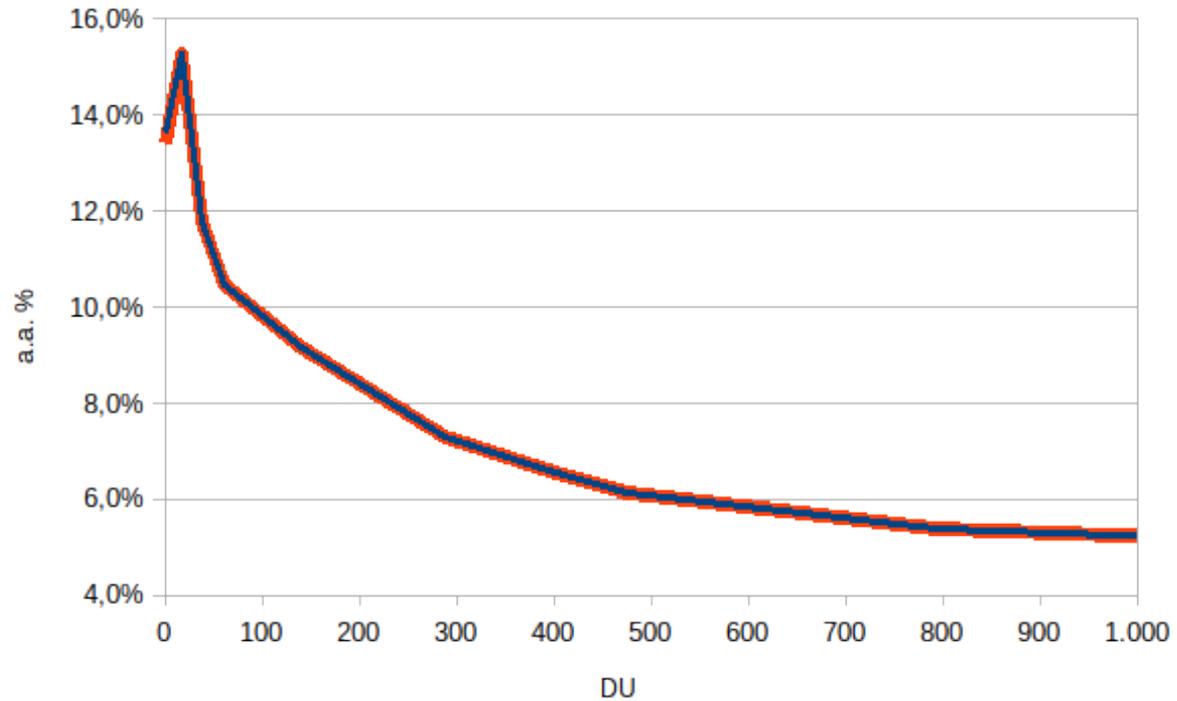
$$CupomLimpo_{du} = \left\{ \left[\frac{Fator_{252}(taxaSuja_{du}, du)}{FatorVariacao_{Database}} \right]^{\frac{252}{du}} - 1 \right\} \times 100$$

Limpo

X

Sujo

Metodologia - Limpeza

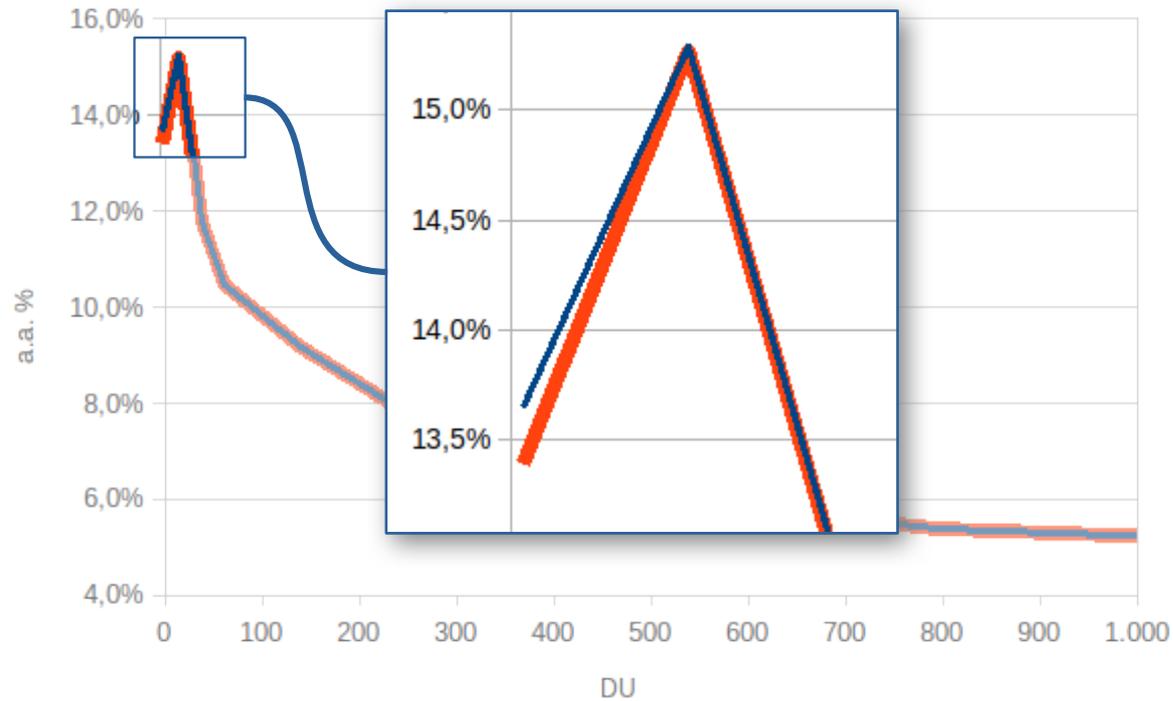


Limpo

X

Sujo

Metodologia - Limpeza



Limpo

X

Sujo

365 Janeiro 2024

	Seg	Ter	Qua	Qui	Sex	Sáb	Dom
1	1	2	3	4	5	6	7
2	8	9	10	11	12	13	14
3	15	16	17	18	19	20	21
4	22	23	24	25	26	27	28
5	29	30	31				

365 Fevereiro 2024

	Seg	Ter	Qua	Qui	Sex	Sáb	Dom
5				1	2		
6		5	6	7			
7		12	13				
8		19					
9							

365 Março 2024

	Seg	Ter	Qua	Qui	Sex	Sáb	Dom
					1	2	3
				7	8	9	10
				15	16	17	
					23	24	
					30	31	

365 Abril 2024

	Seg	Ter	Qua	Qui	Sex	Sáb	Dom
14	1	2	3	4	5	6	7
15	8	9	10	11	12	13	14
16	15	16	17	18	19	20	21
17	22	23	24	25	26	27	28
18	29	30					

365 Maio 2024

	Seg	Ter	Qua	Qui	Sex	Sáb	Dom
18			1	2	3	4	5
19	6	7	8	9	10	11	12
20	13	14	15	16	17	18	19
21	20	21	22	23	24	25	26
22	27	28	29	30	31		

365 Junho 2024

	Seg	Ter	Qua	Qui	Sex	Sáb	Dom
22							7
23							14
24							21
25							28
26	24						

365 Julho 2024

	Seg	Ter	Qua	Qui	Sex	Sáb	Dom
							7
							14
							21
							28

365 Agosto 2024

	Seg	Ter	Qua	Qui	Sex	Sáb	Dom
31				1	2	3	4
32	5	6	7	8	9	10	11
33	12	13	14	15	16	17	18
34	19	20	21	22	23	24	25
35	26	27	28	29	30	31	

365 Setembro 2024

	Seg	Ter	Qua	Qui	Sex	Sáb	Dom
35							1
36	2	3	4	5	6	7	8
37	9	10	11	12	13	14	15
38	16	17	18	19	20	21	22
39	23	24	25	26	27	28	29
40	30						

365 Outubro 2024

	Seg	Ter	Qua	Qui	Sex	Sáb	Dom
40		1	2	3	4	5	6
41	7	8	9	10	11	12	13
42	14	15	16	17	18	19	20
43	21	22	23	24	25	26	27
44	28	29	30	31			

365 Novembro 2024

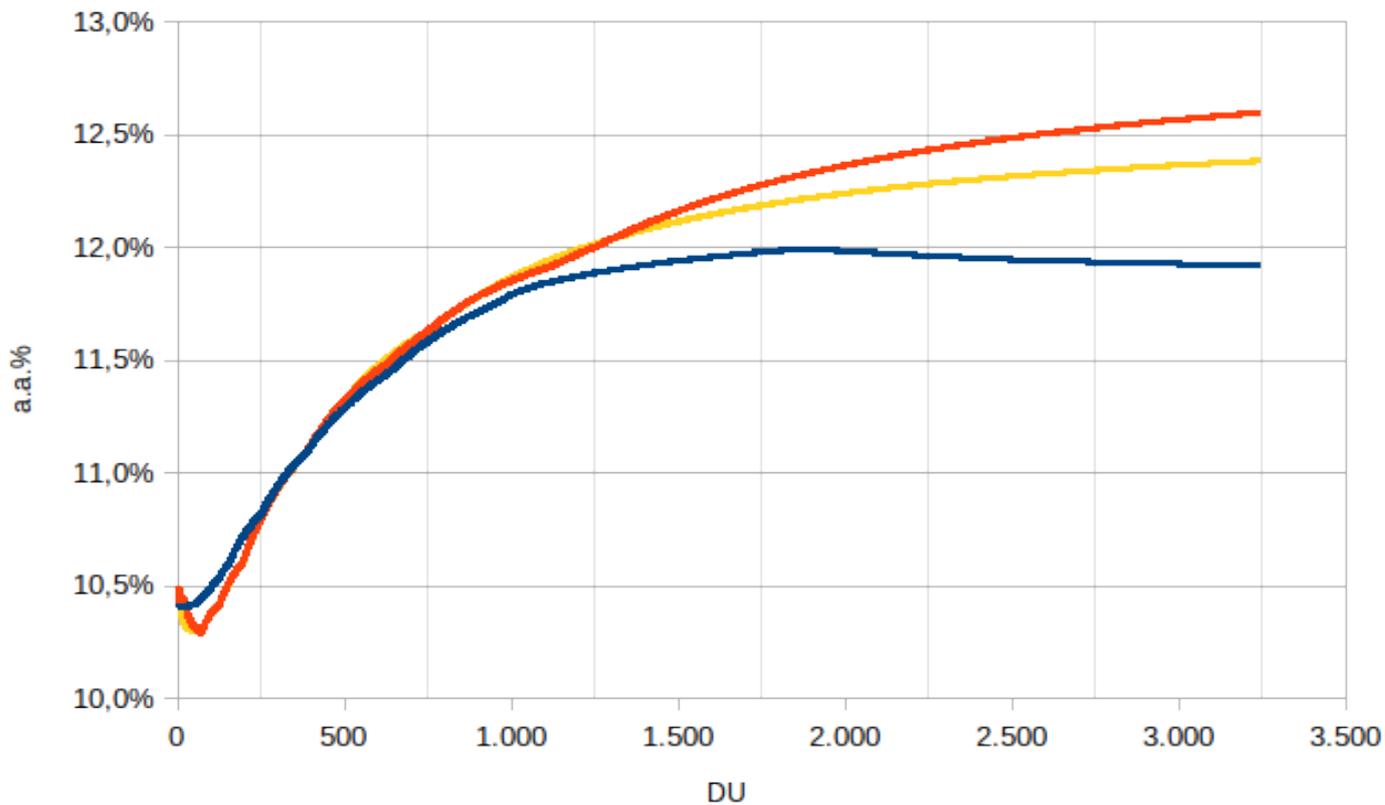
	Seg	Ter	Qua	Qui	Sex	Sáb	Dom
45	4	5	6	7	8	9	10
46	11	12	13	14	15	16	17
47	18			20	22	23	24
48	25	26	27	28	29	30	

365 Dezembro 2024

	Seg	Ter	Qua	Qui	Sex	Sáb	Dom
48							1
49	2	3	4	5	6	7	8
50	9	10	11	12	13	14	15
51	16	17	18	19	20	21	22
52	23	24	25	26	27	28	29
1	30	31					

14.759

Arbitragem

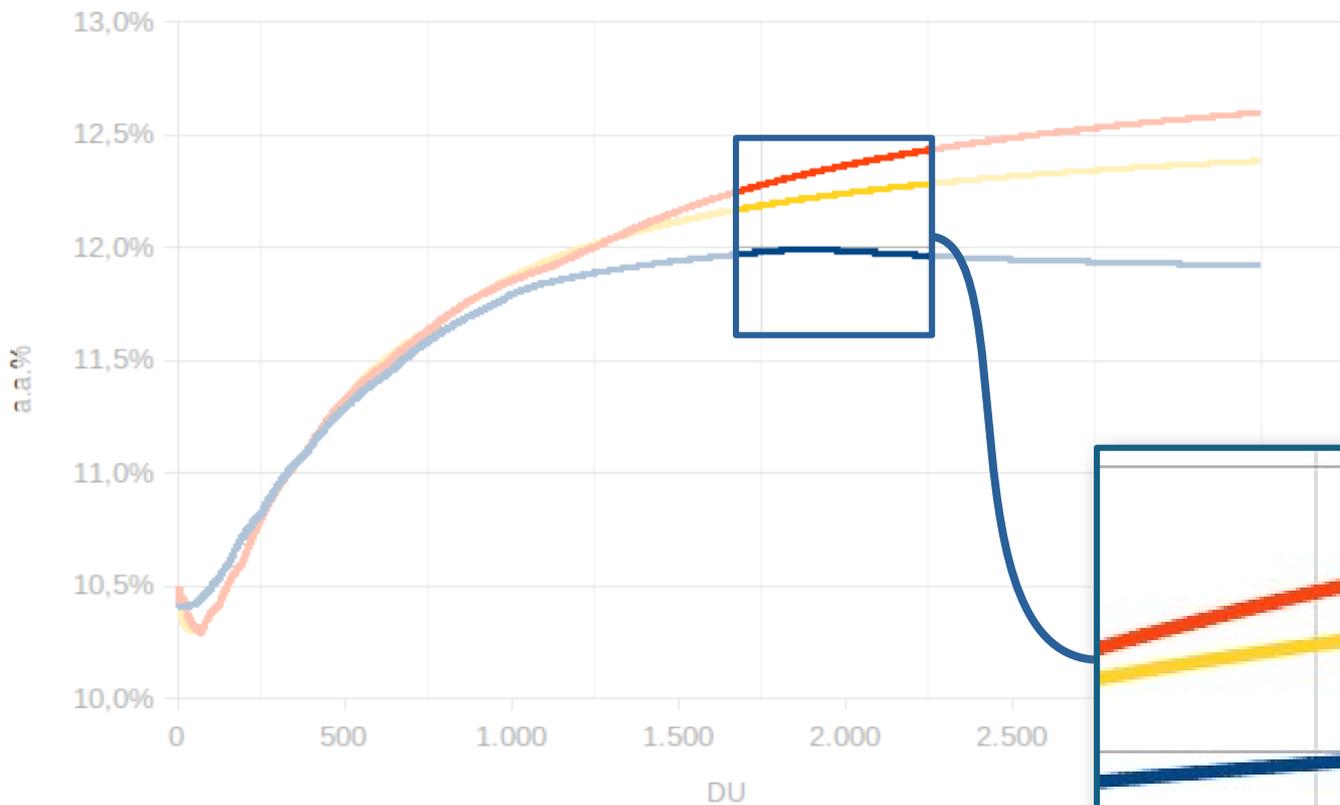


LTN B3

LTN ANBIMA

PRÉ

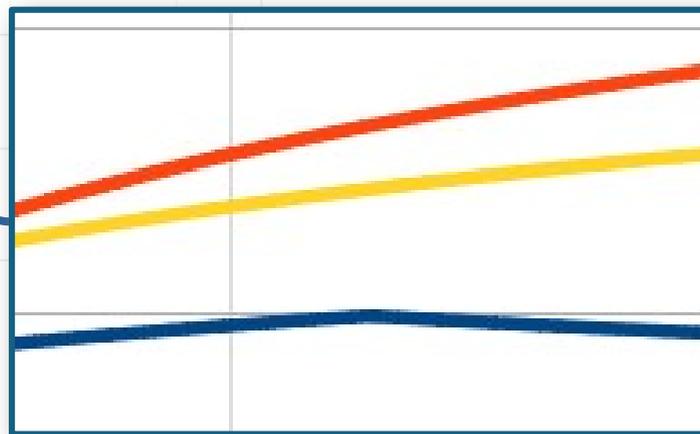
Arbitragem



LTN B3

LTN ANBIMA

PRÉ



Obrigado!

3º Workshop Duxus de Risco

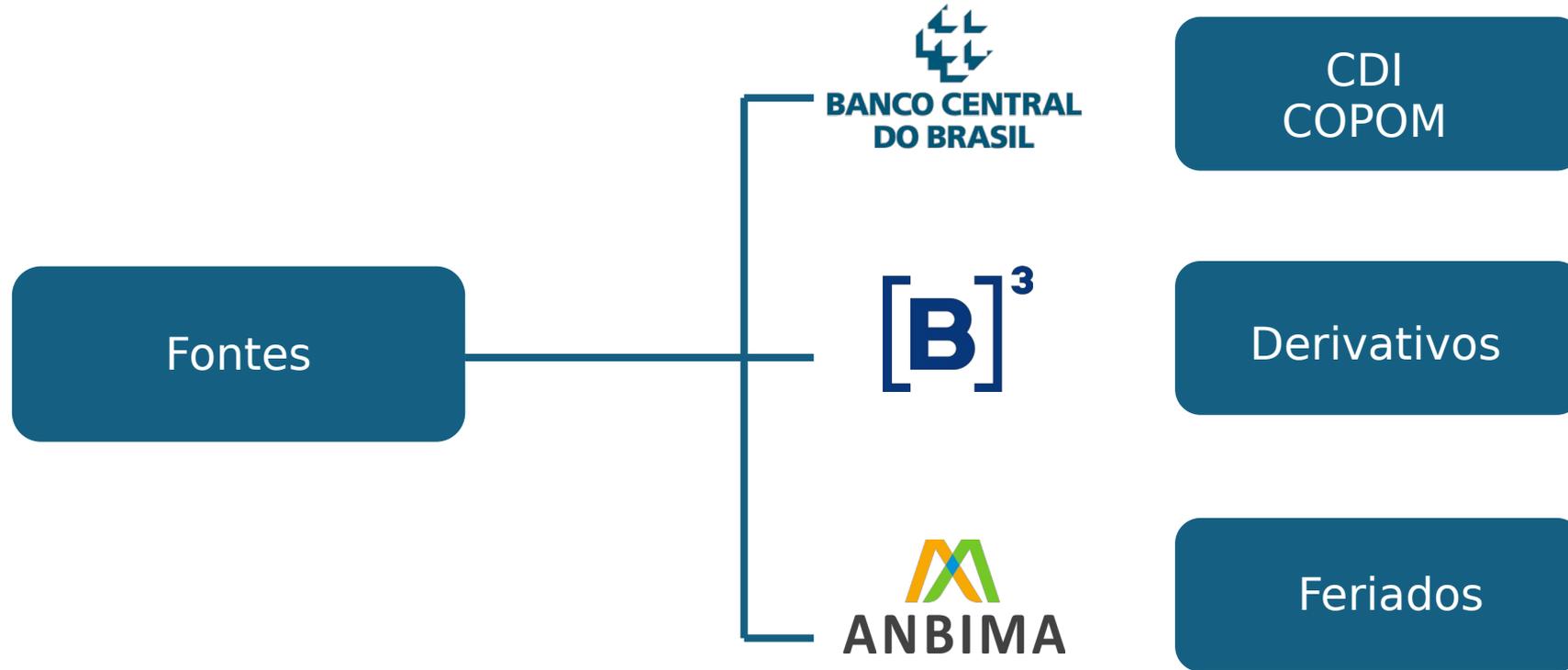
Uma questão de controle.



Curvas na Prática

Fábio Henrique

Pré - Fontes



Pré – 02/07/2024 – Fontes



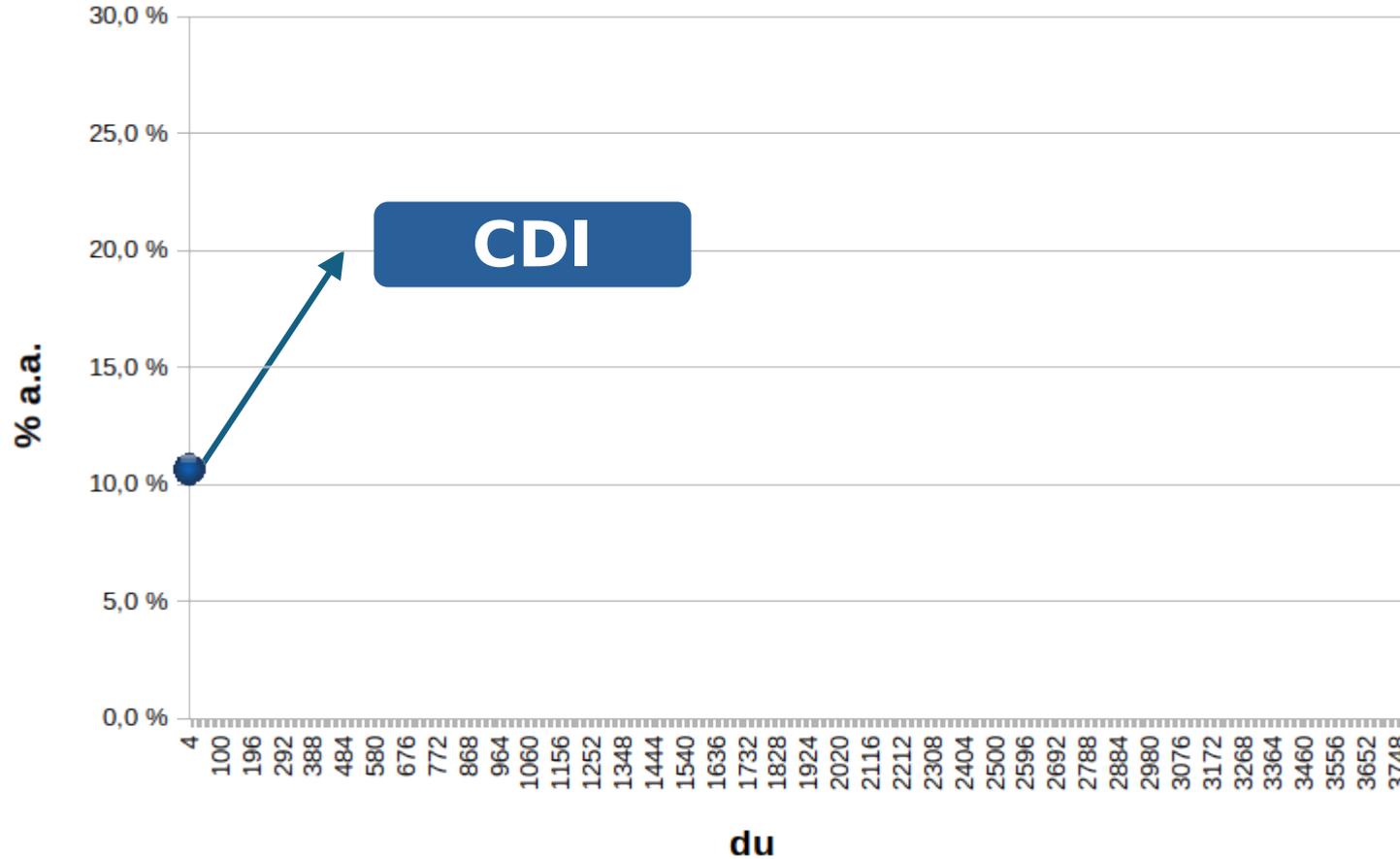
CDI	
Data	Valor
02/07/24	10,4

COPOM
Data
30/01/24
19/03/24
07/05/24
18/06/24
30/07/24
17/09/24
05/11/24
10/12/24

Contrato DI1		Swap DixPRE	
Serie	Vcto.	DU	Taxa
DI1F25	2025-01-02	1	10,4
DI1F26	2026-01-02	7	10,42
DI1F27	2027-01-04	13	10,42
DI1F28	2028-01-03	14	10,42
DI1F29	2029-01-02	15	10,42
DI1F30	2030-01-02	17	10,42
DI1F31	2031-01-02	21	10,42
DI1F32	2032-01-02	24	10,42
DI1F33	2033-01-03	28	10,42
DI1F34	2034-01-02	29	10,42
DI1F35	2035-01-02	30	10,42
DI1F36	2036-01-02	34	10,43
DI1F37	2037-01-02	43	10,45
DI1F38	2038-01-04	44	10,45
DI1F39	2039-01-03	45	10,45
DI1G25	2025-02-03	58	10,47
DI1H25	2025-03-05	59	10,47

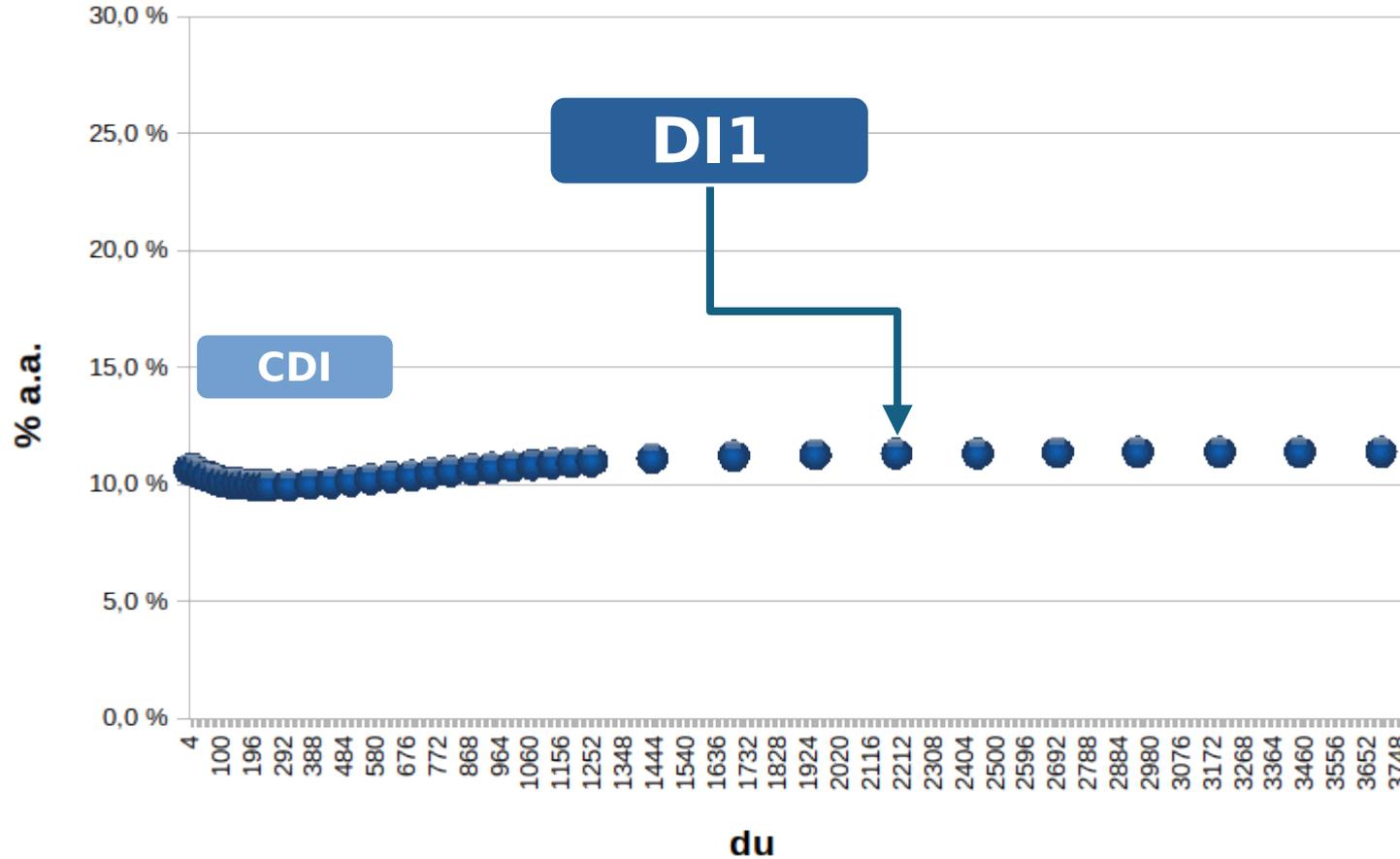
Data	Feriado
12/10/2024	Nossa Sr.a Aparecida - Padroeira do Brasil
02/11/2024	Finados
15/11/2024	Proclamação da República
20/11/2024	Dia Nacional de Zumbi e da Consciência Negra
25/12/2024	Natal
01/01/2025	Confraternização Universal
03/03/2025	Carnaval
04/03/2025	Carnaval
18/04/2025	Paixão de Cristo
21/04/2025	Tiradentes
01/05/2025	Dia do Trabalho
19/06/2025	Corpus Christi
07/09/2025	Independência do Brasil
12/10/2025	Nossa Sr.a Aparecida - Padroeira do Brasil
02/11/2025	Finados
15/11/2025	Proclamação da República
20/11/2025	Dia Nacional de Zumbi e da Consciência Negra
25/12/2025	Natal
01/01/2026	Confraternização Universal
16/02/2026	Carnaval
17/02/2026	Carnaval
03/04/2026	Paixão de Cristo
04/04/2026	Tiradentes

Pré – 02/07/2024 – Tratamento



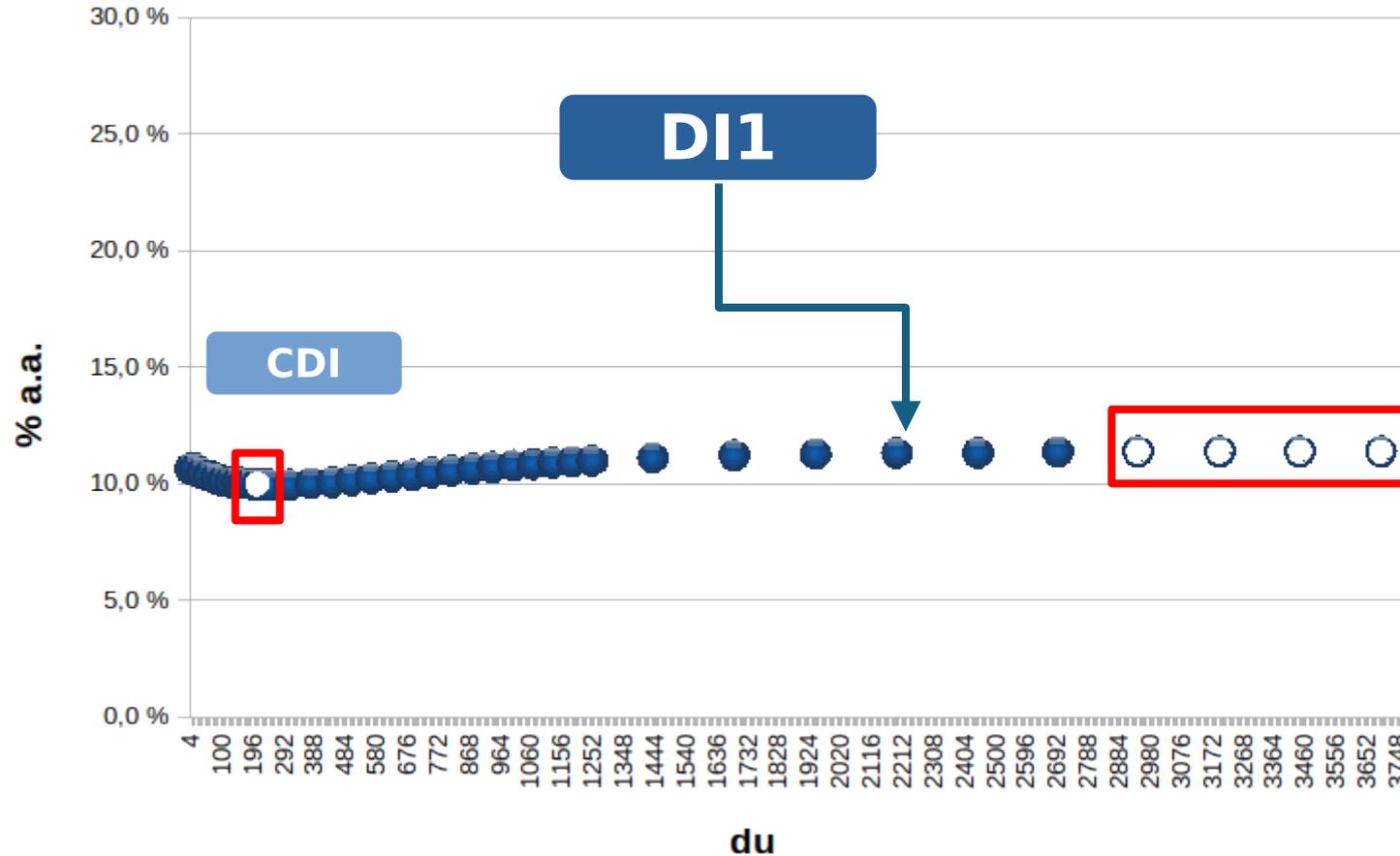
Edição

Pré – 02/07/2024 – Tratamento



Edição

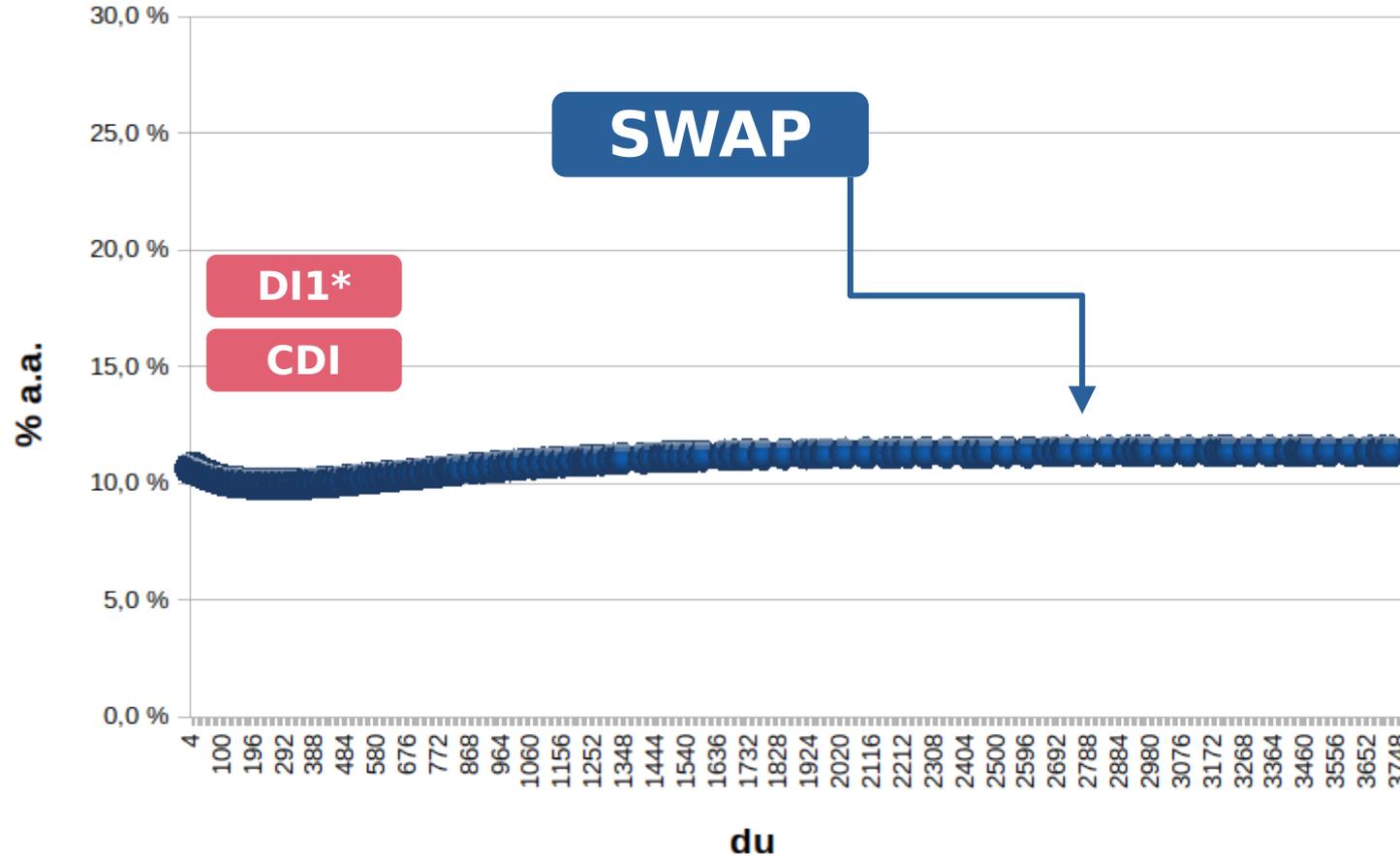
Pré – 02/07/2024 – Tratamento



Edição

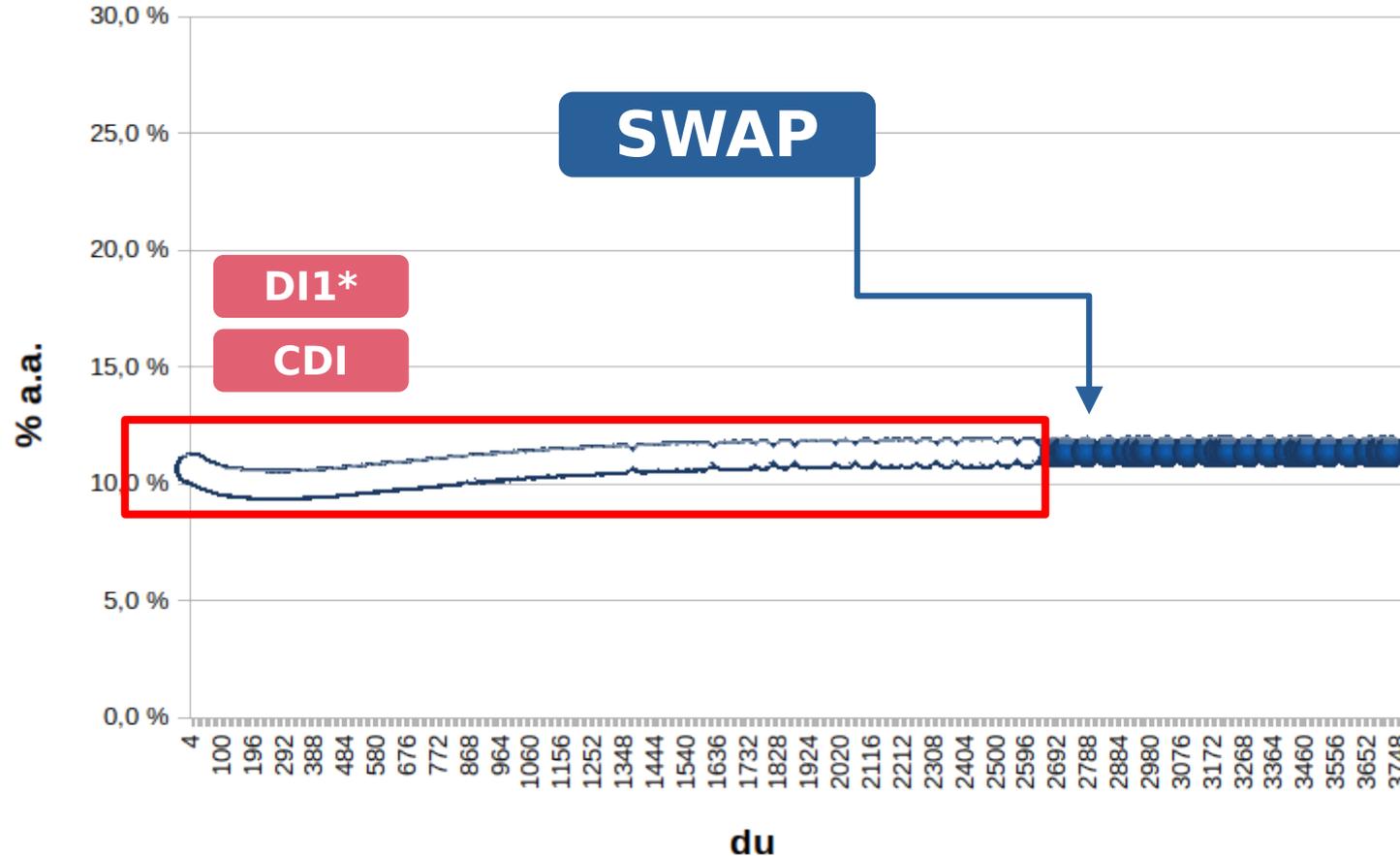
Limpeza

Pré – 02/07/2024 – Tratamento



Edição

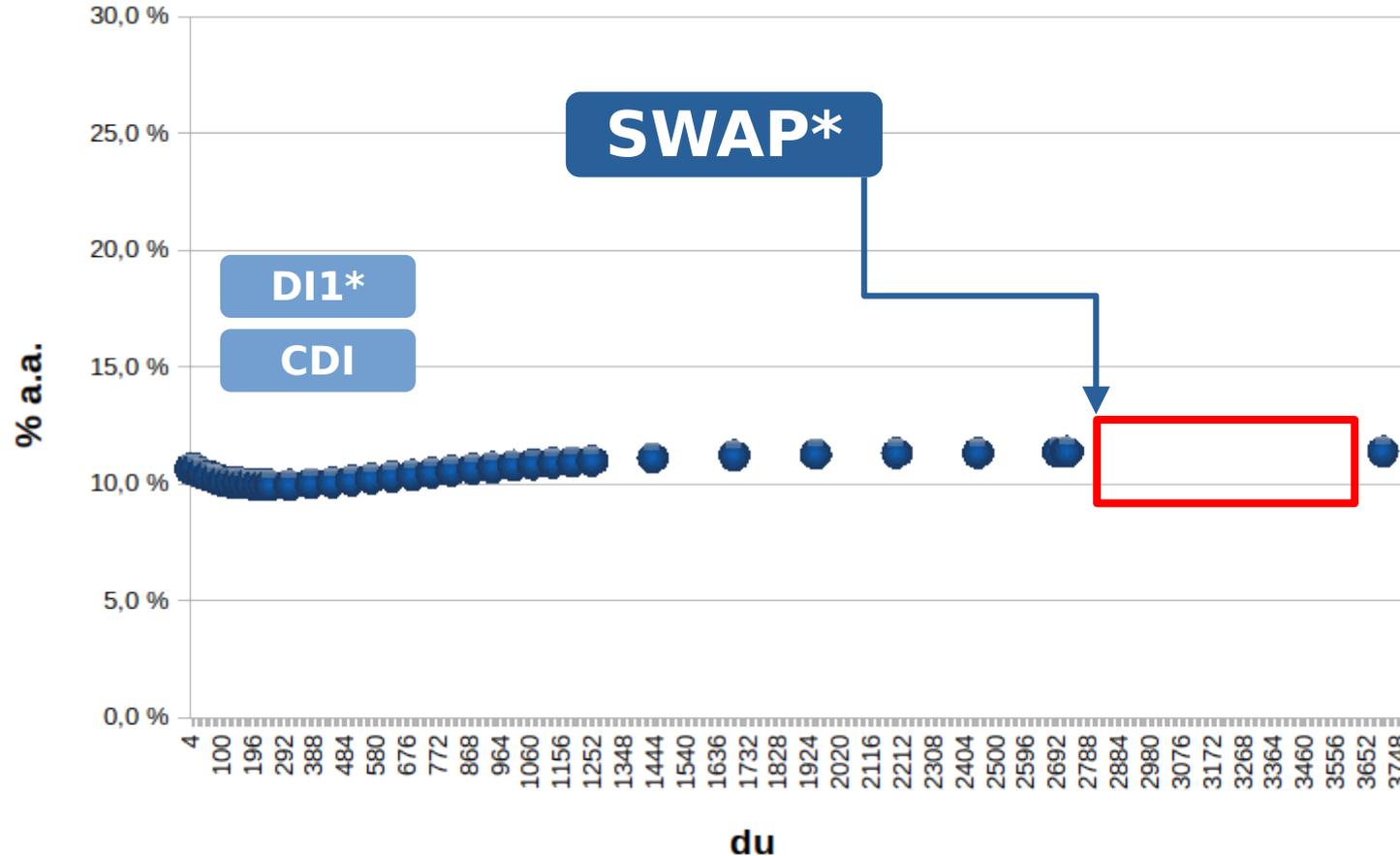
Pré – 02/07/2024 – Tratamento



Edição

Limpeza

Pré – 02/07/2024 – Tratamento

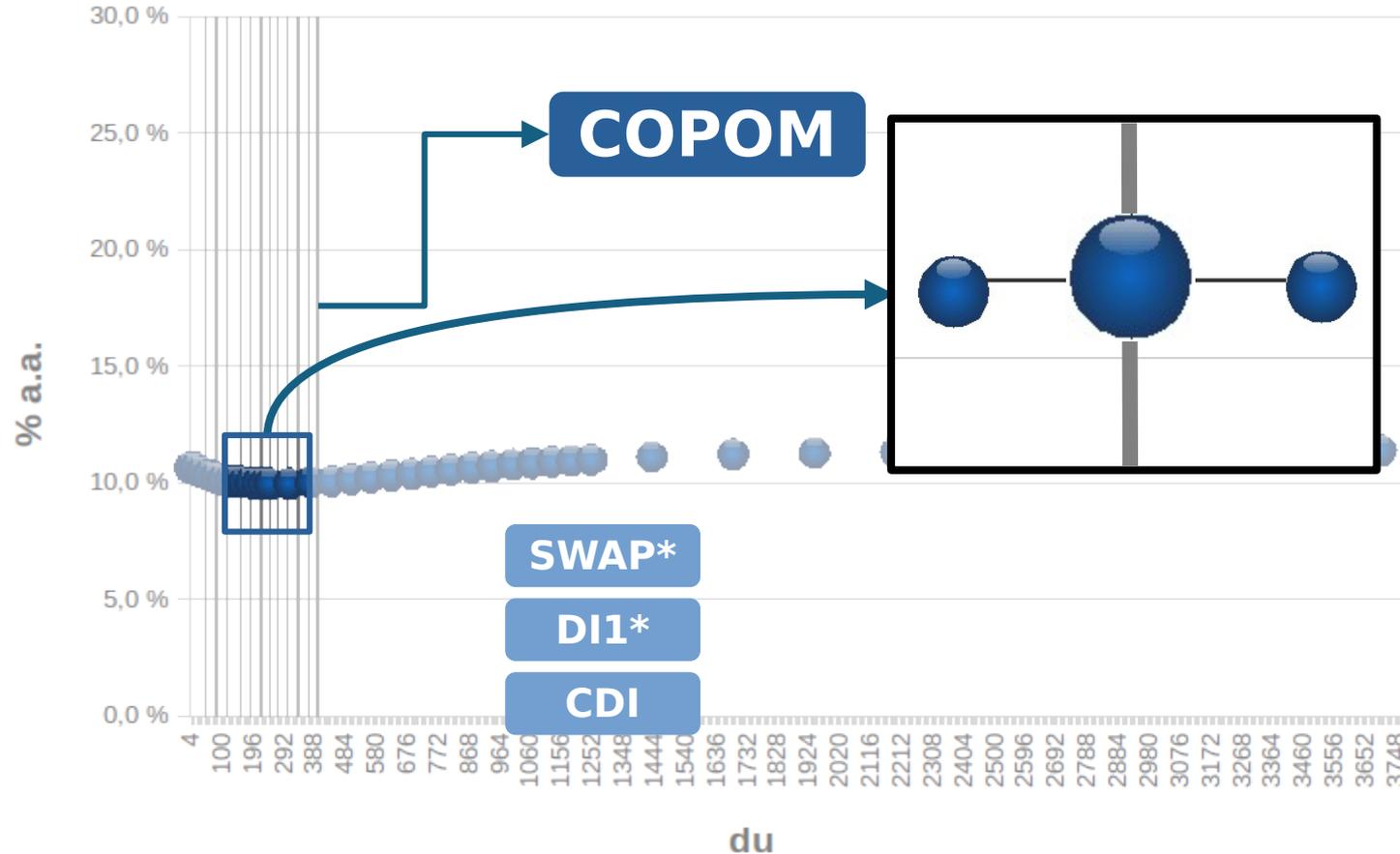


Edição

Limpeza

Otimização

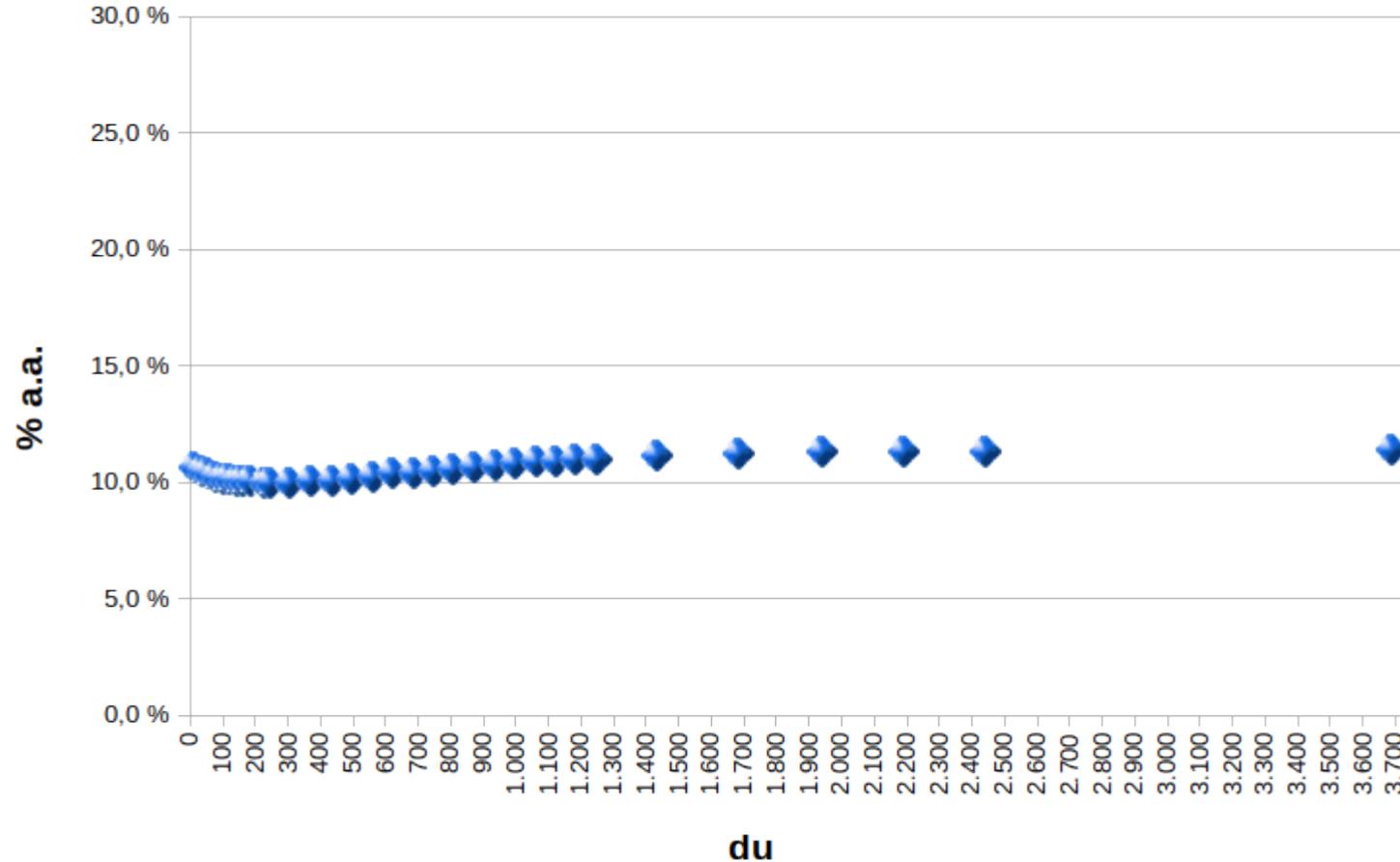
Pré – 02/07/2024 – Tratamento



Edição

Limpeza

Pré – 02/07/2024 – Tratamento



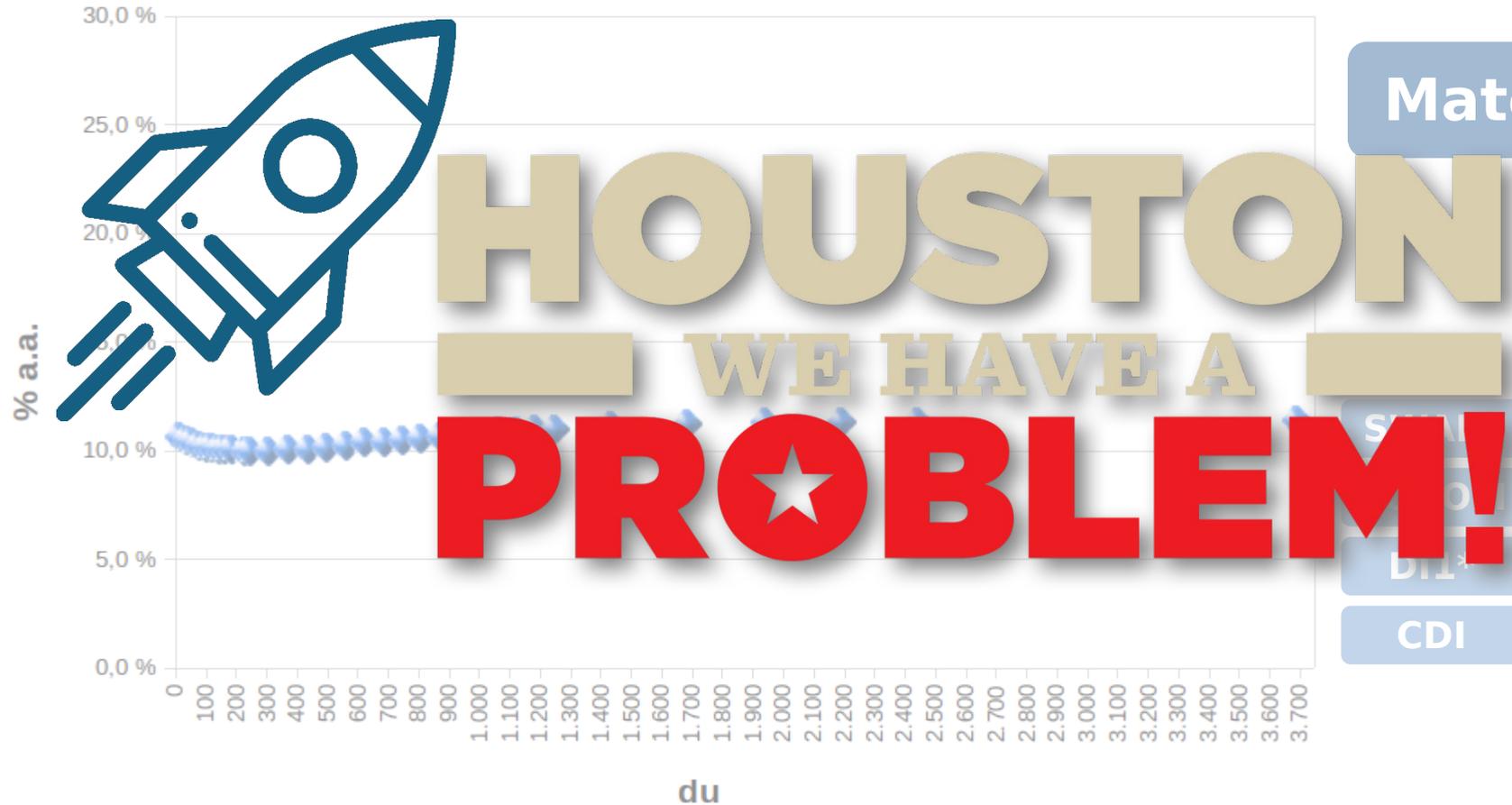
Matéria Prima

SWAP*

COPOM

DI1*

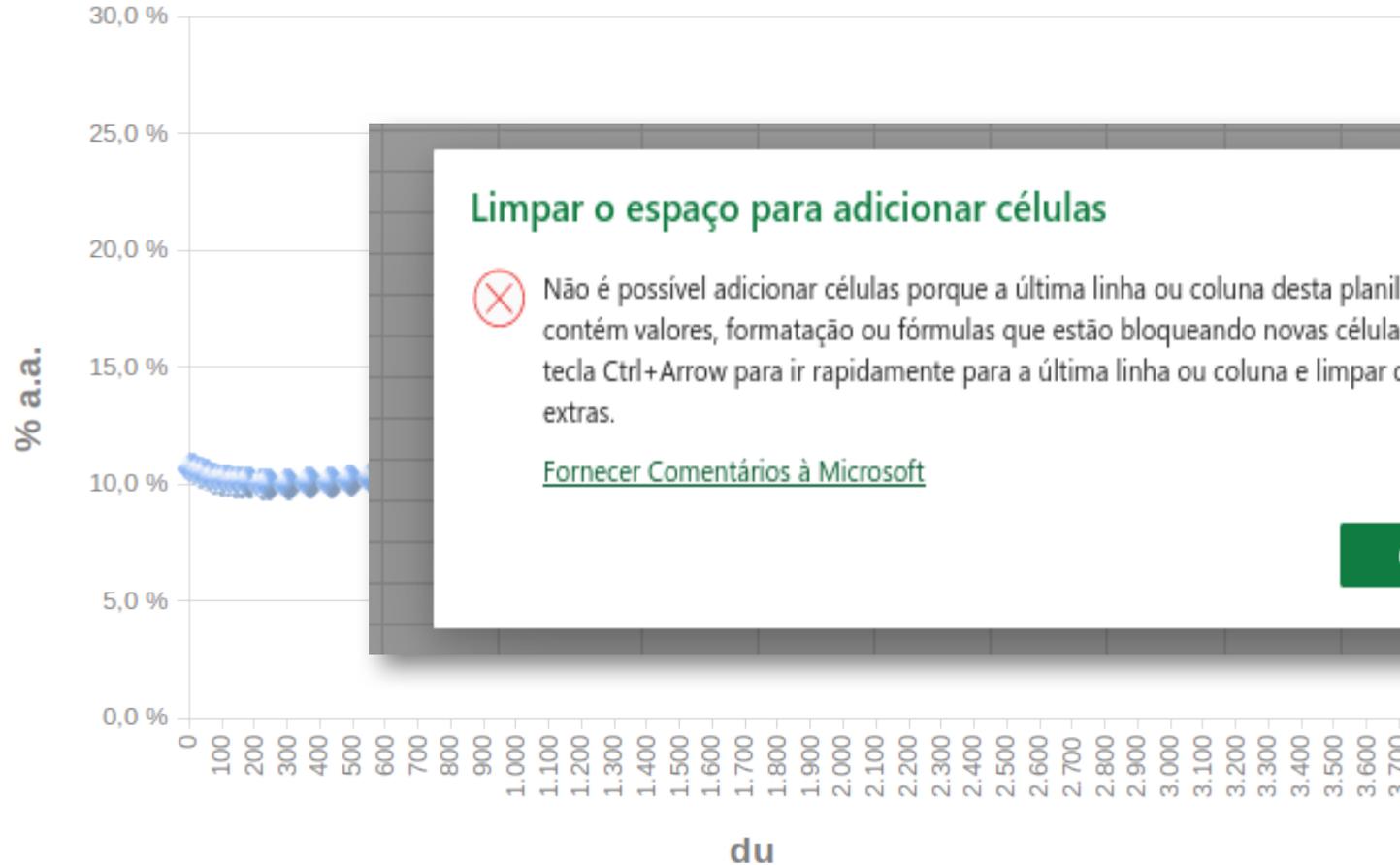
CDI



Matéria Prima

S
DII
CDI

Pré – 02/07/2024 – Tratamento



Matéria Prima

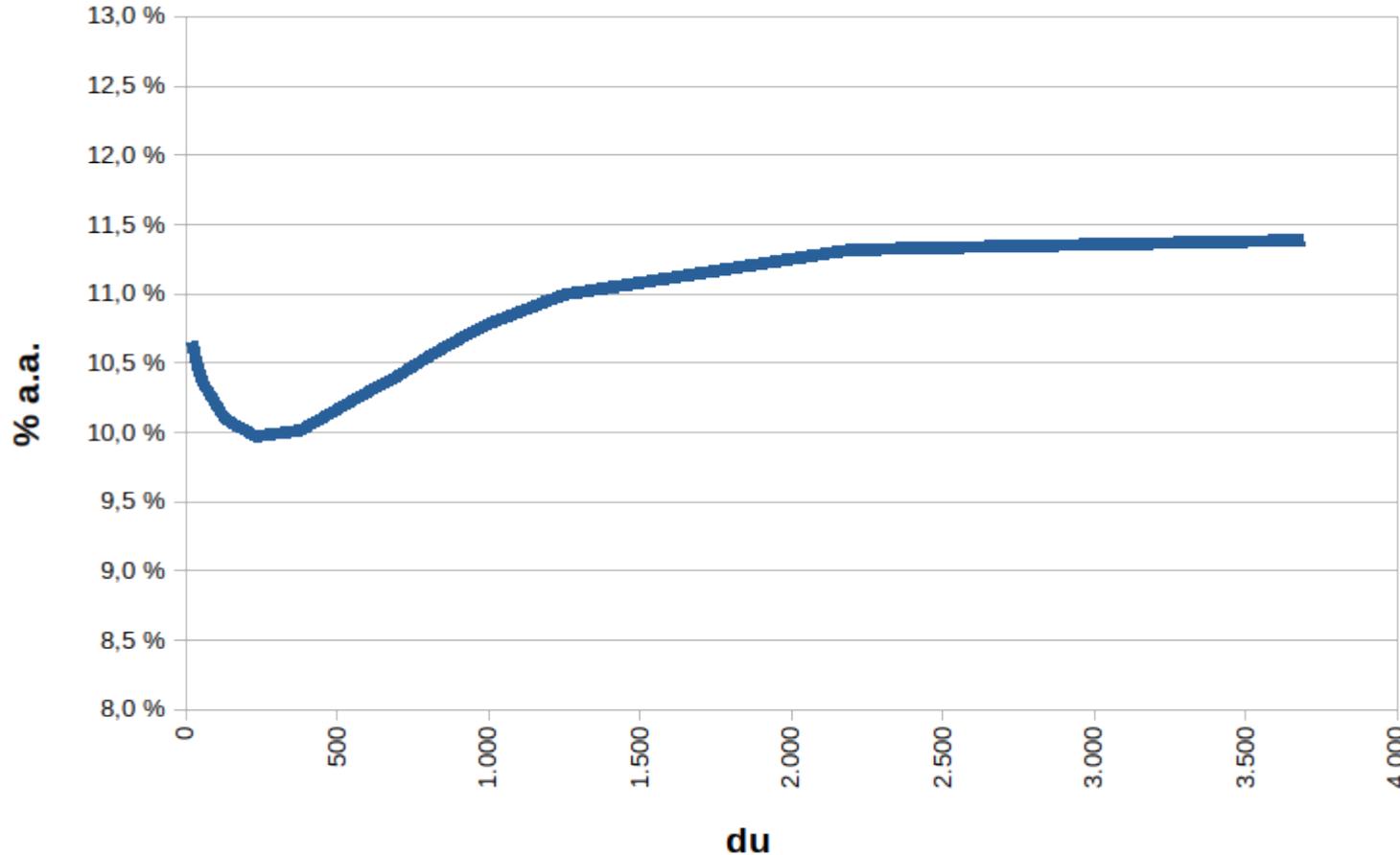
Ⓚ*

ⓀM

*
Ⓚ

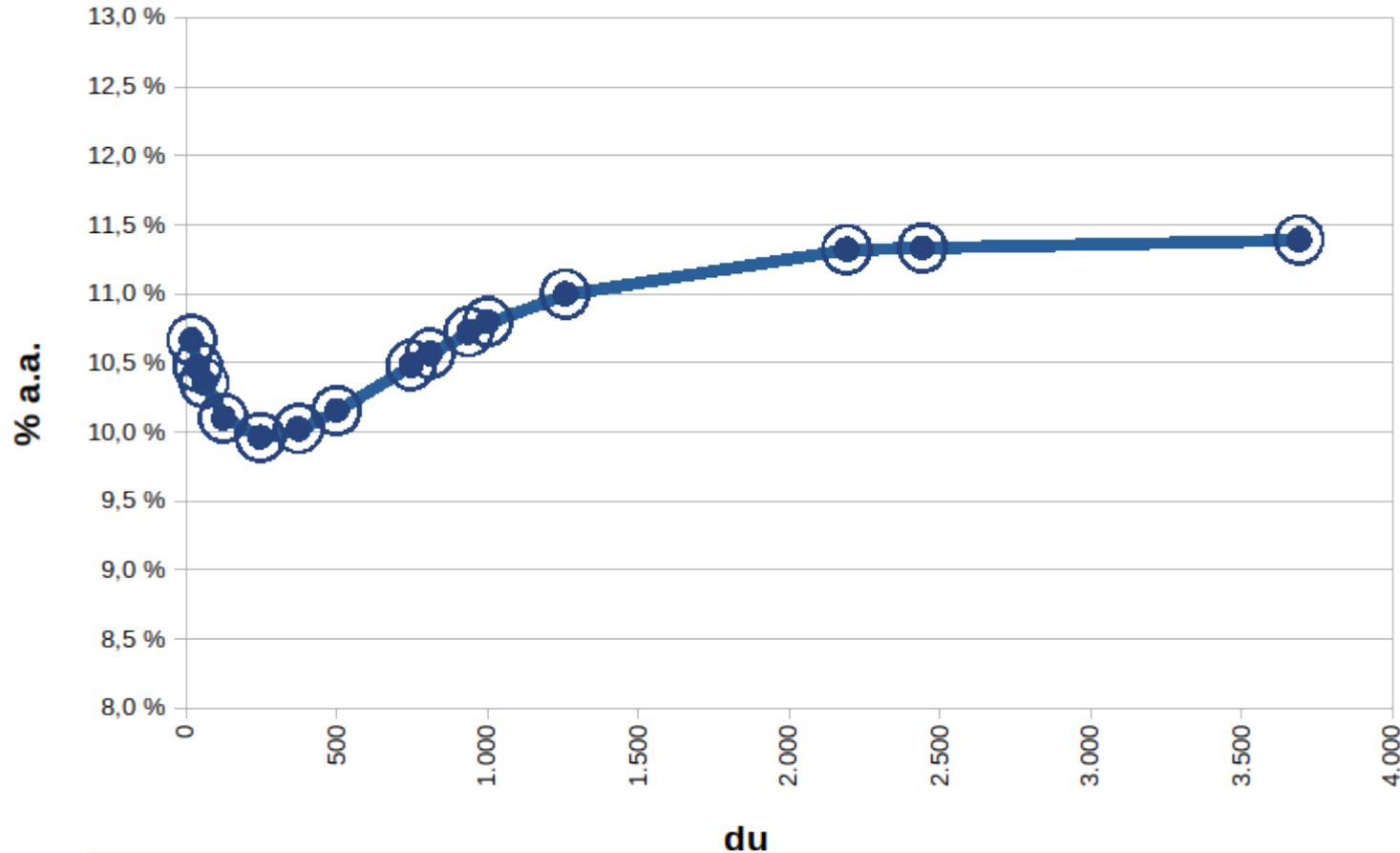
CDI

Pré – 02/07/2024 – Metodologia

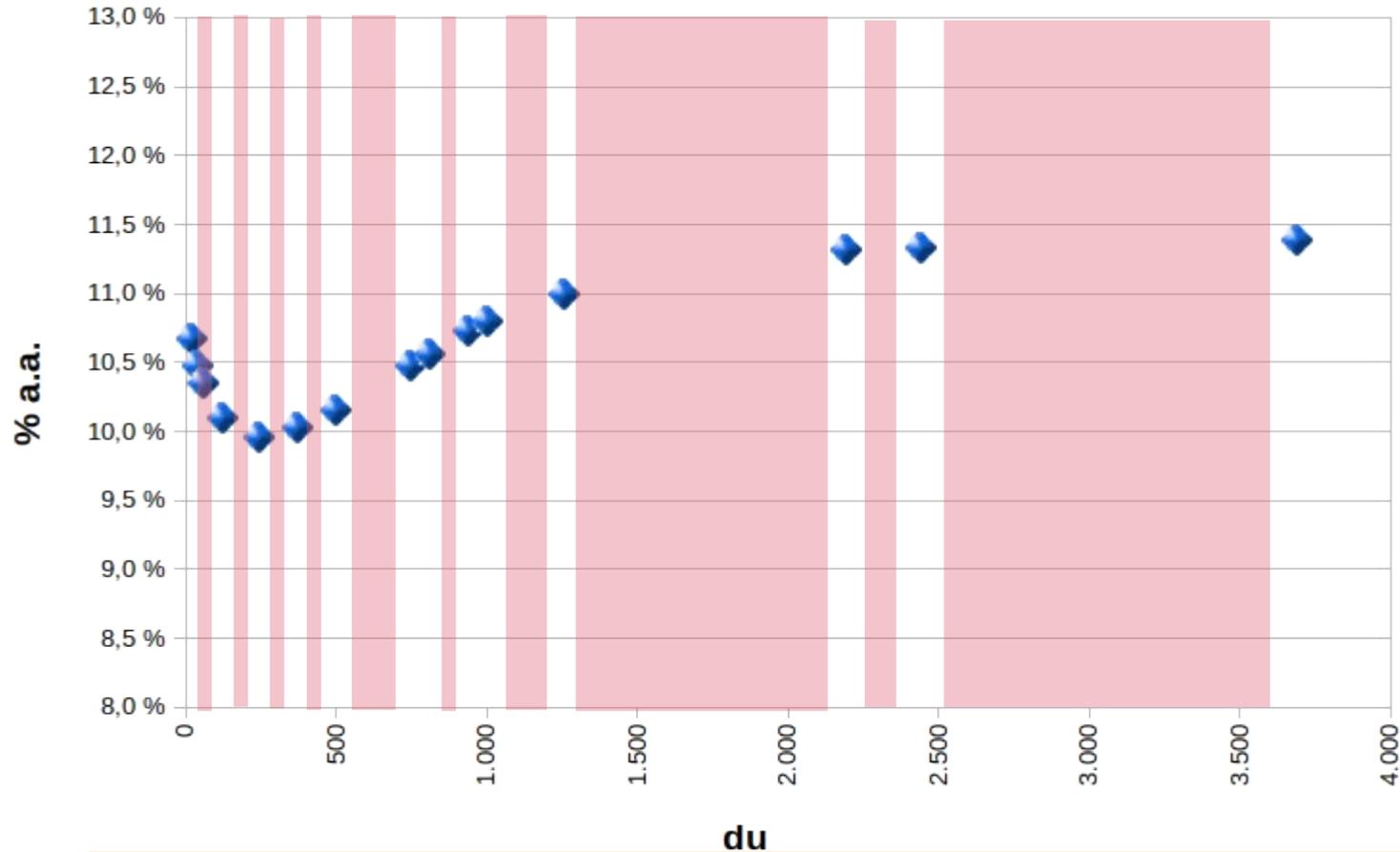


Interpolação

Preferenciais



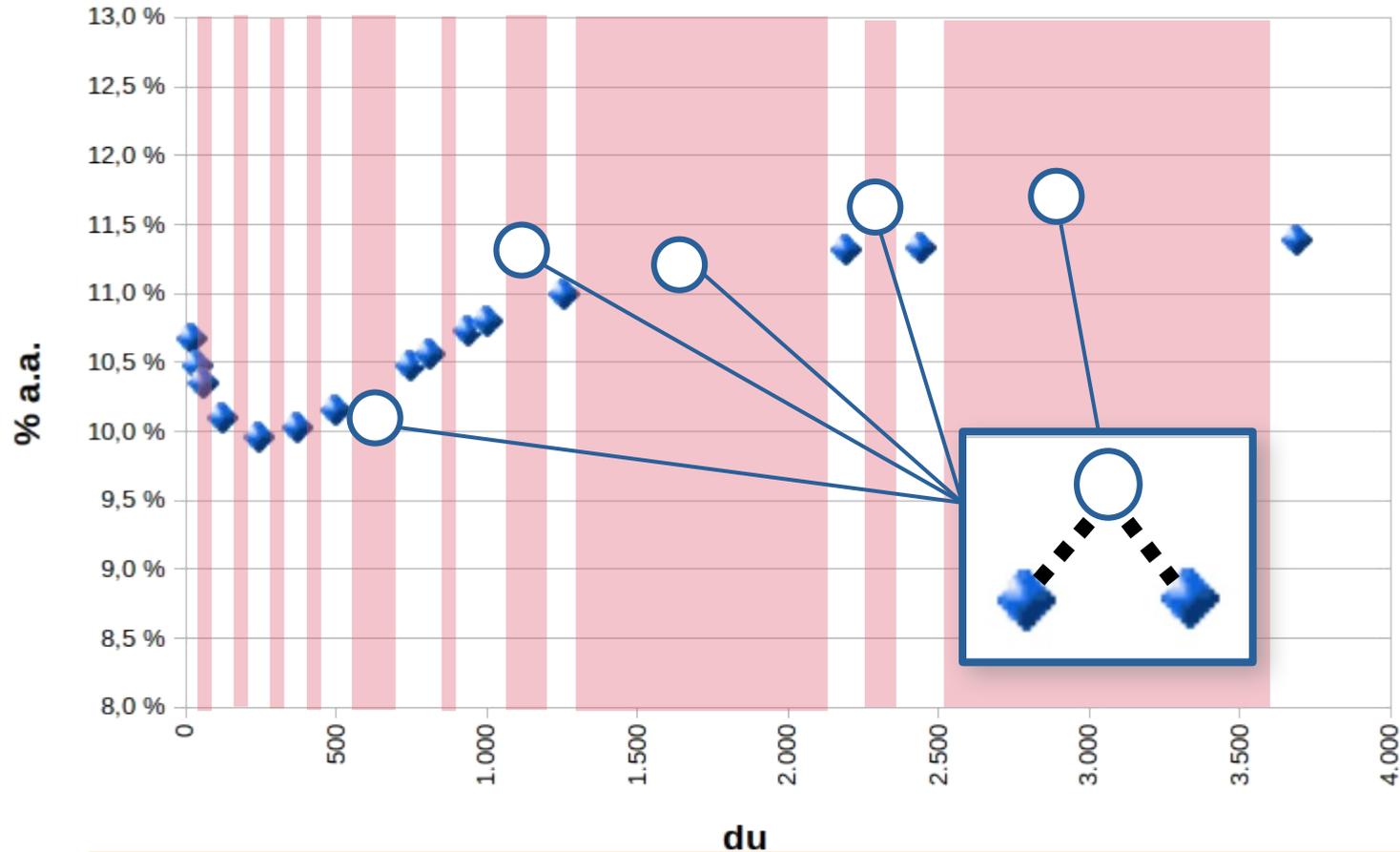
Pré – 02/07/2024 – Metodologia



Preferenciais

Entropia?

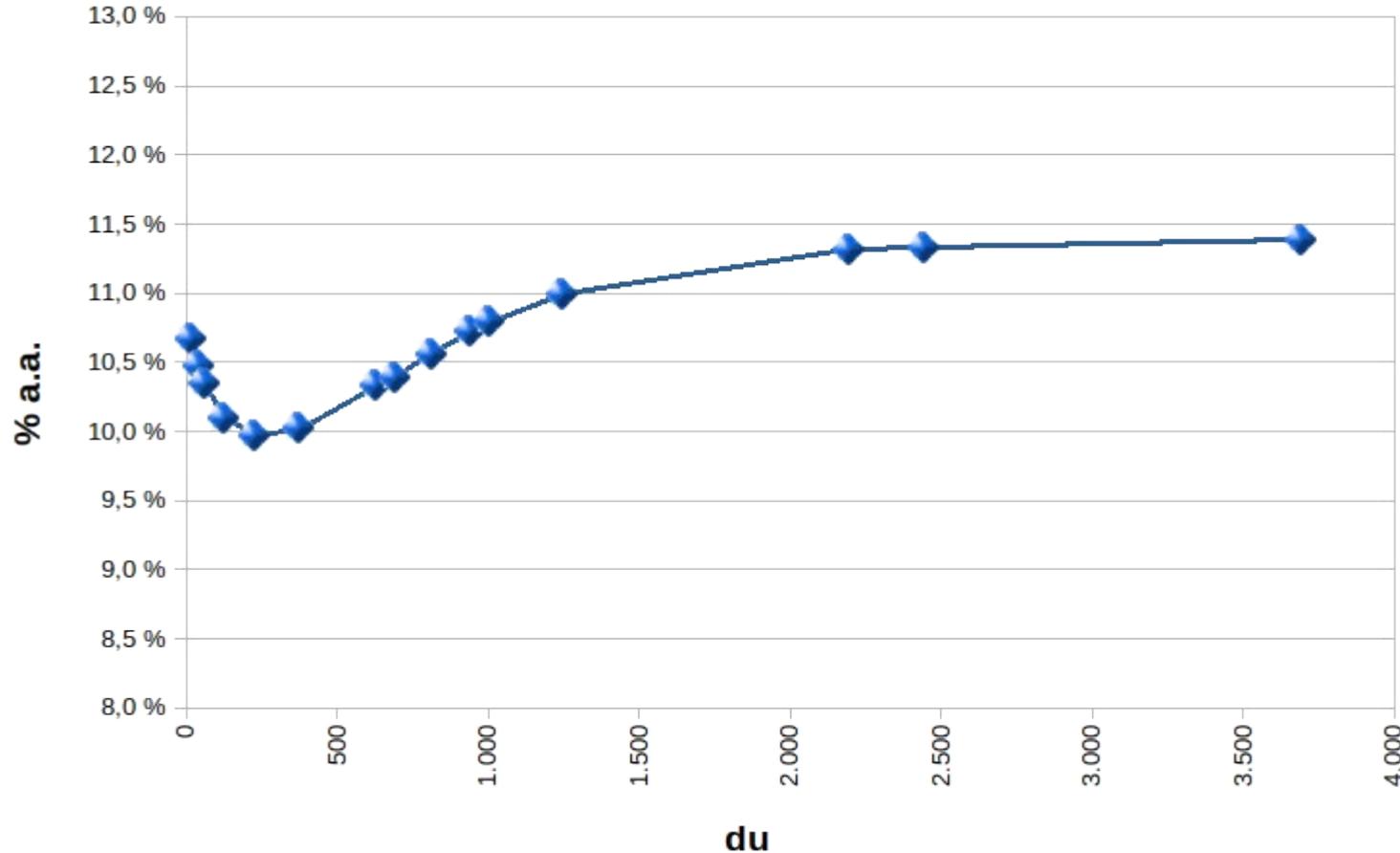
Pré – 02/07/2024 – Metodologia



Preferenciais

Adicionais

Pré – 02/07/2024



Pré

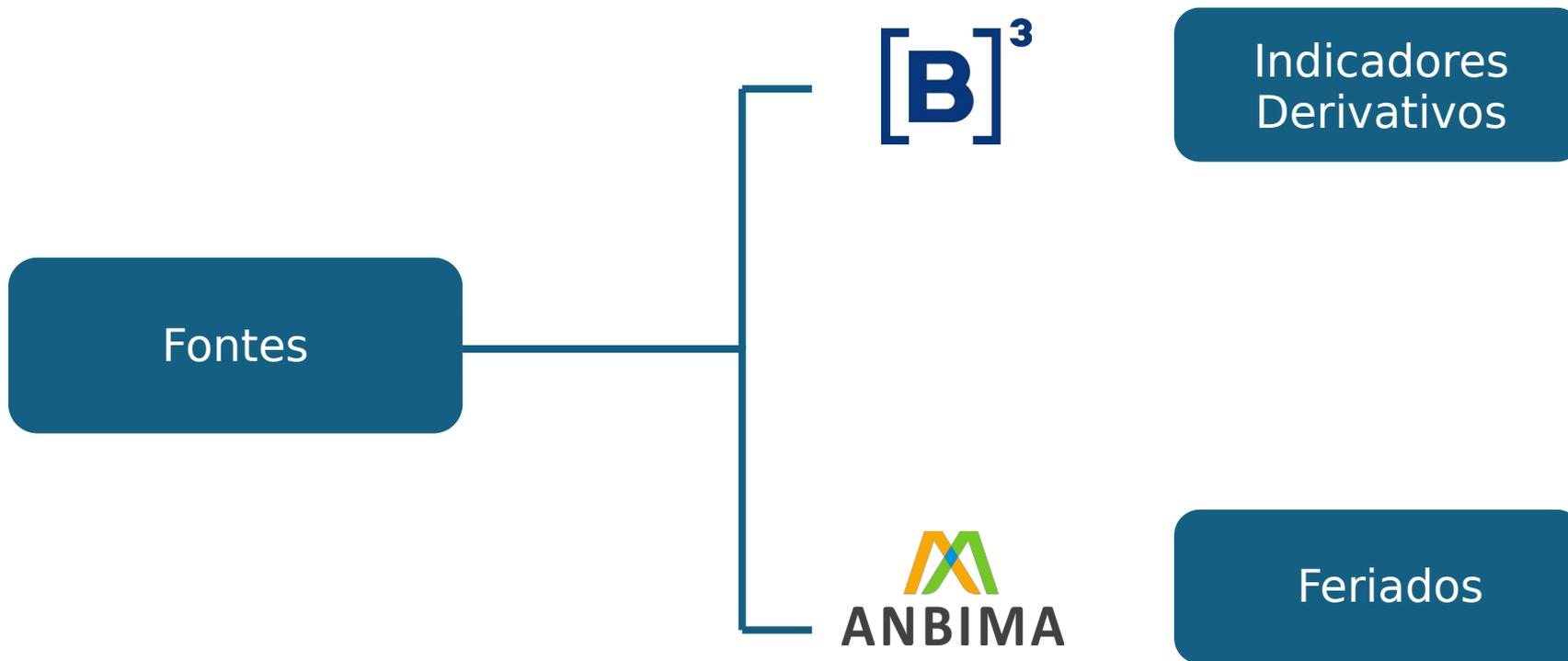
Termo

Efetiva 252

Derivativos

Exponencial

Cupom IPCA – Fontes



Cupom IPCA – 02/07/2024 – Fontes

[B]³



IPCA	
Data	Valor
02/07/24	6.869,21

Contrato IAP	
Série	Vcto.

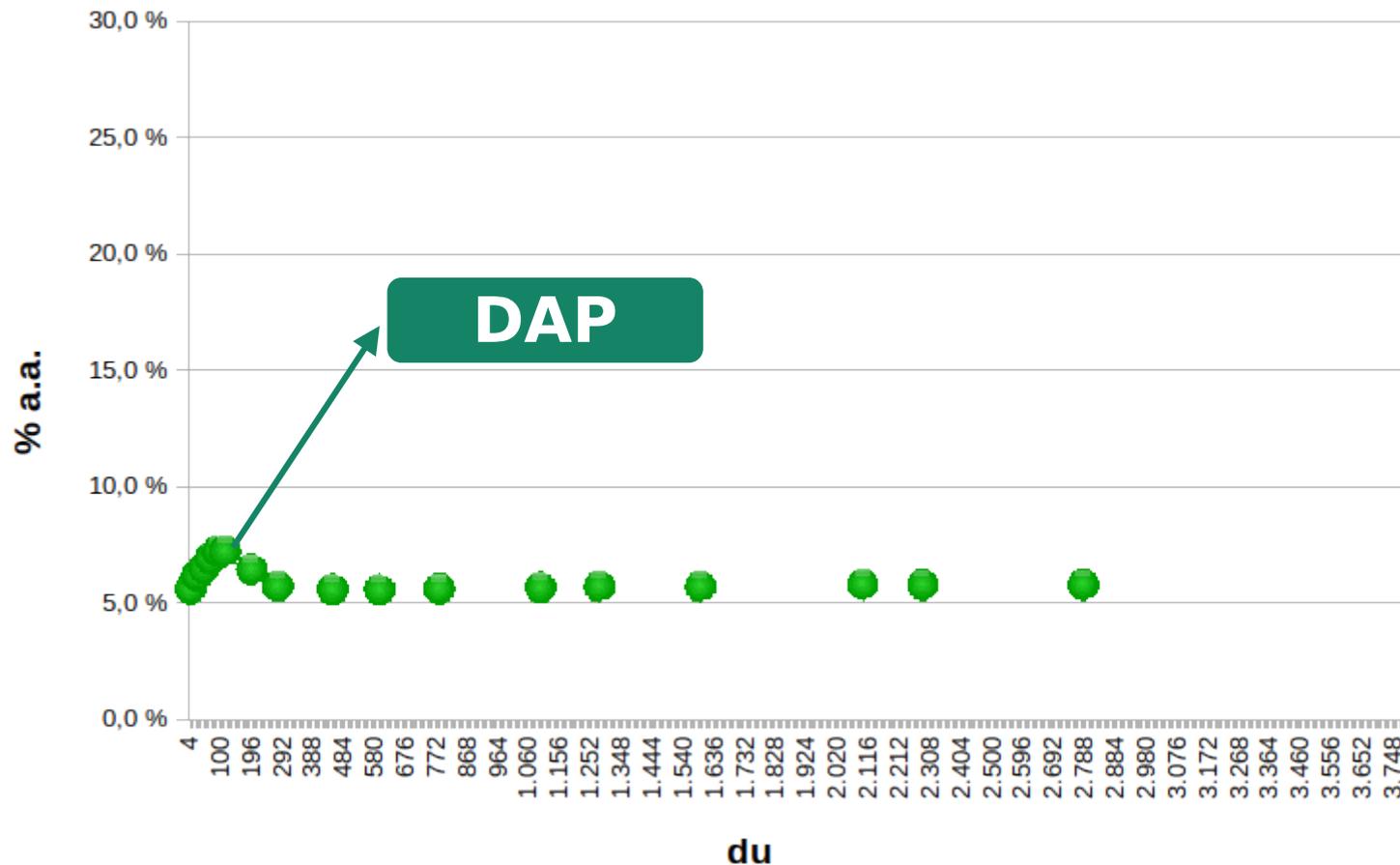
Contrato DAP	
Série	Vcto.
DAPF25	2025-01-15
DAPF26	2026-01-15
DAPJ24	2024-04-15
DAPK24	2024-05-15
DAPK25	2025-05-15
DAPK27	2027-05-17
DAPK29	2029-05-15
DAPK33	2033-05-16
DAPK35	2035-05-15
DAPK45	2045-05-15
DAPK55	2055-05-17
DAPM24	2024-06-17
DAPN24	2024-07-15
DAPQ24	2024-08-15
DAPQ26	2026-08-17
DAPQ28	2028-08-15
DAPQ30	2030-08-15

Swap DI X IPCA	
DU	Taxa
1	10,65
5	10,62
6	10,62
7	10,62
8	10,62
10	10,62
15	10,62
16	10,62
17	10,62
18	10,62
20	10,62
22	7,11
27	0,89
29	1,51
32	2,3
37	3,35
38	3,52

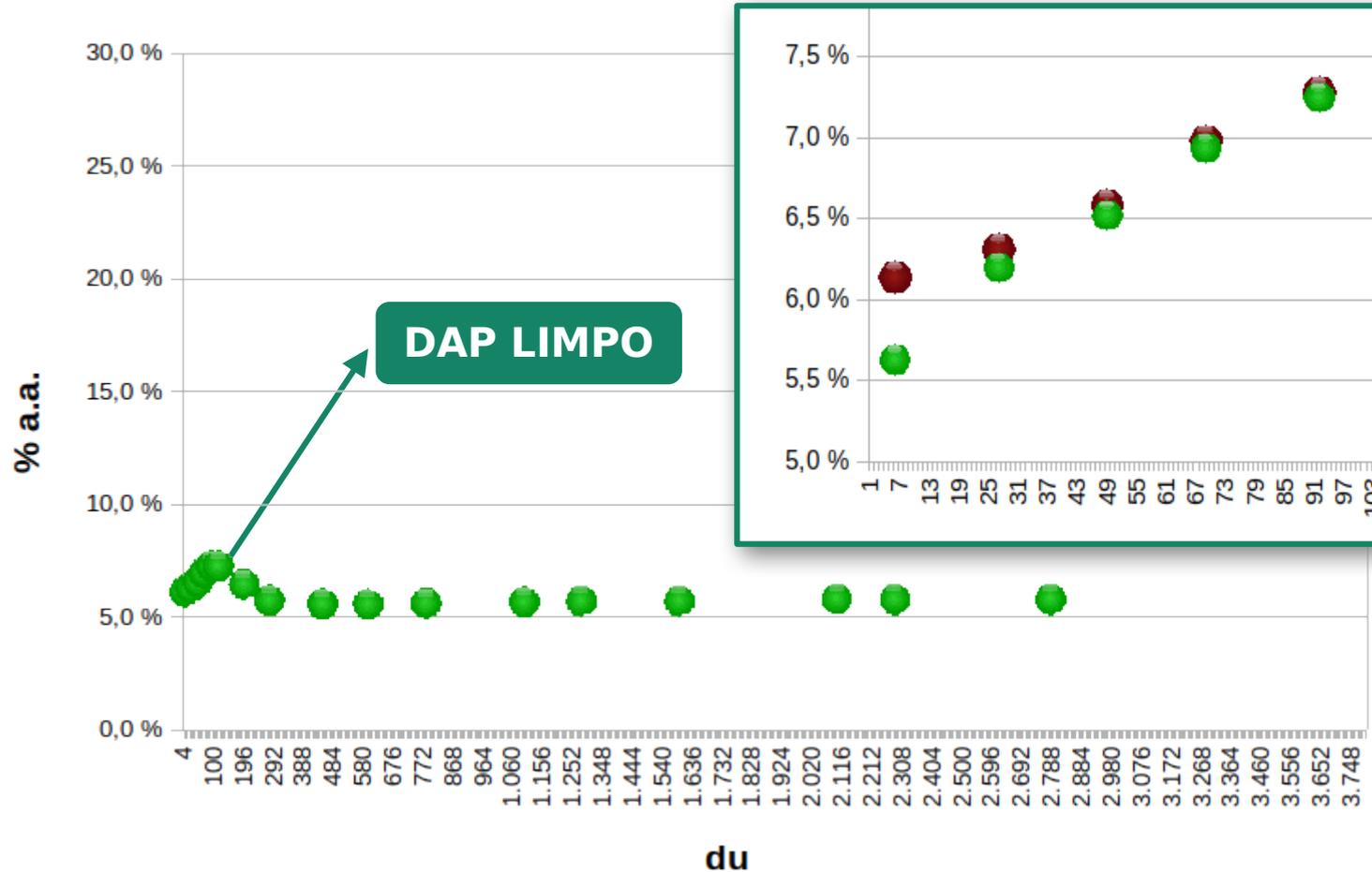
Feriados

Cupom IPCA – 02/07/2024 – Tratamento

Edição



Cupom IPCA – 02/07/2024 – Tratamento

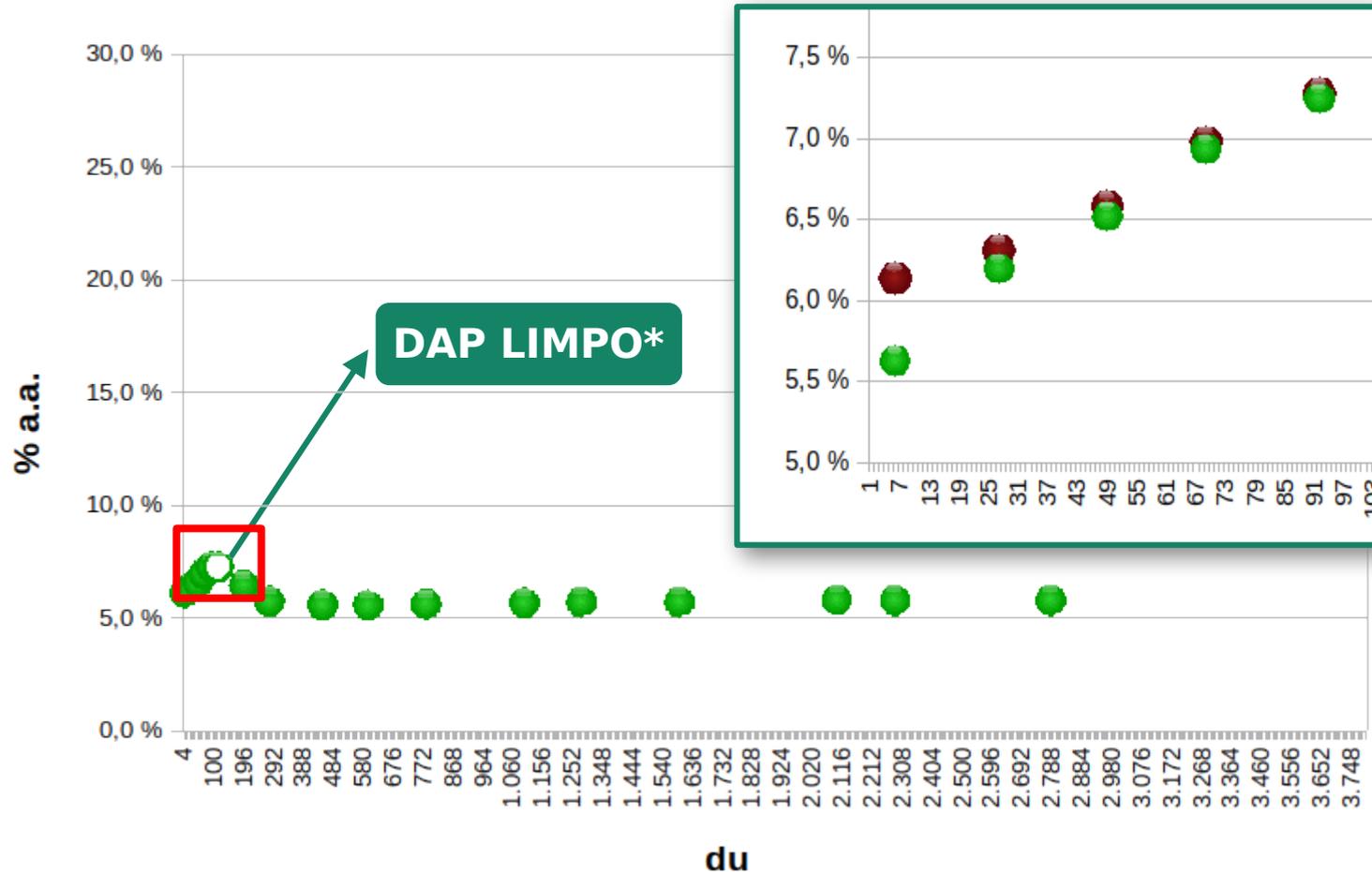


Edição

Limpeza Met.

1,000144154534

Cupom IPCA – 02/07/2024 – Tratamento



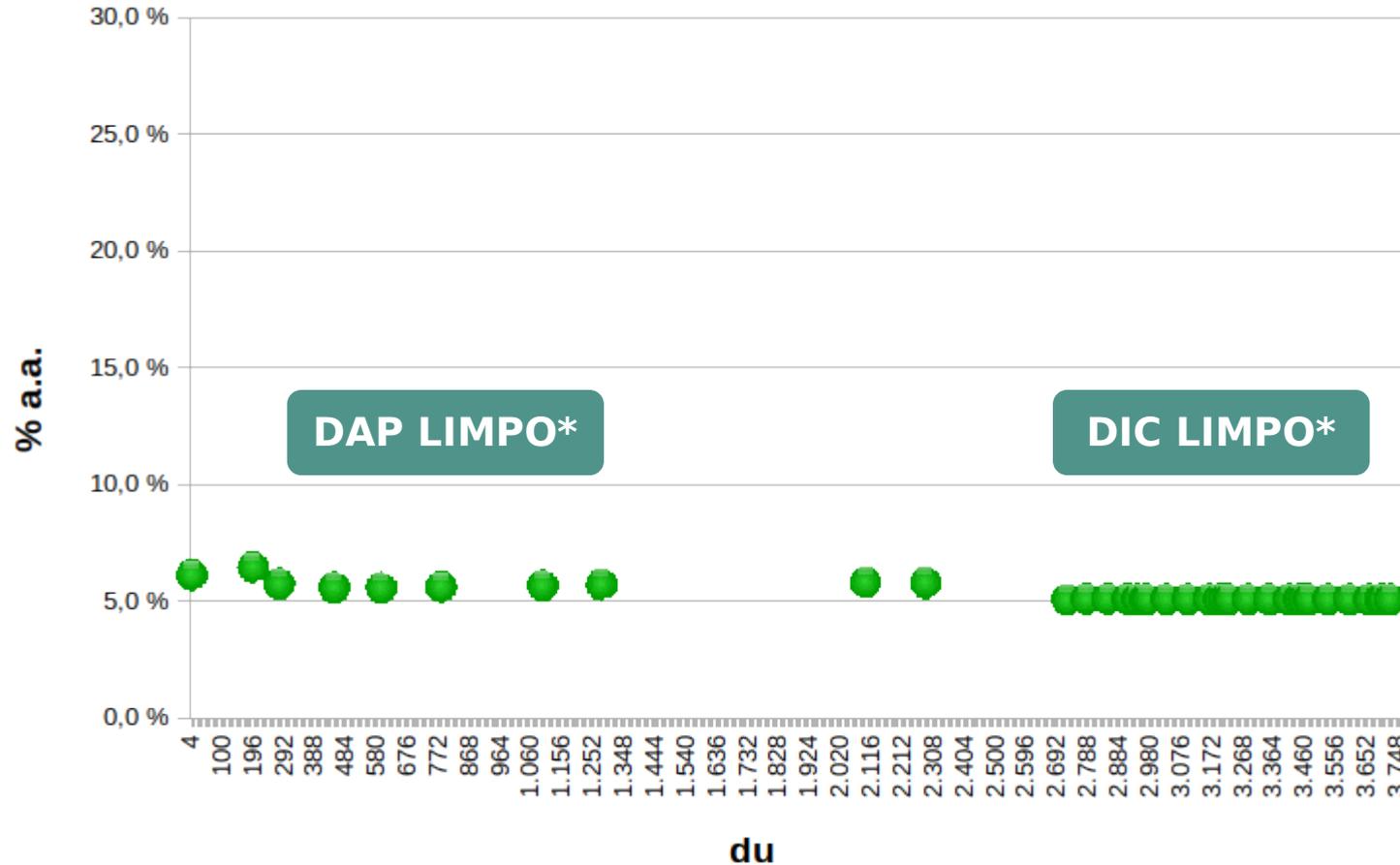
Edição

Limpeza Met.

1,000144154534

Limpeza

Cupom IPCA – 02/07/2024 – Tratamento



Matéria Prima

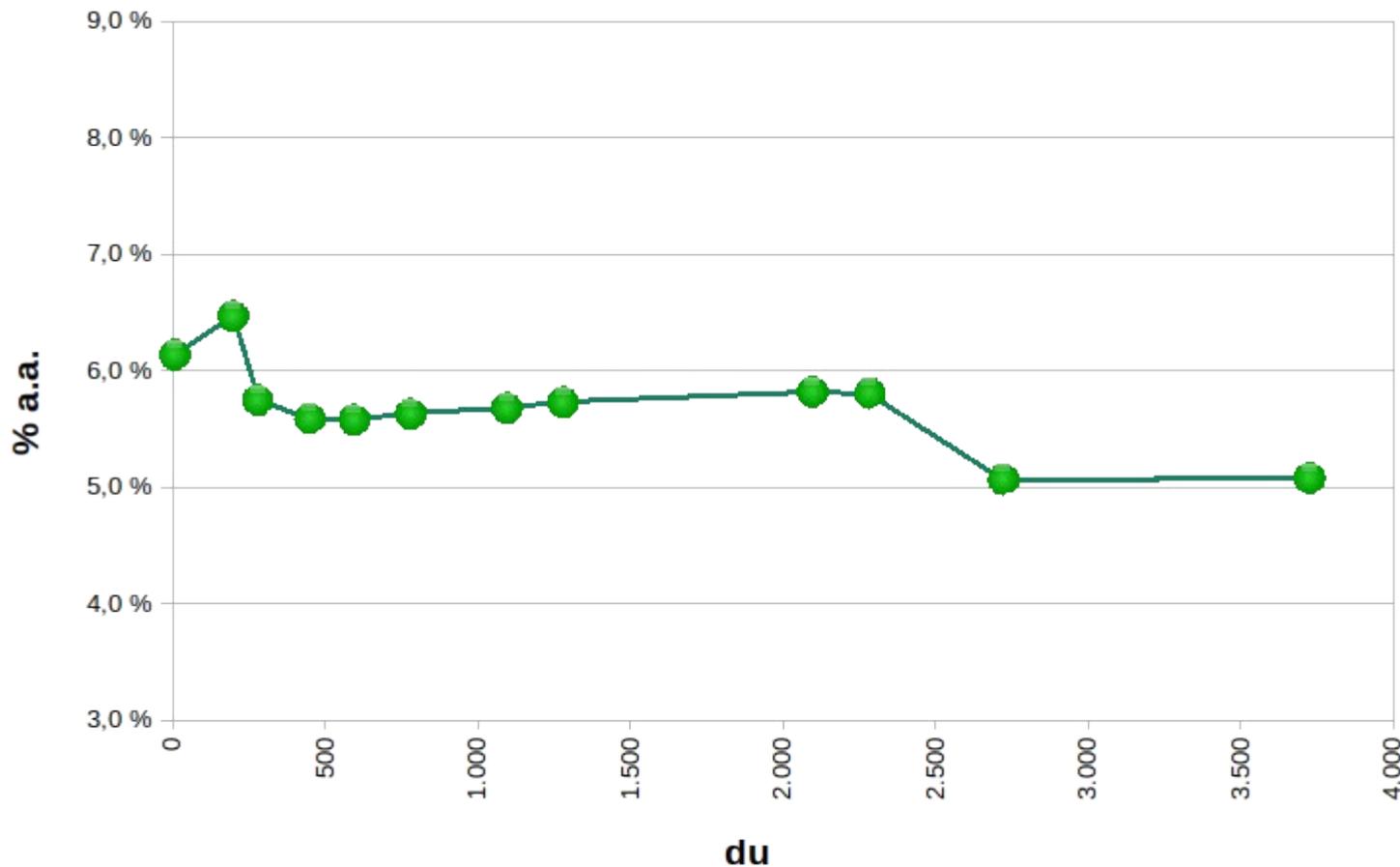
Interpolação

Preferenciais

Adicionais

Otimização

Cupom IPCA – 02/07/2024



CIPCA

Termo

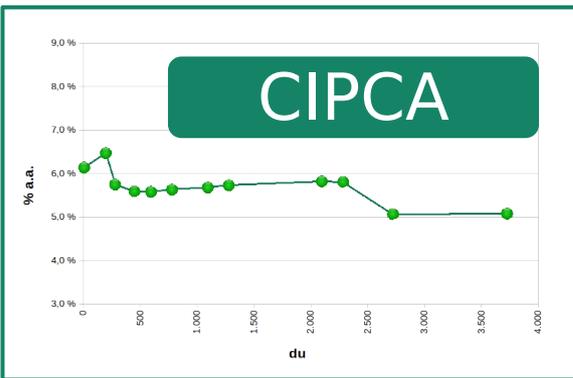
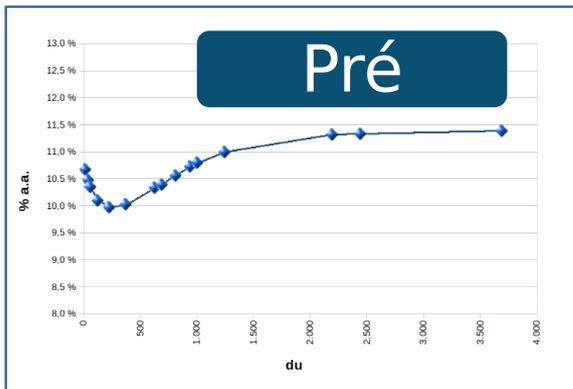
Efetiva 252

Derivativos

Exponencial

Cupom de TLP – Fontes – 10/03/2023

Curvas



BANCO CENTRAL DO BRASIL

SGS 27572

mês	taxa
fev/2023	6,08
utilizado mar/2023	6,15

SGS 433

mês	variação mensal IPCA
01/2023	0,53
02/2023	0,84

[B]³

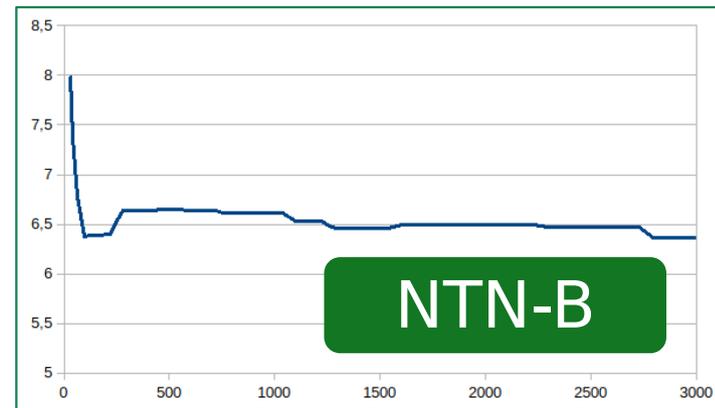
IPCA

Data	Valor
10/03/24	6,553,930



ANBIMA

Feriados

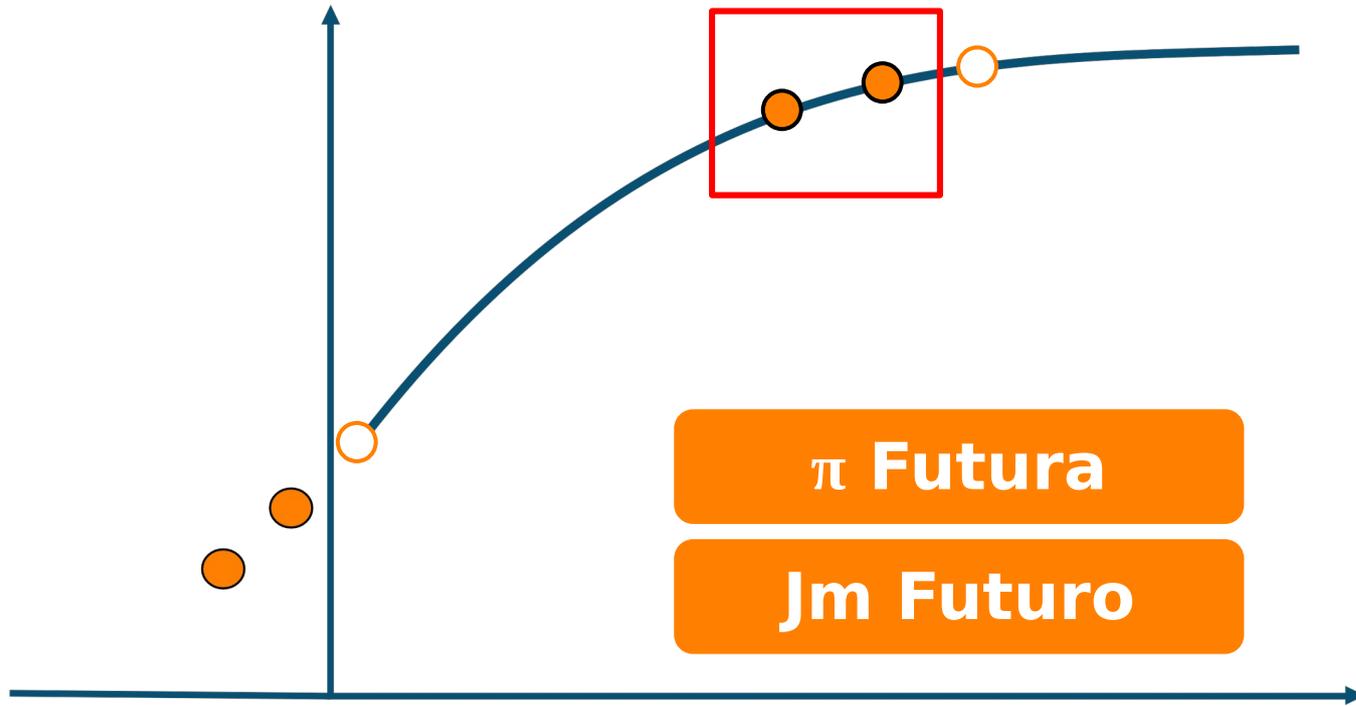


Cupom de TLP – Fórmula

$$\begin{aligned} TLP_{i,m} &= \left(1 + \pi_{m-2}\right)^{\frac{ndu_p}{ndm_p}} \\ &\quad \times \left(1 + \pi_{m-1}\right)^{\frac{ndu_s}{ndm_s}} \\ &\quad \times \left(1 + J_i\right)^{\frac{ndu_p+ndu_s}{252}} - 1 \end{aligned}$$

Cupom de TLP – Fórmula

$$TLP_{i,m} = (1 + \pi_{m-2})^{\frac{ndu_p}{ndm_p}} \times (1 + \pi_{m-1})^{\frac{ndu_s}{ndm_s}} \times (1 + J_i)^{\frac{ndu_p + ndu_s}{252}} - 1$$



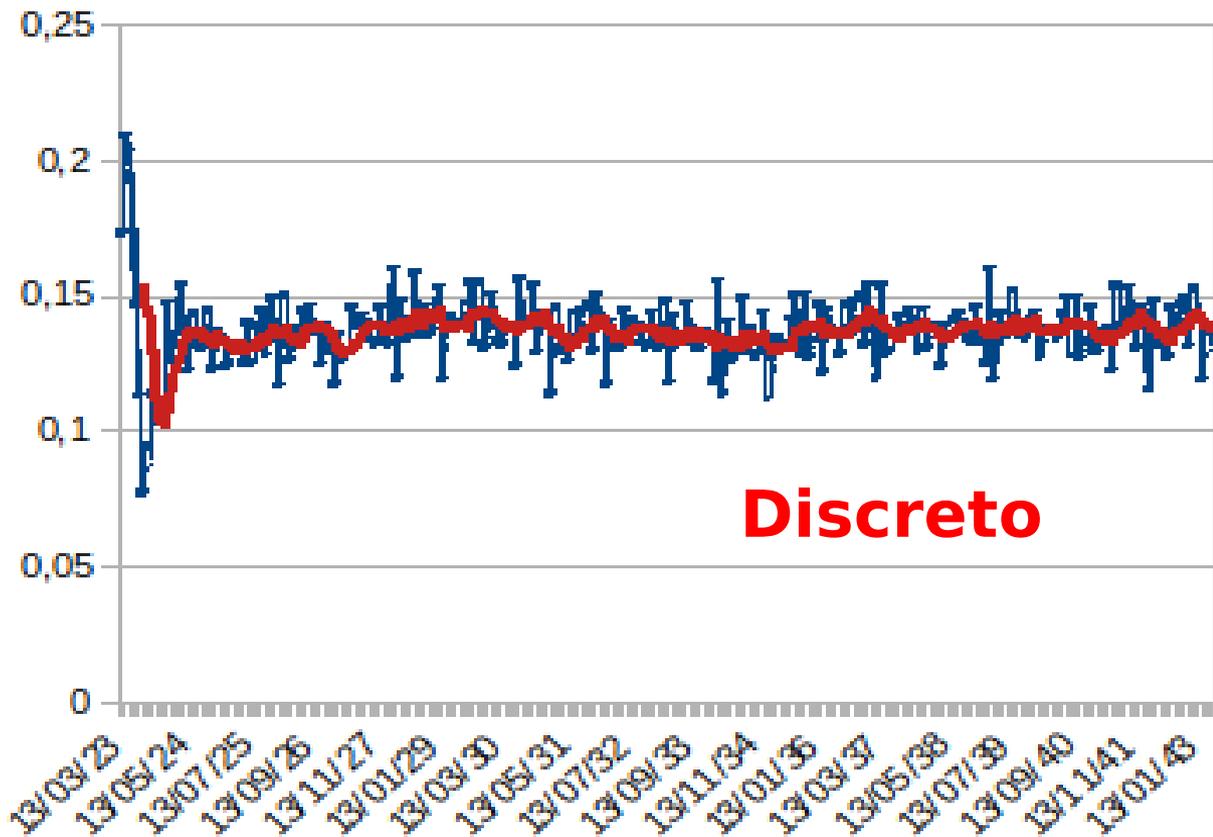
Edição

Metodologia

π Futura

Jm Futuro

Cupom de TLP – Metodologia – 10/03/2023

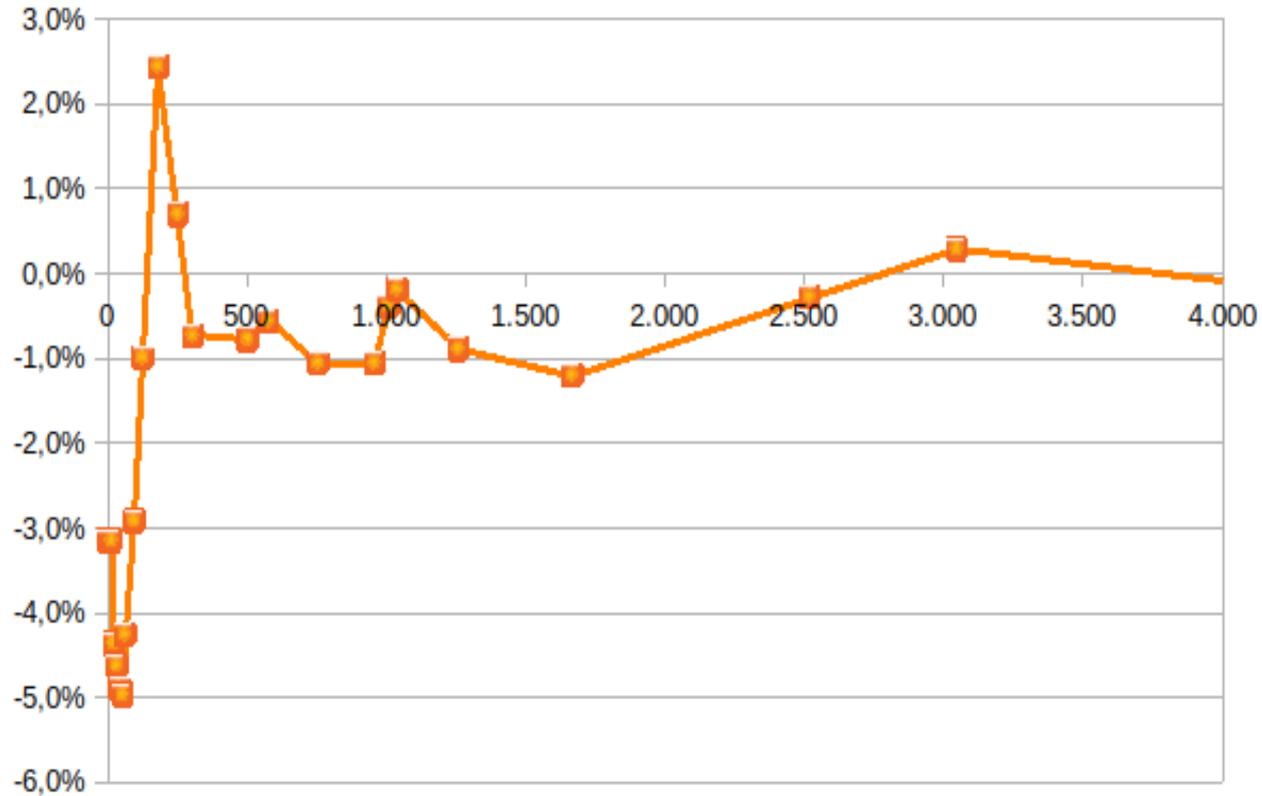


Edição

Metodologia

Pré

Cupom de TLP – 10/03/2023



CTLP

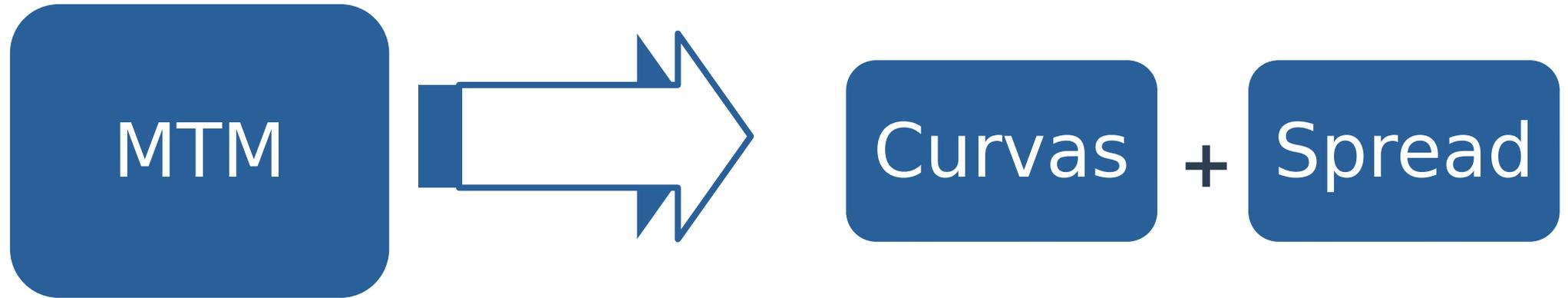
Termo

Efetiva 252

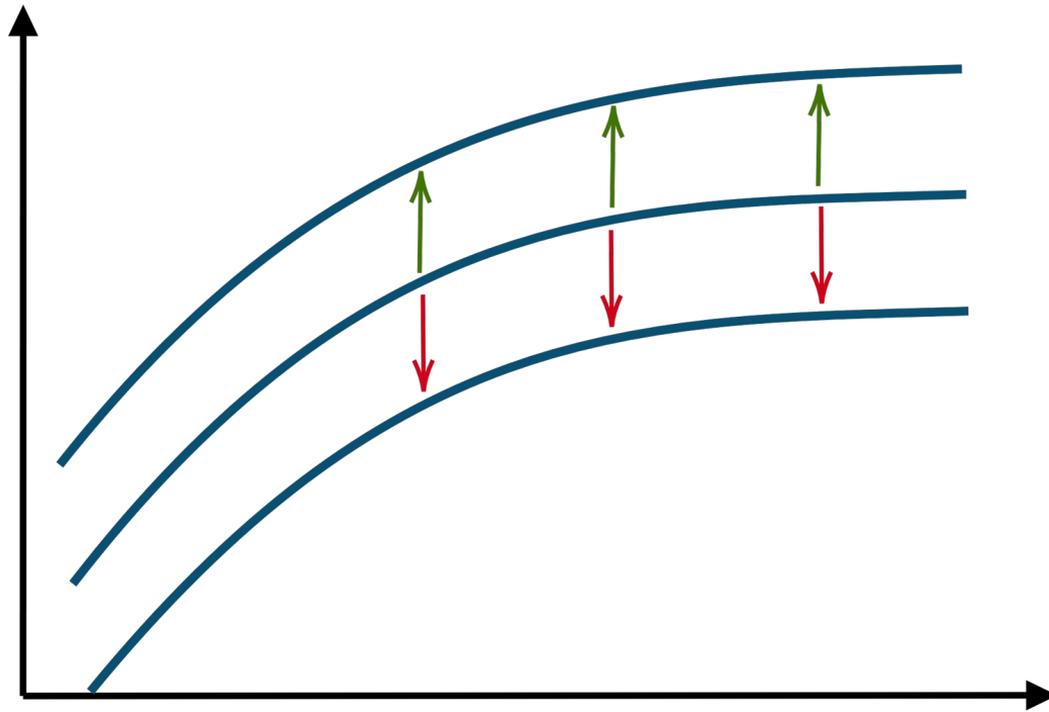
Derivativos

Exponencial

Curvas e Precificação



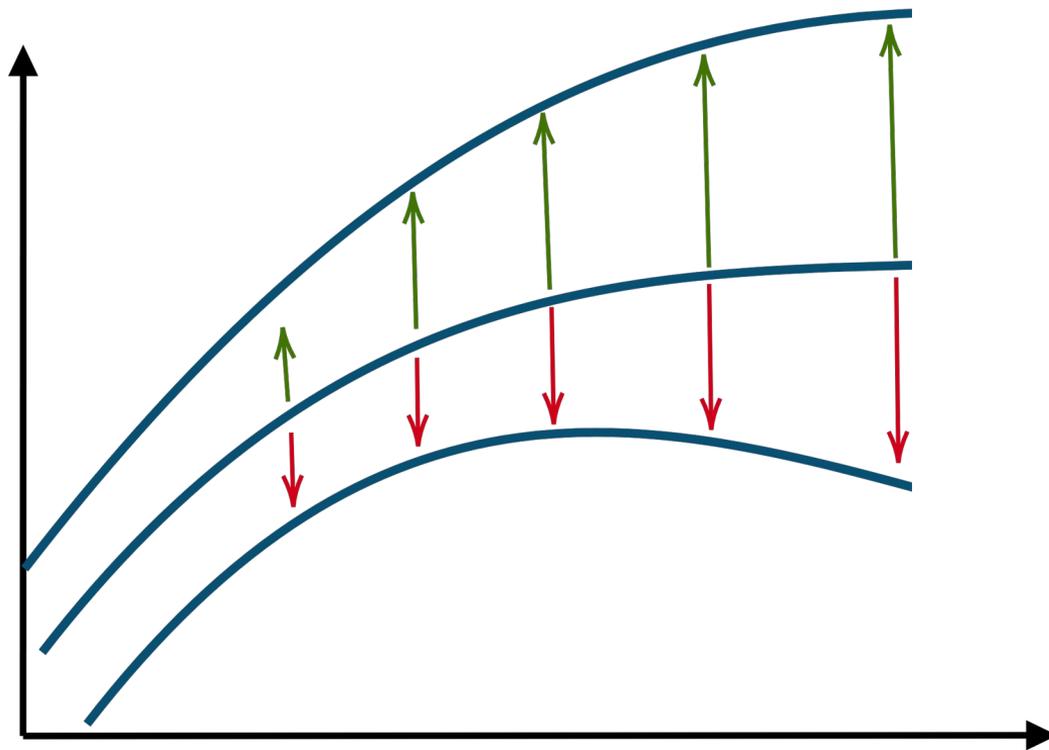
Choque Paralelo



Choque Positivo

Choque Negativo

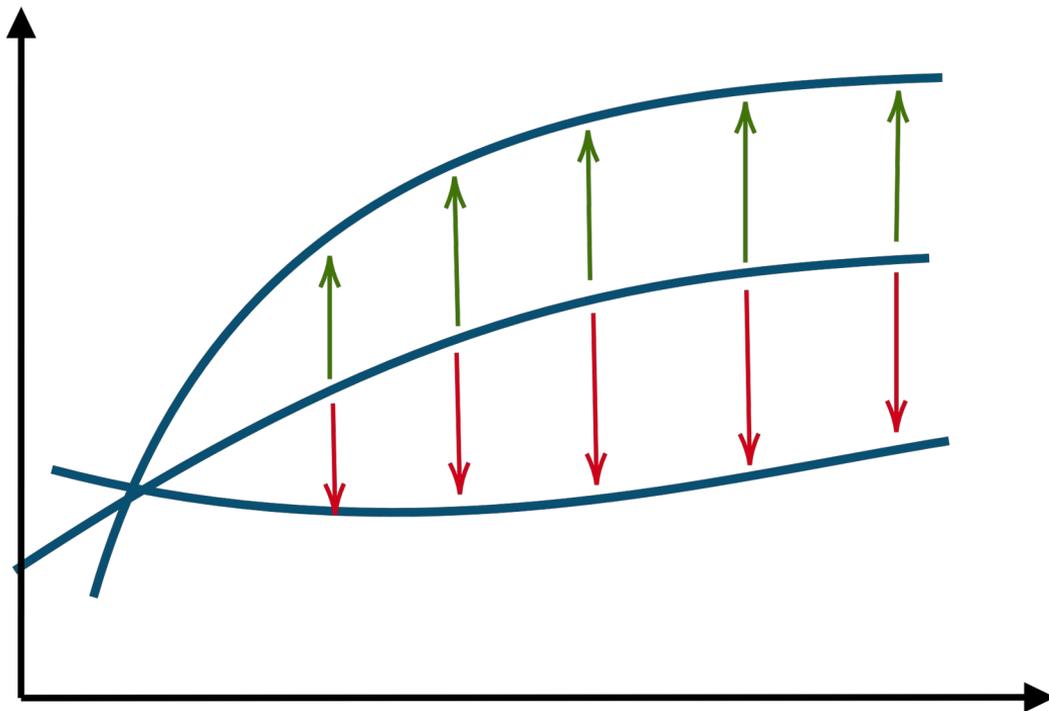
Choque por Ponto na Curva



Choque Positivo

Choque Negativo

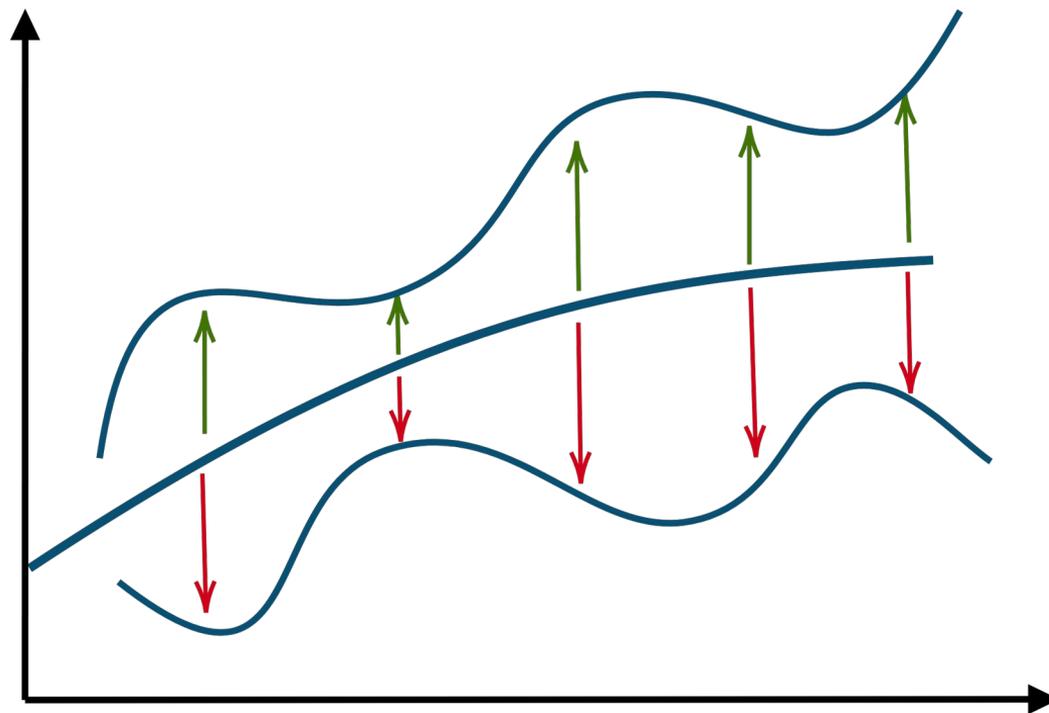
Choque por Ponto na Curva



Choque Positivo

Choque Negativo

Choque Absoluto



Choque Positivo

Choque Negativo

Considerações Finais

Fonte, tratamento e metodologia



Precificação



Obrigado!

3º Workshop Duxus de Risco

Uma questão de controle.



Curvas de Mercado - Debate

Samuel Rodrigues Rios
Fabio Henrique

Julie Scofield