MONTE DEI PASCHI DI SIENA
BANCA DAL 1472

IRRBB as at 30-09-2018
JST Request

Siena, 07/11/2018

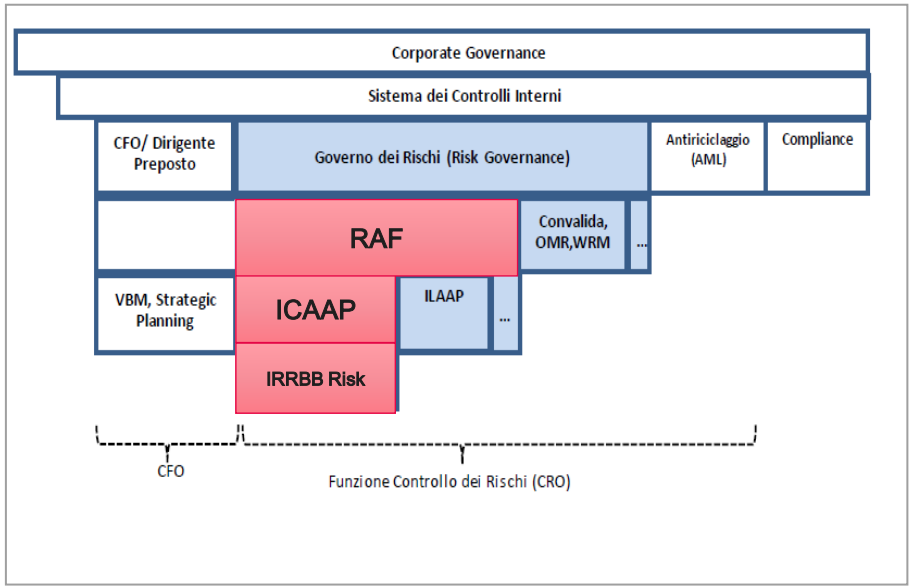
Summary

Interest Rate Risk in the Banking Book (IRRBB)

1. Governance, management and control framework
2. Update of the risk exposure, highlighting the principal changes occurred during the year
3. Focus on behavioral models and relative impacts on risk exposure
4. Expected evolution of the IRRBB position also in relation to the funding strategy and market developments
5. List of open Internal Audit gaps (including materiality/deadline/remediation in progress)

1. Governance, management and control framework: IRRBB Framework

- **Interest Rate Risk of Banking Book (IRRBB)** ***Framework*** is the strategic and operational structure constituted by the set of formalized and shared processes focusing on identification, measurement, management, control and monitoring of risk.
- The «Direttiva di Gruppo in materia di Gestione del Rischio di Tasso di Interesse del Banking Book (IRRBB) - 1030D01508" describes IRRBB Framework according to the principles contained in the "Policy in materia di Risk Management (Governo dei Rischi) - 1030D01114".
- IRRBB Framework is consistent with Capital Adequacy Process (ICAAP) under normal business and stress conditions and with Risk Appetite Framework process.
- The «Direttiva» defines the model adopted by the Group (principles and responsibilities) and represents the "mirror" directive on the Risk Management side of CFO's directive.
- The process is carried out centrally by the parent company and the responsabilities are defined at level of Group for strategic supervision functions, specific committees, business function and control functions.
- IRRBB Framework involves regular independent reviews and evaluations by Internal Validation Function and Internal Audit.



1. Governance, management and control framework: IRRBB Framework

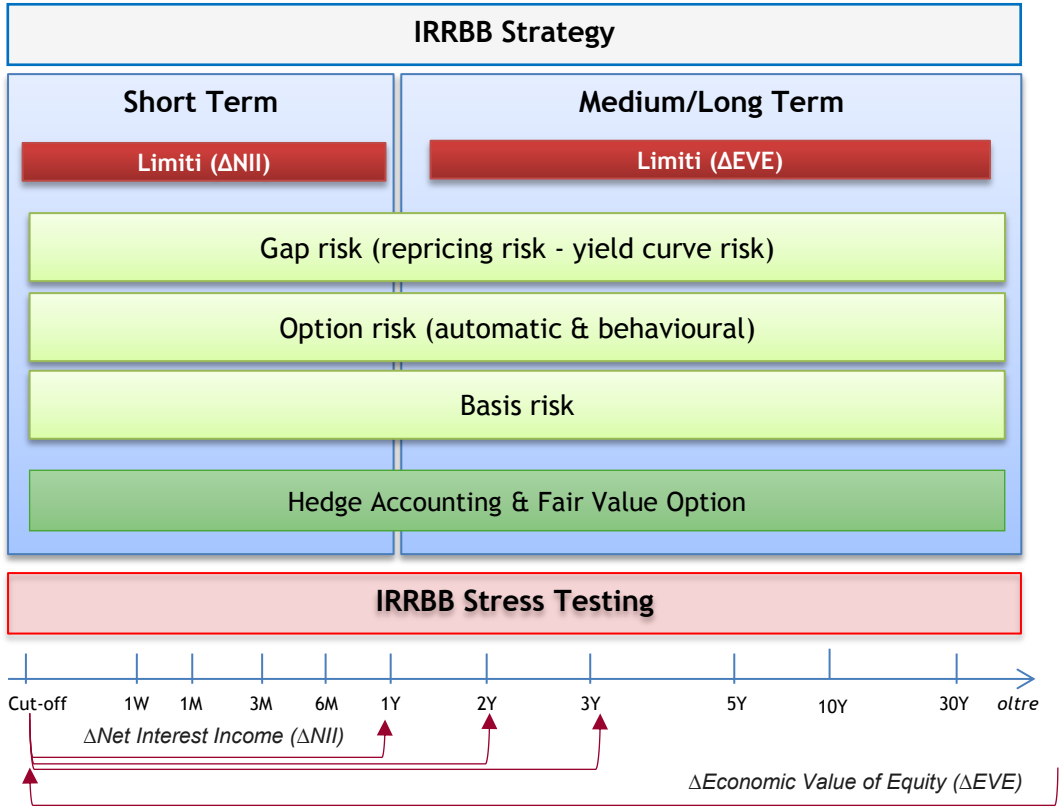
- Policy, procedures and methodology

Risk Department:

- 1030D01508, “Direttiva di Gruppo in materia di Gestione del Rischio di Tasso di Interesse del Banking Book (IRRBB)”, approved by Board of Directors in 14/03/2017.
- 1030D02225, “Gestione del Rischio di Tasso di Interesse del Banking Book (IRRBB)”, approved by Financial Risk Management Function in 20/02/2018.
- 1030D02184, “Regole per la Gestione del Rischio di Tasso di Interesse del Banking Book”, approved by Financial Risk Management Department in 15/02/2017.

Finance Deparment:

- 1030D01518, “Area Finanza, Tesoreria e Capital Management: Regolamento interno in materia di processi di Finanza Proprietaria, Tesoreria, Asset Liability e Capital Management, approved by Finance Department in 04/06/2018.
- 1030D02092, “Gestione operativa del rischio di tasso, approved by Finance Department in 25/03/2016.



- **IRRBB Internal Capital,** included in *Risk Appetite Statement (RAS),* is evaluated considering the highest loss on capital resources stemming from:
  - potential changes in economic value of equity of the banking book that could arise from different scenario (long term view)
  - future interest income reduction resulting from changes in the levels of interest rates (short term view).

1. Governance, management and control framework: IRRBB Framework

IRRBB Strategy

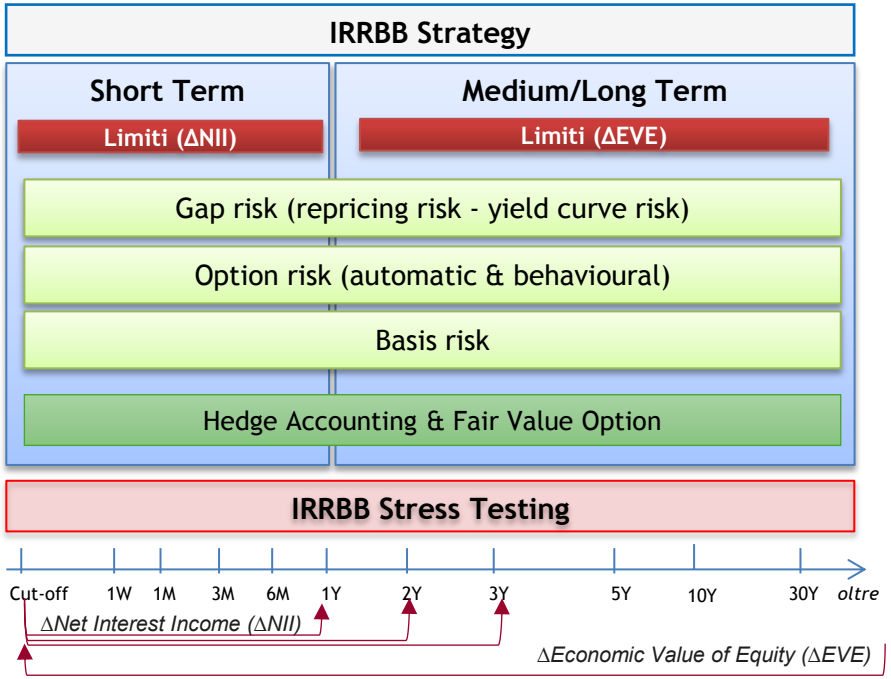
The IRRBB Strategy is the document which describes the governance strategy with a multi-year validity, drawn up by the Chief Financial Officer and approved periodically by the Board of Directors according to RAS.

Hedge Accounting & Fair Value Option

Financial instruments for Hedge Accounting and Fair Value Option for the management of IRRBB risk according to IRRBB Strategy.

IRRBB Stress Testing

Stress Testing Framework provides: i) the execution of EBA Stress Test for NII measure; ii) the construction of a range of interest rate scenarios for internal IRRBB measures.



Internal capital for IRRBB is determined as the maximum of the loss resulting from ΔEVE and ΔNII measures (related to a range of interest rate scenarios j) without allowing offsetting across the two measures.

IRRBB Internal Capital = Max (UL_{NII}, UL_{EVE}) where:

- $UL_{NII} = |\min_j (0, \Delta NII^{1y} (scen_{j,NII}))|$
- $UL_{EVE} = |\min_j (0, \Delta EVE(scen_{j,EVE}))|$

IRRBB Risk Limits

Definition of operating limits within the Risk Appetite Framework. Starting from the Risk Tolerance assigned to the IRRBB within the Risk Appetite Statement, the operating limits are established that guarantee compliance with the maximum absorption threshold of internal capital deriving from the interest rate risk.

Gap Risk

Risk arising from the mismatch in the maturity (repricing) of assets, liabilities and off balance-sheet positions. This risk exposes the bank to changes of shape and slope of the interest rate curve.

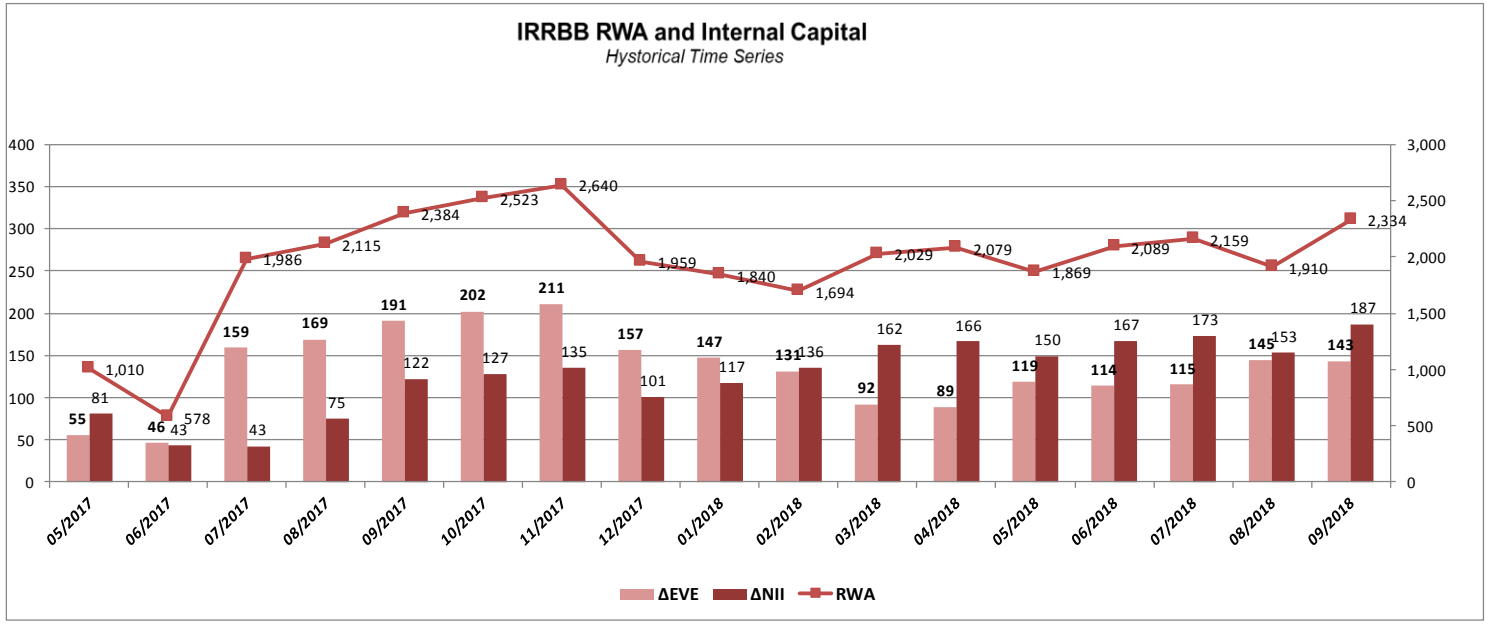
Option Risk

Risk arising from automatic embedded options (e.g cap, floor and swaption) and behavioural non-automatic embedded options (Non-Maturing Deposits - NMDs, Prepayment Risk).

Basis Risk

Risk arising from the possibility to have instruments with different indexing but with similar repricing dates.

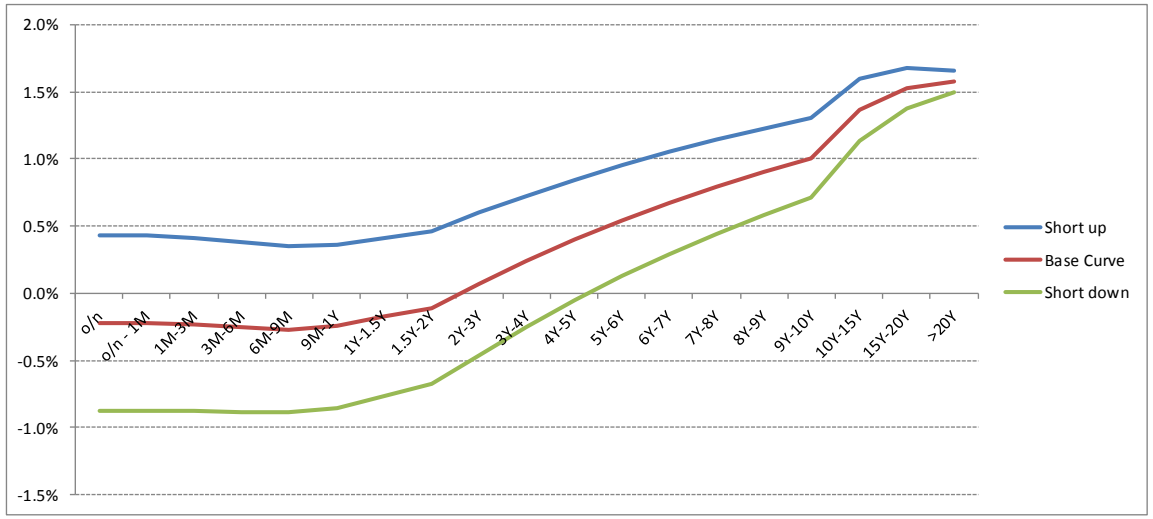
2. Update of the risk exposure, highlighting the principal changes occurred during the year: IRRBB Internal Capital

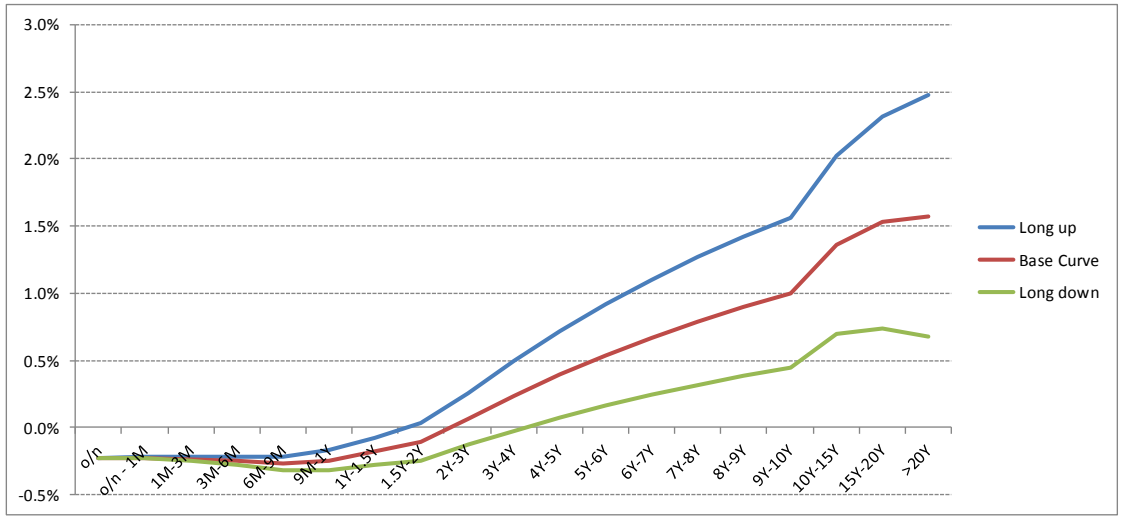


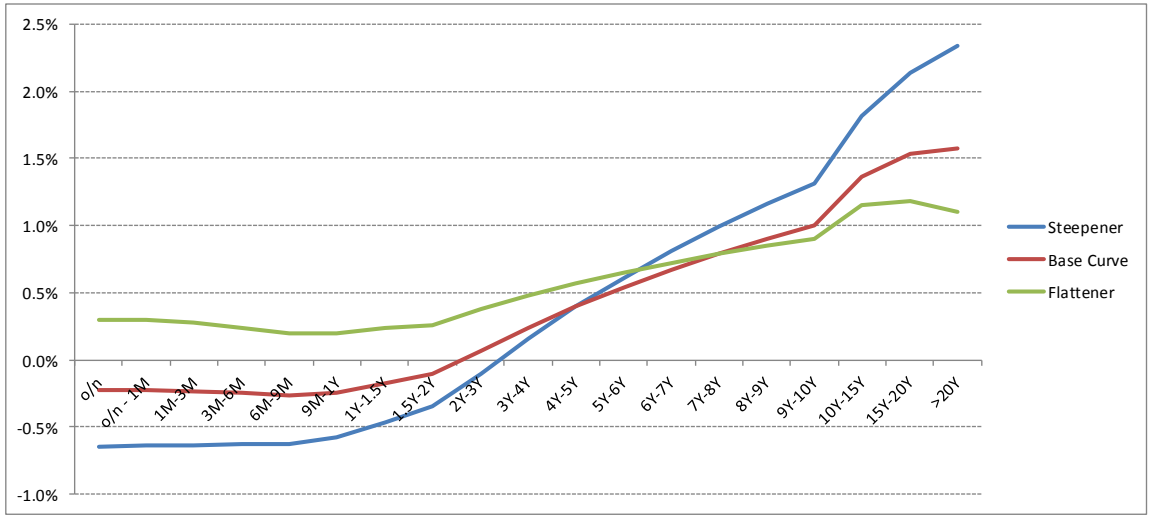
Entity	IRRBB Indicators		Risk Profile 30/09/2018				Risk Limit
	Metrics	Scenario	Risk Appetite	Scenario Value	Limits Check		
Group	?EVE	parallel shift (+100 bps)	257	211	-187	⊗	-178
		parallel shift (-100 bps)	-148	-115			
		steepening	113.1	100			
		flattening	-50	-42			
		long rate up	180	133			
		long rate down	-157	-143			
		short rate up	68	56			
		short rate down	-43	7			
	?NII	parallel shock (+100 bps)	187	214			
		parallel shock (-100 bps)	-155	-187			

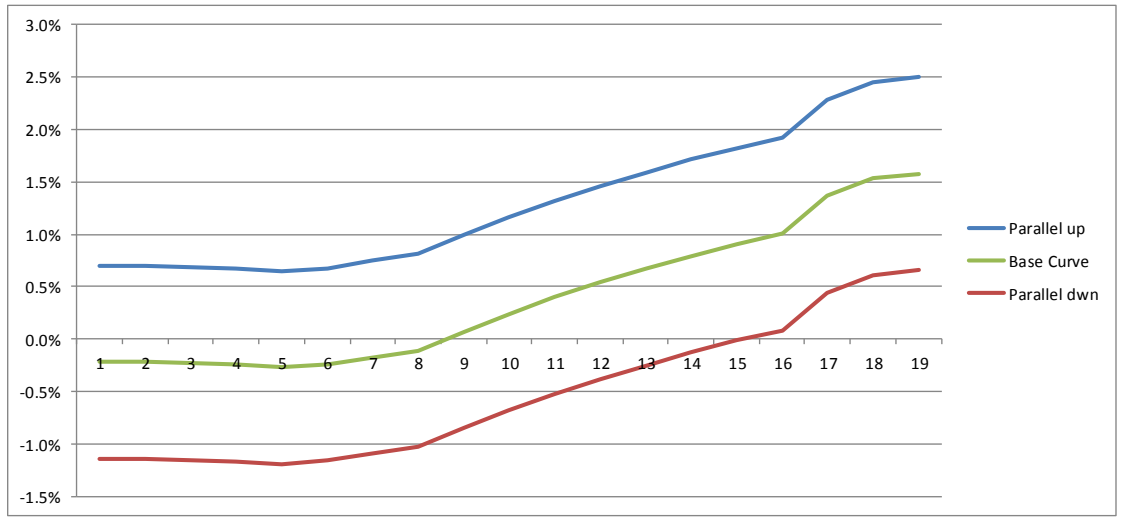
- In September 2018, IRRBB Internal capital is equal to 187 €/mln and it has been evaluated as the highest loss in terms of the actual sensitivity of GMPS stemming from a set of rate scenarios (both ΔEVE and ΔNII sensitivities).
- In September 2018 the breach of IRRBB limits on Consolidated Level is due to the NII sensitivity stemming from the parallel down interest rate scenario (-100bps). Actions are being implemented by Finance Department to rebalance the GMPS profile.

2. Update of the risk exposure, highlighting the principal changes occurred during the year: IR Scenario









2. Update of the risk exposure, highlighting the principal changes occurred during the year: parallel 25bps sensitivity as of 30/09/2018

The principal changes from 31/12/2017 are:

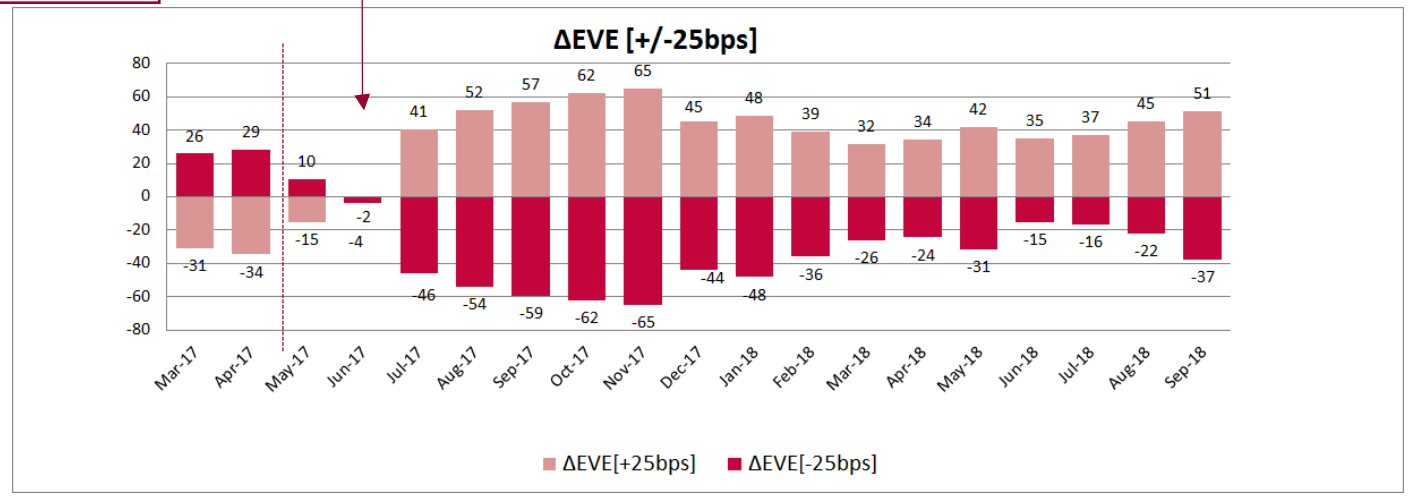
ΔEVE Exposure

- Starting the inclusion of NPL disposal in the IRRBB metrics since Jun-17 (with overturning from *liability sensitive* to *asset sensitive* positioning) IRRBB profile from EVE sensitivity perspective has been stable.

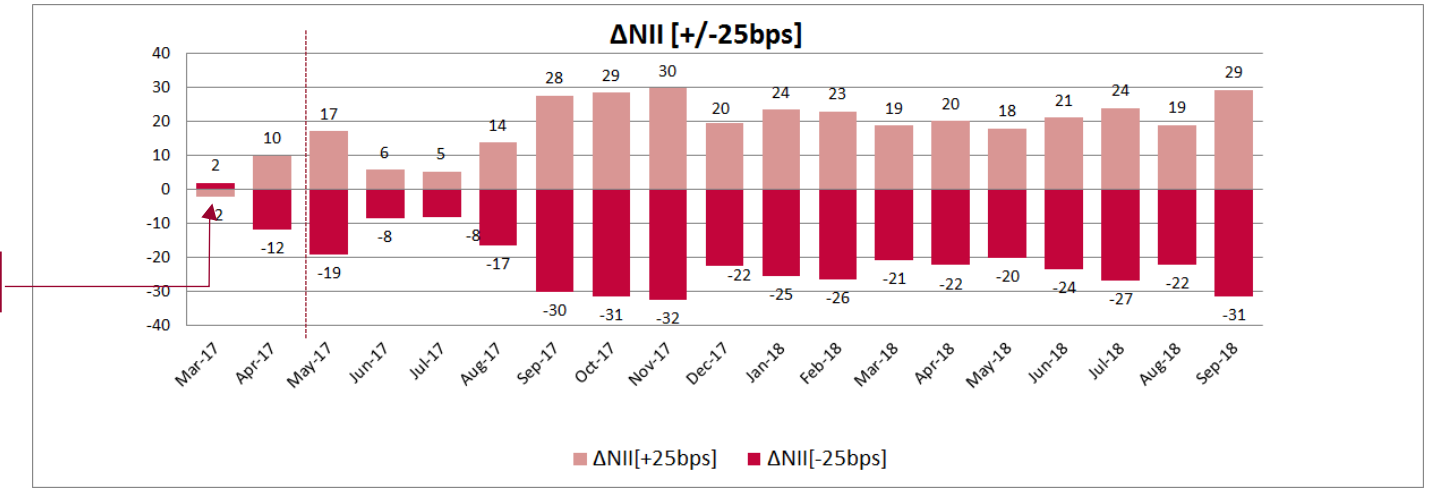
ΔNII Exposure

- Starting GGB issuances since Mar-17 (with restore of a *asset sensitive* short-term position) IRRBB profile from NII sensitivity point of view has been stable.

NPL disposal

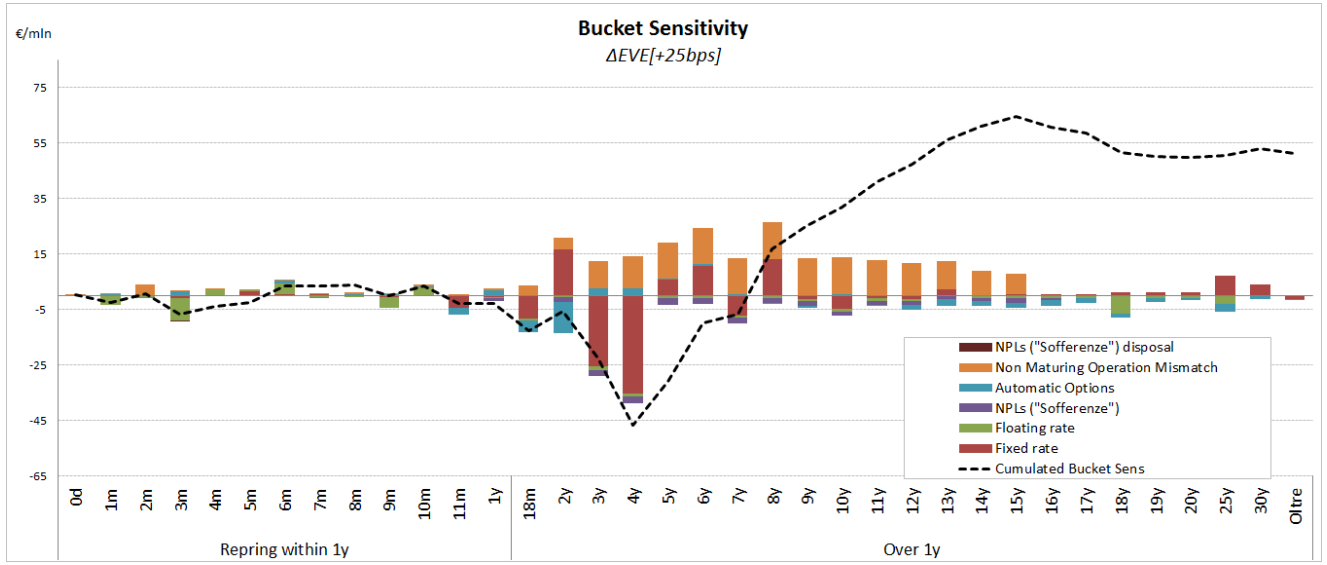


GGB issuances

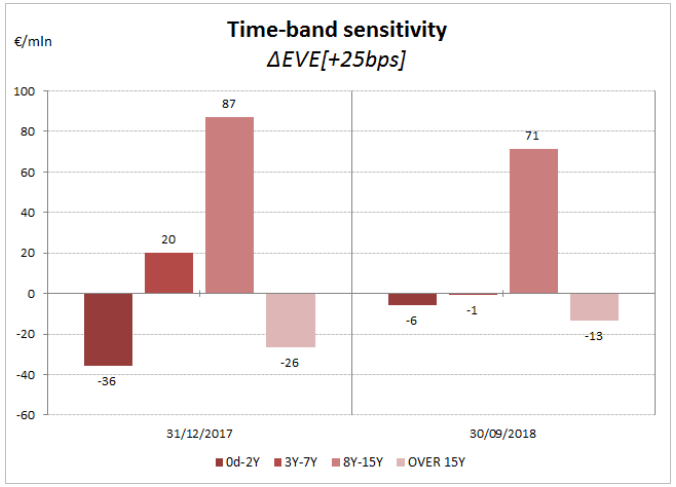


(*) Since May 2017 ALM measures include modeling of negative rates and multi-curve forecasting approach.

2. Update of the risk exposure, highlighting the principal changes occurred during the year: bucket sensitivity 25 bps as of 30/09/2018



- **[0-2y]**: -6 €/mln, repricing of long-term floating rate loans partially off-setted by the unhedged quote of TLTRO II.
- **[3-7y]:** -1 €/mln, outright debt securities contribution, long term fixed rate loans and NPLs («Sofferenze») contribution off-setted by NMDs (core replicating portfolio with amortizing schedule until 15y) and the unhedged quote of time deposits customer funding on liability side.
- **[8-15y]:** +71 €/mln, NMDs contribution on liability side and unhedged Covered Bond contribution partially off-setted by fixed rate long term loans and NPLs («Sofferenze»).
- **[Over 15y]:** -13 €/mln, long-term fixed rate mortgage loans contribution, outright debt securities and automatic options contribution.

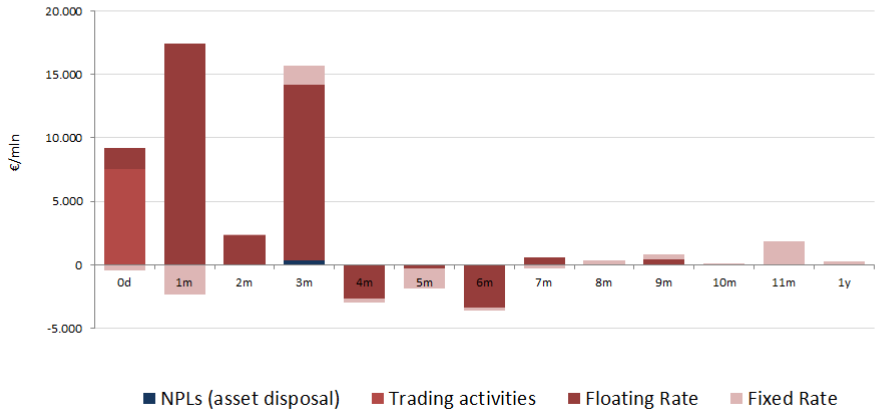


	ΔEVE +25 bps	ΔEVE -25 bps
Gap Risk	**-152**	**158**
Contractual Maturity Mismatch	-216	228
Derivatives	90	-98
NPLs ("Sofferenze")	-27	27
Other (NPLs "Sofferenze" disposal)	0	0
Option Risk	**202**	**-194**

2. Update of the risk exposure, highlighting the principal changes occurred during the year: repricing gap analysis as of 30/09/2018

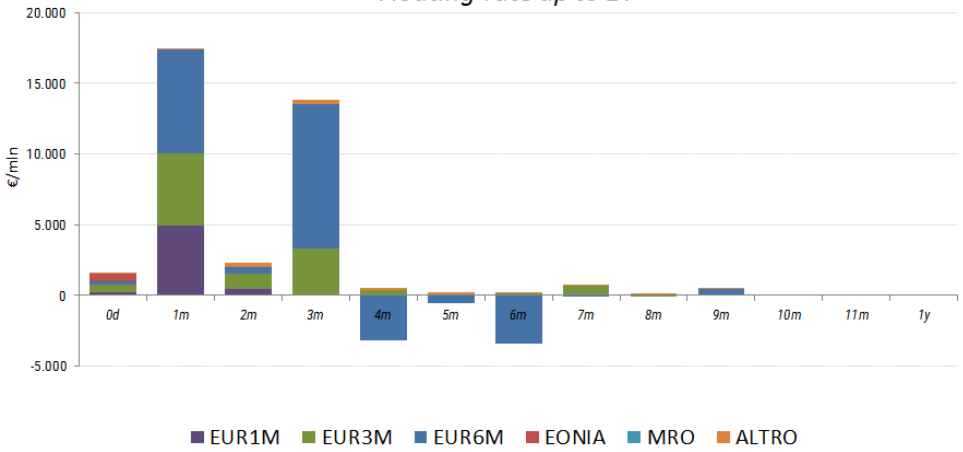
Repricing Gap analysis

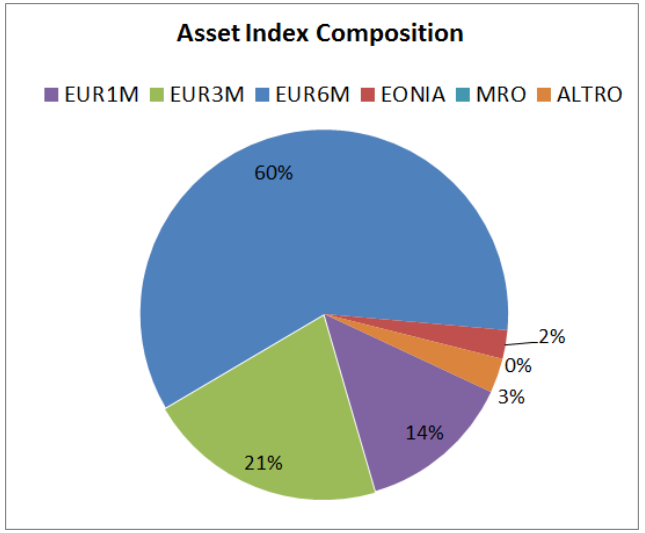
Assets/Liabilities in matuiring/repricing up to 1Y

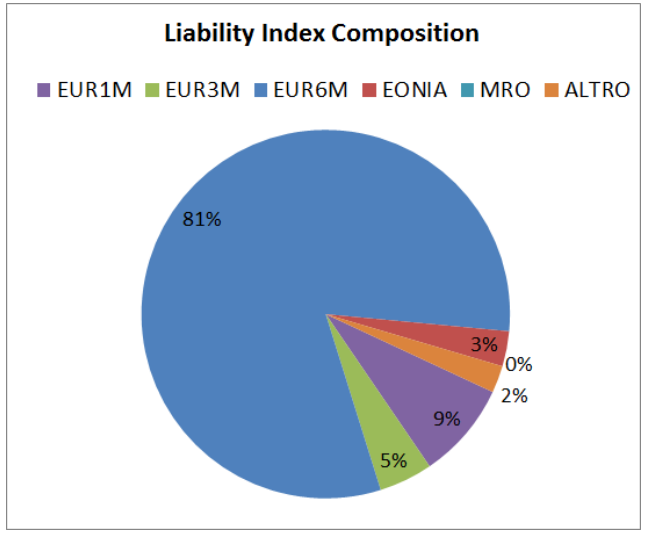


Indexes analysis

Floating-rate up to 1Y







3: Focus on behavioral models and relative impacts on risk exposure

NMD

- In line with Italian banking system, MPS Group had adopted for many years (first development in 2005) a statistical assessment of NMDs consisting of the volume model known in the literature as Bond Portfolio Replication (Bond Replica) for the estimation of stability volumes and the rate model known as the Error Correction Model (ECM) for estimating elasticity.
- The synthesis of the two approaches leads to the final estimation of the stickiness of the NMDs with the identification of the core quotas (stable inelastic volumes), non-core quotas (elastic stable volumes) and non-stable quotas.
- The change in customers' behavior over the years, on the one hand, and on the other the arbitrariness of choice on some critical parameters has led to a review of the volume approach already in 2017. The previous modeling of volumes was «Replaced» with a random walk approach with statistical mean-life (instead of the deterministic cut-off), which came into force starting from March 2018.

	ΔEVE +25 bps	ΔEVE -25 bps
Gap Risk	**-152**	**158**
Contractual Maturity Mismatch	-216	228
Derivatives	90	-98
NPLs ("Sofferenze")	-27	27
Other (NPLs "Sofferenze" disposal)	0	0
Option Risk	**202**	**-194**
Behavioral model	229	-236
NMDs	168	-171
Prepayment	61	-65
Automatic Options	-26	42
Embedded	-45	72
Explicit	19	-30

- An overall review of the asset-side volume model is currently underway and its approval is expected by the end of the year.

PREPAYMENT

- MPS Group has adopted a simplified Constant Prepayment Rate approach to determine the prepayment rates. This approach is based on the calculation of the simple average of the prepayment rates recorded historically at the level of individual analysis clusters.
- The adoption of a survival analysis approach is currently underway in order to identify the relationship between the survival function and certain explanatory variables such as the personal characteristics of the borrower, the mortgage contract and the related economic incentive in the context of interest rates (incentive coupons).

4. Expected evolution of the IRRBB position also in relation to the funding strategy and market developments

Strategic objectives

The management strategy indicated in the IRRBB strategy approved at the beginning of 2018, has the objective function of supporting short-term net interest income (NII) and of benefiting in the medium / long term from the scenario of interest rate plan, expected to rise, respecting the risk exposure limits.

More specifically, main management actions of the risk exposure envisaged by this strategy have the objective of:

a) assume a net position of "variable rate payer" and "fixed rate receiver" in the first part of the curve (ie, under 5 years), in compliance with the limits from time to time in force, in order to support the contribution to NII in the expectation of short-term interest rates still low over the same period;

b) in the contrary, assume a net position of "variable rate receiver" and "fixed rate payer" on the longest section of the curve (ie, above 5 years), on the basis of long-term interest rates on historical levels very low and therefore, expected upward.

As previously mentioned, the objective remains to position the Banking Book for a future rise in interest rates, limiting the impact on the current interest margin and benefiting the Bank's economic value, in compliance with operational management limits.

4. Expected evolution of the IRRBB position also in relation to the funding strategy and market developments

All the hedging actions presented are already included in the Risk Appetite Statement 2018 (RAS) and the related impacts on the income statement are already included in the 2018 budget and in the 2018-2020 business plan. Consistent with this approach, the main actions on the IRRBB risk, in the period 2018-2021, are the following:

- **Fixed-rate mortgages.** Considering that long-term rates are giving the first concrete signs of rising from historical lows and that the possibility of future reductions seems to be greatly reduced, IRRBB policy is continuing with the hedging of fixed-rate mortgages, with a pct. in the 75%-90% range. The hedges are implemented through interest rate swaps, mainly with forward departures. Spot start may also be evaluated, in the future, in order to take advantage of a wider distribution of the cost of hedging on the interest margin, and at the same time benefiting for a longer period of time in the event of an effective increase in rates. Rate options may also be used.
- **Issues**. Coverage in the 80% - 100% range of the newly issued securities liability. The hedging policy maintains a stable level of interest rate risk as the securities issued and hedged are characterized by high stability and repurchased at market prices, and replaces short-term market funding at variable rates. On 27/9/2018 an integration of the business models for the Banking Book financial portfolio has been introduced, including the use of financial assets in the Amortizing Cost category as natural hedging of issues (as an alternative to interest rate swaps).
- **Commercial liabilities**. Coverage in the 50%-75% range of time deposits (so-called CID: *Conto italiano di Deposito*) of new production with a maturity of less than 3/5 years. The hedge aims at maximizing the interest margin on the short-term of the rate curve.
- **Financial assets**. Coverage of up to 50% of Government Bonds and up to 100% of medium / long-term Government Bonds, expected to be purchased as part of the management of the roll-over of the financial assets of the Banking Book.
- **TLTRO2.** Coverage in the 60% -100% range of the existing TLTRO2. The Bank to date hedged 75% of TLTRO2. It was not necessary to proceed with further hedging compared to what was achieved, considering that RAS provides for the possibility of starting the repayment of TLTRO2 in advance of the maturity, for an amount of 6.5 bln. (bringing 10 bn to maturity). Since, in the context of the RAS, this early repayment represents a possibility but will be assessed over time, the IRRBB policy maintains the possibility to proceed with the coverage up to the total of the existing TLTRO2.

4. Expected evolution of the IRRBB position also in relation to the funding strategy and market developments

- Fixed-rate/floating-rate embedded options.

  a. Coverage up to 90% of the cap implicit in variable rate mortgages. The bank has a position on variable rate mortgages, assisted by cap. This position origins from loans placed in the years 2009/2010 on an initial nominal value of around Eur 14 billion. Post-depreciation and prepayments, the residual amount is now about EUR 8.3 bn. To date, the amount of hedging is 36% of the nominal amount, which is adequate to cover the risk of this component, considering several elements: a) the strike of mortgages, mostly concentrated in the 3.5% / 4% area of short-term interest rates (1/6 months), is significantly out-of-the-money; b) the bank has gradually assumed a "long-term" position (gains if rates rise). In the event of a significant rise in rates, the implicit caps in mortgages should gradually reduce this "long" position, effectively reducing the sensitivity to interest rates, at much higher levels; c) historically, the levels of short-term rates (3/6 months), since the birth of the Euro, have risen above 4% on a few occasions and for limited periods of time (2001/2002 and 2007/2008). This tail risk will in any case always be monitored / assessed and prudentially, within the RAS, the possibility of realizing an additional coverage is included.

  b. Up to 100% coverage of 0% floor strikes implicit in variable rate mortgages, both in stock and new production. The bank has a "long" position of 0% floor on the indexing parameter of variable rate mortgages, placed in particular starting from 2016 for a nominal value as at 31.12.2017 of approximately Eur 4.1 billion. Considering the expected scenario and the minimum level reached by interest rates, this value may be optimized in terms of greater net interest income, covering on the market part of the exposure already in place and of expected production.

Finally, analysis is underway, and a further possible intervention can therefore be carried out in the following area:

a) re-fixing risk on the Euribor indices where the Bank is exposed in June and December to the re-pricing on the Euribor 6m index underlying the items of the variable rate commercial asset. This risk can be shifted to shorter maturity indices and with re-pricing dates diluted during the year, to obtain a more stable margin of interest profile. The possibility of managing the basis risk deriving from the mismatch of the indices underlying the commercial floating rate assets under hedge accounting will be assessed as soon as the details of IFRS9 for the management of the interest rate risk of the banking book are disclosed.

4: Update of the IRRBB strategy

The tables below describe the activities carried out in the course of 2018, in line with the IRRBB strategy in force. In the following page is possible to observe how both the sensitivity of economic value and of net interest income have essentially stabilized and finally, the breakdown of the sensitivities along the time shows the overall positioning achieved by the banking book and how it would be in the absence of any hedge.

Hedging activity on flows

Liabilities	Description	Nominal	Hedge 2018	Pct Hedged	Expected Pct on new IRB Plan
1	Newly Issued Fixed Rate Liability	750	750	100%	80%-100%
2	Fixed Rate Deposits	2.354	1.566	67%	50%-75%
Assets	**Description**	**Nominal**	**Hedge 2018**	**Pct Hedged**	**Expected Pct on new IRB Plan**
3	Fixed Rate Loan	1.298	956	74%	70%/75%-90%
4	Floor on Floating Rate Loan	1.184	770	65%	Up to 100%

Hedging activity on stock

Assets	Description	Nominal	Hedging Before 2018	Hedge 2018	Pct Hedged	Expected Pct on new IRB Plan
1	Fixed Rate Loan	4.143	2.716	-	51%	Up to 60%
2	Floating Rate Loan with Floor on EUR 6M	3.622	-	2.350	65%	Up to 100%
3	Floating Rate Loan with Floor on EUR 3M	358		230	64%	Up to 100%
4	Floating Rate Loan with Cap	8.285	2.200	800	36%	Up to 90%
5	TLTRO II	16.500	10.500	5.000	75%	60%-100%

*

* Of which 3,000 early expired ^ *calculated on initial notional of € 5,263*

4: Update of the IRRBB strategy

The above activities will have a prospective impact both on income and on risk measures, with particular reference to the Bank's positioning with respect to the interest rate risk. In order to assess its possible impact, the realization of these activities up to the maximum permitted levels was assumed, calculating the impact on prospective income and risk measures.

This prospective income impact may be represented, at the aggregate level, looking at the impact on the delta EVE of the envisaged hedges. The table below shows the delta EVE (sensitivity of the economic value) for different variations in interest rates, on the right in the hypothesis of absence of coverage; on the left in case the covers are made. In particular, in orange the case of an increase in rates of +25 bps is highlighted. The tables show how, in the absence of coverage, the Bank quickly returns to a "short rate" position, while in case of realization of the covers, the position remains "long rate" however gradually decreasing over time (in correspondence with the increase in expected rates).

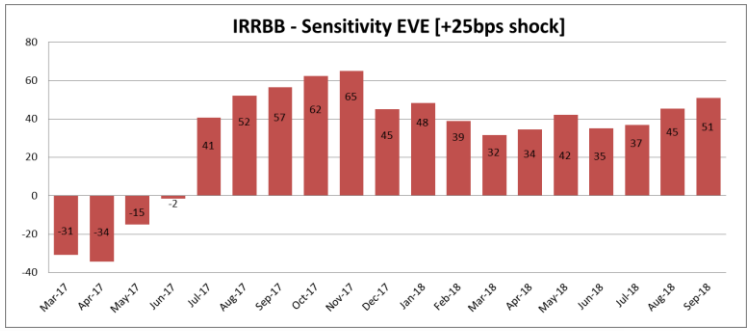
The graphs below moreover represent the realized sensitivity both on EVE and on NII for an increase of +25 bps in interest rates. From the graphs it may be appreciated that the Bank maintains a positive sensitivity to an increase in interest rates, both on EVE and on NII.

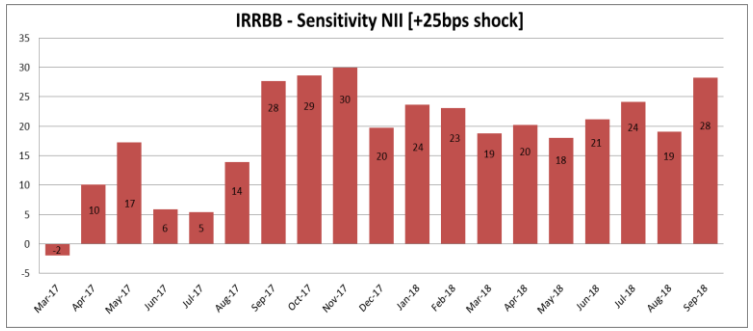
EVE RAF 2018 (CON HEDGE)

ΔEV	dic-17		2018	2019	2020	2021
	Initial	Preco	IY	IIY	IIIY	IVY
par_25up	41	n.a.	58	49	41	31
par_25dw	-42	n.a.	-53	-34	-18	-9
par_100up	155	n.a.	257	243	238	231
par_100dw	-133	n.a.	-148	-152	-104	-14

EVE NO HEDGE

ΔEV	dic-17		2018	2019	2020	2021
	Initial	Preco	IY	IIY	IIIY	IVY
par_25up	41	n.a.	62	26	-8	-43
par_25dw	-42	n.a.	-59	-12	31	66
par_100up	155	n.a.	266	150	47	-61
par_100dw	-133	n.a.	-176	-64	95	296





5. List of open Internal Audit gaps (including materiality/deadline/remediation in progress)

Notification Date	Mitigation Scheduled Date	GAP Denomination	GAP Description	GAP Importance	Completion %	Department in Charge of the GAP	Note	Remedial Action
07/10/18	12/31/18	Methodological documentation	The methodological document (D02184) does not adequately describe the methodologies adopted, the tests carried out and the controls applied.	Low	75%	ALM & Liquidity Risk Department		The methodological document will be enriched and published by the end of the year.
07/10/18	12/31/18	Non-Maturity Deposits: volumes model	The assumption underlying the statistical model is not respected for the KC, PMI, PRIVATE and SB clusters, which represent 95% of the total volumes of assets.	High	90%	ALM & Liquidity Risk Department		The department is working on modeling developments.
07/10/18	12/31/18	Non-Maturity Deposits: volumes model	The underlying assumption of the statistical model is not strictly respected for 25% of the total volumes (KC, PMI, Private and SB). In the case of the Private cluster, the approximation can still be considered acceptable.	Medium	90%	ALM & Liquidity Risk Department		The department is working on modeling developments.
07/10/18	12/31/18	Non-Maturity Assets: rates model	The ECM model used for the KC- Assets cluster does not adequately adapt to the observed phenomenon, since it includes a non-significant parameter (intercept).	Low	90%	ALM & Liquidity Risk Department		The change will be made at the next calibration of ECM Model.
07/10/18	12/31/18	Risk metrics production process	Inefficiency in the production of risk metrics due to high manual skills, with a recurrent use of excel files in which numerous functions and links to other files are set. This approach generates a significant operational risk in the use of files, a difficult auditability, and a high effort in terms of resources for processing.	Medium	50%	ALM & Liquidity Risk Department	Feasibility study (31/12/2018)	IT Function is working on the feasibility study.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