

## NPL disposal treatment in the LGD estimates

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### Abstract

The financial crisis resulted in an exponential increase of Non-Performing Loans (NPL) within banks' portfolios, which hugely impacted their profitability.

To push banks to get rid of the legacy of the crisis, regulators issued a number of regulations bearing significant implications for banks.

Among other things, a threshold with respect to the ratio of Non-Performing Exposure to the bank's overall Exposure (i.e. NPE ratio) has been set, past which banks become subject to a specific monitoring regime.

The regulatory stance coupled with financial market pressure to lead banks to sell off material portions of their Non-Performing Loans portfolios.

Since 2017 Italian banks started disposing NPL portfolios in a growing number. Disposals initially concerned portfolios of bad loans (i.e. *sofferenze*) to then embrace also Unlikely-to-Pay loans.

For AIRB banks (i.e. banks allowed to use internal models for capital requirements purposes) the inclusion of portfolio/massive NPL disposals into their Loss Given Default (LGD) estimates would raise capital requirements to unprecedented levels.

More in detail, once massive NPL disposals are included into LGD models the expected losses estimates jump to levels that are representative of forced sell-off experiences and thus become detached from the internal workout processes used for newly defaulted loans. If used for pricing, provisioning and capital quantification purposes, such biased estimates would impair the formation of new credit, with negative macroeconomic consequences.

To handle the impact of the NPL massive disposals on their LGD models, AIRB banks are working on a number of methodological approaches, that either factor in the probability that massive disposal will occur in the future or try to mitigate the extraordinary disposal prices. Having acknowledged the macroeconomic impact of the inclusion of NPL disposals into LGD models, the European Parliament provided AIRB banks with a limited leeway in their modelling practices.

A specific article of the new Capital Requirement Regulation deals with this issue: article 500. This regulatory evolution is aimed at offsetting the distortive impact that the massive disposals, characterized by the disposal price, would have on the LGD parameter estimation. In fact the article allows to assume that positions object of massive disposal follow the same recovery pattern observed for workouts, as it happens for "open positions", thus offsetting the actual anomalous recovery pattern that would introduce bias in the estimate. Different aspects of the methodology related to the implementation of article 500 continue to be examined by AIRB Italian banks.

### 1 Economic context

With the advent of Financial and Economic Crisis in the Eurozone in 2008 came a rise in the financial sector NPL portfolios, impacting all types of portfolios. The effect of the economic crisis was especially potent on a number of EU bodies, notably Italy, whose banking sector saw a predominantly linear increase of its NPL stock for almost a decade.

In 2015 the gross number of NPL, excluding bad loans, rose to € 350 billion, causing the NPL ratio (as a proportion of Total Loans) to reach historical levels (approx. 17%)<sup>1</sup>. This large quantity of NPL has a number of negative side effects on financial institutions, including a decrease in asset quality and limitations on access to capital, which in turn hinders lending capacity and overall profitability.

Due to the potentially harmful ramifications on both financial institutions and consumers, regulatory bodies, notably the European Central Bank (ECB) and European Banking Authority (EBA) were forced to intervene and implement various measures to ensure the proper management and treatment of these non-performing exposures.

An integral part of the guidance and expectations set by the regulators included a suggested quantitative threshold or trigger (5% of gross loans), which incentivized financial institutions to effectively run off their NPL portfolios on a sizable and expedited basis.

However, illiquid characteristics of the NPL market resulted in financial institutions observing material differences between the fair values and selling prices of positions belonging to the NPL portfolios, impacting both bank financial statements and capital ratios with a direct link to overall business sustainability.

The computation of the regulatory capital is based on the estimates of the LGD models, and their respective outputs. Ultimately, the risk differentiation and quantification of these models are affected by the distortive nature of the NPL portfolio. A number of methodological solutions have been formulated in order to mitigate or offset any discrepancies created within the model by the introduction of disposed positions in the portfolio used as sample for LGD estimation.

While a new regime of proactive regulatory measure seeks to create a more structured approach surrounding the management of impaired loans, including implementation of proper governance, risk management, monitoring, and recovery planning, the LGD parameters remain a crucial element impacted by the effect of NPL portfolio disposals.

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<sup>1</sup> Bank of Italy – Financial Stability Report No. 1/2019

## 2 Probability of disposal

Ultimately, the LGD is computed as an average of the loss rate associated to the disposal event and the loss rate associated to the workout scenario, weighted by the respective probability of occurrence.

In doing so the LGD computation follows the prescriptions of the recent EBA Guidelines on the PD estimation, LGD estimation and treatment of defaulted assets that requires banks to use LGD estimation methods that take into account various recovery scenarios and their probability of occurrence.

The *Probability of disposal* is estimated through a *hybrid* approach, as it makes use of both historical NPL data of the bank, as well as forward-looking simulations of potential future macroeconomic conditions, subject to two primary assumptions:

- General economic conditions affect banks' NPL volumes (i.e. worse economic conditions lead to higher levels of NPL)
- when NPL exceeds certain thresholds banks are bound to sell a portion of the NPLs through extraordinary disposals (i.e. typically priced at a discount due to market illiquidity)

The forward-looking approach aims at simulating future macroeconomic conditions leveraging models and experience banks have developed when implementing the IFRS9 accounting principle. These simulations allow to incorporate potential portfolio disposal, either already planned or not yet foreseen, into LGD estimates.

The *Probability of disposal* estimation utilizes an end-to-end approach, consisting of the following steps:

- 1) Identification of the relationship between one or more macroeconomic variables (e.g. GDP, interest rates, etc.) and the NPL ratio through an econometric model.

Such relation can be investigated by means of different econometric models, such as linear regression or Vector Autoregressive Model (VAR).

With reference to the independent variables, the long list is identified leveraging the already existing models that make use of macroeconomic variables, first and foremost those necessary for implementing the IFRS 9 principle. With reference to the dependent variable, different forms of the NPL stock/ratio can be considered: absolute and relative terms (i.e. differences or variations).

The long list of independent variables is analyzed through both univariate and correlation analyses, in order to move to the identification of the economic indicator(s) to be included in the final econometric model.

- 2) Simulation (i.e. Monte Carlo) of future macroeconomic indicators.

The starting point of the simulation is identified by applying the estimated parameters of the macroeconomic model to the current NPL level (in absolute or relative terms).

Both the number of simulations and the time horizon are elements that have to be identified prior to the beginning of the simulation.<sup>2</sup>

At each step of the simulation, an innovation/error is generated in order to project a step forward the simulated variable (by applying the parameters estimated to the selected macroeconomic variable).

At the end of each simulated year, if the simulated NPL level is higher than the time varying threshold, a disposal is assumed to occur and the NPL level is set back to the value of the threshold.

Both the step of the projection of the macroeconomic variable one step forward and the check of the NPL level are repeated until the end of the time horizon.

A path of simulated NPL levels is computed for each simulation.

The process is repeated for each simulation.

- 3) Identification of the threshold above which the bank is forced to dispose part of its NPL portfolio. This step is required in order to identify the need of selling part of the NPL portfolio, define the amount of NPL to be disposed, set the target NPL level to be reached within a pre-defined time horizon.
- 4) Computation, for each period of time (year) of two components: (1) the probability that the NPL value breaches the threshold and (2) the portion of portfolio to be disposed in order to bring back the NPL value under the threshold.
- 5) Calculation of the probability of disposal over the entire identified time horizon. For each year, the probability of disposal is the product of the probability of a scenario to overcome the time-varying threshold and the average amount to be sold to bring back the NPL level to the threshold. The product of the yearly probabilities of disposal is the overall probability of disposal.

<sup>2</sup> The time horizon can be identified in line with the characteristics of both the application portfolio and the recovery process. Also, the industrial plan can be taken into account.

- 6) Estimate of a “stressed” probability of disposal or of a “downturn value” of the probability of disposal, i.e. using downturn values of the future macroeconomic conditions.

One possible approach is to compute the stressed value of the probability of disposal by considering a negative scenario of the macroeconomic variables and to include it in the simulation, in order to get a “downturn value” of the probability of disposal.

Given potential shortcomings of model performance, including the lack of a sufficiently long time series, it’s also considered a best practice to have a back-testing framework in place.

### **3 Mitigation coefficient**

An alternative approach to the “Probability of Disposal” approach, may consist of applying a “Mitigation Coefficient”, or specific weight to transactions sold via extraordinary NPL disposal. This approach allows banks to include all default experiences in the sample used as basis for the LGD estimation while limiting the potential bias from the NPL disposal.

The approach relies on the quantification of a so-called “Mitigation Coefficient” to be combined with the workout LGD in the model estimation phase, for instance through the implementation of a weighted regression (Weighted OLS) or in the LGD look-up table. When the approach is aimed at offsetting up to the maximum extent possible the impact of one or more extraordinary NPL disposal, the Mitigation Coefficient is computed as an Adjustment Factor, which will be based on the distance between the economic loss observed on extraordinary disposals and the one observed on similar transactions managed through the internal workout process or ordinary disposals (where in ordinary conditions NPL disposals can be considered a natural alternative to internal workout if as efficient as the last one). Once computed, the Factor applies to the concerned transactions as long as they are included in the LGD estimation sample; i.e. new NPL disposals would not change the previously computed Adjustment, that will be frozen. Differently, when the mitigation procedure is aimed at capturing both the extraordinary nature of NPL disposals and their probability of occurrence, two dimensions must be considered: the Adjustment Factor (described above) and the Baseline Mitigation Coefficient (calculated as the ratio between the probability of disposal in an ordinary environment, i.e. low NPL levels, and the probability of disposal in extraordinary conditions, i.e. high NPL levels).

### **4 Interpretation of targeted amendments to credit risk requirements on portfolio disposals designed to limit the impact on capital requirements**

European Commission recently published a new Regulation, the so-called CRR2, which contains a specific article (i.e. Article 500) that takes into account the possibility to mitigate the effect that the massive disposal of NPL has on the LGD models and their respective outputs.

These new guidelines continue to be examined and interpreted by industry experts, though, the article 500 opens a door for banks to avoid taking the brunt of the LGD impact due to the NPL sell-offs.

The article basically allows institutions to “[...] *adjust their LGD estimates by partly or fully offsetting the effect of massive disposals of defaulted exposures on realised LGDs up to the difference between the average estimated LGDs for comparable exposures in default that have not been finally liquidated and the average realised LGDs including on the basis of the losses realized due to massive disposals [...]*”. Although the principle stated by the European Parliament is clear, the rule text leaves room for different interpretations about the methods banks may use to partly or fully offset the effect of massive NPL disposals on LGD estimations.

In this regard, two methodological approaches have been singled out, both suitable to implement the article 500 in the LGD estimation framework. The approaches share similar background rationale, i.e., that disposed positions should be treated as open ones, though each are interpreted slightly differently. In order for both approaches to be applied, institutions are required to adopt a methodology which includes open positions (so called incomplete recovery processes) in the respective LGD model – in order to comply with EBA Guidelines. In particular, under Approach 1 the disposal adjustment is estimated in line with the incomplete recovery processes treatment, basically meaning that disposals are treated as if they were not been disposed, but were still open, with the relative projection of future recoveries. Approach 2 is based on the interpretation of the “not finally liquidated” concept as referred to positions still open in the balance sheet of the Institution, leading to an adjustment based on the application of the estimated LGD values to those positions. Nonetheless, both approaches lead to an LGD calibrated according to a corrective factor for massive disposals to be estimated (i.e. includes closed, substantially closed, open positions, and massive disposals). It is clarified that the adjustment applied on disposed exposures eligible for article 500 treatment should be frozen at the moment of first quantification.

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