



Infrastructure Financing Exchange Hedging Mechanism

Airports

Feb 2017

According to the draft ordinance published by the Ministry of Transport, Ports and Civil Aviation on Feb 10 2017, and to assist in the understanding of the main concepts involved, the Secretariat of the Investment Partnership Program prepared this presentation, which is intended to illustrate, with numerical examples, the logic and functioning of the proposed **Exchange Hedge Mechanism** for partnership contracts in the airport sector.

This presentation reflects the current terms of the draft ordinance submitted to public consultation and serves as a stimulus to encourage the participation of all stakeholders who may bring contributions and improvements to the model originally proposed.

Mechanism – 3 distinctive concession periods

Activation

Calculation
and
Offsetting

Depletion

Mechanism – 3 distinctive concession periods

Activation

- Optional
- Principal and interest
- Limited amounts set in USD
- Foreign financing
- BRL/USD risk offsetting
- Activation within 7 years
- No guarantees required

Calc. and Offsetting

- Exchange Rate Variation minus Benchmark
- Variable Contribution
- Annual offsetting limited from 0 to 10% of Annual Revenue
- Difference transferred to Future Compensation Balance (SMC)
- Mechanism calculations go until year 20 (POA until year 15)

Depletion

- 10 remaining concession years
- Depleats future compensation Balance (SMC)
- Eventual Credits or Debits at the end of the concession terms are cancelled

How does the mechanism work?

- ✓ Optional for the concessionaire, on its foreign debt up to a fixed limit
- ✓ Variable contribution to FNAC, which is 5% of the Annual Gross Revenues
- ✓ Compares the Exchange Rate Variation with the Benchmark* Variation:
 - ✓ If Exchange Rate Var. > Benchmark → the amount of the mechanism effect will reduce the grant payment, up to the limit (zero). The excess is registered in the "Future Compensation Balance" (SMC) in favour of the concessionaire.
 - ✓ If Exchange Rate Var. < Benchmark → the amount of the mechanism effect will increase the grant payment, up to the limit of 10%. The excess is registered in the "Future Compensation Balance " (SMC) in favour of the grantor.

***Benchmark** = IPCA + *factor*%

Practical Example

- ✓ Debt in USD = \$100 MM (initial hedging mechanism amount)
- ✓ Exchange Rate BRL/USD = 3.2
- ✓ Initial hedging mechanism amount in BRL = R\$ 320MM
- ✓ 5% Coupon, paid annually
- ✓ 12 year maturity, Final Amortization
 - ✓ Limit used – US\$ 105MM
- ✓ Concession beginning – 2017



Mechanism Monthly Calculation (T < L)

- ✓ Due Balance in USD

$SD_t = P_t + J_t$, where $J_t = 0$ when interest is not included in the mechanism

- ✓ $ME_t = SD_t \cdot PTAX_t$

- ✓ $Benchmark_t = SD_t \cdot PTAX_0 \cdot (1 + IPCA_t / IPCA_0) \cdot (1 + f)^{(du/252)}$, du – working days

- ✓ Factor% $f = r_{ntnb} - r_{bond}$ (real yield)

- ✓ $Exchange\ Rate\ Differential_t = (ME_t - Benchmark_t)$

- ✓ $Monthly\ Adjustment_t = Exch.\ Rate\ Differential_t - Exch.\ Rate\ Differential_{t-1}$

Mechanism Annual Offsetting (T < L)

- ✓ Annual Compensation Amount (VCA_t): $VCA_t =$ sum of the monthly adjustments (T to T-11), and, for the first calculation, from T to T_0
- ✓ Hedging Mechanism Balance - Previous ($SMC\text{-previo}_t$):

$$SMC\text{-previo}_t = SMC_{t-1} + VCA_t + ACA_t$$
- ✓ Actual Value of Early Offsettings (ACA_t):

$$ACA_t = SCC_t - \sum SC_t$$
, where $SC =$ Agreed Contribution_t – Effective Contribution_t
- ✓ Future Compensation Balance (SMC_t):

$$SMC_t = SMC\text{-previo}_t - SC_t \quad \text{or} \quad SMC_t = SMC_{t-1} + VCA_t + ACA_t - SC_t$$
- ✓ Offset Balance (SC_t) - (amount to be effectively compensated in the mechanism):
 - If $SMC\text{-previo}_t > 0 \rightarrow SMC\text{-previo}_t$ reduces up to the Agreeded Contribution amount.
($0 \leq$ Effective Contribution_t \leq Agreeded Contribution_t)
 - If $SMC\text{-previo}_t < 0 \rightarrow SMC\text{-previo}_t$ increases up to the Agreeded Contribution amount.
(Agreed Contribution_t \leq Effective Contribution_t $\leq 2 * \text{Agreed Contribution}_t$)
- ✓ Actual Value of Offset Balance (SCC)

$$SCC_t = SCC_{t-1} * (1 + \pi + r) + SC_t$$
, where $\pi = (IPCA_t / IPCA_{t-1} - 1)$, $r =$ real yield NTN-B

Hedging Mechanism Depletion (when $L < T < M$)

- ✓ Hedging Mechanism Balance:

$$SMC_t = SMC_{t-1} \cdot (1 + \pi + r) - SC_t$$

- ✓ At the end of the concession term ($T=M$):

If $SMC_m \neq 0$, balance will automatically be cancelled at the end of the concession.

Practical Example

FINANCING INFORMATION						Amounts in million for BRL and USD		
P_0	USD	100,0	Total Term	years	12	r_{bond}	p.a.	4,75%
T_0	date	01/01/18	Grace Period	years	11	$r_{ntnb-10y}$	p.a.	5,50%
$PTAX_0$	BRL/USD	3,20	Amortization	years	1	$f = r_{ntnb10y} - r_{bond}$	p.a.	0,75%
$IPCA_0$	p.a.	4,0%	Interest Rate	p.a.	5,00%			
Agreed Contribution _t	%RBA	5,0%	Interest Payments	period	Annual			

- ✓ If the debt matures after the 20th year (2037), the balance of the exchange hedging mechanism at the end of the 20th year would be definitive and begins the “Depletion Period”.
- ✓ Factor
 - Difference between the Brazil Global Bond yield and Local Treasury Bond (NTN-B) yield, both with approximate 10 year term
 - Applicable at the beginning of each foreign financing.

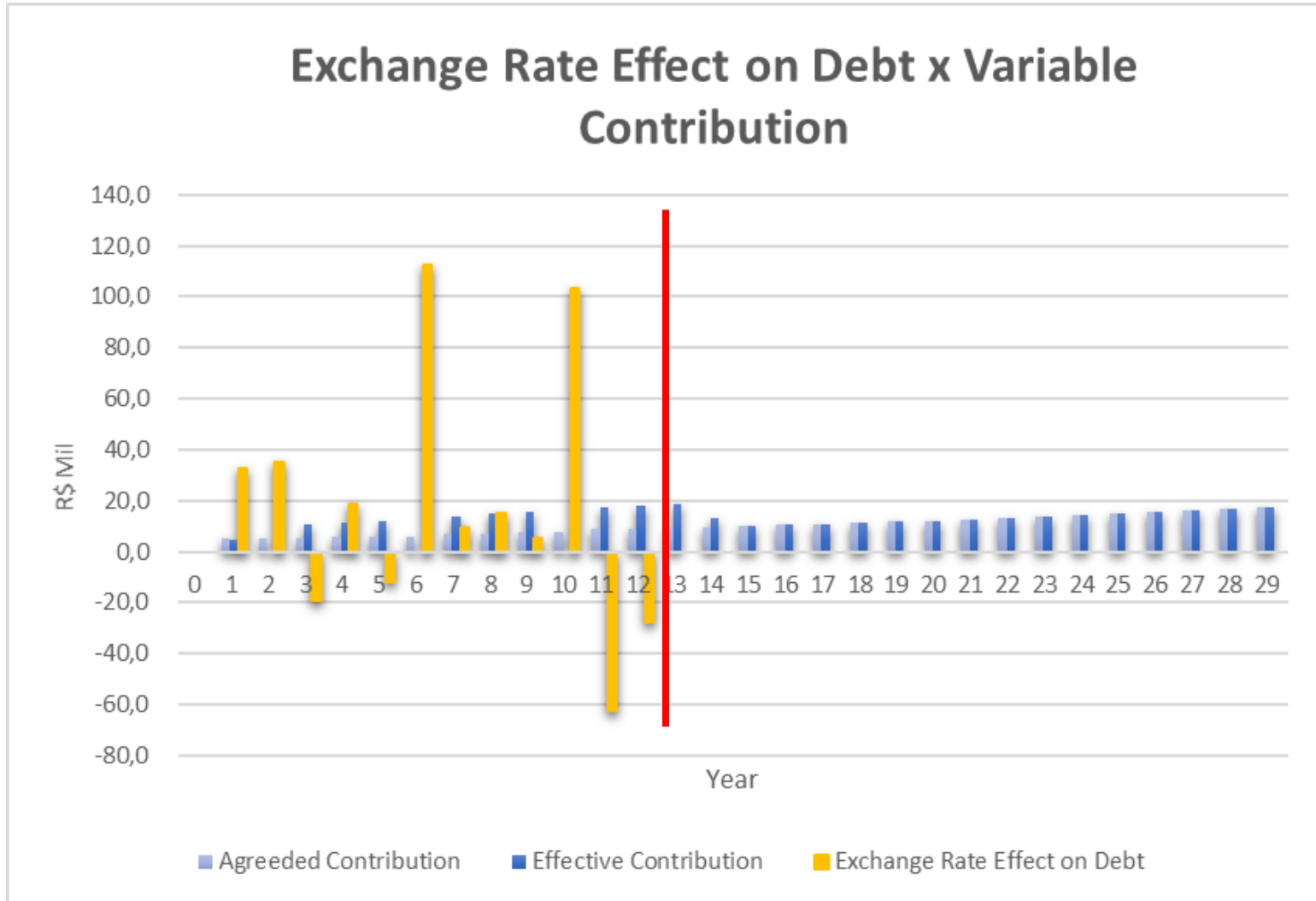
Practical Example

			Year		2018	2019	2020	2021	2022
				01/01/18	12/31/18	12/31/19	12/31/20	12/31/21	12/31/22
EXCHANGE RATE HEDGE MECHANISM				0	1	2	3	4	5
Annual Gross Revenue	RBA _t	R\$			100,0	104,0	108,2	112,5	117,0
IPCA	IPCA _t	p.a.			4,00%	4,00%	4,00%	4,00%	4,00%
IPCA _t /IPCA ₀					4,00%	8,16%	12,49%	16,99%	21,67%
Yield NTN _{B2050}	r	p.a.			5,50%	5,50%	5,50%	5,10%	5,10%
Nominal Exchange Rate Variation		p.a.			5,00%	10,00%	-5,00%	5,00%	-3,00%
Spot Exchange Rate	PTAX _t	BRL/USD	3,20		3,36	3,70	3,51	3,69	3,58
Financing Term	t	years	0		1	2	3	4	5
Interest _t	J _t	USD	0,0		5,0	5,0	5,0	5,0	5,0
Principal _t	P _t	USD	100,0		100,0	100,0	100,0	100,0	100,0
Debt Balance Due_t	SD_t = P_t + J_t	USD	100,0		105,0	105,0	105,0	105,0	105,0
Benchmark _t	SD _t *PTAX ₀ *(IPCA _t /IPCA ₀)*(1+f) ^(du/252)	R\$	320,0		352,2	369,1	386,8	405,4	424,9
Debt Value in BRL	ME _t = SD _t * PTAX _t	R\$	320,0		352,8	388,1	368,7	387,1	375,5
Exchange Rate Differential	ME _t - Benchmark _t	R\$	0,0		0,6	19,0	-18,2	-18,3	-49,4
Annual Compensation Amount	VCA _t	R\$			0,6	18,3	-37,2	-0,2	-31,1
Actual Value of Early Offsets	ACA _t = SCC _t - ∑ SC _t	R\$			0,0	0,0	0,1	1,3	6,6
Hedge Mechanism Previous Balance	SMC-previo_t	R\$			0,6	18,3	-24,1	-20,1	-52,1
Concessionaire's vision		R\$			POSITIVE ADJ.	POSITIVE ADJ.	NEGATIVE ADJ.	NEGATIVE ADJ.	NEGATIVE ADJ.
Agreeded Contribution	Contrib. Pactuada _t / Agreed Contribution	R\$			5,0	5,2	5,4	5,6	5,8
Effective Contribution	Contrib. Recolhida/Effective Contrib	R\$			4,4	0,0	10,8	11,2	11,7
Offset Balance	SC _t = C. Pactuada _t - C. Recolhida _t	R\$			0,6	5,2	-5,4	-5,6	-5,8
Accumulated Nominal Offset Balance	∑ SC _t	R\$			0,6	5,8	-0,2	-11,0	-11,5
Actual Value of Offset Balance	SCC _t = SCC _{t-1} *(1+π+r)+SC _t	R\$			0,6	5,9	1,1	-4,5	-10,7
Future Compensation Balance	SMC_t = SMC-previo_t - SC_t	R\$			0,0	13,1	-18,7	-14,5	-46,3

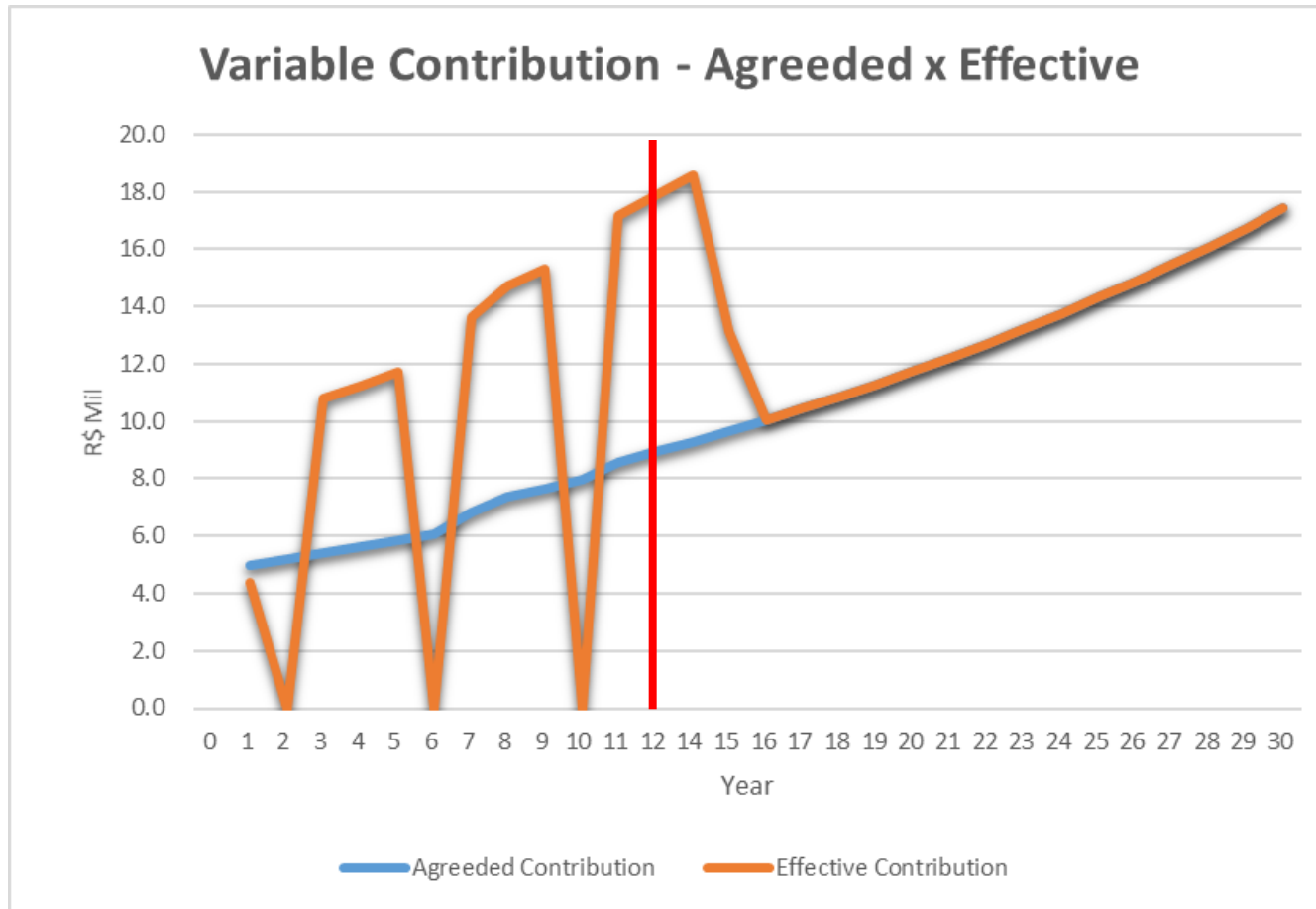
Practical Example

Year			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	
			01/01/18	12/31/18	12/31/19	12/31/20	12/31/21	12/31/22	12/31/23	12/31/24	12/31/25	12/31/26	12/31/27	12/31/28	12/31/29	12/31/30	12/31/31	12/31/32
EXCHANGE RATE HEDGE MECHANISM			0	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16
Annual Gross Revenue	RBA _t	R\$	100,0	104,0	108,2	112,5	117,0	121,7	136,3	147,2	153,1	159,2	171,9	178,8	185,9	193,4	201,1	
IPCA	IPCA _t	p.a.	4,00%	4,00%	4,00%	4,00%	4,00%	4,00%	12,00%	8,00%	4,00%	4,00%	8,00%	4,00%	4,00%	4,00%	4,00%	4,00%
IPCA _t /IPCA ₀			4,00%	8,16%	12,49%	16,99%	21,67%	36,27%	47,17%	53,05%	59,18%	71,91%	78,79%	85,94%	93,37%	101,11%	109,15%	
Yield NTN _{B2050}	r	p.a.	5,50%	5,50%	5,50%	5,10%	5,10%	5,10%	4,80%	4,80%	4,80%	4,50%	4,50%	4,50%	4,50%	4,50%	4,80%	5,00%
Nominal Exchange Rate Variation		p.a.	5,00%	10,00%	-5,00%	5,00%	-3,00%	30,00%	2,00%	3,00%	1,00%	20,00%	-10,00%	-5,00%	13,00%	4,00%	4,00%	
Spot Exchange Rate	PTAX _t	BRL/USD	3,20	3,36	3,70	3,51	3,69	3,58	4,65	4,74	4,88	4,93	5,92	5,33	5,06	5,72	5,95	6,19
Financing Term	t	years	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Interest _t	J _t	USD	0,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0			
Principal _t	P _t	USD	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0				
Debt Balance Due _t	SD _t = P _t + J _t	USD	100,0	105,0	105,0	105,0	105,0	105,0	105,0	105,0	105,0	105,0	105,0	105,0				
Benchmark _t	SD _t *PTAX ₀ *(IPCA _t /IPCA ₀)*(1+f) ^(du/252)	R\$	320,0	352,2	369,1	386,8	405,4	424,9	479,6	522,0	547,1	573,4	624,1	654,1	685,5			
Debt Value in BRL	ME _t = SD _t * PTAX _t	R\$	320,0	352,8	388,1	368,7	387,1	375,5	488,1	497,9	512,8	518,0	621,6	559,4	531,4			
Exchange Rate Differential	ME _t - Benchmark _t	R\$	0,0	0,6	19,0	-18,2	-18,3	-49,4	8,5	-24,1	-34,3	-55,4	-2,5	-94,7	-154,1			
Annual Compensation Amount	VCA _t	R\$		0,6	18,3	-37,2	-0,2	-31,1	58,0	-32,6	-10,2	-21,2	52,9	-92,1	-59,4	0,0	0,0	0,0
Actual Value of Early Offsettings	ACA _t = SCC _{t-1} - ∑ SC _t	R\$		0,0	0,0	0,1	1,3	6,6	0,7	-6,7	-13,4	-8,5	-17,4	-28,8	-38,8	0,0	0,0	0,0
Hedge Mechanism Previous Balance	SMC-previo _t	R\$		0,6	18,3	-24,1	-20,1	-52,1	10,9	-21,1	-11,0	-16,3	61,6	-9,7	-21,7	-12,8	-3,5	0,0
Concessionaire's vision		R\$		POSITIVE ADJ.	POSITIVE ADJ.	NEGATIVE ADJ.	NEGATIVE ADJ.	NEGATIVE ADJ.	POSITIVE ADJ.	NEGATIVE ADJ.	NEGATIVE ADJ.	NEGATIVE ADJ.	POSITIVE ADJ.	NEGATIVE ADJ.	NEGATIVE ADJ.	NEGATIVE ADJ.	NEGATIVE ADJ.	
Agreeded Contribution	Contrib. Pactuada _t / Agreed Contribution	R\$		5,0	5,2	5,4	5,6	5,8	6,1	6,8	7,4	7,7	8,0	8,6	8,9	9,3	9,7	10,1
Effective Contribution	Contrib. Recolhida _t / Effective Contrib	R\$		4,4	0,0	10,8	11,2	11,7	0,0	13,6	14,7	15,3	0,0	17,2	17,9	18,6	13,1	10,1
Offset Balance	SC _t = C. Pactuada _t - C. Recolhida _t	R\$		0,6	5,2	-5,4	-5,6	-5,8	6,1	-6,8	-7,4	-7,7	8,0	-8,6	-8,9	-9,3	-3,5	0,0
Accumulated Nominal Offset Balance	∑ SC _t	R\$		0,6	5,8	-0,2	-11,0	-11,5	0,2	-0,7	-14,2	-15,0	0,3	-0,6	-17,5	-18,2	-12,8	-3,5
Actual Value of Offset Balance	SCC _t = SCC _{t-1} * (1+π+r) + SC _t	R\$		0,6	5,9	1,1	-4,5	-10,7	-6,5	-14,1	-22,7	-32,4	-28,5	-39,5	-51,8			
Future Compensation Balance	SMC _t = SMC-previo _t - SC _t	R\$		0,0	13,1	-18,7	-14,5	-46,3	4,9	-14,3	-3,7	-8,7	53,7	-1,1	-12,8	-3,5	0,0	0,0

Exchange Rate Effect on Debt and Offsetting



Model Effect on Granting – Variable Contribution



Investment Partnerships Program Secretariat

www.ppi.gov.br

Marcelo Allain – marcelo.allain@presidencia.gov.br

Igino Mattos – igino.mattos@presidencia.gov.br