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NPL update from 2021 EBA stress test

Overview

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We analyse credit data from the EU-wide bank stress and the risk dashboard published by the European Banking Authority (EBA). Regulatory disclosures of data related to non-performing loans attract much interest currently as European authorities aim to improve the transparency and efficiency of the market non-performing bank loans (NPL). We discuss the usefulness of the regulatory disclosures for market participants who trade in NPL. The EBA stress test projects credit losses in two macroeconomic scenarios reflecting different recovery paths from the steep recession in 2020 resulting from the restrictions to fight the Covid-19 pandemic. The data includes projections for new NPL created in the years 2021 to 2023 and hence can provide useful insight in the potential supply of NPL. Banks and investors can benefit from the stress test data as benchmarks to assess the probability of default, loss given default and loan loss provision parameters used by bank, country of exposure and exposure class. The projections from the baseline scenario are broadly in line with earlier predictions to see a doubling of the NPL ratio in many lending segments. The strong recovery in 2021 makes the adverse scenario less likely to materialise while still providing interesting insight in the sensitivities of default and recovery to changes in the macroeconomic environment.

Regulatory disclosures to support the market for NPL

A number of recent policy initiatives aim at improving the availability and quality of data for NPL. In the wake of the Covid recession bank supervisors and policy makers have been concerned that Europe may see a renewed increase in NPL with the potential to slow the economic recovery as banks with higher NPL ratios become more cautious to lend. An efficient secondary market for NPL is seen as an important tool to help banks manage legacy and new NPL. According to the European Commission's action plan for NPL, the market for distressed assets in Europe suffers from low transparency, information asymmetries, illiquidity and high bid-offer spreads (EC 2020). Market participants agree that the level of transparency is low, but some disagree that the market is inefficient as current NPL sales

often attract strong interest from investors with a high degree of competition. Four policy initiatives are currently aimed at increasing transparency and helping improve the market for NPL:

1. EBA is currently consulting on revising its data templates for NPL transactions (EBA 2021a).
2. The European directive for credit servicers and credit purchasers has advanced in the parliamentary process and may make those EBA NPL templates mandatory to use (EC 2021a).
3. The Commission is consulting on the establishment of a central data hub for NPL transaction and recovery data (EC 2021b). The central data collection may include loan-level transaction prices and recovery data as well as data from the NPL securitisation market. The data hub may also collect aggregated data from supervisory databases such as AnaCredit. In the same consultation, the Commission asks about improvements to bank regulatory disclosures under Pillar 3 to make the information more relevant to the market for NPL.
4. EBA is consulting on amended rules of the securitisation regulation to reduce the hurdles for NPL securitisations (NPL Markets 2021 and references therein). In addition, data from private NPL securitisation transactions may become easier to access once delivered to a securitisation repository. The extension of the obligation to report to a securitisation repository to private securitisations was recently recommended by the joint committee of supervisors (JC 2021).

While granular loan-level price and recovery cash flow data are most useful to help investors value NPL, well-designed aggregate data benchmarks can also help the market to become more efficient. In addition to the initiatives aimed at improving transparency in the future, there have been some tangible improvements in the actual available information about the credit risk of bank loans and NPL. EBA has adjusted their quarterly disclosures in the risk dashboards and the annual transparency exercises to help the market understand the impact of Covid moratoria and public sector guarantees (PSG) as well as the asymmetric impact of the Covid recession on different economic sectors (EBA 2021c). The 2021 EBA stress test also provides additional disclosures on moratoria and PSG as well as additional data on IFRS Stage 2 exposures, i.e. loans that are performing but have experienced a significant increase in credit risk (EBA 2021b).

In this article we summarize some of the supervisory data of particular interest to the market for NPL. We start with the actual data available to date and then use the EBA stress test disclosures to look at future projections from large banks. The actual data are taken from the EBA risk dashboard and are available on a quarterly basis from 2014 with additional granularity starting in Q1 2019 up to and including Q1 2021, i.e. they include one year of data to assess the impact of the Covid pandemic that started in Q1 2020. The EBA stress test takes the actual data from year end 2020 as a starting point and projects credit performance annually at year end 2021, 2022 and 2023.

Recent NPL data before and after the onset of Covid-19

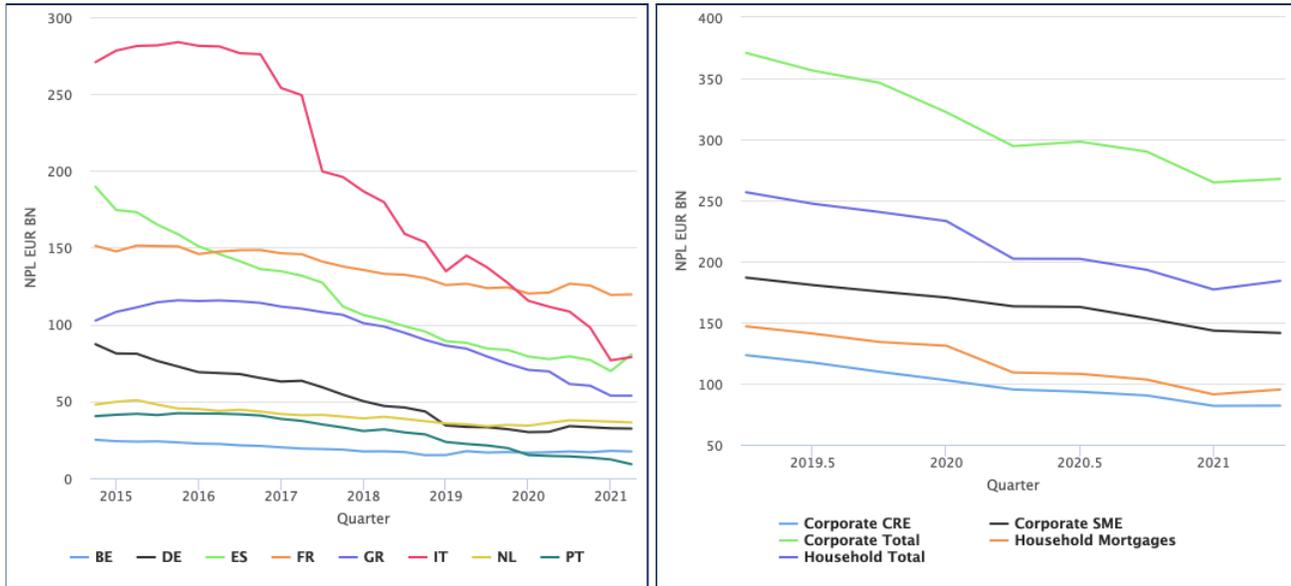


Figure 1a. NPL volumes selected countries.

Figure 1b. NPL volumes by asset class (Source: EBA).

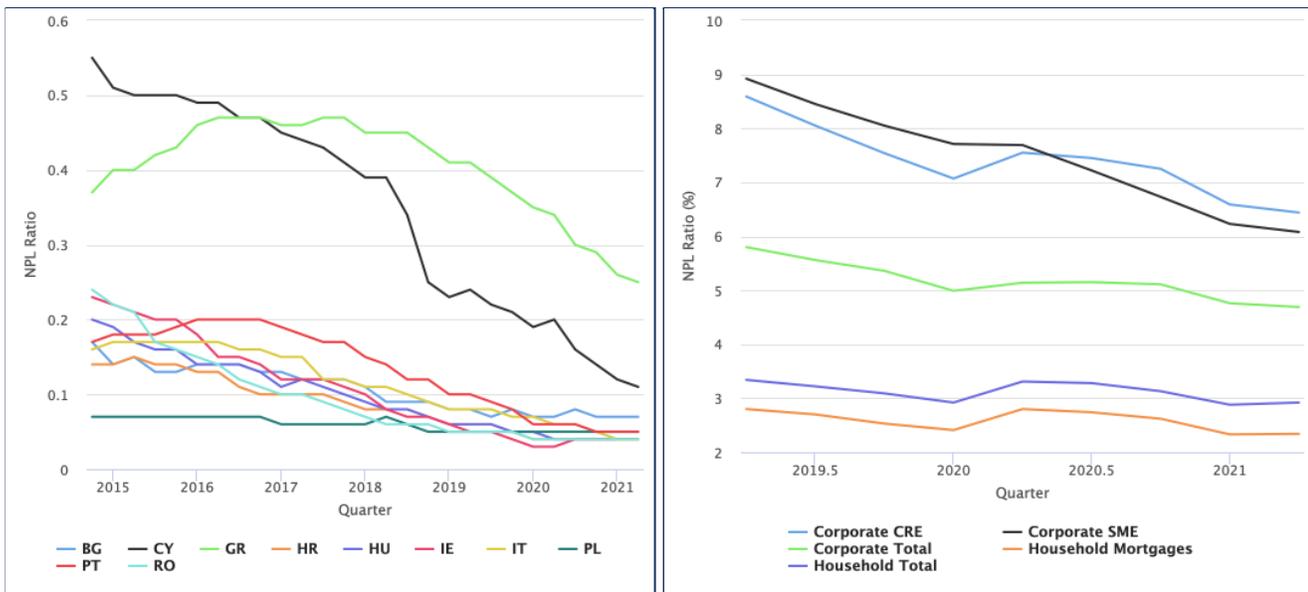


Figure 2a. NPL ratios for selected countries.

Figure 1b. EU NPL ratios by asset class (Source: EBA).

Figure 1a shows the volume of NPL in selected European countries since 2014 and Figure 1b shows the Volume of NPL by major asset class. The overall declining trend since 2014 has continued during the last view quarters. There was an increase in NPL in Italy and Spain in the first quarter of 2021, i.e. the last point of observation, but it is too early to say whether this is the beginning of a new wave of NPL.

Figure 2a and 2b show the NPL ratio by country and asset class, respectively. The region saw a fairly constant NPL ratio over the course of 2020, as the decrease in NPLs was balanced by a decrease in loans and advances. Only Greece and Cyprus have managed to reduce their very high NPL ratios significantly during recent quarters by means of large NPL securitisation transactions. Corporate CRE and SME loans have the highest NPL ratios with residential mortgages the lowest. Corporate NPL outweigh retail NPL by almost 3 to 1.

At this high level of aggregation it appears that the Covid recession did not have much of an impact on European NPL. However, it is well known that the Covid lockdowns have hit some sectors more severely than others. EBA identifies the sector with the highest negative impact from Covid by NACE code as Accommodation and food services, Transportation and storage, Arts and entertainment as well as Other services. Figure 3 shows the latest NPL ratios in March 2021 for the different sectors in different countries. Greece, Cyprus still have sectors with very high NPL ratios even after their recent reductions.

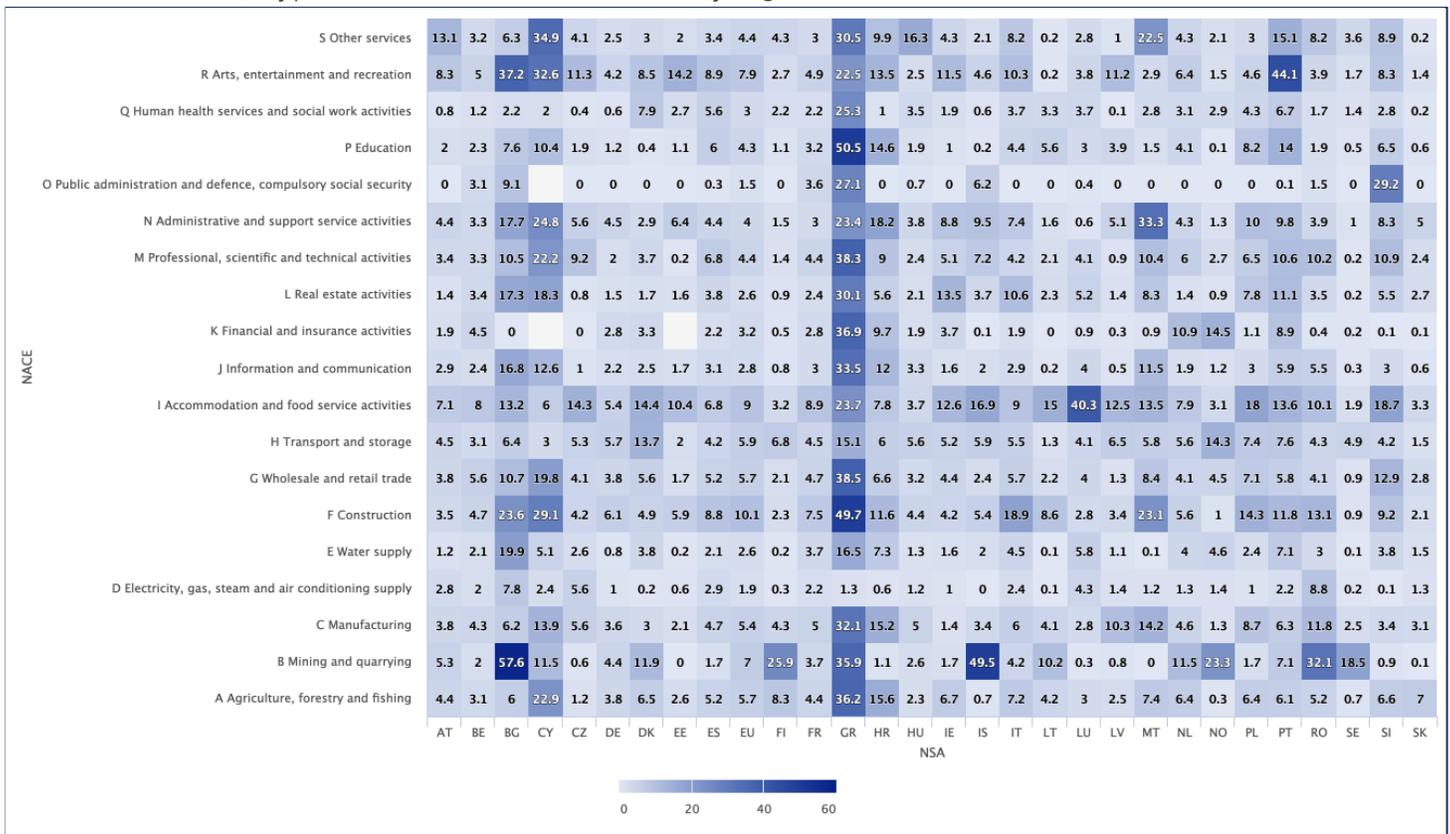


Figure 3. Observed NPL ratios for European countries and economic sectors in March 2021 (Source: EBA).

Bulgaria, Romania, Portugal or Croatia follow with higher than average ratios. In terms of economic sectors Accommodation and food services and Art and entertainment show the expected elevated exposure to NPL from the impact of Covid whereas the impact is less obvious in Transportation and Other services.

The EBA risk data clearly show that the impact of the Covid recession on bank NPL thus far has been subdued. Credit risk models calibrated on data prior to Covid would have predicted a much stronger increase in NPL from the steep recession in 2020 (NPL Markets 2021b) based on rise in NPL in previous recessions like the 2009 financial crisis. The worst-case scenario feared in the first half of 2020 is now unlikely to materialise. Nevertheless, the ultimate impact of the crisis on banks' NPL remains uncertain and supervisors and policy makers in Europe remain concerned and are monitoring the situation closely (McCaul 2021). The public support measures implemented in most jurisdictions mitigated the negative effects of the pandemic recession on banks' NPL, but NPL are still expected to rise as these measures are phased out. Figure 4 shows the recent increase in stage 2 loans, particularly among loans that benefited from payment moratoria, as an indicator of intensifying credit risks in future. In a recent research from the Bank of International Settlement, the authors argue that the tail risk of higher than expected corporate insolvencies has increased due to high indebtedness that built up when the pandemic impaired real activity (BIS 2021).

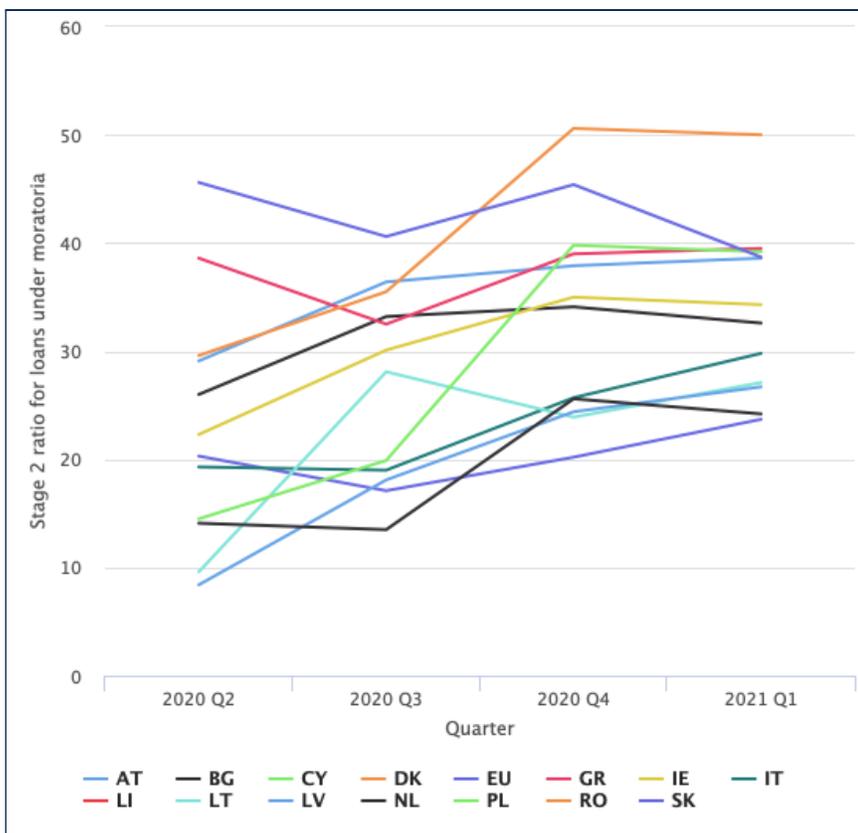


Figure 4: Ratio of IFRS 9 Stage 2 loans to total loans with expired EBA-compliant moratoria in selected countries. Stage 2 loans have suffered an significant increase in credit risk after origination. For comparison, the overall share of stage 2 loans in the European Union rose to 9.0% of total loans in Q1 2021 from 6.7% per cent in Q4 2019. Source: EBA.

Projected NPL development from the EBA bank stress test

The EU-wide stress test conducted by EBA in 2021 is designed to test the resilience of the EU banking sector amid COVID-19. The macroeconomic baseline and adverse scenarios used in the exercise cover a three-year horizon taking the year end 2020 as the starting point. The baseline scenario for EU countries is based on the December 2020 projections from the national central banks and envisages that the GDP in the EU will increase over the three-year horizon. The adverse scenario is designed as a hypothetical adverse situation and draws upon a prolonged COVID-19 scenario in a low interest rate environment. The adverse scenario envisages that real GDP in the EU will further decline with a cumulative deviation of real GDP growth from its baseline level of -12.9%. Such a decrease in real GDP following the unprecedented decline in 2020 reflects a very severe scenario (EBA 2021d).

The stress test reveals aggregated data about credit risk, which is of interest to the market for NPL, including actual and projected non-performing loan volumes, IFRS 9 accounting stages and loan loss provisions with granular data at bank, exposure class and country level. The stress test data are disclosed to contribute to market discipline and serve as a benchmarking tool, but are not explicitly designed to support the market for NPL. Future exercises could be more beneficial to NPL market participants with minor changes in the disclosures as we outline below. The EBA stress test covers a sample of 50 large banks¹, covering 70% of total banking assets in the European Union and European Economic Area. The stress test's cumulative impact over three years in the adverse scenario is mostly driven by credit risk losses of 308bn EUR, which have an impact of -423 bps on the common equity tier one (CET1) capital ratio. At the end of the stress test horizon in the adverse scenario, the CET1 capital ratio drops to a level of 10.3%, a reduction of 497 bps from year end 2020, meaning that the banking sector remains sufficiently capitalized even in a severe continuation of the Covid crisis.

Which data from the stress test disclosure are of particular interest to NPL market participants?

In our view, the projected supply of new NPL (which we equate with Stage 3 exposures throughout this section) for different exposure classes by country of exposure and reporting bank are of interest as are the range of credit risk related parameters that can be derived from the disclosed data. Risk parameters include the PD, LGD and expected loss as well as the coverage ratio as observed for the different banks. For example, all else being equal, banks with higher coverage ratios will find it easier to sell loans to investors than banks with lower loan loss provisions for the same asset class and country.

Bank Pillar 3 reports are available with similar data about NPL ratios and coverage ratios at a higher frequency of publication (at least annual) and covering more institutions. However, the Pillar 3 disclosures have significant drawbacks that reduce their usefulness for the market of NPL, some of which are addressed in the current consultation by the European Commission (EC 2021b). The Pillar 3

¹An additional 51 medium size banks were tested by the ECB which we do not consider further hereunder as there is no granular data disclosure for those banks.

tables do not have the same degree of standardization as the stress test results and few risk measures are broken out by exposure class and country of exposure which is essential for NPL investors as the investors risk appetite and ability to value NPL vary by both exposure class and country.

Projected volumes of new NPL

Figure 5a and 5b show the projected volume of new NPL in billions of Euro aggregated by country and exposure in the baseline and the adverse scenario, respectively. The baseline scenario is close to the expected economic development projected by the national central banks at year end 2020. Investors who are looking for an expected supply of new NPL should focus on this scenario. Note that the data in this article relate only to loans under the IRB approach. Loans treated by banks under the standardized approach are disclosed separately and follow a different break out by exposure class. For the corporate and retail exposure classes investigated here, exposures under the standardized approach play a minor role with a share of less than 20% for most banks.

In the baseline scenario, France produces the largest volume of NPL with retail NPL (EUR 44bn) dominating corporate NPL (20.5bn). Italy is projected to produce retail and corporate NPL in equal parts (15.4bn retail vs 15.5bn corporate). Germany, the Netherlands and Spain are projected to each produce around 10bn of each retail and corporate NPL over the next three years. The numbers for the adverse scenario are much higher as can be seen in Figure 5b. French retail loans are projected to be the largest NPL segment by far in the adverse scenario with 60.9bn in new NPL exposures.

Projected NPL ratios in the baseline and adverse scenario

We note that due to the methodology of the stress test the stock of NPL increases materially even in the benign baseline scenario. There are no cures or write-offs allowed in the EBA stress test methodology and the balance sheet is assumed constant, i.e. loans that expire are replaced with new loans of the same characteristics to maintain a constant balance sheet (EBA 2020). As a consequence, the NPL ratios are increasing continuously from their observed values at year end 2020. The NPL ratio is calculated in each year as the ratio of IFRS 9 Stage 3 exposures to total exposures in Stages 1, 2, and 3. Figure 6a shows the actual NPL ratios by country and exposure class at year end 2020. Again, only loans under the IRB approach are considered here. Figure 6b shows the NPL ratios at year end 2023 for the baseline scenario and Figure 6c shows the NPL ratios at year end 2023 for the adverse scenario. Due to the cumulative increase we see that already in the baseline scenario many country-exposure segments exceed the important 5% hurdle which requires banks to produce detailed NPL management plans. In the adverse scenario, almost all country-exposure segments exceed 5%. Comparing the actual numbers in 2020 with the projected NPL ratios in the adverse scenario in 2023 shows a massive increase ranging from a doubling of the NPL ratios for high NPL countries like Italy to a more than 10-fold increase in low NPL countries such as Sweden.

How do these projections from the EBA stress test compare to the forecasts for Covid-induced NPL from last year when a slow economic recovery from the lockdowns was considered a more likely

scenario? The cumulative nature of the EBA stress test data will overestimate actual NPL ratios even if the baseline macroeconomic scenario materializes. In the baseline scenario the stress test data show a doubling of the NPL ratio in many country-exposure segments in line with our latest NPL forecasts from early 2021 (NPLM 2021a). Our initial forecasts in 2020 were more conservative and closer to the steep increases projected by the banks for the adverse scenario (NPLM 2020b). Significant uncertainty remains about the recovery path, but the adverse scenario now appears very unlikely to materialize. EBA does not publish the likelihood of either of the two scenarios to occur and there is no established method to establish such likelihoods. Recent research suggests, however, that more attention should go into the scenario selection process as the currently proposed scenarios may not plausibly answer the question on how big losses in a bad economic scenario can possibly get, and whether the proposed adverse scenario will look like the bad scenario causing such extreme losses. The current stress test scenarios might leave aside many dangerous scenarios and thus create an illusion of safety (Breuer and Summer 2020). For example, the proposed adverse scenario, while undoubtedly severe, does not reflect a full collapse of international supply chains or a steep increase in inflation and interest rates.

Projected default rates and loss given default

In addition to the projected supply of new NPL discussed in the previous section, NPL market participants should be interested in the risk parameters that can be derived from the EBA stress test data. For NPL, the most important risk parameter is the recovery rate or LGD. For performing loans, the PD is equally important. Both PD and LGD parameters are submitted by the banks to EBA as part of the stress test templates with additional break out by IFRS 9 stage, but the public disclosure does not contain PD nor LGD parameters (EBA 2020). The disclosure is limited to exposure values in the three different IFRS 9 stages and their respective provision levels. We calculate the one year PD from the year on year increase in Stage 3 exposures. We approximate the LGD of newly defaulted loans by calculating the ratio of the change in Stage 3 provisions over the change in Stage 3 exposures. Naturally, we would have preferred to observe and model the LGD as reported by the banks.

PD and LGD play an important part in modelling expected credit losses and may be used as inputs into a bottom-up valuation of bank loans (NPLM 2020a). The great advantage of the EBA stress test data is the consistent coverage of many countries and asset classes. A disadvantage is the high level of aggregation. For example, the performance of the corporate exposure classes is not broken out by NACE industry codes and commercial real estate financings cannot be identified. Also, there is no information about the default vintage of the stock of NPL at the beginning of the stress test or the degree of collateralisation for secured exposures. On the plus side, the data are disclosed by bank and hence the range of risk parameters used in each country-exposure segment can be examined.

The heterogeneity of bank risk parameters is a well known phenomenon that has received scrutiny by bank supervisors (EBA 2021e). Heterogeneity in the composition of the underlying exposure classes can explain most but not all of the observed variability in the risk parameters. For example, a bank reporting mainly prime auto loans in the exposure class Retail - Other - Non SME will report different and likely

lower probabilities of default (PD) and loss given default (LGD) parameters than a bank which reports mainly unsecured consumer loans in this exposure class. Similarly, for residential mortgages (exposure class Retail - Secured by real estate property - Non SME) some banks may focus more on high LTV or non-conforming mortgages whereas other banks focus on prime low LTV mortgages with lower PD and LGD estimates.

Figures 7a, b and c show the range of PD, LGD and coverage ratios found for Corporate SME loans in different countries, respectively. Each dot represents one bank. The one year PD, the LGD and coverage ratio is determined for each year 2021 to 2023 and then the simple average of the three values is shown. In Figure 7b, the difference between the LGD estimates for the two banks reporting IRB Corporate SME exposures in Bulgaria and Romania is striking, suggesting material differences in the business mix, collateral mix or risk models. The EBA data help investors identify such divergences and allows further analysis of related asset classes (e.g. Retail SME exposures) or using additional disclosures from Pillar 3 reports for the banks in question.

Given the current attempt to improve data for the NPL market, supervisors should consider additional NPL relevant disclosures in future stress test exercises. The cure rate, time to workout and cost of workout are additional risk parameters that impact the valuation of NPL and unlikely to pay loans, but are not disclosed by EBA. Bank delivered actual cure rates observed in 2019 and 2020 (EBA 2020) whereas time and cost of workout are not collected as part of the stress test. For 2021 to 2023 the stress test methodology requires banks to assume no cure. Hence, cure rates cannot be derived from the disclosed data, but are indirectly taken into account through lower LGD assumptions.

Sensitivities of default rates and recoveries to macroeconomic scenarios

The adverse scenario is a severe downside scenario which has a low probability to materialize. Nevertheless, the publication of the adverse scenario is of interest to NPL investors as well, as it provides insight in the sensitivity of loan defaults and recoveries to the economic cycle. NPL investors need to understand how their expected returns can vary in different economic situations. For example, what happens to loan recoveries if house prices decline by 15% over three years? For residential mortgage loans, the collateral value will be a direct input into an NPL valuation model and investors can perform the sensitivity analysis without resorting to stress test data (NPLM 2020a). However, for unsecured loans or loans secured by non-property collateral, the sensitivity of recoveries to house price declines or other macro variables like the unemployment rate is not obvious and requires empirical data. Estimating such sensitivities from data is only possible if the historical data span at least a full economic cycle which is often not available to investors but are required from banks to develop IRB risk models or stress test models. We calculate those sensitivities from the EBA stress test data based on the macroeconomic variables defining the scenarios and the relevant risk measure reported by EBA. Previous stress test results have been analysed using similar macro models derived from the disclosed data. Philippon et al. (2017) modelled the impairment rates disclosed in the 2014 EBA stress test using a logit-linear model. In addition, the authors performed a backtest of the projected losses and found the

stress test projections informative and unbiased on average with model-based losses as good predictors for realised losses.

We model the one year PD for Stage 1 and Stage 2 performing loans combined and the LGD for newly defaulted Stage 3 loans. As the PD is floored at zero and in most cases close to the lower bound we choose to model the probit transformed PD with a linear regression model in line with market practise. We model LGD outright without transformation using linear regression with one or two macro variables. Our main aim is to understand the sensitivity of NPL recoveries to macroeconomic variables. As we see in Figure 8, the banks not only vary in their baseline parameters but also by the relative increase in the risk parameters from baseline to adverse. Some banks show virtually no sensitivity to the scenario which is not plausible given the severity of the adverse macroeconomic conditions. Hence, for investors to understand the sensitivities we suggest to look at individual bank models rather than a pooled model averaging over all banks who report a particular country-exposure class combination. While the stress test covers large banks only, the exposure of individual banks to a segment might be small or zero. We exclude any banks with a total segment exposure of less than Euro 50 million. If a bank's loan volume in a segment is small, it is likely not to have much data to develop detailed stress test models and the reported risk parameters and sensitivities may differ materially from those used by the banks with much larger exposures. Hence, when selecting bank-segment models, we apply three criteria jointly; the best fit with the correct sign, the relative importance of the segment for the bank expressed as the country rank reported in the stress test data (e.g. for ING Bank, the Netherlands have country rank 1, Germany country rank 2 and Belgium country rank 3) and the highest sensitivity to the macro environment. We use all macro variables for which stress test scenarios are reported with no lag and with a one year lag. The result is a list of some 270,000 bank-segment one and two factor models from which we select 140 models for each PD and LGD. Figure 9 shows two examples for the calibrated models. Most of the selected models show a fit that is qualitative similar to those shown in Figure 9a and 9b. Figure 9a suggests for instance that the PD for Italian SME can increase four fold if unemployment increases from 10% to 15%. Similarly, based on the model shown in Figure 9b, the LGD of Corporate SME loans in the Czech Republic can increase from 25% to 35% when unemployment doubles from 4% to 8%. The selected models can then serve as a benchmark for segment specific defaults and losses in a range of economic scenarios and help banks or investors to manage their credit portfolios and optimize their allocation of newly originated loans (see e.g. NPLM 2021a).

Conclusions

We analyse recent credit data from the EU-wide bank stress and the EBA risk dashboard. The expected wave of NPL from the fallout of Covid-19 has not materialized, but further loan defaults are expected when public support measures have been phased out. The baseline scenario of the EBA stress test provides important insight to NPL market participants on the potential supply of new NPL by country and exposure class. A doubling of the NPL ratio by 2023 for many market segments is a possible scenario whereas the extreme defaults in the severe adverse scenario are very unlikely to materialize. We show the usefulness of the EBA disclosures on three levels of aggregation: to compare the NPL development between country-exposure segments, to compare the projections from different banks within one country-exposure segment, and to explore the sensitivities of risk parameters at the bank-country-exposure level to different macroeconomic variables. We demonstrate how investors can stress test their own exposures to default and recovery risk by employing the macro models for PD and LGD described in this paper. Using the models allows investors to better understand the sensitivity to other plausible economic scenarios not covered by the EBA stress test like, for instance, an increase in inflation and interest rates or alternative scenarios for real estate prices.

Given the current attempt to improve data for the NPL market, supervisors should consider additional NPL relevant disclosures in future stress test exercises or additional disclosures from the 2021 stress test. The cure rate is an important risk parameter for the valuation of non-performing and unlikely to pay loans, but is not disclosed by EBA. Bank delivered actual cure rates and thus disclosing such cure rates would be a quick win. Another quick win would be the disclosure of the break out of corporate exposures and provisions by NACE code which banks supplied to EBA. The current disclosures for corporate loans make it impossible to identify commercial real estate financings or developer loans or loans to sectors that have hit the hardest by the Covid lock downs like accommodation and food services. The importance of a breakdown of corporate credit risk by NACE sectors has been recognized not only in the context of the asymmetric economic shock from Covid. In the upcoming 2022 climate stress test, EBA will collect credit projections by NACE sectors to help identify those corporate activities subject to climate transition risk. Additional data relevant to the NPL market is the time and cost of workout, the average default vintage of the stock of NPL at the beginning of the stress test, and the degree of collateralisation for secured exposures which would increase the usefulness of the disclosures for NPL market participants.

Annex Stress Test Data

Retail – Secured by real estate property – SME	0.4	1.1	0	0.2	0.4	0.1	4.2	0.5		1.8	1.5		0	0.6	0.3	0.3
Retail – Secured by real estate property – Non SME	0.8	2.5	0.1	0.9	2.9	2.3	15.5	9.5	0.2	6.5	7.4	0	0.5	4.5	5.9	7.4
Retail – Secured by real estate property	1.3	3.6	0.2	1.1	3.3	2.4	19.7	10	0.2	8.3	9	0	0.5	5.1	6.3	7.6
Retail – Other – SME	0.3	1	0	0.3	0.1	0.1	12.4	1.1	0	3.9	1.4	0	0.1	1.4	0.5	0.2
Retail – Other – Non SME	0.4	0.6	0	0.5	0.5	1.4	9	4.5	0.1	2.7	0.3	0.1	0.1	2.8	0.8	0.3
Retail – Other	0.7	1.7	0.1	0.9	0.6	1.5	21.4	5.6	0.1	6.6	1.7	0.1	0.2	4.2	1.3	0.6
Retail – Qualifying Revolving	0	0	0	0			2.9	0.3		0.4	0.1	0	0	0.7		0.4
Retail	2	5.4	0.3	2	3.9	3.9	44	15.9	0.3	15.4	10.8	0.2	0.8	10.1	7.6	8.6
Corporates – Specialised Lending	1	0.5	0.1	0.6	0	0	1.2	1.6	0.1	1.4	1.8	0.1	0.2	0.5	0	1.4
Corporates – SME	1.1	2.5	0.1	1	2.3	0.8	7.4	2.3	0.1	6.5	4.6	0.2	0.2	4.4	2	0.8
Corporates	3.5	7	0.3	2.3	3.9	1.7	20.5	10.5	0.3	15.5	10.2	0.4	0.6	8.3	3.6	4.7
	Austria	Belgium	Bulgaria	Czech Republic	Denmark	Finland	France	Germany	Hungary	Italy	Netherlands	Romania	Slovakia	Spain	Sweden	United Kingdom

Figure 5a. Projected new NPL in billion Euros in the baseline scenario by country and exposure by 2023 (Data: EBA, calculation NPL Markets).

Retail – Secured by real estate property – SME	1.2	1.6	0	0.2	1.1	0.1	5.2	0.6		3.1	3.8		0	1	1	0.5
Retail – Secured by real estate property – Non SME	1.3	4	0.1	1.5	5.5	2.8	21.4	15.5	0.2	8.2	11.8	0	1.1	7.5	11.3	14.9
Retail – Secured by real estate property	2.5	5.6	0.2	1.7	6.5	2.9	26.6	16.1	0.2	11.3	15.6	0	1.1	8.4	12.4	15.4
Retail – Other – SME	0.4	1.4	0.1	0.5	0.2	0.2	18.2	2.3	0	5.7	2	0	0.2	2.3	0.9	0.4
Retail – Other – Non SME	0.5	0.9	0	0.7	1.2	1.6	12.3	6	0.2	4.6	0.5	0.1	0.3	3.6	1.9	0.7
Retail – Other	1	2.3	0.1	1.3	1.4	1.8	30.5	8.3	0.2	10.3	2.5	0.1	0.5	5.9	2.8	1.1
Retail – Qualifying Revolving	0.1	0	0	0			3.8	0.5		0.5	0.2	0	0	0.9		0.8
Retail	3.5	8	0.3	3	7.9	4.7	60.9	24.9	0.5	22.2	18.3	0.2	1.6	15.2	15.2	17.2
Corporates – Specialised Lending	1.5	1	0.1	1	0	0	2.6	2.4	0.2	2.1	4.7	0.1	0.3	1.4	0	3.3
Corporates – SME	2	3.7	0.2	1.4	7.2	1.7	10.6	3.3	0.2	11.7	8.4	0.2	0.5	7.4	8.5	1.8
Corporates	5.5	11.3	0.4	3.5	12.8	3.6	38	17.4	0.5	30	26.7	0.5	1.2	16.2	16	9.9
	Austria	Belgium	Bulgaria	Czech Republic	Denmark	Finland	France	Germany	Hungary	Italy	Netherlands	Romania	Slovakia	Spain	Sweden	United Kingdom

Figure 5b. Projected new NPL in billion Euros in the adverse scenario by country and exposure by 2023 (Data: EBA, calculation NPL Markets).

Retail – Secured by real estate property – SME	4.56	1.67	7.34	3.84	2.53	3.59	2.51	0.67		10	4.04		2.65	19.9	0.19	5.61
Retail – Secured by real estate property – Non SME	1.12	1.29	2.73	1.03	0.92	2.27	0.93	0.6	5.21	2.91	0.74	4.32	1.16	3.81	0.15	1.11
Retail – Secured by real estate property	1.75	1.35	3.52	1.09	1.02	2.3	1.09	0.6	5.25	3.47	0.91	4.32	1.18	4.49	0.15	1.22
Retail – Other – SME	4.4	3.44	6.62	4.69	6.59	6.87	4.6	2.06	11.98	11.31	5.61	5.41	4.05	12.2	1.97	4.98
Retail – Other – Non SME	1.53	2.02	7.71	3.55	2.93	3.41	2.71	2.47	2.8	5.11	2.63	6	4.23	7.67	1.3	1.1
Retail – Other	2.3	2.69	7.34	3.85	3.21	3.77	3.52	2.39	3.4	8.18	4.43	5.89	4.17	9.23	1.46	2.1
Retail – Qualifying Revolving	7.3	1.18	3.44	3.77			3.5	0.52		2.55	5.8	1.21	2.55	2.92		0.85
Retail	2.18	1.63	4.66	1.79	1.2	2.57	1.93	0.99	4.66	4.71	1.08	4.34	1.66	5.31	0.24	1.24
Corporates – Specialised Lending	2.18	2.72	10.47	1.13	0	0	1.1	1.03	1.32	6.55	2.56	2.17	2.88	5.43	1.12	1.7
Corporates – SME	4.25	4.74	8.43	4.37	4.52	2.61	3.96	1.84	2.44	16.39	8.91	5.09	2.29	12.01	0.59	5.69
Corporates	2.53	4.25	5.76	2.44	2.9	2.19	2.5	1.68	1.86	8.42	5.16	3.94	1.65	7.06	0.63	2.16
	Austria	Belgium	Bulgaria	Czech Republic	Denmark	Finland	France	Germany	Hungary	Italy	Netherlands	Romania	Slovakia	Spain	Sweden	United Kingdom

Figure 6a. NPL ratio reported for year end 2020 by country and exposure (Data: EBA, calculation NPL Markets).

Retail – Secured by real estate property – SME	9.67	5.21	15.65	18.48	5.33	8.7	6.2	2.5		18.2	9.96		9.19	26.95	2.01	9.57
Retail – Secured by real estate property – Non SME	3.42	2.96	8.75	2.97	2.24	4.76	2.48	2.96	9.37	5.4	2.33	6.92	3.05	5.99	1.82	4
Retail – Secured by real estate property	4.55	3.35	9.88	3.32	2.43	4.84	2.86	2.93	9.42	6.41	2.73	6.92	3.13	6.87	1.83	4.14
Retail – Other – SME	9.36	8.15	16.18	13.28	13.16	14.58	9.92	6.27	21.48	18.83	17.17	9.27	9.6	19.8	10.44	20.98
Retail – Other – Non SME	4.22	4.58	14.22	8.07	5.33	10.58	5.6	6.86	10.54	10.24	6.34	11.58	8.3	15.47	5.32	8.26
Retail – Other	5.61	6.26	15.59	9.44	5.93	11.01	7.45	6.75	11.26	14.49	12.88	11.16	8.68	16.96	6.48	11.43
Retail – Qualifying Revolving	8.92	2.96	11.87	7.95			9.61	1.44		10.78	8.9	4.43	5.95	7.59		5.36
Retail	5.07	3.94	11.64	4.84	2.72	5.98	4.51	3.69	10.01	8.63	3.18	8.16	4.02	8.85	2.14	4.35
Corporates – Specialised Lending	8.68	6.17	13.22	5.98	0.27	0.55	3.56	3.14	4.92	12.15	6.01	5.28	7.32	8.26	2.02	4.98
Corporates – SME	9.55	9.3	12.87	11.14	7.06	4.95	8.85	4.35	6.91	22.78	15.67	12.22	6.08	19.55	2.34	10.85
Corporates	6.32	8.72	9.79	7.35	5.07	4.08	5.7	3.74	4.66	12.68	9.31	8.82	4.87	11.22	2.16	4.76
	Austria	Belgium	Bulgaria	Czech Republic	Denmark	Finland	France	Germany	Hungary	Italy	Netherlands	Romania	Slovakia	Spain	Sweden	United Kingdom

Figure 6b. Projected NPL ratio for year end 2023 in the baseline scenario (Data: EBA, calculation NPL Markets).

Retail – Secured by real estate property – SME	19.04	6.75	16.56	23.72	9.73	9.88	7.07	3.11		23.87	18.54		16.44	30.7	5.59	13.05
Retail – Secured by real estate property – Non SME	4.73	3.92	9.68	4.24	3.4	5.31	3.07	4.45	11.84	6.07	3.27	7.32	5.22	7.44	3.34	6.95
Retail – Secured by real estate property	7.32	4.4	10.81	4.68	3.8	5.41	3.48	4.37	11.89	7.48	4.07	7.32	5.35	8.42	3.46	7.1
Retail – Other – SME	12.07	9.92	17.8	17.26	16.42	17.15	12.4	10.79	27.59	22.33	22.17	9.57	15.46	24.13	17.25	28.85
Retail – Other – Non SME	5.16	5.7	14.75	10.15	9.14	11.8	6.67	8.27	14.04	13.85	8.88	12.16	12.85	17.73	10.37	16.48
Retail – Other	7.03	7.69	16.69	12.02	9.7	12.33	9.12	8.79	14.93	18.05	16.91	11.68	13.61	19.94	11.93	19.55
Retail – Qualifying Revolving	9.15	4	13.45	9.33			11.41	1.97		12.33	10.75	4.61	8.78	8.57		9.79
Retail	7.32	5.07	12.65	6.49	4.28	6.69	5.5	5.22	12.86	10.36	4.63	8.57	6.67	10.64	4.02	7.46
Corporates – Specialised Lending	11.79	10.15	20.83	9.92	0.48	0.95	6.39	4.26	7.59	14.82	11.85	6.04	8.74	13.48	3.02	9.24
Corporates – SME	13.98	11.46	15.52	13.86	12.64	7.49	11.02	5.49	10.25	27.93	21.32	14.67	10.5	24.61	8.19	16.94
Corporates	8.45	11.47	11.95	9.87	10.09	6.25	8.42	5.1	7.18	16.67	15.99	10.7	7.82	15.16	7.5	7.73
	Austria	Belgium	Bulgaria	Czech Republic	Denmark	Finland	France	Germany	Hungary	Italy	Netherlands	Romania	Slovakia	Spain	Sweden	United Kingdom

Figure 6c. Projected NPL ratio for year end 2023 in the adverse scenario (Data: EBA, calculation NPL Markets).

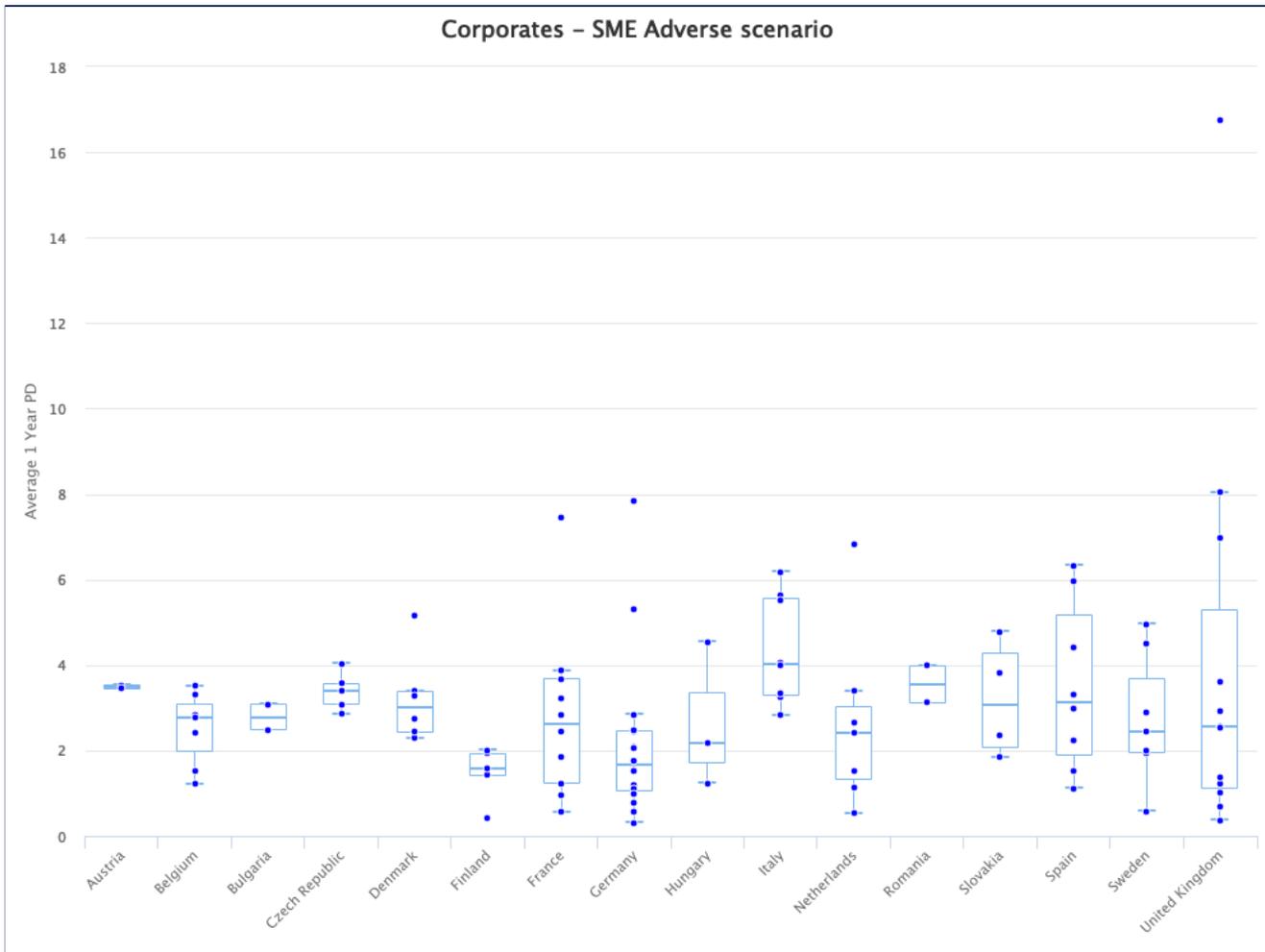


Figure 7a. Average one year PD in the adverse scenario for Corporate SME exposures in selected countries (Source: EBA, Calculation: NPLM).

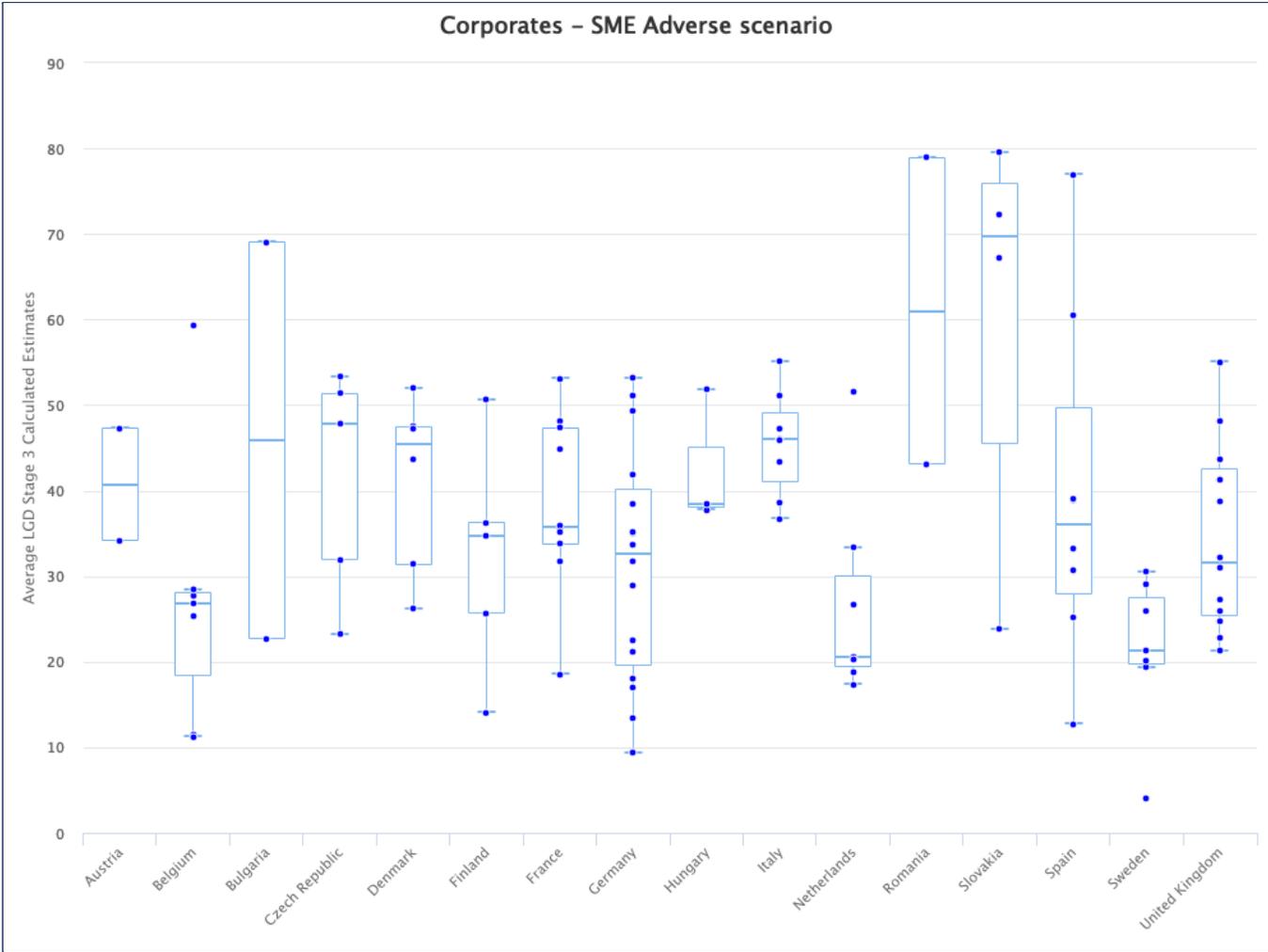


Figure 7b. Average LGD for exposures transitioning to Stage 3 in the adverse scenario for Corporate SME exposures in selected countries (Source: EBA, Calculation: NPLM).

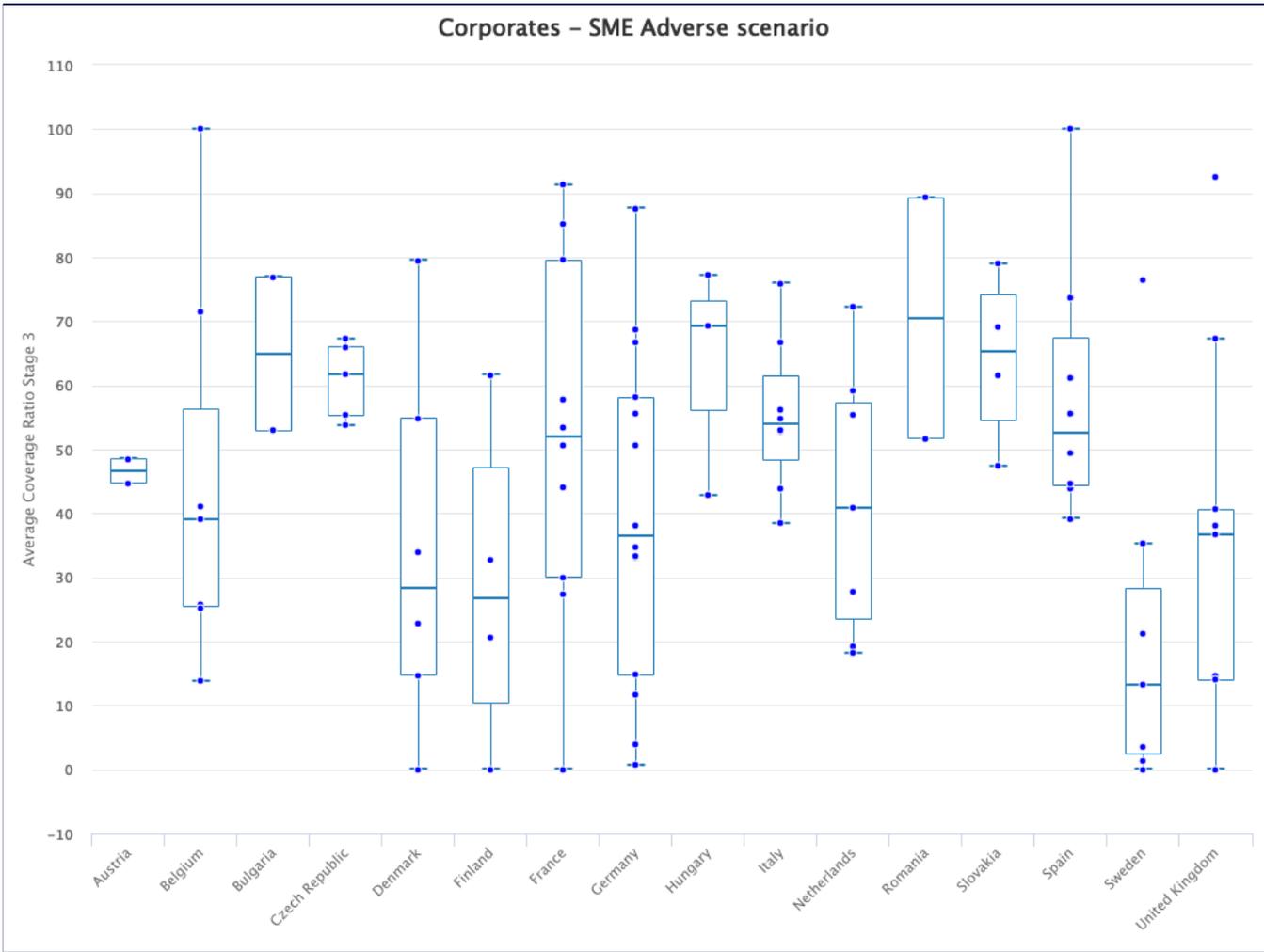


Figure 7c. Average Stage 3 coverage ratios in the adverse scenario for Corporate SME exposures in selected countries (Source: EBA, Calculation: NPLM).

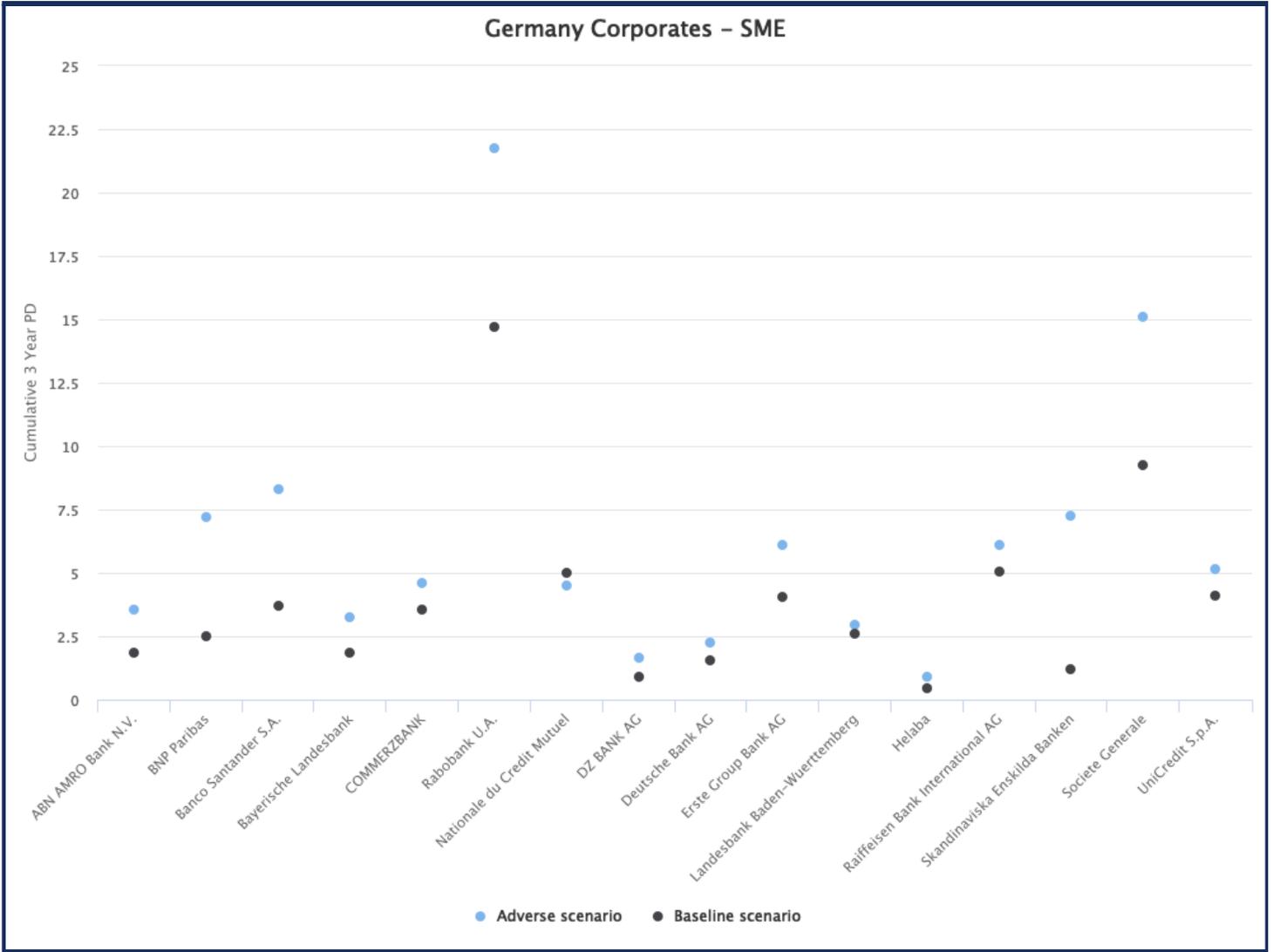


Figure 8a. The cumulative 3 year PD is shown by bank and scenario (Source: EBA, Calculation: NPLM).

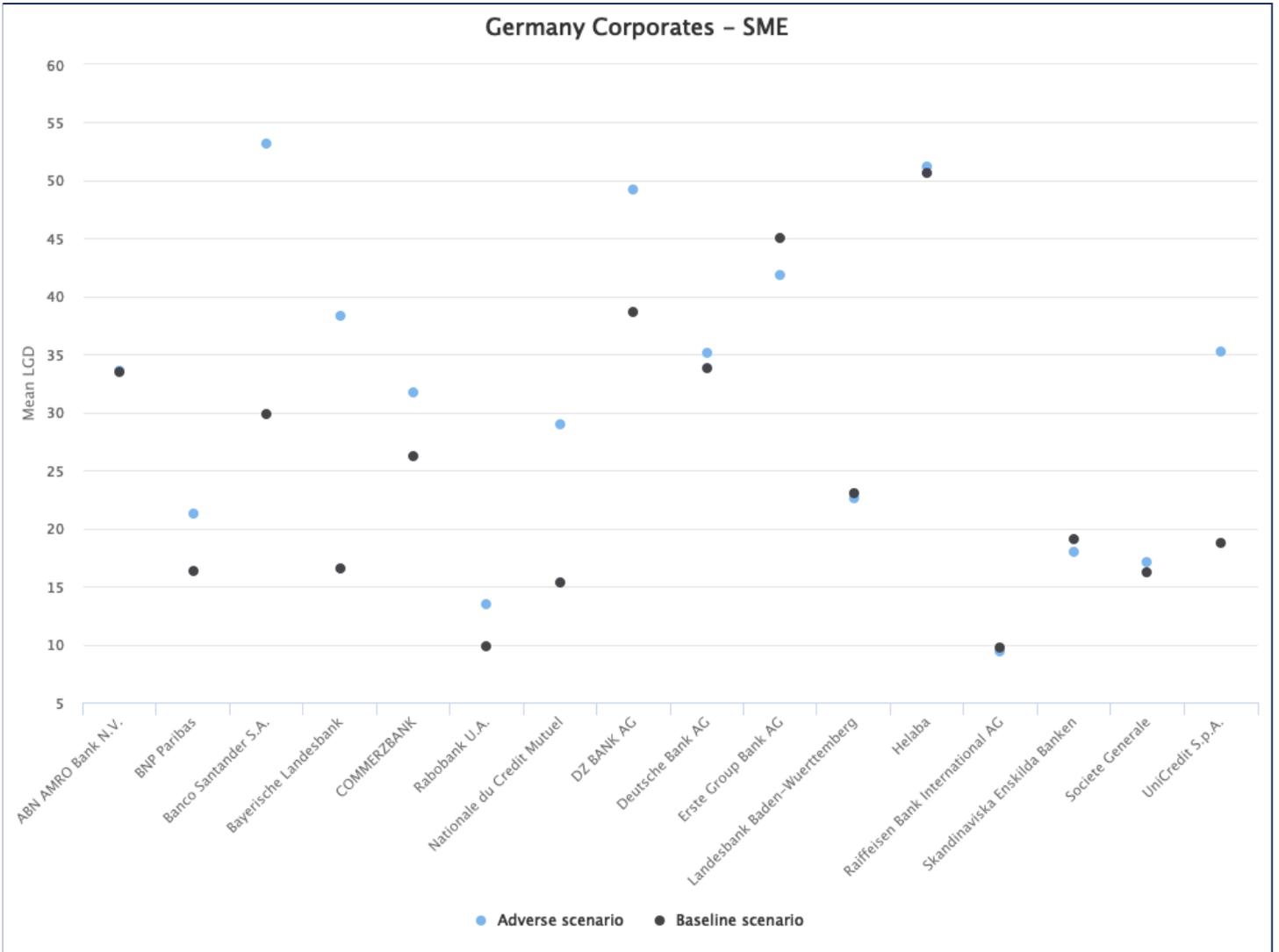


Figure 8b. The mean LGD over the 3 year stress test horizon by scenario and bank (Source: EBA, Calculation: NPLM).

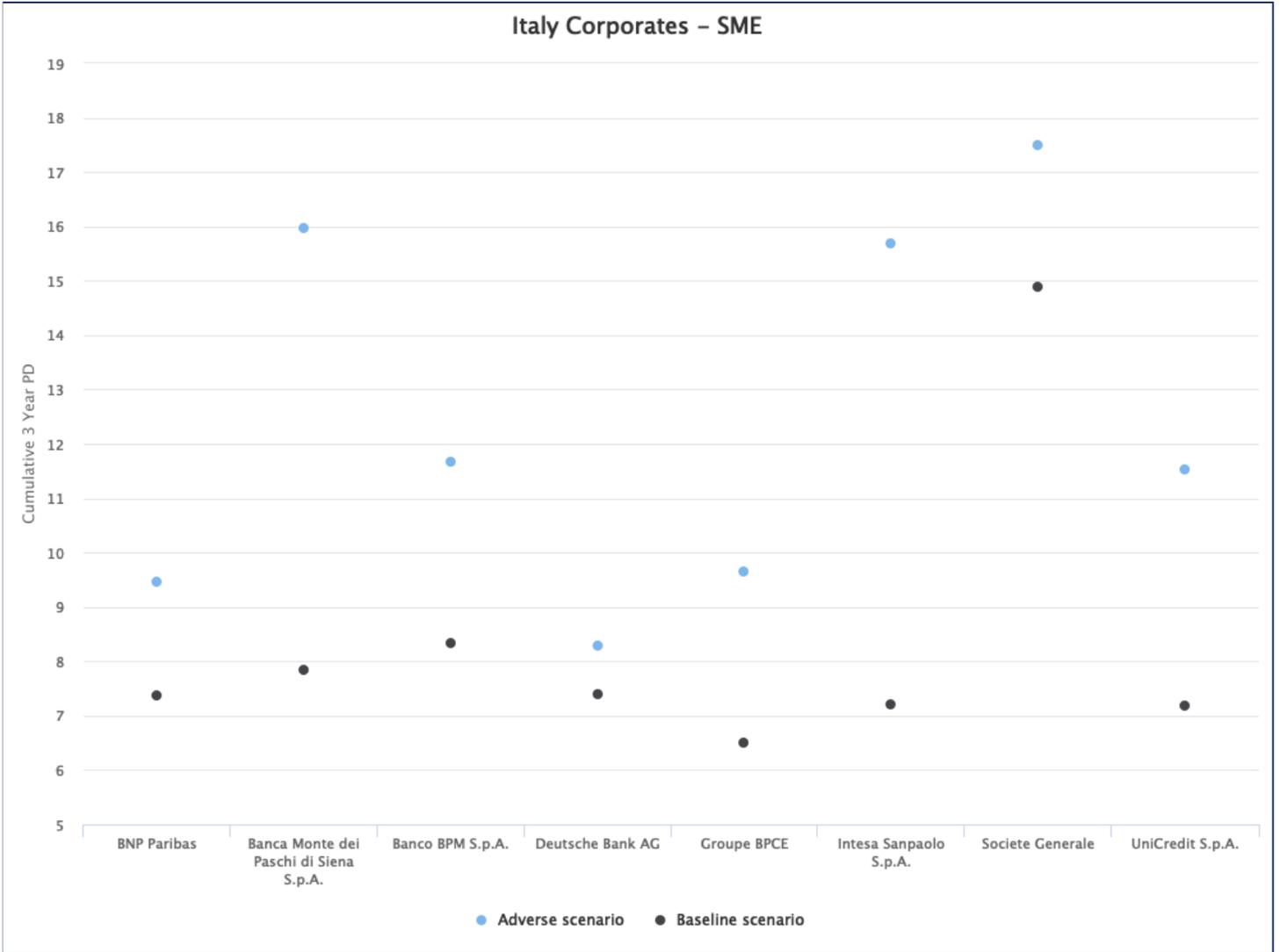


Figure 8c. The cumulative 3 year PD is shown by bank and scenario (Source: EBA, Calculation: NPLM).

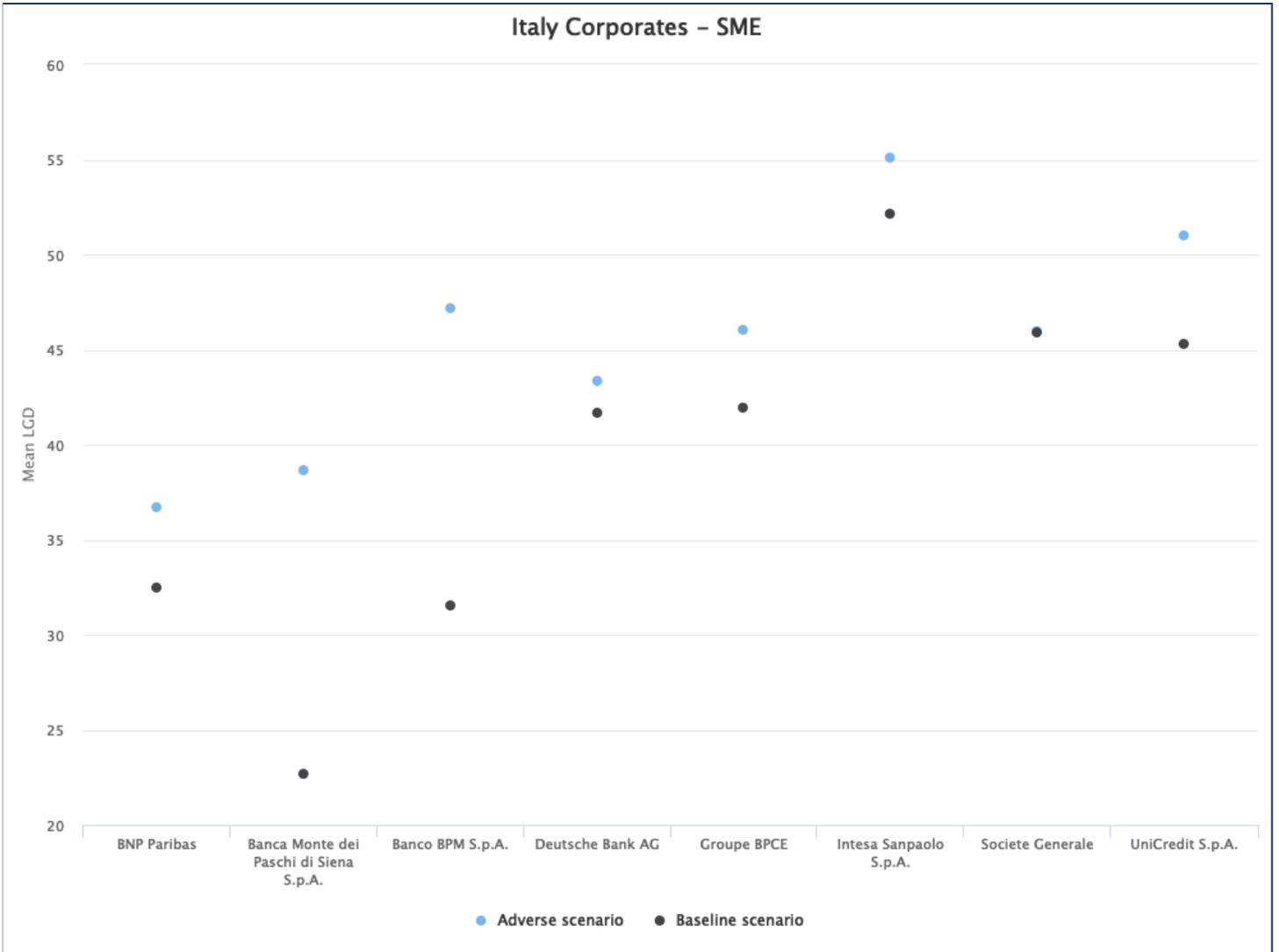


Figure 8d. The mean LGD over the 3 year stress test horizon by scenario and bank (Source: EBA, Calculation: NPLM).

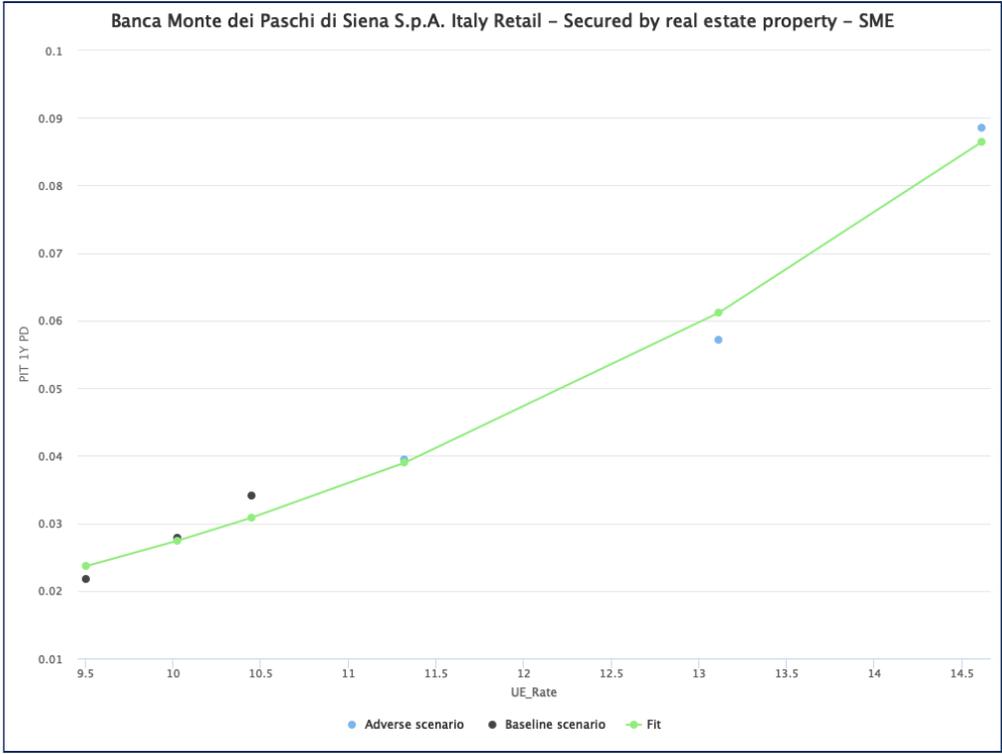


Figure 9a. The one year PD observed over three years in two scenarios fitted by a linear model using the unemployment rate.

The probit transformed PD is modelled. (Source: EBA, Calculation: NPLM).

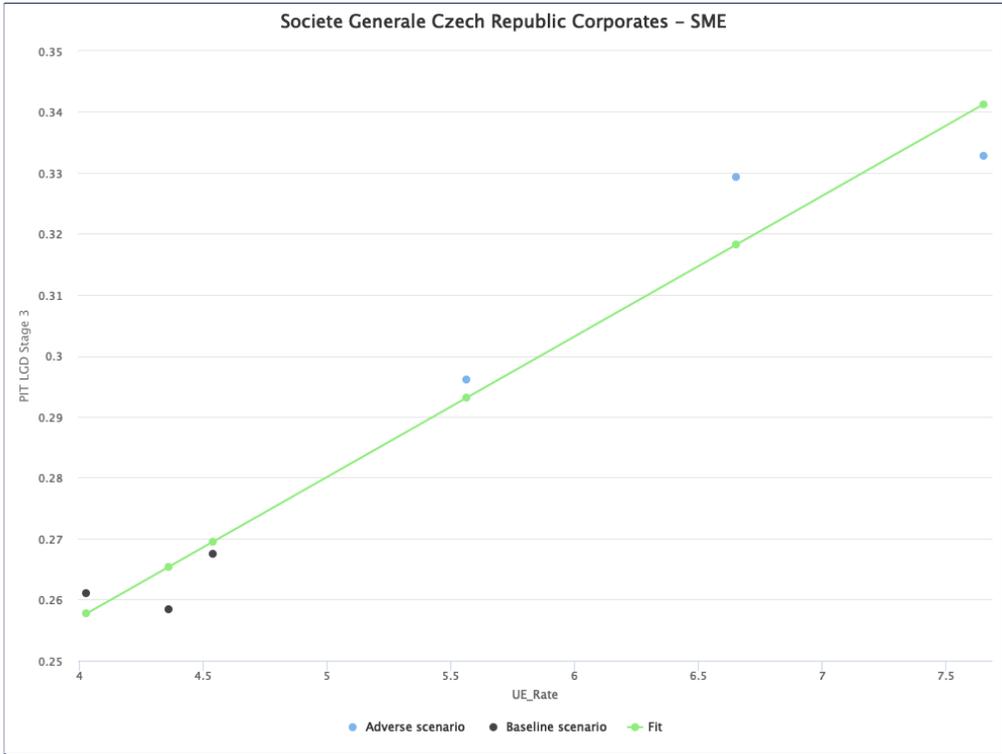


Figure 9b. LGD observed over three years in two scenarios fitted by a linear model using the unemployment rate. (Source: EBA, Calculation: NPLM).

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About NPL Markets

NPL Markets is an innovative marketplace for illiquid loan trading operating throughout Europe that is based on the four pillars: Data preparation, Marketplace execution and investor reach, Valuation, and Reporting. NPL Markets helps sellers to prepare and standardize transaction data and select the optimal transaction portfolio based on balance sheet impact, supports investors with deal screening and initial valuation and provides online revaluation and reporting tools.

With the help of its proprietary data mapping and transformation tool NPL Markets helps financial institutions to map their data to the data formats defined by EBA for NPL transactions and by ESMA for securitisation disclosures. Once standardized and validated the loan-level data can be uploaded to the NPL Markets valuation tool to conduct a detailed discounted cash flow analysis using pre-populated pricing parameters in different macroeconomic scenarios across all major asset classes.

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