Accounting vs. prudential disclosure - An empirical analysis of credit institutions in the context of valuation and impairments

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Abstract

This paper analyses the effectiveness of regulatory measures in regard to non-performing exposures through the relationship of accounting provisions and regulatory provisioning requirements of European banks. Additionally, the first observable effects of the Prudential Backstop are analysed. First, the accounting and regulatory frameworks are presented with their respective terminology and methods. After that, the analysis is conducted with data from the EBA-transparency exercises from 2019 to 2021. The results show that further reduction of IRB-Shortfall has been achieved for almost all institutes, while larger institutes, institutes from higher NPL countries and institutes with retail and corporate focussed business models being affected the most in terms of alignment of accounting provisions and regulatory provisioning needs. The Prudential Backstop so far exhibits only extremely limited effects, as most exposures are not yet affected. So far larger institutes, institutes with retail business models and institutes from higher NPL countries are affected the most.

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1 Introduction

After the global financial crisis in 2008, many European countries faced high Non performing Loans (NPL) ratios.[3] As high NPL ratios limit credit growth, lead to an increase in unemployment and set back economic growth[4][5], the resolution of NPL became a priority for banking regulation. One of the obstacles in the way of resolution was that completely different methodologies were used by institutes for valuation, provisioning and assigning risk weights to loans. As a result, regulators and investors were unable to accurately assess the risk level in the banking sector.[6] Definitions of key terms surrounding NPL, such as default and non-performing were widely varying leading to further differences within institutes.[7]

This overall situation led to different actions by banking regulators. When addressing NPL, further disclosure requirements were implemented for banks facing high NPL-ratios they were urged to implement strategies to resolve NPLs. In the case of provisioning, a more uniform framework, that recognised credit losses more timely, was needed, which led to the development and implementation of the International Financial Reporting Standard (IFRS) 9[8]. Further, in order to have more comparable approaches within all institutes, multiple guidelines were issued, laying down expectations in regard to the provisioning models used. All these measures were effective in reducing NPL-levels within the European Banking sector, as the average NPL-ratio decreased to 1.95% in the first quarter of 2022.[9]

The European Union (EU) capital regulation further prescribed that any provisioning shortfall (IRB[10]-Shortfall) should be deducted from Common Equity Tier 1 capital (CET1), whereas any excess of provisioning could be added to Tier 2 capital up to 0.6% of Risk weight Assets (RWA). This way the risk from credit losses is accounted for within the institutes' risk management, even if they are not provisioned for. This measure does not address the provisioning behaviour of institutes directly, however

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[3] Cf. European Banking Coordination "Vienna" Initiative, 2012, p. 4.
[4] Cf. Klein, 2013, p. 16.
[5] Cf. Nkusu, 2013, p. 20.
[6] Cf. BCBS, 2017, p. 3.
[7] Cf. EBA, 2017b, p. 3.
[8] Cf. ECB, 2014, p. 65.
[9] Cf. ECB, 2022, p. 67.
[10] IRB = Internal ratings-based.

it can be used as a measure of misalignment between actual on balance sheet (accounting) provisions and regulatory provisioning needs, expressed in expected losses. After the financial crises, especially institutes from vulnerable countries showed this misalignment between the recognition of accounting provisions and regulatory provisioning needs, which then improved after the crises, with additional supervisory provisioning being imposed.[11]

Additionally, the Prudential Backstop has been implemented, as part of the European Commission's "Action Plan to Tackle NPLs in Europe", which aims to reduce the future build-up of NPL and reduce the current stock[12]. It is meant to reduce NPL levels and further increase provision coverage on NPE by establishing time-based minimum coverage requirements for NPE, as the provisioning behaviour of banks has not much changed in terms of coverage of NPE.

This paper aims to give insight into the provisioning behaviour of banks in relation to the regulatory requirements, using the IRB-Shortfall and -Excess as a measure insufficient or excessive provisioning within the accounting framework from a regulatory perspective. By this, the effectiveness of the regulatory measures to reduce NPL and enforce adequate provisioning is measured. Furthermore, first effects of the Prudential Backstop are analysed. The analyses are conducted with data from the European Banking Authority (EBA) transparency exercise which have been aggregated on a size, business model and country NPL classification along which the results are interpreted.

The paper is structured as follows: First, the theoretical frameworks are addressed. The accounting framework and the valuation, provisioning and impairment of loans within this framework are presented. This is followed by the regulatory framework, where all key terms surrounding the regulatory provisioning requirements and the Prudential Backstop are displayed and the underlying models and their specifications are laid out. Concluding the theoretical framework section of the paper, the IRB-Shortfall and -Excess as well as the Prudential Backstop are shown. Following the theoretical segment of this paper, the analysis of the European banking sector

[11] Cf. ECB, 2014, p. 65.

[12] Cf. EC, 2017, accessed on 05.10.2022.

in regards to IRB-Shortfall and -Excess as well as the Prudential Backstop is conducted. Research questions are developed first, followed by a depiction of the data set used. Then the analysis of IRB-Shortfall and -Excess is conducted, followed by the analysis of the Prudential Backstop. The last part of the paper summarises the key elements and gives a brief overview of possible future research.

2 Theoretical framework

2.1 Accounting framework - IFRS 9

The accounting framework that will be focussed on in this paper is the IFRS 9, as all major banks report their financial assets – and thus their loans – according to the standards laid out therein. IFRS 9 has been the mandatory standard in the EU since the first of January 2018 for consolidated financial statements, replacing the incurred credit loss model, and with it the "too little too late" recognition of loss allowances, of International Accounting Standard (IAS) 39 with an expected credit loss model.[13][14] As an accounting framework, the main objective of the IFRS is to present stakeholders with a true and fair view of the financial situation of corporations and enable them to make efficient decisions, especially considering investment.[15]

2.1.1 Asset valuation, provisioning and impairment

Under IFRS 9 financial assets are initially recognized either as amortised cost, as fair value through profit or loss, or as fair value through other comprehensive income, based on the business model in accordance with the asset and the cash flows associated with it.[16] Loans for this matter are usually classified in the amortised cost category, as most financial institutions originate them with the purpose of holding them until maturity and collecting interest and repayment. This leads to loans being measured at their fair value at initial recognition. Subsequent measurement takes into account only principal repayments, any amortisation using the EIR-

[13] Cf. IFRS Foundation, 2022, accessed on 05.10.2022.
[14] Cf. Deutsche Bundesbank, 2019, p. 75.
[15] Cf. Küting, Pfitzer, Weber, 2013, p. 12.
[16] Cf. IFRS Foundation, IFRS 9.4.1.

method[17] and loss allowances.[18] Interest revenue is generally computed via the EIR-method on the gross carrying amount of financial assets.[19]

Provisioning under IFRS 9 is conducted via loss allowances for expected credit losses, which are to be recognised for every loan. The extent of the loss allowances varies depending on the stage, at which the loan is recognised. Three different stages are to be differentiated, with the first stage measuring the loss allowance through 12-month Expected credit loss (ECL).[20] Loans enter the first stage upon initial recognition.

If the credit risk of a loan is seen to have increased significantly in relation to initial recognition, this loan shall enter the second stage. Under the second stage, the loss allowance is measured at lifetime ECL, leading to an overall increase in provisioning.[21] While it is not clearly defined, what amounts to a significant increase in credit risk, there is the rebuttable presumption that risk has significantly increased when a debtor has become more than 30 days past-due.[22] Further, if the credit risk of a loan is deemed to be low, a bank is permitted to assume that credit risk did not increase significantly. This exemption is to be used in a limited manner and every use has to be based on clear evidence that a significant increase in credit risk has not taken place.[23][24] For loans within stages one and two interest income is calculated through the EIR-method on the gross carrying amount of the asset.[25]

Loans that become credit-impaired are transferred into stage three, where additionally to the loss allowances being measured at lifetime ECL, interest income is calculated by applying the EIR to the amortised cost of the loan.[26] A loan is viewed as credit-impaired if one or more events, such as significant financial distress of an obligor, default or past-due events, bankruptcy of an obligor or concessions towards an obligor for reasons of financial distress, negatively affect estimated future cash

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17 EIR = Effective interest rate.
18 Cf. IFRS Foundation, IFRS 9.5.2.1.
19 Cf. IFRS Foundation, IFRS 9.5.4.1.
20 Cf. IFRS Foundation, IFRS 9.5.5.5.
21 Cf. IFRS Foundation, IFRS 9.5.5.3.
22 Cf. IFRS Foundation, IFRS 9.5.5.11.
23 Cf. EBA, 2017a, p. 47.
24 Cf. IFRS Foundation, IFRS 9.5.5.10.
25 Cf. IFRS Foundation, IFRS 9.5.4.1.
26 Cf. IFRS Foundation, IFRS 9.5.4.1 (b).

flows.[27] A further exact definition of credit-impairment or default does not exist. However, a rebuttable presumption that a default does not occur later than the moment a loan becomes more than 90 days overdue is implemented and it is advised that the definition of default used is consistent with the definition used in internal risk management and for regulatory purposes.[28][29] Further, the banking regulation also pushes banks to guide their accounting definition of default off of the regulatory definition.[30] The regulatory definition of default will be laid out under section 2.2.1.1. of this paper.

Lowering the stage of loans back to stages two or one is also possible, if the credit-impairment is cured or the significant increase in risk has subsided.

The following chart gives an overview over the different stages and measures connected to them in regards to provisioning and calculation of interest:

Impairment according to IFRS 9			
	Stage 1	**Stage 2**	**Stage 3**
Calculation of loan loss provisions	12-month expected credit loss (9.5.5.5)	Lifetime expected credit loss (9.5.5.3)	
Calculation of interest	Effective interest rate on gross carrying amount (9.5.4.1)		Effective interest rate on amortised cost (including ECL) (9.5.4.1 b)
Entry and Upgrading	First recognition (Exception for Purchased or Originated Credit Impaired Exposures) (9.5.5.5)	Significant increase in credit risk (Exception if credit risk of exposure is determined as low 9.5.5.10)	Credit-impairment event (9.5.4.1 b, 9.5.5.10) POCI (9.5.5.13)
Downgrading	No further downgrade	Significant decrease in credit risk	Curing of credit-impairment

Figure 1: Impairment and staging according to IFRS 9

2.1.2 Specifications of the expected credit loss model

Credit losses are defined as the difference between the contractual cash flows of an asset and the discounted expected future cash flows from the contract.[31] The relevant discount rate under IFRS 9 is the EIR at initial recognition.[32] Expected credit losses are defined as probability weighted estimate of credit losses over the expected lifespan of the loan.[33] This generally opens up the measurement of ECL

[27] Cf. IFRS Foundation, IFRS 9 Appendix A.
[28] Cf. IFRS Foundation, IFRS 9 Appendix B 5.5.37.
[29] Cf. BCBS, 2015, p. 24.
[30] Cf. EBA, 2017a, p. 37.
[31] Cf. IFRS Foundation, IFRS 9 Appendix A.
[32] Cf. IFRS Foundation, IFRS 9 Appendix B 5.5.44.
[33] Cf. IFRS Foundation, IFRS 9 Appendix B 5.5.28.

through an EAD*PD*LGD approach[34], which is used by almost all institutions.[35] The model used has to incorporate historical, current and forward looking data, concerning all areas relevant to the estimation of ECL, including macroeconomic variables. Further, banks are required to generate multiple different scenarios that are taken into consideration for ECL estimation. Temporary adjustments to the models are allowed to be made to account for risk factors, that would otherwise not appropriately be considered in the model.[36] If adjustments are applied, they have to be consistent with forward-looking forecasts and have to be properly documented.[37] These adjustments, also referred to as overlays, have e.g. been applied in relation to the COVID-19 crisis, leading to higher ECL.[38]

Due to the inclusion of forward-looking data and expectations concerning the economic developments, as well as banks having to define significant credit risk increases for themselves, there is the possibility for a lot of discretion in provisioning for ECL which may harm comparability of financial statements or may even lead to disincentives to accurately depict the financial situation of the institute.[39][40]

In regards to their ECL models, banks are also expected to use common processes for accounting as well as regulatory purposes to the highest extent possible, such as in PD estimation, rating systems or the overall data used to classify loans, in order to reduce incentives for inappropriate credit risk management and to ensure consistency.[41][42]

2.1.3 Effect of profitability on provisions and use of provisions

Provisions directly influence profitability. This does not come as a surprise as provisions directly reduce equity through profit and loss. However, the more interesting aspect is how provisions are used by the management of an institute in order to achieve certain goals. Loan loss provisions may be used by institutes to manage

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34 EAD = Exposure at default, PD = Probability of Default, LGD = Loss Given Default
35 Cf. EBA, 2021, p. 11.
36 Cf. BCBS, 2017, pp. 10-14.
37 Cf. EBA, 2017a, p. 30.
38 Cf. EBA, 2021, pp.11-12.
39 Cf. Deutsche Bundesbank, 2019, p. 81.
40 Cf. Beerbaum, Piechocki, 2017, p. 6.
41 Cf. EBA, 2017a, p. 21.
42 Cf. BCBS, 2015, pp. 17-18.

their earnings and smooth their results.[43] When earnings within a year are low, managers are incentivised to reduce loan loss provisions in order to boost profitability[44], while during years of high profitability, managers can be incentivised to increase provisions to build up a reserve for later use.

2.2 Regulatory framework

The European regulatory framework Regulation (EU) No 575/2013 (CRR) follows the main purpose of preserving financial stability and protecting deposits of creditors.[45] It is in line with the international requirements of the Basel Capital Framework. Due to this it follows the approach of setting expectations on the amount of provisions to be made in order to ensure this goal. Concerning the provisioning of loans it entails multiple corrections/ additions to the accounting framework, such as the IRB-shortfall/-excess and the prudential backstop through which the regulatory acceptable provisioning of loans is achieved. In the context of these measures, the key terms of supervisory reporting and public disclosure have to be contrasted, which include defaulted exposures, non-performing exposures and forborne exposures.[46]

2.2.1 Definitions of key terminology

2.2.1.1 Defaulted exposures

Defaulted exposures (art. 178 CRR) include all exposures, that are either past-due on a material exposure for more than 90 days, or exposures, in regard to which full repayment is unlikely without realisation of collateral. Further, all exposures that are classified as stage 3 according to IFRS 9 are also regarded as defaulted.

Materiality of a past-due exposure is defined by an absolute and a relative threshold. Retail exposures are regarded as material in absolute terms if they are greater than 100,-€, while non-retail exposures are regarded as material when they are greater than 500,-€. In relative terms, the National Competent Authorities (NCA) can set a threshold between zero and two and a half percent of the credit obligation past-due in relation to total on-balance obligations of the debtor. The EBA however suggests,

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43 Cf. Norden, Stoian, 2013, pp. 11-18.
44 Cf. Collins, 1995, p. 268.
45 Cf. BCBS, 2015, p. 5.
46 Cf. BCBS 2017, p. 3.

that the threshold is set at one percent. Both thresholds have to be breached in order for a past-due amount to be considered material.[47]

Indications for the unlikeliness of full repayment include bankruptcy of the debtor, Specific Credit Risk Adjustment (SCRA) due to significant declines in credit quality being recognised, or restructuring of a credit obligation where a lesser financial obligation is likely.

Generally, the definition of default is applied on a debtor basis, however for retail exposures it may be applied on an individual exposure basis. When classified on an individual basis, an optional pulling effect may be applied, which considers a debtor as defaulted, when the individual defaulted exposures towards that debtor exceed 20% of all on-balance sheet exposures of that debtor.[48]

An exposure is placed back into non-defaulted status, when the definition of default no longer applies, but not before a minimum probation period of three months.[49]

2.2.1.2 Non-performing exposures

Non-performing exposures (art. 47a CRR) are defined as all exposures, which are more than 90 days past-due on a material exposure or unlikely to be repaid in full without making use of collateral, including all exposures that are considered defaulted according to art. 178 CRR or credit-impaired (stage 3) according to IFRS 9. Materiality is assessed the same way as for defaulted exposures.

The classification of exposures as non-defaulted on an individual basis or on debtor basis depends on the cause of non-performance of the exposure. If it is classified as non-performing due to being defaulted or through art. 47a CRR, then the classification shall follow the one of defaulted assets. If it however is classified as non-performing due to being credit-impaired, then the transaction-based approach of the IFRS is taken.

Additionally, the pulling effect is mandatory when it comes to non-performing exposures, which differentiates the classification from defaulted exposures, where it is only optional.

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[47] Cf. EBA, 2016b, p. 3.
[48] Cf. EBA, 2016c, p. 14.
[49] Cf. EBA, 2016c, p. 12.

For exposures to be reclassified to performing status, there are to be no amounts past-due more than 90 days and full repayment is to be viewed as likely, without the use of collateral, while also all discontinuation criteria for the classification as defaulted or credit-impaired have to be met.[50]

2.2.1.3 Forborne exposures

Debt contracts in regards to which forbearance measures have been applied are considered as forborne exposures (art. 47b CRR). Forbearance measures are viewed as concessions towards a debtor that have been granted due to financial distress or in order to prevent financial distress such as modifications to the contract or refinancing of debt.

Forborne exposures can also be classified as credit-impaired, defaulted and non-performing. The discontinuation of the classification as forborne depends on the further classification. An exposure is classified as non-performing while being forborne when at the point in time of the forbearance measures it is classified as non-performing or is classified as non-performing due to the forbearance measures. Further, forborne exposures are considered as non-performing if they become re-forborne or become more than 30 days past-due while they are considered performing forborne. They can be reclassified to a performing forborne exposure if there are no further past-due amounts, there is no concern regarding repayment and at least one year has passed since the forbearance measures.[51] When a forborne exposure is classified as performing, it is placed on a minimum two year probation period and can be cured to overall performing status when no amounts are past-due more than 30 days and there have been repayments of more than an insignificant amount of principal and interest over the period of one year. An exposure can also be immediately classified as performing forborne under probation, if the extension of forbearance measures has no led to the exposure being classified as non-performing and it was not considered non-performing at the moment of extension of measures. The following figure displays the possible categorisations and gives a brief overview over the criteria for reclassification.[52]

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[50] Cf. Commission implementing regulation (EU) 2015/227 Annex V.
[51] Cf. Commission implementing regulation (EU) 2015/227 § 157.
[52] Cf. Commission implementing regulation (EU) 2015/227 § 176.

	Classification	Event	Consequence
Forborne exposure (§163)	Performing forborne under probation (§ 178, §180) Minimum two year probation	§ 176 does not apply	Performing exposure under probation (§ 177)
		§ 176 applies	**Performing Exposure**
		Second forbearance measure or over 30 days past due (§ 179)	Non-performing forborne exposure (§180)
	Non-performing forborne exposure (§ 180) Minimum one year probation	§ 157 applies	Performing Exposure under probation (§ 180)
		§ 157 does not apply	Non-performing forborne exposure (§ 180)

All legal references are in reference to Commission Implementing Regulation (EU) 2015/227

§ 157

One year has passed since the forbearance measures

no past-due amounts after forbearance measures

no concern regarding full repayment
e.g. payments equal to the amount of past-due or written-off

§ 176

Minimum two year probation period since classification as performing

Regular payments of more than an insignificant aggregate amount of principal or interest over at least one year

No exposure past-due more than 30 days at the end of the probation period

Figure 2: Classification of forborne exposures

2.2.1.4 Overview of the exposure types

The following depiction serves to give a brief overview over the most important features of each of the exposure classes mentioned and shows the interlinkages between them:

Performing Exposure

Fully performing: No past-due amount and no risk of non-repayment

Performing assets past-due below 90 days

Performing assets which have been renegotiated where it didn't qualify as forbearance

Non-performing exposure Art. 47a CRR and for reporting purposes

Material Exposure past-due more than 90 days

Exposure unlikely to be repaid in full without realisation of security

Pulling effect: if the gross carrying amount of a more than 90 days past-due exposure is greater than 20% of an obligor's on-balance sheet exposures, all exposures are classified as non-performing

Examples
Credit obligation is put on non-accrued status
Specific credit risk adjustment resulting from a significant perceived decline in credit quality is recognized
Sale of credit obligation at a material creditrelated economic loss
Bankruptcy of obligor (or filing thereof)

Effect on **CET1** due to deduction of applicable amount of insufficient coverage for NPE

Forborne Exposure Art. 47b CRR and for reporting purposes

Debt contracts in regards to which forbearance measures have been applied

Forborne exposures consist of concessions made towards a debtor that is experiencing or about to experience financial difficulties

Examples of forbearance measures
Modification of contract terms
Refinancing of troubled debt
Approval of use of embedded forbearance clauses for a debtor that is non-performing or would be considered non-performing without the use of the clauses

Default Art. 178 CRR

Material Exposure past-due more than 90 days
Exposure unlikely to be repaid in full without realisation of security

Optional: Pulling effect
Effect on **capital ratios** and **own funds requirements** through computation of risk weights and regulatory capital amounts within the Standard and IRB-approach

Credit impaired IFRS 9

Stage	Entry	Measurement of impairment
Stage 3	credit-impairment event	lifetime expected credit loss (eff. Interest rate on amortised cost)

Figure 3: Overview over the exposure classes

2.2.2 Regulatory provisioning under the IRB-Approach

Under the IRB-approach the level of provisioning determined to be appropriate is determined differently based on whether the foundation IRB-approach or the advanced IRB-approach is used by the institution. The level of provisioning is always based on the calculation of expected losses, while minimum capital requirements for unexpected losses can be viewed as indirect additional provisioning, which is carried out on the basis of Risk Weightes Exposure Amount (RWEA).[53]

[53] Cf. Regulation (EU) No 575/2013 (CRR), art. 92.

Both calculations, for expected losses, as well as for unexpected losses are based on PDs, LGDs and exposure amounts. Under the foundation IRB-approach, institutes do not estimate LGDs themselves, except for retail exposures, but instead rely on the LGDs laid out in art. 161 (1) CRR. Under the advanced IRB-approach, institutes apply own estimates for LGDs for non-retail exposures as well.

2.2.2.1 Expected Losses

For non-defaulted exposures, the calculation of expected losses (art. 158 CRR) follows the following formulae:

$$EL = PD * LGD$$

Equation 1: Calculation of expected losses (source: art. 158 (5) CRR)

$$ELA = EL * risk\ exposure$$

Equation 2: Calculation of expected loss amounts (source: art. 158 (5) CRR)

For defaulted exposures the calculation differs based on the IRB-approach of the institute. Under the foundation IRB-approach expected losses for defaulted exposures are equal to the LGD according to art. 161 (1) CRR, as the PD for defaulted exposures is always equal to 1, regarding non-retail exposures. The advanced IRB-approach calculation for expected losses is used for retail exposures.

Expected losses under the advanced IRB-approach are equal to the Expected loss best estimate (ELBE).

2.2.2.2 Unexpected Losses

The RWEA for unexpected losses (art. 153 f. CRR) is generally calculated according to the following formulae for non-retail exposures:

$$RW = \left(LGD * N\left(\frac{1}{\sqrt{1-R}} * G(PD) + \sqrt{\frac{R}{1-R}} * G(0.999)\right) - LGD * PD\right) * \frac{1+(M-2.5)*b}{1-1.5*b} * 12{,}5 * 1{,}06$$

Equation 3: Calculation of risk weights (source: art. 153 (1) CRR)

Where:

N(x) = the cumulative distribution function for a standard normal random variable

G(Z) = the inverse cumulative distribution function for a standard normal random variable

R = the coefficient of correlation, defined as

$$R = 0.12 * \frac{1 - e^{-50*PD}}{1 - e^{-50}} + 0.24 * \left(1 - \frac{1 - e^{-50*PD}}{1 - e^{-50}}\right)$$

Equation 4: Calculation of the coefficient of correlation (source: art. 153 (1) CRR)

b = the maturity adjustment factor, defined as

$$b = (0.11852 - 0.05478 * \ln(PD))^2$$

Equation 5: Calculation of the maturity adjustment factor (source: art. 153 (1) CRR)

If the exposure is a retail exposure, the formula for calculation of the Risk weight (RW) is the same as equation 4, with the only difference being that no adjustment concerning the maturity of the exposure is included in the formula. Further, the co-efficient of correlation is adjusted to be lower, resulting in lower risk weights.

For defaulted exposures under the foundation IRB-approach, the risk weight is always equal to 0. If the advanced IRB-approach is used, the risk weight is calculated according to the following formula:

$$RW = \max\{0; 12.5 * (LGD\ in\ default - ELBE)\}$$

Equation 6: Calculation of RW of defaulted exposures under advanced IRB-approach (source: art. 153 (1) CRR)

This causes no indirect provisioning through Minimum Capital Requirement (MCR) of defaulted exposures under the foundation IRB-approach, while under the advanced IRB-approach direct regulatory provisioning through EL, as well as indirect provisioning through MCR is applied.

2.2.2.3 Estimation of PD

In order to be adequate, the PDs used within the calculations of expected losses and RW, in order to account for unexpected loss (UEL), need to be reflective of the long-run average PD of the exposure type in question. The long-run average PD is to be calculated as the average of one-year default rates observed by the institute. Whenever the institute recognises that data is missing or of lacking quality, a margin of conservatism is to be applied. The PD used for the calculations is also benchmarked to the maximum value of either the average of the one-year default rates of the five most recent years or the average of one-year default rates over all periods for which data is available.[54]

2.2.2.4 Estimation of LGD

The estimation of LGDs should generally be based on each institutions own loss and recovery experiences. Institutions should take into account all relevant data concerning the obligor and the transaction, as well as all data in relation to the date

[54] Cf. EBA, 2017b, pp. 10, 21-23.

of default and all cash flows and events that occurred after the date of default. Data on collateral valuation is only to be taken from before the date of the default, as revaluations during default tend to be more conservative and thus would not be fit for non-defaulted exposures LGD estimation. Further, economic downturn conditions need to be implemented in the processes of LGD estimation in order to include scenarios of overall worsening of the economic situation. The discount rate to be used to discount cash flows for LGD estimation is equal to the interbank funding rate and a five percent add-on. For any lack of data, a margin of conservatism is to be applied. The resulting LGD estimates should be the higher of the LGD based on the long-run average LGD and the LGD based on downturn conditions.[55]

2.2.2.4.1 Estimation of ELBE

The ELBE generally has to be estimated using the same estimation methods of the LGD and may be obtained through the long-run average LGD on defaulted exposures, including any adjustments, whenever they are necessary. It may also be obtained through accounting provisions, if the accounting provisions are determined in accordance with all requirements laid out in regards to own LGD estimation of the CRR and the EBA guidelines on PD and LGD estimation or can be adjusted to meet those requirements. In contrast to the estimation of LGD, the ELBE estimation should not take into consideration any margin of conservatism and data of collateral valuations that have taken place after defaults of exposures should also be considered.[56]

2.2.2.4.2 Estimation of LGD in default

Like the ELBE, the LGD in default is also to be estimated using the same methods for estimation of the LGD. It can be estimated by either taking the sum of ELBE and adding an add-on that captures UEL and considers adverse development of economic conditions or through the long-run average LGD, which has been adjusted

[55] Cf. EBA, 2017b, pp. 21, 27-33.
[56] Cf. EBA, 2017b, pp. 35-40.

for downturn conditions, an additional margin of conservatism and additional potential expected losses.[57] The LGD in default should reflect the EL under current economic circumstances and the UEL that might occur during the recovery period.[58][59]

2.3 Accounting framework vs. regulatory framework

2.3.1 IRB-Shortfall/ IRB-Excess

IRB-Shortfall or –Excess (art. 159 CRR) is calculated as the sum of specific and general credit risk adjustments, additional value adjustments according to art. 34 and 105 CRR and other own funds reductions related to an exposure minus the regulatory expected loss amounts calculated according to § 158 CRR. Positive differences contribute an IRB-Shortfall, as accounting provisions and further measures are not satisfactory to fulfil regulatory provisioning needs. This leads to any IRB-Shortfall amounts to be deducted from CET1 capital according to art. 36 (1)(d) CRR. Negative differences amount to an IRB-Excess, which portrays overprovisioning in relation to the regulatory provisioning requirements. IRB-Excesses can be recognised as Tier 2 (T2) capital up to 0.6% of RWEA according to art. 62 (d) CRR. The IRB-Shortfall and -Excess is to be determined separately for institutes portfolios of defaulted and non-defaulted exposures. While an IRB-Excess of the portfolio of non-defaulted exposures may be used to offset an IRB-Shortfall of the portfolio of defaulted exposures, it is not possible to reverse the roles. This way, an IRB-Excess and IRB-Shortfall can coexist within an institute, showing the level of underprovisioning of non-defaulted exposures and overprovisioning on defaulted exposures. Overall, the IRB-Shortfall and -Excess can be used as measures of under- or overprovisioning of institutes, due to the direct comparison of regulatory needs and accounting measures taken.

While generally, the calculation of accounting provisions and regulatory provisioning needs should share the same methods, data and processes as far as possible, differences always remain. They arise due to the different goals of the accounting framework and regulatory framework. The regulatory goal of financial stability and securing deposits of creditors focusses on a more conservative approach than the

[57] Cf. EBA, 2016a, art. 54(2)(a).
[58] Cf. EBA, 2016a, p. 14.
[59] Cf. EBA, 2017b, p. 41.

accounting framework, with the goal of informing stakeholders about the current state of the institute in order to form decisions. Differences thus are present in the models, as for regulatory provisioning needs downturn conditions need to be considered, a margin of conservatism is required and discount rates differing from the accounting models are used to compute provisions.

2.3.2 Prudential Backstop

The prudential backstop (art. 36 (1)(m), 47c CRR) is a further regulatory measure that assures appropriate coverage of non-performing exposures. Implemented through regulation (EU) 2019/630, the prudential backstop is meant to ensure appropriate coverage of non-performing exposures, following the idea that the longer an exposure is regarded as non-performing, the more unlikely repayment becomes. It requires institutes to compute the amount of insufficient coverage for each exposure by subtracting all Credit risk adjustment (CRA), own funds reductions, value adjustments, the IRB-shortfall determined for the exposure and any write-offs or differences of purchasing price and nominal value from the exposure value, multiplied with a factor based on the exposure type, collateral that has been received in relation to it and the time since classification as non-performing. The following table shows the different factors according to the different classifications:

		Coverage Factors										
Years after classification as non-performin		1	2	3	4	5	6	7	8	9	10	11
Collateralization	unsecured	0	0	0.35	1	1	1	1	1	1	1	1
	secured by other collateral*	0	0	0	0.25	0.35	0.55	0.8	1	1	1	1
	secured by imm. Property	0	0	0	0.25	0.35	0.55	0.7	0.8	0.85	1	1
		Coverage Factors if forbearance measures are granted in the marked year										
Collateralization	unsecured	0	0	0	0.35	1	1	1	1	1	1	1
	secured by other collateral	0	0	0	0	0.25	0.35	0.55	0.8	1	1	1
	secured by other collateral	0	0	0	0.25	0.25	0.35	0.55	0.8	1	1	1
	secured by other collateral	0	0	0	0.25	0.35	0.35	0.55	0.8	1	1	1
	secured by other collateral	0	0	0	0.25	0.35	0.55	0.55	0.8	1	1	1
	secured by imm. property	0	0	0	0	0.25	0.35	0.55	0.7	0.8	0.85	1
	secured by imm. property	0	0	0	0.25	0.25	0.35	0.55	0.7	0.8	0.85	1
	secured by imm. property	0	0	0	0.25	0.35	0.35	0.55	0.7	0.8	0.85	1
	secured by imm. property	0	0	0	0.25	0.35	0.55	0.55	0.7	0.8	0.85	1

* secured by other collateral refers only to CRR eligible collateral

Year of forbearance measure

Changed coverage factor in the following year

Table 1 Coverage factors of the prudential backstop (based on art. 47c CRR)

The prudential backstop causes unsecured non-performing exposures to be fully covered at the start of the fourth year, while collateralised exposures need to be fully covered after seven years, or even nine years if they are collateralised by immovable property. This is expected to move institutes to decrease their amount of Non-performing exposures (NPE), especially for collateralised exposures, as higher amounts of collateral are associated with lower LGDs and thus also lower provisions.[60][61]

Forbearance measures also play an important role within the prudential backstop, as they can allow institutes to uphold the applicable factor for an additional year, if they are applied within the marked timeframes depicted in the table.

Any insufficient coverage determined through the prudential backstop is to be deducted from CET1 according to art. 36 (1)(m) CRR, however it only applies to exposures originated after the 25th of April 2019.[62] This further CET1 reduction is not recognised in the calculation of RWEA, which leads to the calculation of RWEA for non-performing exposures, that have already been fully deducted from CET1. The additional capital requirements stemming from this fact could force institutes into fully provisioning the amounts of the exposures affected by the prudential backstop, in order to evade them.

For exposures originated before the 25th of April 2019, the European Central Bank (ECB) has set regulatory expectations within their Pillar 2 assessment, which is a more simplified approach wherein unsecured exposures are to be fully covered by the third year and secured exposures are to be fully covered by the eight year, regardless of type of collateral.[63]

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60 Cf. Hidding, 2021, p. 29.
61 Cf. Binder, Glos, Riepe, 2020, p. 1125.
62 Cf. Regulation (EU) No 575/2013 (CRR), art. 469a.
63 Cf. ECB, 2019, p. 10.

2.4 Overview of frameworks and terminology

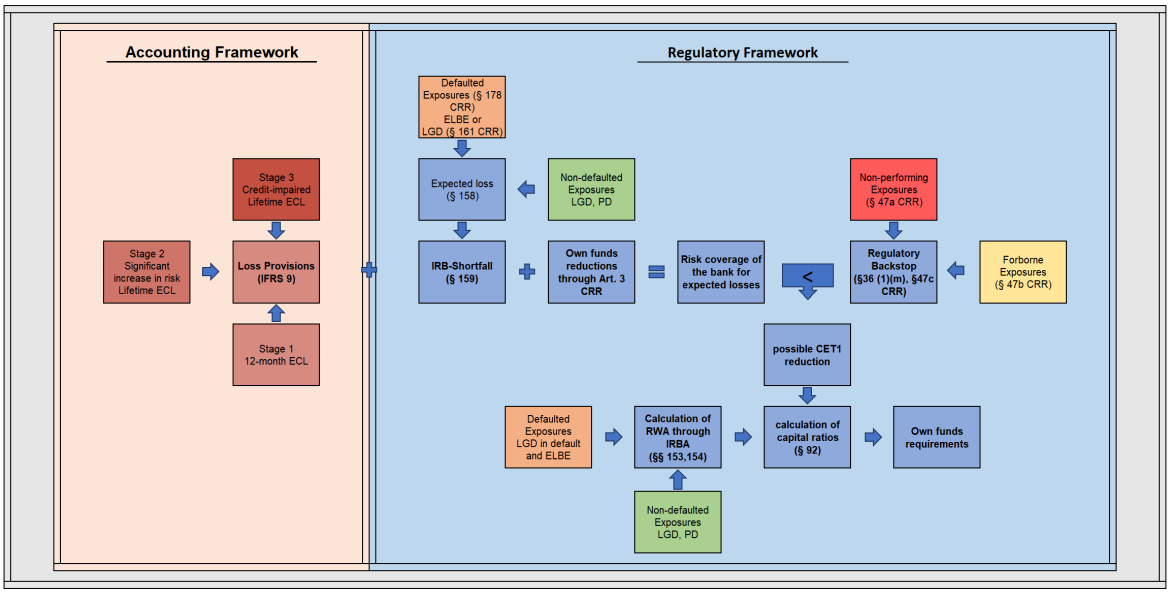

Figure 4: Overview of interconnections of accounting and regulatory framework

Within the accounting framework the calculation of loss provisions takes place. It is directly connected to the regulatory framework through the calculation of the IRB-Shortfall and -Excess where expected losses for defaulted and non-defaulted exposures are compared with the accounting provisions. If the provisions, IRB-shortfall and further own funds reductions of an institutes non-performing exposures are lower than the prudential backstop, additional CET1 is deducted. This increases own funds requirements. The own funds requirements are further influenced by the calculation of RWEA for defaulted and non-defaulted exposures, which constitute an indirect provisioning.

3 Analysis of Credit Institutions

3.1 Research questions

Banking regulators have taken many different measures in order to tackle the problem of non-performing loans and the timely recognition and provisioning of these, such as aligning the regulatory and accounting provisioning to the highest degree possible, expanding disclosure for institutes with high NPL ratios and bringing these institutes to develop NPL strategies. In regards to these measures, the amount of IRB-Shortfall and -Excess, as well as the prudential backstop can be used to evaluate, to which degree these measures have taken effect. The IRB-Shortfall and -Excess can give an overview over the general level of under- or overprovisioning of the banking sector and give insight into the overall provisioning behaviour. The amount of prudential backstop further shows the level of underprovisioning taking place for non-performing exposures, giving an insight into the overall risk coverage of the banking sector.

This overall leads to the first research question: Do the measures taken by the banking regulation take effect in institutes, leading them to adequately provision for their risks?

Further, a more detailed analysis of the banking sector could give a deeper insight into which banks are more affected by the measures. Different business models could be affected differently, based on the type of lending they provide. Different size institutions could be affected differently, as banking supervision generally follows the principle of proportionality, which may leave smaller, less complex institutes with more possibilities to (mis-)use discretion. Additionally, the overall level or strength of supervision may differ on a country-level within the EU, which could also bring up differences in the level of provisioning and the adequacy thereof.

These considerations conclude in three further research questions:

1. Are institutes of different business models affected differently?
2. Are institutes of different sizes affected differently?
3. Are institutes of different countries affected differently?

In the case that some institutes are affected differently, it would be necessary to understand the driving forces of these differences in order to adequately address

these differences in the future. One driver could be the institutes' ability to use discretion within their accounting provisions, in order to influence their profit- or loss-situation. Reductions of accounting provisions could be used to boost profitability on paper and increases could be planned in profitable years to build reserves for less-profitable years. Due to these considerations, the last research question is formed:

Is there a relationship between the level of provisioning and the profit or loss of the institute?

Additionally, the effect of the Prudential Backstop on institutes is of interest. Especially the reactions of institutes are interesting, as multiple measures could be taken in order to reduce the effect. Provisions could be increased, forbearance measures could be extended in higher quantities or NPE could be removed from the institutes' assets through sales. These reactions will also be analysed within the analysis of the Prudential Backstop but will have to be limited to the coverage of unsecured NPE, as these are the only ones which may exhibit any effect due to the maturity conditions of the Prudential Backstop. For this, the CET1-capital deduction through the Prudential Backstop, the NPE-provision coverage ratio (Coverage Ratio), the NPE-Ratio and the Forborne-NPE-Ratio will be examined.

3.2 Description of the data set

The data set used to answer the research questions is the data provided by the EBA transparency exercises from 2018 to 2021. The institutes viewed are the institutes from the 2021 transparency exercise, consisting of detailed data from 120 institutes and one position for 15 other banks. Due to no detailed data on these 15 banks existing, the consolidated data on these banks is dropped. The data has been assessed on a quarterly basis, however data gaps persist for the second half of 2019.

For the analysis of the IRB-Shortfall and IRB-Excess the data only of the 68 banks which use the IRB-approach in determining credit risk is used. As the data of the EBA transparency exercise does not provide data on the IRB-Excess and instead only lists it in the consolidated position "Other Tier 2 Capital components and deductions", the data is enhanced with the IRB-Excess data taken from the institutes' Pillar 3 disclosure reports, which they publish semi-anually. Due to data constraints the IRB-Excess data only covers the period since 2020. The IRB-Excess data has further been cross-checked for compatibility with the EBA transparency exercise

data by comparing the reported values of the IRB-Shortfall and CET1 capital within the reports. Whenever the three semi-annual reports, or where available, quarterly reports, data on IRB-Excess matched the position “Other Tier 2 Capital components and deductions” within the EBA-transparency exercise period, it is assumed that for those institutes the position within the exercise is equal to the IRB-Excess in order to gain as many data samples as possible. If differences between the positions occurred, only the data reported within the pillar 3 disclosure reports is considered. Institutes, for which no data was available, were excluded.

The profit and loss data has been calculated to represent the profit and loss of the respective quarter. When no data on previous quarters existed, in order to compute the quarterly data, the data sample has been excluded. This leads profit and loss data only to be available from the third quarter of 2018.

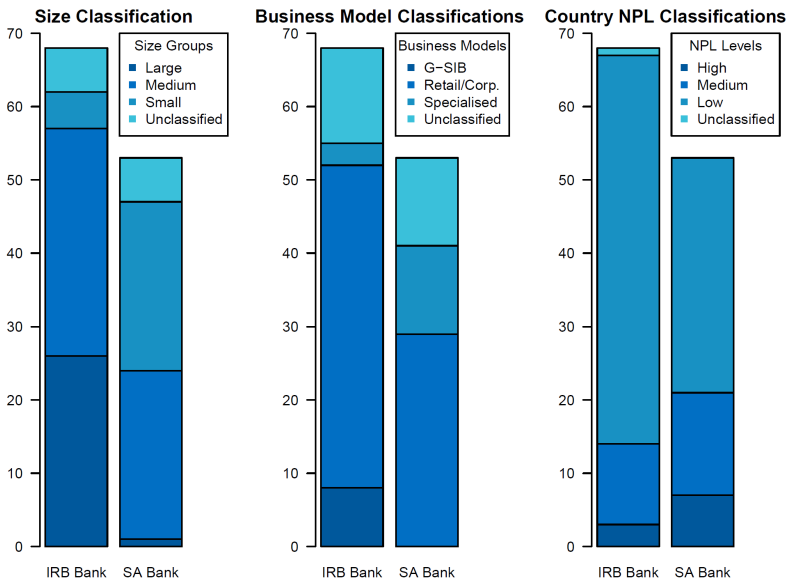

Figure 5: Classifications of institutes

Within the data set, the banks are categorised along their credit-risk approach, their size, business model and the institutes home state.

Of the institutes observed, 67 use the IRB-approach, while 53 use the standard approach (SA) to measure credit risk.

The size classification is determined by the average total assets of the institutes, during the observation period, in relation to the other institutes total assets. Institutes are regarded as large, when their total assets exceed the 75%-quantile, while they are regarded as small, when their total assets fall short of the 25%-quantile.[64] All

[64] Based on the size classification within the EBA risk dashboard analyses.

banks in between are regarded as medium-sized. This leads to a total of 27 large, 54 medium-sized, 28 small and 12 unclassified[65] institutes.

Three groups of business model classifications have been determined, Global systemically important banks (G-SIB), retail- and corporate-lending focussed institutes and specialised institutes, such as asset managers or custodians. Of the institutes observed, 8 are regarded as G-SIBs, 73 are categorised as retail/corporate institutes and 15 as specialised, while 25 remain unclassified.[66]

The country grouping of banks has been carried out via the institutes' countries' average NPL-ratio during the observation period.[67] Countries with average NPL-ratios under five percent were regarded to as countries with low NPL-ratios. Countries with average NPL-ratios over five percent, but under ten percent are regarded as countries with medium NPL-ratios and countries with average NPL-ratios exceeding ten percent are classified as high NPL-ratio countries. The classification is based upon the five percent limit at which institutes face additional disclosure requirements.[68] Ten banks of the sample are classified in the high NPL group, while 25 are classified in the medium NPL group and 85 are classified in the low NPL group. A detailed list of the institutes and the classifications assigned to them, as well as the data presented, can be found in the appendix.

3.3 Analysis of IRB-Shortfall and IRB-Excess

The analysis is conducted by calculating the average of the IRB-Shortfall and -Excess in relation to CET1, in order to account for different institute sizes, throughout each of the reporting dates of the reporting period. The averages of IRB-shortfall and IRB-Excess are then compared within the groups of the classifications to analyse for differences within the classification groups. Further, within each group, the IRB-Shortfall, IRB-Excess and relative profit and loss are analysed for any relationships and the results are graphically represented.

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65 Due to lack of data within the EBA transparency exercise data set the institutes were not able to be classified. Banks regarded as unclassified are not excluded from the other categories.

66 Business model classifications were based on ECB business classifications and the banks focus of business.

67 Data on the NPL-ratios has been taken from the 2019-2021 EBA risk dashboards.

68 Cf. EBA, 2018, p. 3.

3.3.1 Classification by Size

When viewing the size classification, it is obvious that institutes across all size classes have reduced their IRB-Shortfall.

Large institutes have on average had the lowest IRB-Shortfall in relation to CET1 of about 1.5%, and reduced it to 0.25%. Medium-sized institutes had the highest IRB-Shortfall at the start of the observation period of around 2.3% and reduced it to 0.8%. Small institutes have started out with a relatively low IRB-Shortfall of 1.6% and reduced it to slightly above 0.8%, after having an increase of up to 1.8% during 2019. With this they have shown the lowest reduction of all groups.

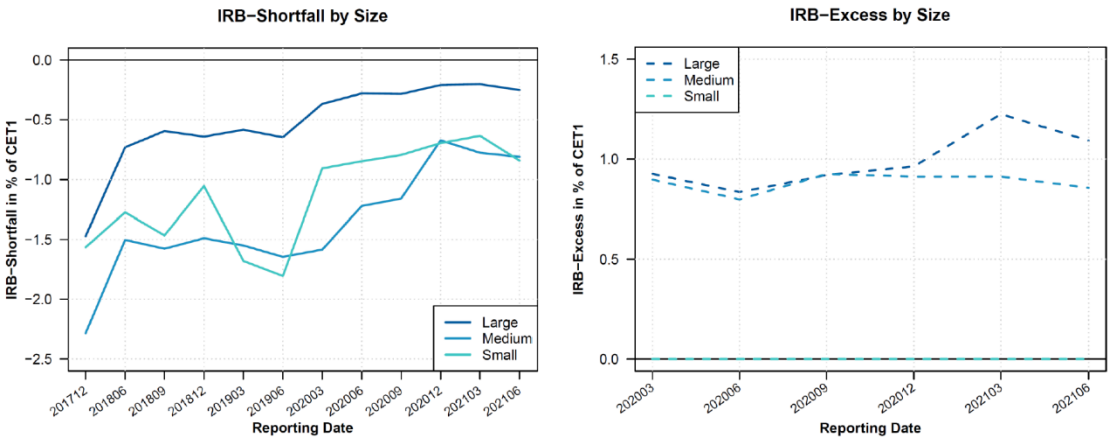

Figure 6 IRB-Shortfall and -Excess by institute size

The development of the IRB-Excess shows the same pattern, however increases are only small, if any. Large institutes slightly increased their IRB-Excess from 0.9% of CET1 to 1.1% during the observation period of 2020 to the second quarter of 2021 and remain the institutes with the highest IRB-Excess. Medium-sized institutes show a slightly reduced IRB-Excess from just under 0.9% to around 0.85%. Small institutes show no IRB-Excess throughout the whole observation period. This could be due to the low sample size, however it could also be an indication, that small institutes generally tend to underprovision their exposures.

Overall, this paints a positive picture in regard to the development of provisioning of the European banking sector. The decreases in IRB-Shortfall show a further alignment of accounting provisions with the regulatory provisioning requirements across all bank sizes, showcasing that the measures to have institutes appropriately provision for their credit risk are taking effect. However, the effect seems to differ between bank sizes, as smaller institutes are less affected as their development regarding

reduction of shortfall remains lower. The overall stable IRB-Excesses within the large and medium-sized institutes, which even exceed the IRB-Shortfalls, showing that on average, exposures are overprovisioned, further support the positive effects of supervisory measures.

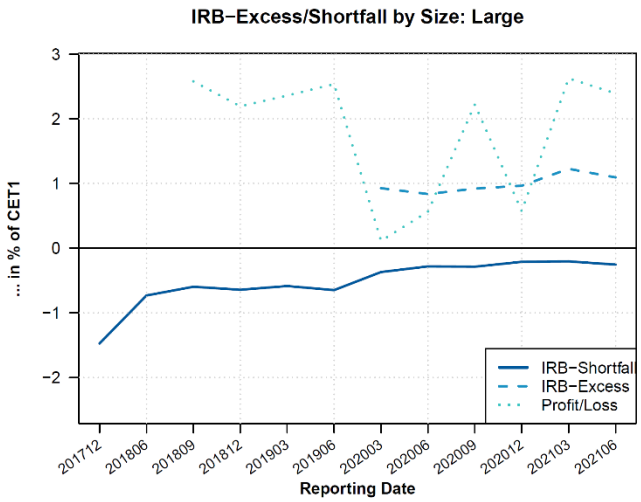

Figure 7: IRB-Excess and -Shortfall of large institutes

Large institutes have increased their IRB-Excess while also decreasing their IRB-Shortfall, showing a conservative provisioning approach, in line with regulatory expectations. Further, their IRB-Excess is about four times the size of the IRB-Shortfall, showing that on average exposures are overprovisioned in regards to regulatory requirements. In regards to profit and loss, there does not seem to be a relationship between the IRB-Shortfall or -Excess as they are decreased or increased in a rather stable manner.

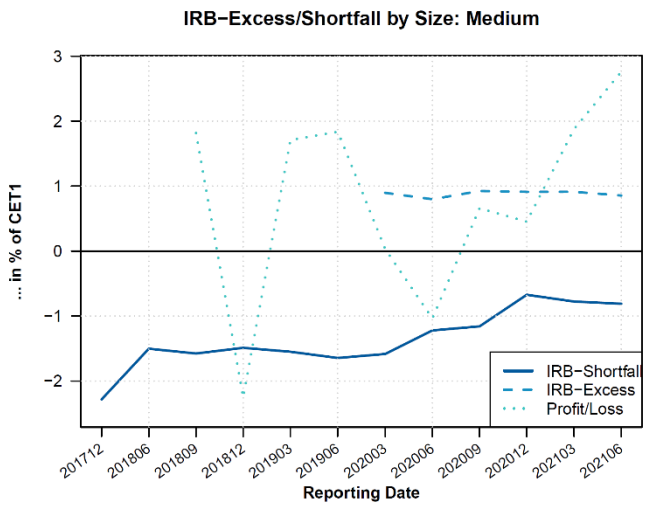

Figure 8: IRB-Shortfall and -Excess of medium-sized institutes

Medium-sized institutes have kept their IRB-Excess stable while further reducing their IRB-Shortfall to about the same level. This leads to the conclusion, that within medium-sized institutes, their credit risk exposures are neither under- or overprovisioned. A relationship between profit and loss and the IRB-Shortfall or -Excess is also not visible.

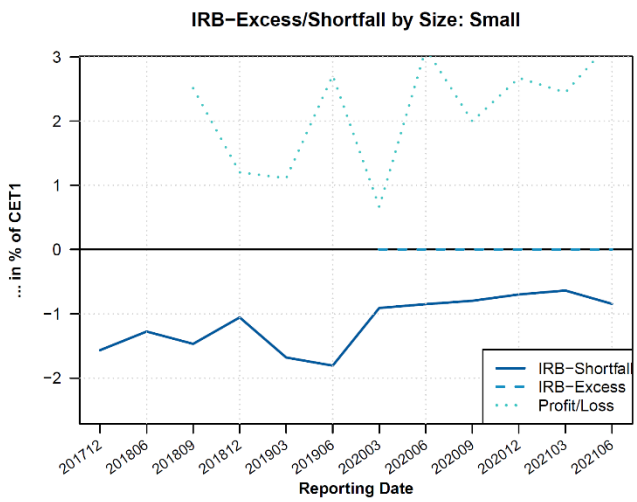

Figure 9: IRB-Shortfall and -Excess of small institutes

Small institutes however show a relationship between profit and loss and IRB-Shortfall. In the period of the second half of 2018 up to the start of 2020, there seems to be a negative relationship. Whenever profit decreases, the IRB-Shortfall increases and vice versa. Write-offs could be the explanation for the decreases in profit, while IRB-Shortfall decreases, however, write-ups would not have the opposite effect. Further the increases in profit, during which the IRB-Shortfall further increases in absolute terms, in the period from the start of 2021 to the second quarter of 2021 could be a sign of using provisions to influence the profit and loss position of the institutes.

3.3.2 Classification by Business Models

IRB-Shortfall has also been decreased throughout all business models. G-SIBs started out with the lowest IRB-Shortfall of 1.3% and reduced it to 0.3%, staying the business model group with the lowest IRB-Shortfall. They are followed by the group of specialized institutes, which have reduced their IRB-Shortfall from 1.4% to 0.6%, however a strong increase in the shortfall can be seen from the start of 2020 to the third quarter of 2020, where it reached a peak of 1.8%. The group of retail and corporate focussed institutes started out with an average shortfall of 2.2% and reduced it to 0.7%.

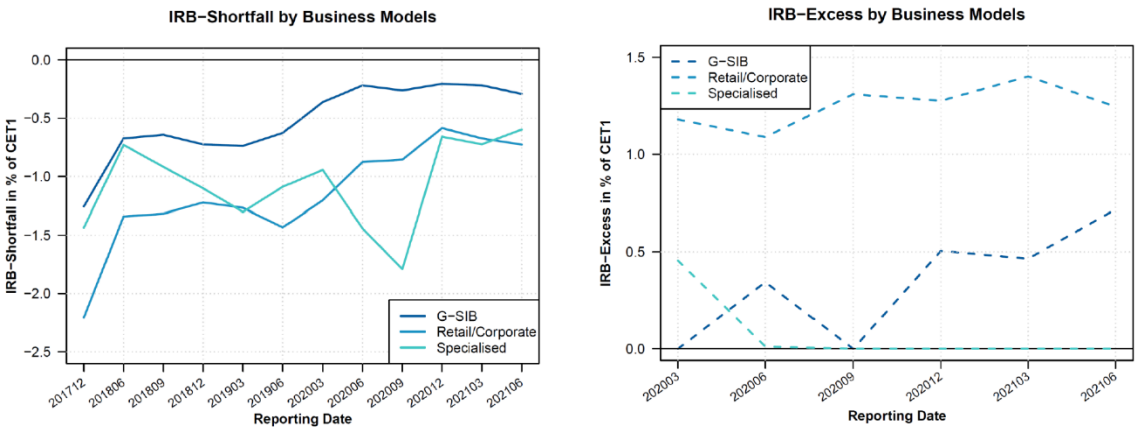

Figure 10 IRB-Shortfall and -Excess by business models

IRB-Excess has developed quite differently between the three groups. G-SIBs have overall increased their excess up to 0.7%. Due to the data sample being quite small for the first and third quarter of 2020, the values may just be results of lack of data. The specialized institutes showed an IRB-Excess for the first reporting date, however it has been reduced to zero by the second quarter of 2020 and stayed there for the rest of the observation period. The excess of the retail and corporate oriented institute group has remained relatively stable around 1.2%, however increased up to 1.4% in the first quarter of 2021.

The overall decrease of IRB-Shortfall within all business models shows that they are all affected by the measures aimed at ensuring proper provisioning of the banking regulation. G-SIBs seem to be especially influenced as the lowest IRB-Shortfall can be seen for them, as well as the biggest increase in build-up of an IRB-Excess.

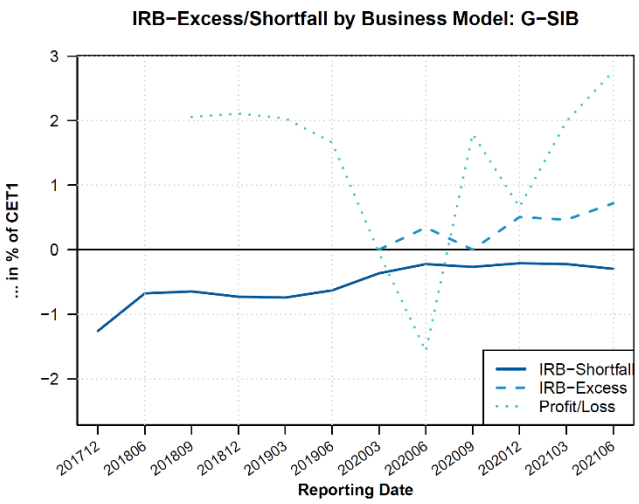

Figure 11: IRB-Shortfall and -Excess of G-SIBs

The group of G-SIB institutes overall steadily increased their IRB-Excess and at the same time reduced their IRB-Shortfall. At the last reporting date, the IRB-Excess is over two times the size of the IRB-Shortfall, showing that overprovisioning is more common than underprovisioning. A relationship between the profitability and the shortfall or excess does not seem to exist.

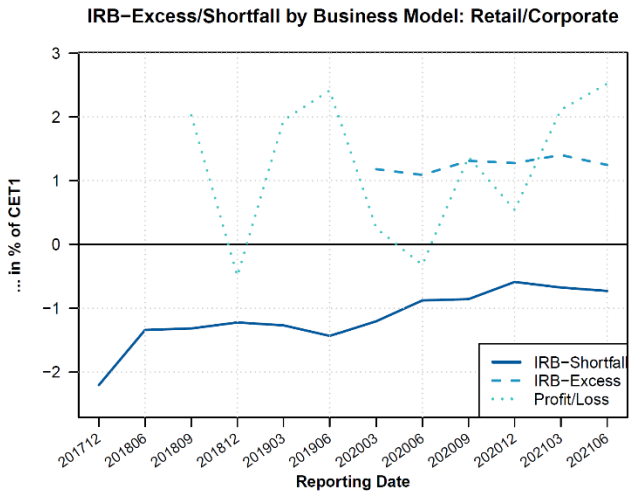

Figure 12: IRB-Shortfall and -Excess of retail- and corporate-oriented institutes

Retail- and corporate-oriented institutes have on average slightly increased their IRB-Excess while at the same time reducing their IRB-Shortfall. For these institutes, the excess also exceeds the shortfall, however not as much as for the group of G-SIBs. A slight relationship between profit and loss and the IRB-Excess and -Shortfall seems to be visible. The same way, as is observable within the group of small institutes, it can be seen, throughout the period from the third quarter of 2018 to the end of the observation period, that with increases in profitability, further increases of the IRB-Shortfall can be observed.

IRB-Excess can be seen to move in the same direction as profitability, with increases in profitability going along with increases in excess and vice versa. This could be a sign of the institutes using provisions to smooth their results and manage earnings by building up reserves when profitability is relatively high and using these reserves when profitability falls.

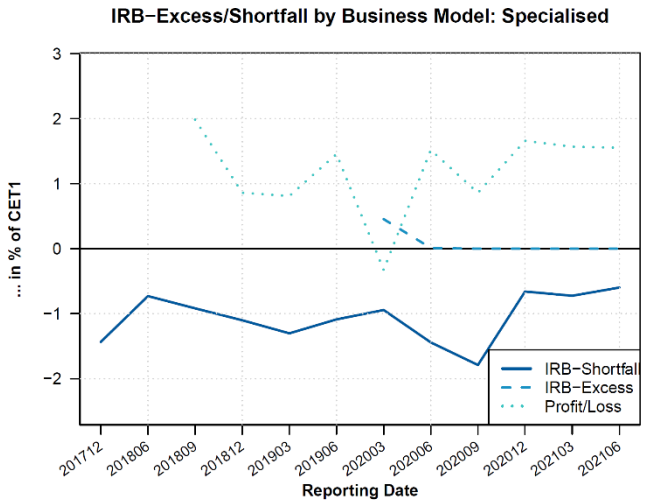

Figure 13: IRB-Shortfall and -Excess of specialised institutes

Institutions with a specialised business model overall reduced their IRB-Shortfall, however, their IRB-Excess also has reduced to no excess being recognised. This does not necessarily lead to the conclusion, that specialised institutes only underprovision, as the sample size is very small with only three observations being available at most. The IRB-Shortfall and profitability seem to be correlated in some way, as, with the exception of the period from the second half of 2019 to the second half of 2020, both

follow the same pattern, with increases and decreases taking place at the same reporting dates. This could be viewed as an indication for possible earnings smoothing.

3.3.3 Classification by Country NPL Groups

Just like in the previous analyses, throughout all country groups, the IRB-Shortfall has also been reduced. The strongest reduction took place in the group of high NPL countries, which reduced their shortfall from 4% to only around 0.2% of CET1. The group of institutes with medium NPL-levels originally had quite a high shortfall moving around 2.4% until the second quarter of 2019, when they started heavily reducing their shortfall to 0.5% at the end of the observation period. Countries from low NPL countries have had the lowest shortfall within the observation period, until the end of 2020, where they reached the highest shortfall of all groups. They have nonetheless also reduced their shortfall from 1.6% to 0.7%.

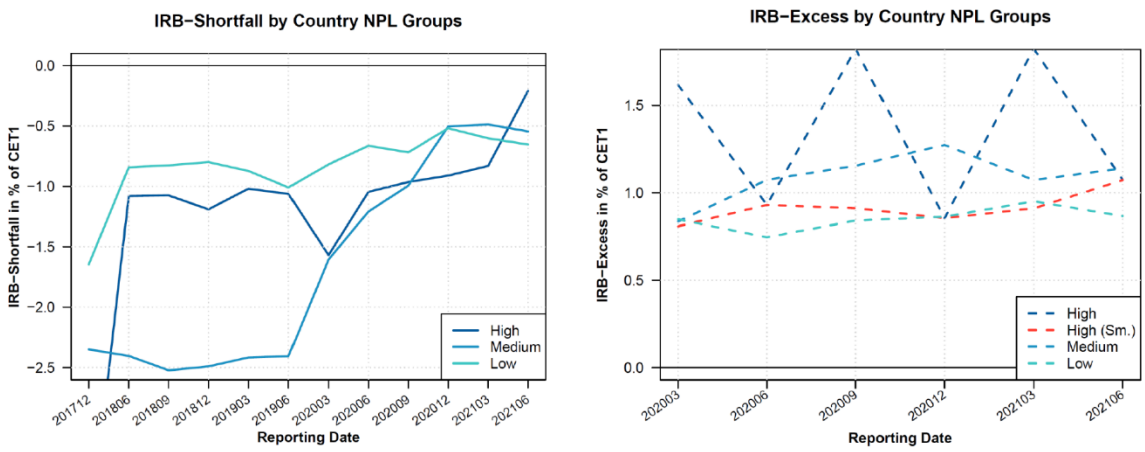

Figure 14 IRB-Shortfall and -Excess by country NPL groups

IRB-Excess has developed similar to the other analyses as well, with the excess staying quite constant, while slight increases can be observed. The institutes show a strong variability within their excess, caused by the small sample size and differences in observation counts between reporting dates. Due to this, the data set has been extended, by assuming that for one of the reporting banks, the reported values of no excess were applicable to all reporting dates. When observing the smoothed results, the high NPL group increased their IRB-Excess from 0.8% to around 1.1%. The medium NPL group also increased their excess from slightly above 0.8% to slightly above 1.1%. The low NPL group stayed relatively constant with an excess of around 0.85%.

The results for the different NPL groups are in line with the previous two group analyses, further showing, that throughout all the countries viewed, the measures of banking regulation take effect. Differences in development of IRB-Shortfall can definitely be seen throughout the countries based on their NPL ratios. Countries with overall higher NPL ratios seem to be affected more strongly, which makes sense, considering the measures are designed to cause reduction of NPL and appropriate provisioning, especially for non-performing exposures. In regards to IRB-Excess, all country groups show about the same development with only slight increases, if any are noticeable.

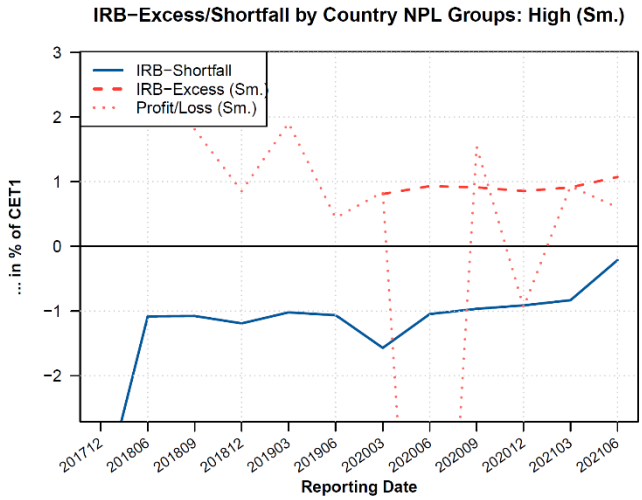

Figure 15: IRB-Shortfall and -Excess of institutes from high NPL countries (smoothed data)

The institutes from the high NPL country group have drastically reduced their shortfall from the end of 2017 to the second quarter of 2018, where they only made slight improvements until 2021, where they again reduced their shortfall quite heavily. At the same time, the IRB-Excess has stayed relatively stable around 0.9%, with slight increases toward the end of the observation period. IRB-Excess is greater than IRB-Shortfall at the end of the observation period, by a great amount. A relationship between profitability and IRB-Excess and -Shortfall does not seem to be present.

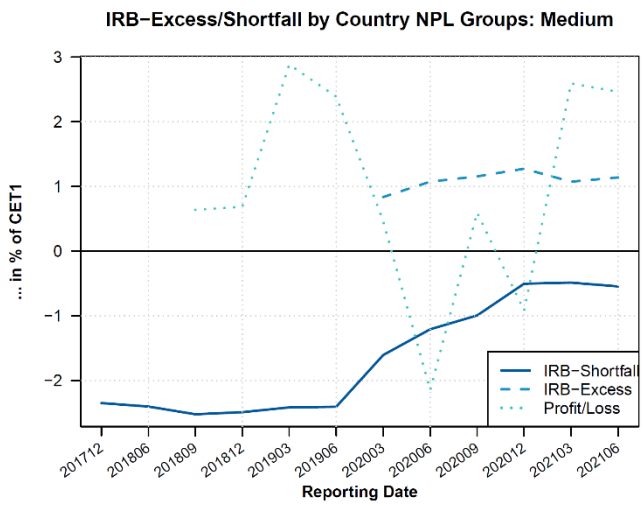

Figure 16: IRB-Shortfall and -Excess of institutes from medium NPL countries

Institutes from medium NPL countries on average did not reduce their shortfall up to the second quarter of 2019. After the second quarter of 2019, IRB-Shortfall has been reduced drastically, which could be attributed to the announcement of the prudential backstop and the

ECB communicating their expectations concerning the coverage of non-performing loans within the Pillar 2 assessment. IRB-Excess has been kept relatively stable , with slight increases towards the end of the observation period. A direct relationship between profitability and IRB-Shortfall and -Excess can not be seen, however the assumption, that the increase in provisioning which led to a strong reduction in IRB-Shortfall did also lead to the losses in the first half of 2020 can be made.

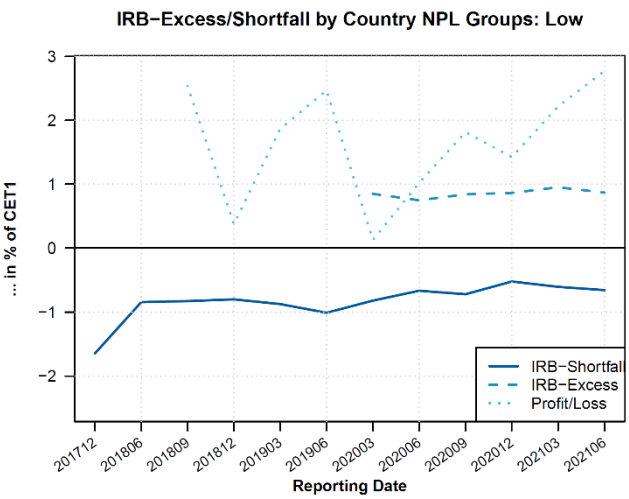

Figure 17: IRB-Shortfall and -Excess of institutes from low NPL countries

The IRB-Shortfall has stayed relatively unaffected at a low level for the institutes from low NPL countries, after an initial reduction from the end of 2017 to the second quarter of 2018. The IRB-Excess also remained relatively stable above the level of shortfall throughout the observation period. A relationship between profitability and IRB-Shortfall seems to exist, in the same way it has been observed for the small institutes. Decreases in profitability go along with increases of shortfall and vice versa.

3.3.4 Summary of results

All in all, IRB-Shortfall has been reduced within the European banking sector, showing that the banking regulations efforts to reduce NPL and establish adequate provisioning are effective in closing the gap between accounting provisions and regulatory provisioning needs. However, certain types of institutes are affected differently than others. Large institutes and G-SIBs have had relatively low amounts of shortfall throughout the observation period and further reduced them. This is in line with the principle of proportionality of supervision, under which the more intensive supervision forces more appropriate provisioning and leaves less room for discretion. Most affected are institutes from high and medium NPL countries, medium-sized institutions and institutes with a focus on retail- and corporate-lending, showing the greatest reductions of shortfall. As the measures are focussed at reducing NPL levels, it comes at no surprise, that institutes from countries with higher NPL levels are more affected than institutes from lower NPL countries. Small institutes, low NPL institutes

and specialised institutes seem to be the least affected, showing the least progress in reducing IRB-Shortfall. These institutes also show a relationship between profitability and IRB-Shortfall, giving rise to the assumption that the lower level of supervision enables them to use more discretion within their provisioning frameworks.

The IRB-Excess has been very stable within all groups observed, mostly staying in a range of around 0.8% to 1.2% of CET1. The only exceptions are small institutes and specialised institutes, which show no IRB-Excess. This could be the cause of the low sample size within these groups, however it could also be evidence that these institutes tend to generally underprovision their exposures. At the last observed date, the IRB-Excess, if any was reported, was always greater than IRB-Shortfall, which overall shows that the institutes tend to overprovision their exposures.

3.4 Analysis of Prudential Backstop

For this analysis, data concerning the CET1-deduction due to the Prudential Backstop, the Provision Coverage Ratio of NPE, the NPE-Ratio and the Ratio of forborne NPE will be viewed on a group average basis on all reporting dates from the start of 2019 to the 30th of June 2021. The group averages, as well as overall distribution data in the case of the CET1-deductions will be compared and evaluated on a group basis. The Coverage Ratio, NPE-Ratio and Ratio of forborne NPE are viewed to analyse any behaviour of institutes in order to reduce stress from the Prudential Backstop by the means of additional provisioning, sale of NPE or use of forbearance measures. The results are presented graphically.

3.4.1 Classification by Size

Different size institutions are on average barely affected by the Prudential Backstop deductions from CET1. Large institutions are affected the most on an institute basis with over 75% of the groups institutes having to deduct under 0.05% of CET1. The average deduction was 0.032% of CET1. Medium-sized institutions are the group with the second highest CET1 deduction with 75% of institutes facing a CET1 reduction of 0.025%. The average reduction, however is way larger with 0.22%, however, this is caused by two outlier institutions. The lowest affected group are the

small institutes with an average CET1 reduction of just above 0.002%, while more than 75% of institutions face an even more minimal reduction of just above 0.001%.

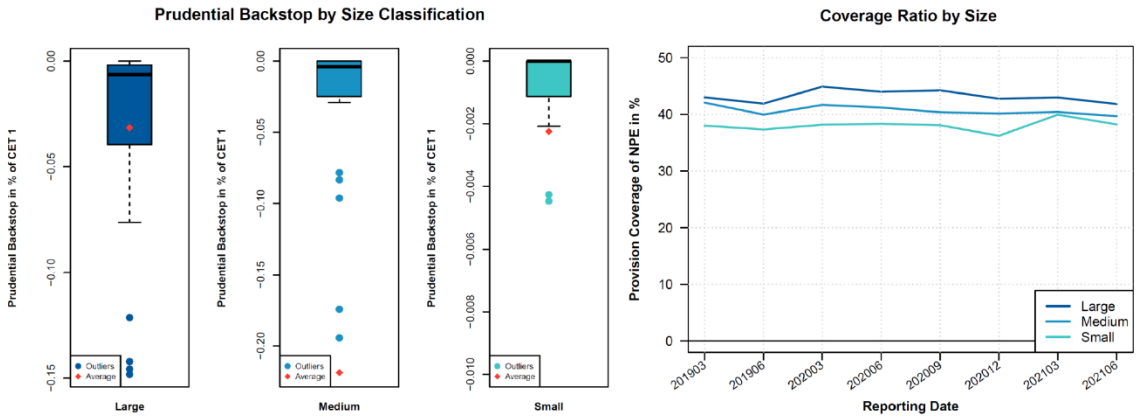

Figure 18 Prudential Backstop and Coverage Ratio by institute size

When looking at the provision coverage of NPE, these low CET1 reductions due to the Prudential Backstop are not surprising, as the average provisioning, during the whole observation period, is over 35% of the exposure value throughout all groups, which would be the minimum required coverage by the Prudential Backstop, that could apply. The average Coverage Ratio also does slightly decrease towards the end of the observation period. What is surprising however, is that the group of large institutes, with the highest coverage ratio of around 43%, is affected the most, and the group of small institutes, with the lowest Coverage Ratio of around 38%, is affected the least.

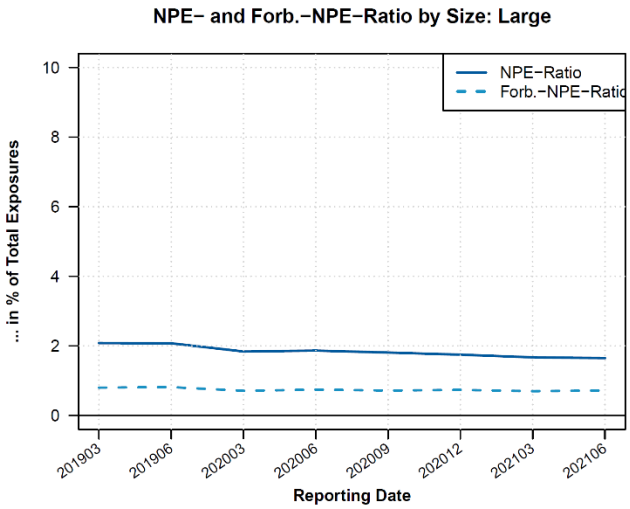

Figure 19: NPE- and Forborne-NPE-Ratio of large institutes

Further viewing the group of large institutes, the overall NPE-Ratio was decreased from 2.08% to 1.65%, while the ratio of NPE with forbearance measures remained around 0.7% of total exposures, meaning that the amount of NPE with forbearance measures increased in relation to overall NPE, which could indicate an extended use of forbearance measures to reduce the burden of the Prudential Backstop by keeping the required coverage factors low.

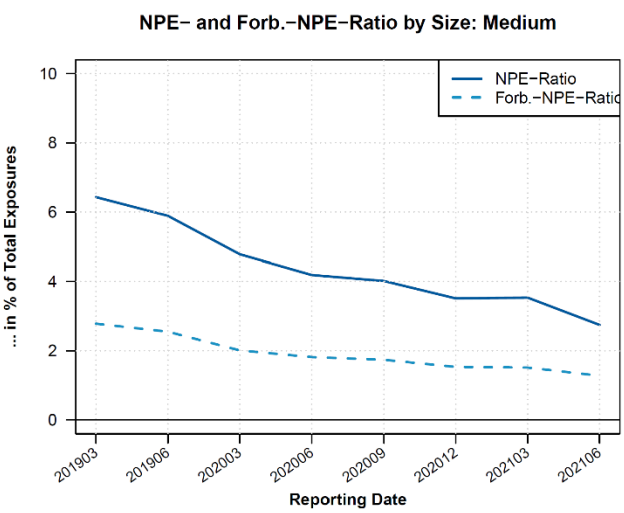

Figure 20: NPE- and Forborne-NPE-Ratio of medium-sized institutes

Medium-sized institutes have drastically reduced their NPE-Ratio by bringing it down to 2.74% from 6.43%. At the same time the average ratio of forborne-NPE has decreased from 2.78% to 1.27%. The overall strong reduction of about 57% in NPE in just over two years shows that the overall measures of banking regulators to reduce NPE are effective, and the strong reduction could also be attributed to the announcement of the Prudential Backstop, as due to it and the communication of the ECB on treatment of NPE that were originated before the 25th of April 2019, institutes are incentivised to increase provisions or reduce NPE-levels. The relatively slightly lower reduction of the ratio of forborne-NPE by 54% also indicate a higher use of forbearance measures on NPE, if only slightly.

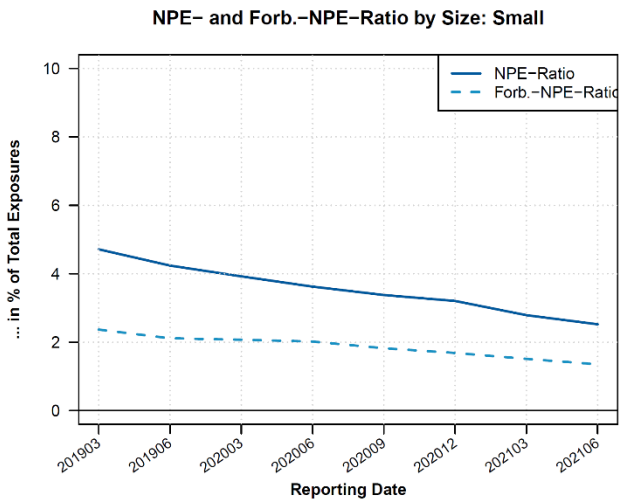

Figure 21: NPE- and Forborne-NPE-Ratio of small institutes

Small institutes exhibit a similar development to the medium-sized institutes, however to a lower degree. They reduced their NPE-Ratio from 4.7% to 2.5% and their Forborne-NPE-Ratio from 2.37% to 1.35%.

These results could indicate that larger institutes face higher deductions through the Prudential Backstop, as they use the least forbearance measures on their NPE.

3.4.2 Classification by Business Model

The business model analysis on the effect of Prudential Backstop shows the same very limited effect of CET1-deductions from the Prudential Backstop, as in the size analysis. G-SIBs are the second most affected group with over 75% of institutes facing a CET1-reduction of under 0.01% and an average deduction of 0.007%. Retail and corporate focussed institutes are the most affected group with an average deduction of 0.13% and over 75% of institutes in the group having less than 0.021% of their CET1 deducted. Specialised institutes remain basically unaffected, as the CET1-deductions, if any are present, are extremely limited. The high group average – which is not depicted, as it is solely based on one outlier and would break the scale – is not representative of the group.

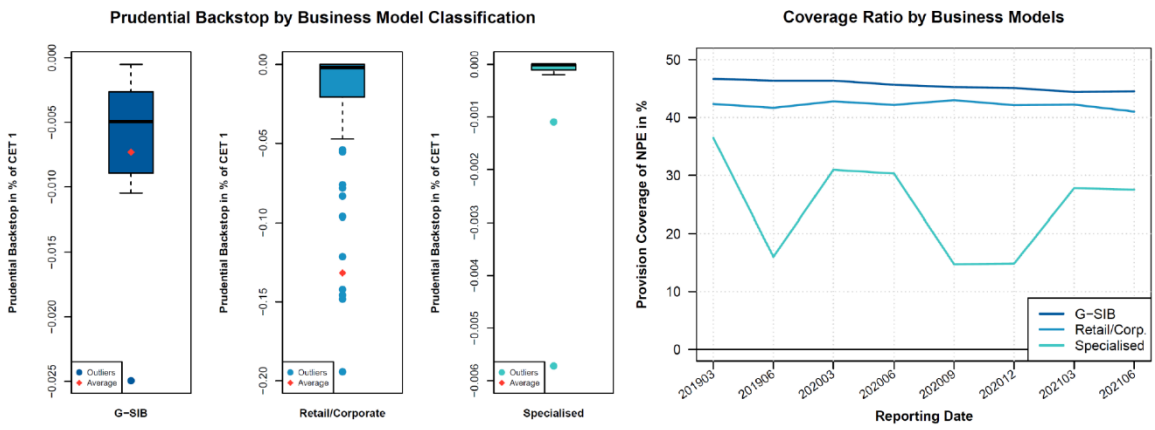

Figure 22 Prudential Backstop and Coverage Ratio by business model

The overall level of unaffectedness can be explained by the Coverage Ratios of around 45% and 42% of G-SIBs and retail and corporate oriented institutes. Interestingly, they tend to decrease towards the end of the observation period. Specialised institutes exhibit a strongly fluctuating Coverage Ratio, which is below the 35%-mark, which would indicate that a CET1-deduction for unsecured NPE should be performed. It also becomes visible again, that the institutes with the higher average Coverage Ratio are more affected than the institutes with the lower ratio.

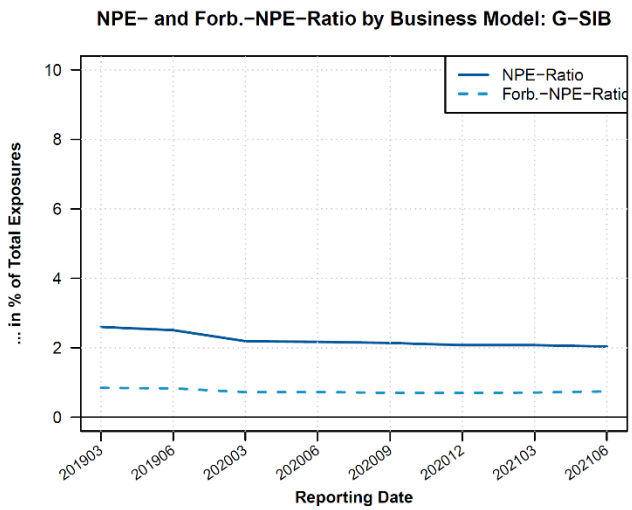

Figure 23: NPE- and Forborne-NPE-Ratio of G-SIBs

G-SIBs have overall further lowered their NPE-Ratio from 2.6% to 2%, while also lightly lowering their Forborne-NPE-Ratio, from 0.85% to 0.75%. Overall this indicates a higher use of forbearance measures on NPE, but does not necessarily indicate a use of forbearance to offset the minimum coverage requirement, as provisioning is on average high enough.

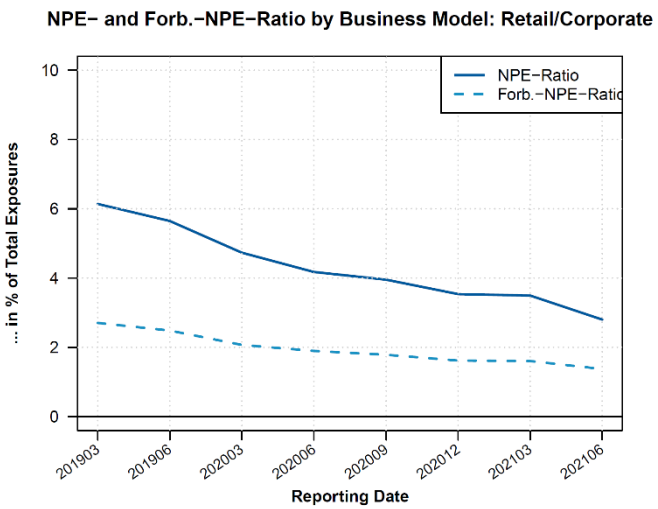

Figure 24: NPE- and Forborne-NPE-Ratio of retail- and corporate-oriented institutes

Retail- and corporate-focussed institutes have heavily reduced their NPE-Ratio from 6.1% to 2.8%, while also reducing their ratio of forborne NPE from 2.7% to 1.4% of total exposures. This development seems about equal to the development of the medium-sized institutes, however the reduction of the NPE-Ratio in relation to the Forborne-NPE-Ratio is even stronger, hinting at a more extensive use of forbearance. Overall, average provisioning for NPE of these institutes is high enough, not to have additional CET1-deductions applied, however, forbearance measures might be used as supportive measures, decreasing the overall level of coverage.

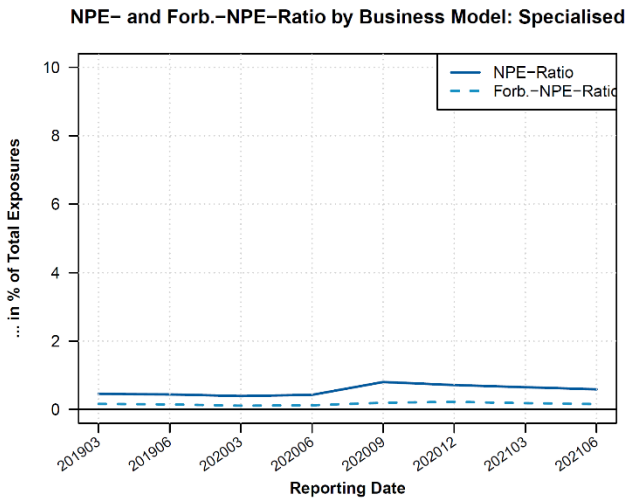

Figure 25: NPE- and Forborne-NPE-Ratio of specialised institutes

Surprisingly, specialised institutes have increased their NPE-Ratio from 0.46% to 0.59%, though it still remains at a very low level. The use of forbearance measures on NPE is also very low, with only a Forborne-NPE-Ratio of around 0.15%, meaning that only about a quarter of all NPE are subject to forbearance measures. This overall development could explain the extremely limited effect of the Prudential Backstop on specialised institutes, as their NPE-Ratio remains miniscule. However, given the low rate of coverage of NPE, either provisioning is mostly carried out only on unsecured NPE or the NPE-portfolio is mostly consisting of secured exposures, considering these results. The prior case would need further attention, while the latter would become visible, given enough time, as the coverage requirements would increase.

Also, in this analysis, the institutions that have a higher coverage ratio, do not exhibit a higher use of forbearance measures on their NPE in relation to their NPE, which leads to the assumption, that a use of forbearance measures to lower the overall level for required coverage may not be the case.

3.4.3 Classification by Country NPL Group

The Prudential Backstop also has a varying effect on institutes from different countries. Institutes from countries of the highest NPL-Ratio group are affected the most with an average CET1-deduction of 0.18%. The general effect is lower, with over 75% of institutes only facing a deduction of under 0.0175%. The institutes from medium NPL countries seem to be affected the least, with an average deduction of only 0.006% of CET1 and over 75% of institutes only having 0.008% or less deducted from their CET1 capital. The second most affected group is the group of institutes

from low NPL countries, with an average deduction of 0.13% and more than 75% of institutes deducting 0.013% or less from their CET1-capital.

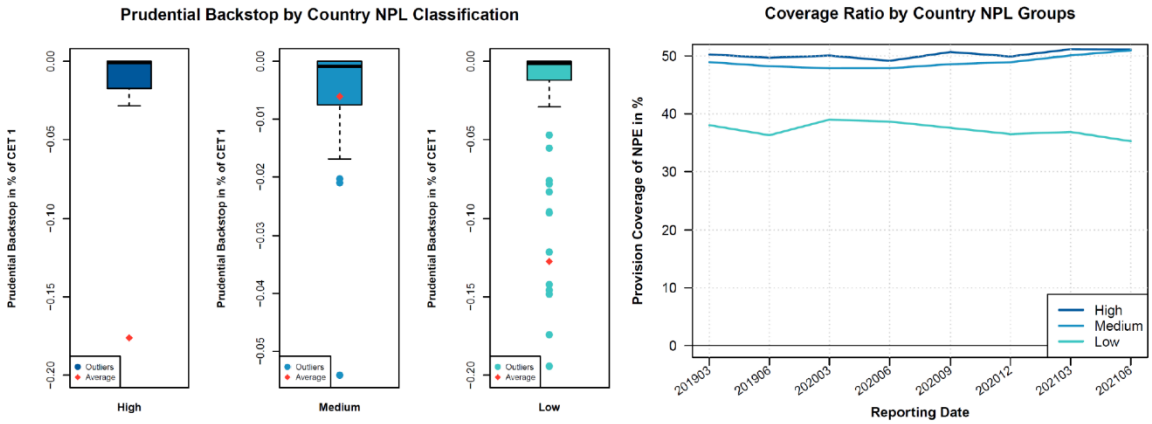

Figure 26: Prudential Backstop and Coverage Ratio by Country NPL Groups

Taking into consideration the average Coverage Ratios, as in the previous analyses, they are above the 35% mark, which again could be an indicator for the low level of effect. Unlike in the previous analyses, the Coverage Ratios do not decrease towards the end of the observation period, except for the low NPL group. Also, the institutes with a higher average Coverage Ratio, do not seem to be affected less than the institutes with a lower average Coverage Ratio of NPE. Overall, one would expect institutes with higher NPL-Ratios to be affected more, as the Prudential Backstop only aims at NPE.

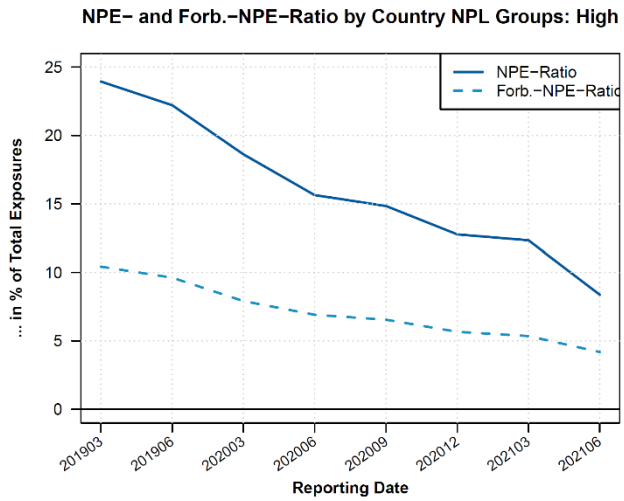

Figure 27: NPE- and Forborne-NPE-Ratio of institutes from high NPL countries

The institutes from high NPL countries have heavily reduced their NPE-Ratio, from 24% down to just above 8%. At the same time, the Ratio of forborne NPE has been reduced from 10.4% to 4.2%, which indicates that overall more forbearance measures are being used on NPE, while a lot of NPE have been taken care off since the announcement of the Prudential Backstop. The increase of use of forbearance could be a temporary measure to limit the effect of the Prudential Backstop, may however also just be a measure applied by the institutes in order to properly deal with NPE. A higher effect

of the Prudential Backstop would be expected in regards to the high NPE-Ratio, however the average Coverage Ratio of the institutes seems to suffice, or the amount of new NPE since the announcement of the Prudential Backstop is low.

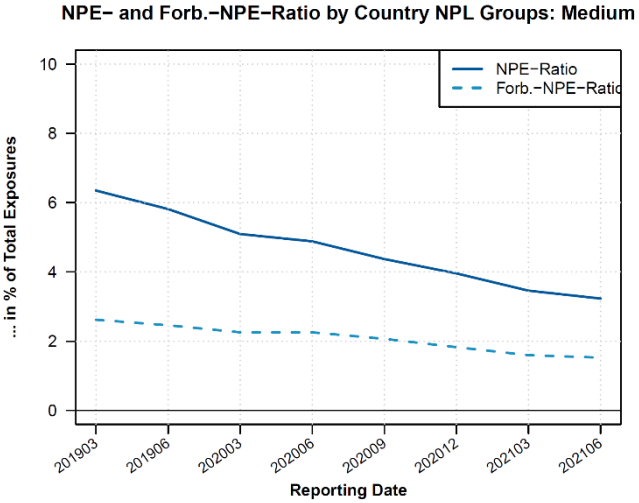

Figure 28: NPE- and Forborne-NPE-Ratio of institutes from medium NPL countries

Institutes from medium NPL countries have also reduced their NPE-Ratio. It was reduced from 6.3% to 3.2%, while at the same time, the ratio of NPE with forbearance measures has been reduced from 2.6% to 1.5%, showing the same development as most of the institute groups within the analyses. There is no conclusive reason for the institutes from medium NPL countries being the least affected from these results, as they neither exhibit an extremely low amount of NPE, nor do they use forbearance measures very extensively, which may hint at the fact, that their coverage of NPE is overall just more appropriate.

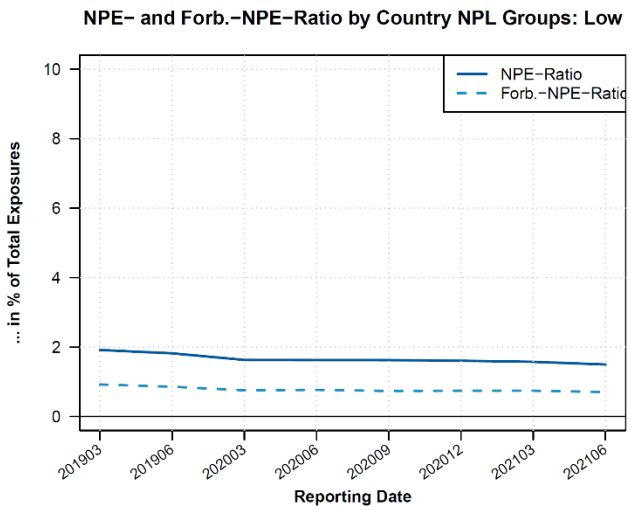

Figure 29: NPE- and Forborne-NPE-Ratio of institutes from low NPL countries

The institutes from low NPL countries have also reduced their NPE-Ratio from 1.9% to 1.5%, while reducing their ratio of forborne NPE from 0.9% to 0.7%. Their NPE-Ratio is very low throughout the whole observation period, which could explain the low impact of the Prudential Backstop even while their Coverage Ratio is substantially lower than the ratios of the other institute groups, similar to the group of specialised institutes.

3.4.4 Summary of results

Summarising the group analyses, the Prudential Backstop has an extremely limited effect on the European banking sector, with most institutes barely facing any CET1-deductions due to the Prudential Backstop. One main reason for this are that only exposures that were originated after the 25th of April 2019 and shortly after the origination turned non-performing would have any effect on the institutes, as the data only reaches until the 30th of June 2021. Further, only unsecured NPE would have an effect, as secured NPE would only start having a minimum required level of coverage after three years since the classification as non-performing. Another reason for the limited effect is the Coverage Ratio of institutes, that on average exceeds the 35% minimum required coverage for unsecured NPE. Due to this coverage, most exposures should, on average, be sufficiently covered, thus not showing a further effect. Further factors for a lower influence are that since the announcement of the Prudential Backstop, all institute groups viewed, except the group of specialised institutes, have reduced their NPE-Ratio, which is a positive development, intended within the Prudential Backstop, that also limits its effect on institutes.

Nonetheless, the results show that institutes are affected differently based on their size, business model and home country. Larger institutes seem to be affected more than smaller institutes, institutes that more lean more into retail- and corporate-focussed business models tend to be more affected than G-SIBs and especially specialised institutes, which makes sense, since retail exposures often tend to be unsecured, and institutes from countries with high NPL levels seem to be more affected than institutes from countries with lower NPL levels.

All the results from this analysis, are only an indication of the actual effect, the Prudential Backstop might develop, as it is still early in it's implementation and most NPE are not yet influenced by it. However, the overall reduction of NPE-levels of institutes in advance, before the Prudential Backstop starts having a bigger effect, seems to be a common measure across all institutes, alongside increasing the amount of forbearance applied to NPE.

4 Conclusion

Banking regulators and supervisors have put in significant efforts to reduce the levels of NPL in banks that arose after the global financial crisis and to induce adequate

provisioning of performing and especially non-performing exposures. The alignment of the accounting and regulatory frameworks for provisioning to a high extent is also one of the measures taken by regulators, in order to enforce proper provisioning.

The ongoing reduction of the average IRB-Shortfall throughout the European banking sector proves that the measures are taking effect and provisioning is becoming more timely and proper. The relatively stable average level of IRB-Excess, if there is an excess, within the banks, which in relation to the IRB-Shortfall increases, also exceeds the shortfall, further showing that more adequate provisioning is achieved. Nonetheless, institutes are affected differently based on their size, business model and their home country. Institutes from countries with higher NPL-Ratios are affected more than institutes from countries with lower NPL-Ratios, which is relatively intuitive as the measures are aimed at reducing NPL-levels and establishing adequate provisioning where it previously was not. Further, larger institutes show greater improvement than smaller institutes, hinting at a more strict enforcement for larger institutes, which is in line with the principle of proportionality of banking supervision. When viewing business models, the most affected institutes are retail- and corporate-oriented institutes and G-SIBs which show a strong reduction in IRB-Shortfall, with G-SIBs already having a relatively low amount of shortfall to begin with. Small and specialised institutes as well as institutes from low NPL countries are affected the least, with them also showing a relationship between profitability and IRB-Shortfall, which might indicate that these institutes use discretion within the accounting framework, in order to smooth or influence their profitability.

The newest measure implemented, the Prudential Backstop, exhibits an extremely limited effect on institutes within the observed period, due to the very limited range of NPE falling within the conditions in order to be affected by a minimum coverage requirement, as only exposures originated after the 25th of April 2019 are included within the conditions laid out. This leads to only unsecured NPE that have been non-performing for over two years having a possible effect, if they are not covered by provisions of at least 35% of the exposure value. Nonetheless, the slight effects observed could be an indication of the future influence that the Prudential Backstop may have. Larger institutes and institutes from higher NPL countries currently have the largest CET1-deductions due to the Prudential Backstop, with smaller institutes and institutes from low NPL countries showing the least. The most affected business

models are retail and corporate focussed institutes, followed by G-SIBs. Specialised institutes show almost no effect. Interestingly, the institutes with the lowest Coverage Ratio are the least affected. All institutes, except specialised institutes, which have a very low level of NPE, have reduced their NPE-Ratios since the announcement of the Prudential Backstop and increased the relative amount of forbearance on NPE, showing that the announcement of the Prudential Backstop in combination with the other measures of banking regulation and supervision have exerted their planned effect. As the Prudential Backstop was implemented with the intention of overall increasing the Coverage Ratio of NPE, it has not yet delivered results in that regard, as the average Coverage Ratios of the European institutes have been relatively stable at the level, when the Prudential Backstop was announced. This effect may develop in a couple of years, when the maturity conditions of the Prudential Backstop start to apply and more exposures fall within them.

Future analyses concerning the further development of the effect of the Prudential Backstop could give insight into the actual effects and developments, as well as the measures taken by institutes to limit them, as the current observations are prone to be inaccurate as the effect of the Prudential Backstop is still extremely limited.

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Appendix

	Bank_Name	LEI_Code	ISO	IRB/SA	Size_Class	Country_NPL_Group	Business_Model
1	DekaBank Deutsche Girozentrale	0W2PZJM8XOY22M4GG883	DE	IRB Bank	Medium	Low	Specialized
2	Akciju sabiedriba "Citadele banka"	2138009Y59EAR7H1UO97	LV	SA Bank	Small	Low	Retail/Corporate
3	Luminor Holding AS	213800RZWHE5EUX9R444	EE	SA Bank	Small	Low	Retail/Corporate
4	MDB Group Limited	213800TC9PZRBHMJW403	MT	SA Bank	Small	Low	Retail/Corporate
5	KBC Groep	213800X3Q9LSAKRUWY91	BE	IRB Bank	Large	Low	Retail/Corporate
6	LSF Nani Investments S.à r.l.	222100K6QL2V4MLHWQ08	PT	IRB Bank	Medium	High	Unclassified
7	Biser Topco S.à r.l.	222100ZXZ9BRGDMKXL75	SI	SA Bank	Small	Medium	Retail/Corporate
8	RCB Bank Ltd	253400EBCBBVB9TUHN50	CY	SA Bank	Unclassified	High	Retail/Corporate
9	Barclays Bank Ireland plc	2G5BKIC2CB69PRJH1W31	IE	IRB Bank	Unclassified	Medium	Specialized
10	Intesa Sanpaolo S.p.A.	2W8N8UU78PMDQKZENC08	IT	IRB Bank	Large	Medium	Retail/Corporate
11	Erwerbsgesellschaft der S−Finanzgruppe mbH & Co. KG	391200EEGLNXBBCVKC73	DE	IRB Bank	Medium	Low	Retail/Corporate
12	Jyske Bank A/S	3M5E1GQGKL17HI6CPN30	DK	IRB Bank	Medium	Low	Unclassified
13	UBS Europe SE	5299007QVIQ7IO64NX37	DE	SA Bank	Medium	Low	Specialized
14	DEUTSCHE APOTHEKER− UND ÄRZTEBANK EG	5299007S3UH5RKUYDA52	DE	IRB Bank	Unclassified	Low	Retail/Corporate
15	ALPHA SERVICES AND HOLDINGS S.A.	5299009N55YRQC69CN08	GR	SA Bank	Medium	High	Retail/Corporate
16	BNG Bank N.V.	529900GGYMNGRQTDOO93	NL	SA Bank	Medium	Low	Unclassified
17	Volkswagen Bank Gesellschaft mit beschränkter Haftung	529900GJD3OQLRZCKW37	DE	SA Bank	Medium	Low	Retail/Corporate
18	Münchener Hypothekenbank eG	529900GM944JT8YIRL63	DE	IRB Bank	Unclassified	Low	Retail/Corporate
19	Kuntarahoitus Oyj	529900HEKOENJHPNN480	FI	SA Bank	Medium	Low	Specialized
20	DZ BANK AG Deutsche Zentral−Genossenschaftsbank, Frankfurt am Main	529900HNOAA1KXQJUQ27	DE	IRB Bank	Large	Low	Retail/Corporate
21	Sberbank Europe AG	529900IZ8TASAYR3A694	AT	SA Bank	Small	Low	Retail/Corporate
22	Magyar Bankholding	529900J3WLMSUC78RN75	HU	SA Bank	Small	Medium	Unclassified
23	HASPA Finanzholding	529900JZTYE3W7WQH904	DE	SA Bank	Medium	Low	Retail/Corporate
24	Nordea Bank Abp	529900ODI3047E2LIV03	FI	IRB Bank	Large	Low	Retail/Corporate
25	Bank of Valletta Plc	529900RWC8ZYB066JF16	MT	SA Bank	Small	Low	Retail/Corporate
26	BAWAG Group AG	529900S9YO2JHTIIDG38	AT	IRB Bank	Medium	Low	Retail/Corporate
27	State Street Europe Holdings Germany S.a.r.l. & Co. KG	529900V3O1M5IHMOSF46	DE	SA Bank	Medium	Low	Specialized
28	OTP−csoport	529900W3MOO00A18X956	HU	SA Bank	Medium	Medium	Unclassified
29	Raiffeisenbankengruppe OÖ Verbund eGen	529900XSTAE561178282	AT	SA Bank	Medium	Low	Retail/Corporate
30	Bank Polska Kasa Opieki S.A.	5493000LKS7B3UTF7H35	PL	SA Bank	Medium	Medium	Unclassified
31	Nova Ljubljanska Banka d.d., Ljubljana	5493001BABFV7P27OW30	SI	SA Bank	Small	Medium	Retail/Corporate
32	Abanca Corporacion Bancaria, S.A.	54930056IRBXK0Q1FP96	ES	SA Bank	Medium	Low	Retail/Corporate
33	Banco Santander, S.A.	5493006QMFDDMYWIAM13	ES	IRB Bank	Large	Low	G−SIB
34	Unicaja Banco, S.A.	5493007SJLLCTM6J6M37	ES	IRB Bank	Medium	Low	Retail/Corporate
35	Investeringsmaatschappij Argenta	5493008QOCP58OLEN998	BE	IRB Bank	Medium	Low	Retail/Corporate
36	Precision Capital S.A.	549300AUUQG072ATL746	LU	SA Bank	Small	Low	Unclassified
37	Länförsäkringar Bank AB (publ)	549300C6TUMDXNOVXS82	SE	IRB Bank	Small	Low	Unclassified
38	SFIL	549300HFEHJOXGE4ZE63	FR	IRB Bank	Medium	Low	Specialized
39	RBC Investor Services Bank S.A.	549300IVXKQHV6O7PY61	LU	SA Bank	Small	Low	Specialized
40	Citibank Holdings Ireland Limited	549300K7L8YW8M215U46	IE	SA Bank	Medium	Medium	Retail/Corporate
41	Gruppo Bancario Finecobank	549300L7YCATGO57ZE10	IT	SA Bank	Small	Medium	Specialized
42	ING Groep N.V.	549300NYKK9MWM7GGW15	NL	IRB Bank	Large	Low	G−SIB
43	Ibercaja Banco, S.A.	549300OLBL49CW8CT155	ES	SA Bank	Medium	Low	Retail/Corporate
44	Íslandsbanki hf.	549300PZMFIQR79Q0T97	IS	SA Bank	Small	Low	Unclassified
45	Banca Transilvania	549300RG3H390KEL8896	RO	SA Bank	Small	Medium	Unclassified
46	Akcine bendrove Šiauliu bankas	549300TK038P6EV4YU51	LT	SA Bank	Small	Low	Retail/Corporate
47	Landsbankinn hf.	549300TLZPT6JELDWM92	IS	SA Bank	Small	Low	Unclassified
48	UniCredit S.p.A.	549300TRUWO2CD2G5692	IT	IRB Bank	Large	Medium	G−SIB
49	Kutxabank, S.A	549300U4LIZV0REEQQ46	ES	SA Bank	Medium	Low	Retail/Corporate
50	First Investment Bank AD	549300UY81ESCZJ0GR95	BG	SA Bank	Small	Medium	Unclassified
51	HSBC Bank Malta p.l.c.	549300X34UUBDEUL1Z91	MT	SA Bank	Small	Low	Retail/Corporate
52	J.P. Morgan AG	549300ZK53CNGEEI6A29	DE	SA Bank	Unclassified	Low	Specialized
53	National Bank of Greece, S.A.	5UMCZOEYKCVFAW8ZLO05	GR	SA Bank	Medium	High	Retail/Corporate
54	AIB Group plc	635400AKJBGNS5WNQL34	IE	IRB Bank	Medium	Medium	Retail/Corporate
55	Bank of Ireland Group plc	635400C8EK6DRI12LJ39	IE	IRB Bank	Medium	Medium	Retail/Corporate
56	Ulster Bank Ireland Designated Activity Company	635400KQIMALJ4XLAD78	IE	IRB Bank	Unclassified	Medium	Retail/Corporate
57	Bank of Cyprus Holdings Public Limited Company	635400L14KNHZXPUZM19	CY	SA Bank	Small	High	Retail/Corporate
58	LP Group B.V.	72450088V7QLGDPY6W41	NL	IRB Bank	Small	Low	Unclassified
59	de Volksbank N.V.	724500A1FNICHSDF2I11	NL	IRB Bank	Medium	Low	Retail/Corporate
60	OP Osuuskunta	7437003B5WFBOIEFY714	FI	IRB Bank	Medium	Low	Retail/Corporate
61	CaixaBank, S.A.	7CUNS533WID6K7DGFI87	ES	IRB Bank	Large	Low	Retail/Corporate
62	DEUTSCHE BANK AKTIENGESELLSCHAFT	7LTWFZYICNSX8D621K86	DE	IRB Bank	Large	Low	G−SIB
63	Gruppo Bancario Mediolanum	7LVZJ6XRIE7VNZ4UBX81	IT	SA Bank	Small	Medium	Specialized
64	J.P. Morgan Bank Luxembourg S.A.	7W1GMC6J4KGLBBUSYP52	LU	SA Bank	Unclassified	Low	Specialized
65	Credito Emiliano Holding S.p.A.	815600AD83B2B6317788	IT	IRB Bank	Medium	Medium	Retail/Corporate
66	Banco BPM SpA	815600E4E6DCD2D25E30	IT	IRB Bank	Medium	Medium	Retail/Corporate
67	COMMERZBANK Aktiengesellschaft	851WYGNLUQLFZBSYGB56	DE	IRB Bank	Large	Low	Retail/Corporate
68	Banco de Crédito Social Cooperativo	9598002014000588119 0	ES	SA Bank	Medium	Low	Retail/Corporate
69	RCI Banque	96950001WI712W7PQG45	FR	IRB Bank	Medium	Low	Retail/Corporate
70	Confédération Nationale du Crédit Mutuel	9695000CG7B84NLR5984	FR	IRB Bank	Large	Low	Retail/Corporate
71	La Banque Postale	96950066U5XAAIRCPA78	FR	SA Bank	Large	Low	Retail/Corporate

71	La Banque Postale	96950066U5XAAIRCPA78	FR	SA Bank	Large	Low	Retail/Corporate
72	Bpifrance	969500STN7T9MRUMJ267	FR	SA Bank	Medium	Low	Specialized
73	C.R.H. – Caisse de refinancement de l'habitat	969500TVVZM86W7W5I94	FR	SA Bank	Unclassified	Low	Specialized
74	Banque Internationale à Luxembourg	9CZ7TVMR36CYD5TZBS50	LU	IRB Bank	Small	Low	Retail/Corporate
75	Raiffeisen Bank International AG	9ZHRYM6F437SQJ6OUG95	AT	IRB Bank	Medium	Low	Retail/Corporate
76	Belfius Bank	A5GWLFH3KM7YV2SFQL84	BE	IRB Bank	Medium	Low	Retail/Corporate
77	Volksbanken Verbund	AT0000000000043000VB	AT	SA Bank	Small	Low	Retail/Corporate
78	Landesbank Baden-Württemberg	B81CK4ESI35472RHJ606	DE	IRB Bank	Large	Low	Retail/Corporate
79	ABN AMRO Bank N.V.	BFXS5XCH7N0Y05NIXW11	NL	IRB Bank	Large	Low	Retail/Corporate
80	Hellenic Bank Public Company Limited	CXUHEGU3MADZ2CEV7C11	CY	SA Bank	Small	High	Retail/Corporate
81	Coöperatieve Rabobank U.A.	DG3RU1DBUFHT4ZF9WN62	NL	IRB Bank	Large	Low	Retail/Corporate
82	Landesbank Hessen-Thüringen Girozentrale	DIZES5CFO5K3I5R58746	DE	IRB Bank	Medium	Low	Retail/Corporate
83	Norddeutsche Landesbank – Girozentrale –	DSNHHQ2B9X5N6OUJ1236	DE	IRB Bank	Medium	Low	Retail/Corporate
84	Deutsche Pfandbriefbank AG	DZZ47B9A52ZJ6LT6VV95	DE	IRB Bank	Medium	Low	Retail/Corporate
85	Bank of America Europe Designated Activity Company	EQYXK86SF381Q21S3020	IE	SA Bank	Unclassified	Medium	Retail/Corporate
86	Kommuninvest – group	EV2XZWMLLXF2QRX0CD47	SE	SA Bank	Medium	Low	Unclassified
87	Aareal Bank AG	EZKODONU5TYHW4PP1R34	DE	IRB Bank	Medium	Low	Retail/Corporate
88	HSBC Continental Europe	F0HUI1NY1AZMJMD8LP67	FR	IRB Bank	Medium	Low	Retail/Corporate
89	Skandinaviska Enskilda Banken – group	F3JS33DEI6XQ4ZBPTN86	SE	IRB Bank	Large	Low	Unclassified
90	Groupe BPCE	FR9695005MSX1OYEMGDF	FR	IRB Bank	Large	Low	G-SIB
91	Groupe Crédit Agricole	FR969500TJ5KRTCJQWXH	FR	IRB Bank	Large	Low	G-SIB
92	Sydbank A/S	GP5DT10VX1QRQUKVBK64	DK	IRB Bank	Small	Low	Unclassified
93	SBAB Bank AB – group	H0YX5LBGKDVOWCXBZ594	SE	IRB Bank	Medium	Low	Unclassified
94	Banca Popolare di Sondrio, Società Cooperativa per Azioni	J48C8PCSJVUBR8KCW529	IT	IRB Bank	Medium	Medium	Retail/Corporate
95	Banca Monte dei Paschi di Siena S.p.A.	J4CP7MHCXR8DAQMKIL78	IT	IRB Bank	Medium	Medium	Retail/Corporate
96	Eurobank Ergasias Services and Holdings S.A.	JEUVK5RWVJEN8W0C9M24	GR	IRB Bank	Medium	High	Retail/Corporate
97	Nederlandse Waterschapsbank N.V.	JLP5FSPH9WPSHY3NIM24	NL	SA Bank	Unclassified	Low	Specialized
98	Banco Comercial Português, SA	JU1U6S0DG9YLT7N8ZV32	PT	IRB Bank	Medium	High	Retail/Corporate
99	Banco Bilbao Vizcaya Argentaria, S.A.	K8MS7FD7N5Z2WQ51AZ71	ES	IRB Bank	Large	Low	Retail/Corporate
100	Nykredit Realkredit A/S	LIU16F6VZJSD6UKHD557	DK	IRB Bank	Medium	Low	Unclassified
101	CASSA CENTRALE BANCA	LOO0AWXR8GF142JCO404	IT	SA Bank	Medium	Medium	Retail/Corporate
102	AXA Bank Belgium	LSGM84136ACA92XCN876	BE	IRB Bank	Small	Low	Unclassified
103	Swedbank – group	M312WZV08Y7LYUC71685	SE	IRB Bank	Large	Low	Unclassified
104	Piraeus Financial Holdings	M6AD1Y1KW32H8THQ6F76	GR	SA Bank	Medium	High	Retail/Corporate
105	Danske Bank A/S	MAES062Z21O4RZ2U7M96	DK	IRB Bank	Large	Low	Unclassified
106	The Bank of New York Mellon SA/NV	MMYX0N4ZEZ13Z4XCG897	BE	SA Bank	Small	Low	Specialized
107	Svenska Handelsbanken – group	NHBDILHZTYCNBV5UYZ31	SE	IRB Bank	Large	Low	Unclassified
108	ICCREA BANCA S.P.A.	NNVPP80YIZGEY2314M97	IT	SA Bank	Medium	Medium	Retail/Corporate
109	Société générale	O2RNE8IBXP4R0TD8PU41	FR	IRB Bank	Large	Low	G-SIB
110	Powszechna Kasa Oszczednosci Bank Polski S.A.	P4GTT6GF1W40CVIMFR43	PL	SA Bank	Medium	Medium	Unclassified
111	Erste Group Bank AG	PQOH26KWDF7CG10L6792	AT	IRB Bank	Large	Low	Retail/Corporate
112	Mediobanca – Banca di Credito Finanziario S.p.A.	PSNL19R2RXX5U3QWHI44	IT	IRB Bank	Medium	Medium	Retail/Corporate
113	BNP Paribas	R0MUWSFPU8MPRO8K5P83	FR	IRB Bank	Large	Low	G-SIB
114	Banque et Caisse d´Epargne de l´Etat, Luxembourg	R7CQUF1DQM73HUTV1078	LU	IRB Bank	Unclassified	Low	Retail/Corporate
115	Arion banki hf	RIL4VBPDB0M7Z3KXSF19	IS	SA Bank	Small	Low	Unclassified
116	Banco de Sabadell, S.A.	SI5RG2M0WQQLZCXKRM20	ES	IRB Bank	Large	Low	Retail/Corporate
117	Caixa Geral de Depósitos, SA	TO822O0VT80V06K0FH57	PT	SA Bank	Medium	High	Retail/Corporate
118	Hamburg Commercial Bank AG	TUKDD90GPC79G1KOE162	DE	IRB Bank	Medium	Low	Retail/Corporate
119	Bayerische Landesbank	VDYMYTQGZZ6DU0912C88	DE	IRB Bank	Large	Low	Retail/Corporate
120	Bankinter, S.A.	VWMYAEQSTOPNV0SUGU82	ES	IRB Bank	Medium	Low	Retail/Corporate
121	All other banks	XXXXXXXXXXXXXXXXXXXX	OT	IRB Bank	Unclassified	Unclassified	Unclassified

Table 2 European Banks viewed and their classification

Data variable	Explanation
Av_	Average
N_	Number of observations
Shortfall_	IRB-Shortfall data
Excess_	IRB-Excess data
Profitloss_	Profit and loss data
Pb_	Prudential Backstop data
NPE_Ratio_	NPE-Ratio data
Coverage_Ratio_	Coverage-Ratio data
NPE_Forb_Ratio_	Data on Ratio of forborne NPE
Large	Large institutes are viewed
Medium (Size classification)	Medium-sized institutes are viewed
Small	Small institutes are viewed
GSIB	Institutes with the G-SIB business model are viewed
Ret	Institutes with retail- and corporate-oriented business models are viewed
Sp	Institutes with specialised business models are viewed
High	Institutes from countries with high NPL ratios are viewed
Medium (Country NPL classification)	Institutes from countries with medium NPL ratios are viewed
Low	Institutes from countries with low NPL ratios are viewed

Table 3 Data variables and their explanations

	Av_Shortfall_Large	Av_Profitloss_Large	Av_Excess_Large	Av_Shortfall_Medium	Av_Profitloss_Medium	Av_Excess_Medium	Av_Shortfall_Small	Av_Profitloss_Small	Av_Excess_Small
201712	−1.47370716768526	NA	NA	−2.28424065379801	NA	NA	−1.5647640748067	NA	NA
201806	−0.730697908137828	NA	NA	−1.50342485454226	NA	NA	−1.27430789753893	NA	NA
201809	−0.595315007196363	2.58004886026797	NA	−1.57698928235678	1.81735699071036	NA	−1.46672750844797	2.51369998652429	NA
201812	−0.641988290206879	2.19420650371289	NA	−1.48962905231729	−2.25244323609816	NA	−1.05420035489888	1.20168235143612	NA
201903	−0.58432500116834	2.35938224651949	NA	−1.54996624875274	1.71015465640408	NA	−1.67930107489239	1.11020048600016	NA
201906	−0.647444181729735	2.53749408291982	NA	−1.64567620425025	1.8362466224347	NA	−1.80565964528938	2.71334206983175	NA
202003	−0.36764552199206	0.109067752683624	0.925563020920128	−1.58454565971758	0.0316695009322592	0.897095574118663	−0.906962833802577	0.664272120608019	0
202006	−0.280463055552785	0.560877190555049	0.834270723838213	−1.22172304502144	−1.03704362026496	0.797945624353121	−0.847394792240682	3.1278929622985	0
202009	−0.284979589956683	2.22296280018917	0.919595183543757	−1.15939209919653	0.659118870476452	0.924834147247332	−0.794984336370708	1.99766124026104	0
202012	−0.209475576364194	0.569929731252842	0.963534570995554	−0.672807369530757	0.452178211321311	0.911689822540044	−0.696102023011179	2.67475422108929	0
202103	−0.202955927814414	2.62588217598667	1.2251678641215	−0.77686731571461	1.8776383381038	0.912495246718545	−0.634907969976292	2.44645520621947	0
202106	−0.251957879698538	2.3934921779716	1.09209477121872	−0.811037333879569	2.75807813565262	0.855551415450757	−0.842223281119292	3.2549985744589	0

Table 4 IRB-Shortfall and -Excess data by size classification

	N_Shortfall_Large	N_Profitloss_Large	N_Excess_Large	N_Shortfall_Medium	N_Profitloss_Medium	N_Excess_Medium	N_Shortfall_Small	N_Profitloss_Small	N_Excess_Small
201712	24	0	0	27	0	0	3	0	0
201806	24	0	0	27	0	0	3	0	0
201809	25	23	0	29	27	0	3	3	0
201812	26	25	0	30	29	0	4	3	0
201903	25	25	0	29	29	0	4	4	0
201906	26	25	0	30	29	0	4	4	0
202003	25	25	16	30	30	24	4	4	4
202006	26	25	20	31	30	28	4	4	4
202009	25	25	17	30	30	24	4	4	4
202012	26	25	23	31	30	29	4	4	4
202103	25	25	17	30	30	24	5	5	5
202106	26	25	22	31	30	29	5	5	5

Table 5 Number of observations for IRB-Shortfall and -Excess data by size classification

	Av_Shortfall_GSIB	Av_Profitloss_GSIB	Av_Excess_GSIB	Av_Shortfall_Ret	Av_Profitloss_Ret	Av_Excess_Ret	Av_Shortfall_Sp	Av_Profitloss_Sp	Av_Excess_Sp
201712	−1.25629803283418	NA	NA	−2.20524540876202	NA	NA	−1.4345054453004	NA	NA
201806	−0.673813187348465	NA	NA	−1.33967123229483	NA	NA	−0.72958580638844	NA	NA
201809	−0.642409531283655	2.05805235443257	NA	−1.31673124818736	2.02537422762498	NA	−0.918119993053225	1.98546646623966	NA
201812	−0.725325835982819	2.10869928985549	NA	−1.22233531588113	−0.49482119935346	NA	−1.10161470387097	0.860670270261213	NA
201903	−0.738053455281484	2.03663574604057	NA	−1.26776837250144	1.94929299352245	NA	−1.30283137393787	0.810562905836721	NA
201906	−0.626470465349647	1.66272996884303	NA	−1.43314762770554	2.41452479023909	NA	−1.08829791552823	1.45604588388854	NA
202003	−0.362093203192831	−0.0482547666330501	0	−1.20336554192922	0.250851483815765	1.1793297089161	−0.943654662296284	−0.326841081213395	0.4548675062648
202006	−0.219280207333589	−1.56885923534891	0.343450031378045	−0.875897556213843	−0.31644579237554	1.08844177061219	−1.44244129056872	1.5195496954517	0.011461965920459
202009	−0.262390961179613	1.79456182210294	0	−0.856117847550013	1.37075619657537	1.30982660520481	−1.78995672611219	0.859744363808138	0
202012	−0.205707062870143	0.660195777242047	0.504695356717892	−0.585753598778371	0.53893190762639	1.27549925226501	−0.658938113375907	1.66009104443095	0
202103	−0.218669563117813	1.98829639676531	0.464483624341921	−0.673556991308721	2.11240203949253	1.40160553783256	−0.724621165050584	1.56985875687876	0
202106	−0.291858176438151	2.76728859167077	0.717605073493107	−0.726967405128817	2.5206971606169	1.24538311829311	−0.598277966004719	1.55338040564791	0

Table 6 IRB-Shortfall and -Excess data of business model classification

	Av_Shortfall_GSIB	Av_Profitloss_GSIB	Av_Excess_GSIB	Av_Shortfall_Ret./Corp.	Av_Profitloss_Ret./Corp.	Av_Excess_Ret./Corp.	Av_Shortfall_Special	Av_Profitloss_Special	Av_Excess_Special
201712	8	0	0	37	0	0	2	0	0
201806	8	0	0	37	0	0	2	0	0
201809	8	8	0	39	33	0	2	2	0
201812	8	8	0	42	36	0	2	2	0
201903	8	8	0	40	37	0	2	2	0
201906	8	8	0	42	37	0	2	2	0
202003	8	8	3	42	38	34	3	2	3
202006	8	8	6	44	38	39	3	2	3
202009	8	8	3	42	38	34	3	2	3
202012	8	8	7	44	38	41	3	2	3
202103	8	8	4	42	38	34	3	2	3
202106	8	8	8	44	38	40	3	2	3

Table 7 Number of observations for IRB-Shortfall and -Excess data of business model classification

	Av_Shortfall_High	Av_Profitloss_High	Av_Profitloss_High_Sm	Av_Excess_High	Av_Excess_High_Sm	Av_Shortfall_Medium	Av_Profitloss_Medium	Av_Excess_Medium	Av_Shortfall_Low	Av_Profitloss_Low	Av_Excess_Low
201712	−3.96944568387881	NA	NA	NA	NA	−2.34888568811117	NA	NA	−1.64599349624301	NA	NA
201806	−1.08019404636609	NA	NA	NA	NA	−2.40270206063068	NA	NA	−0.842219157735778	NA	NA
201809	−1.07509524763507	1.81028549301227	1.81028549301227	NA	NA	−2.52200723385345	0.637932863476534	NA	−0.826009842647481	2.5378308508953	NA
201812	−1.18989737821468	−9.93585280607735	0.852917377835721	NA	NA	−2.4899633164823	0.684653175997898	NA	−0.799077238554284	0.373000791878552	NA
201903	−1.01953383977939	0.415172996540138	1.90616019800493	NA	NA	−2.41562138138821	2.88263292784267	NA	−0.872650090134163	1.86588321309786	NA
201906	−1.06257714041829	−2.49619345955082	0.441263093308927	NA	NA	−2.40605605773451	2.38846989039322	NA	−1.00901731098273	2.46813529930527	NA
202003	−1.56939668472059	−1.2519991734927	0.837703724977484	1.61683034872287	0.808415174361437	−1.6062856460574	0.465268927252621	0.835834215147656	−0.818449367972821	0.125583925589254	0.848116849380799
202006	−1.04532831176981	−11.0710842334415	−10.4292843304819	0.930129705194206	0.930129705194206	−1.20839793022533	−2.14851508252068	1.07313386167184	−0.664024649410346	1.02068258400281	0.746134584354414
202009	−0.964298639840315	−2.41480811609891	1.54424206122227	1.82252336646476	0.91126168323238	−0.994348120090552	0.59516116084589	1.15465171903289	−0.718628575872242	1.81332457405852	0.840960759289637
202012	−0.911020565539307	−6.70112363413565	−0.940668094980534	0.853791054494067	0.853791054494067	−0.504058093636743	−0.919364229648733	1.27347644462952	−0.519347850250809	1.4231969249907	0.862675946408949
202103	−0.830863950535699	1.48724652959985	0.927005561297932	1.82146721222321	0.910733606111606	−0.487523661271807	2.59180332773277	1.07285910718315	−0.602784626739258	2.21709397990591	0.950559054834948
202106	−0.210685716154877	1.22415864352317	0.602071698733801	1.07208269413835	1.07208269413835	−0.545310046095745	2.46243211793229	1.1391337137259	−0.653651545111237	2.77125575831673	0.866144856736972

Table 8 IRB-Shortfall and -Excess data of Country NPL Classification

	N_Shortfall_High	N_Profitloss_High	N_Profitloss_High_Sm	N_Excess_High	N_Excess_High_Sm	N_Shortfall_Medium	N_Profitloss_Medium	N_Excess_Medium	N_Shortfall_Low	N_Profitloss_Low	N_Excess_Low
201712	2	0	0	0	0	9	0	0	46	0	0
201806	2	0	0	0	0	9	0	0	46	0	0
201809	3	2	2	0	0	9	9	0	48	42	0
201812	3	3	2	0	0	9	9	0	51	45	0
201903	3	3	2	0	0	9	9	0	49	46	0
201906	3	3	2	0	0	9	9	0	51	46	0
202003	3	3	2	1	2	11	9	8	50	47	40
202006	3	3	2	2	2	11	9	9	52	47	46
202009	3	3	2	1	2	11	9	8	50	47	41
202012	3	3	2	2	2	11	9	10	52	47	49
202103	3	3	2	1	2	11	9	9	51	48	41
202106	3	3	2	2	2	11	9	11	53	48	48

Table 9 Number of obsersations for IRB-Shortfall and -Excess data of country NPL classification

	Av_Pb_Large	Av_Pb_Medium	Av_Pb_Small	Av_NPE_Ratio_Large	Av_NPE_Ratio_Medium	Av_NPE_Ratio_Small	Av_Coverage_Ratio_Large	Av_Coverage_Ratio_Medium	Av_Coverage_Ratio_Small	Av_NPE_Forb_Ratio_Large	Av_NPE_Forb_Ratio_Medium	Av_NPE_Forb_Ratio_Small
201903	NA	NA	NA	2.07949727096253	6.42862498093149	4.71455136948996	42.9976865539918	42.0607397673075	37.9992059538915	0.797688898118539	2.77984257859972	2.36918474219687
201906	NA	NA	NA	2.07213221012734	5.88873922411887	4.2396313811846	41.8935163474879	39.9537352546184	37.3230070050282	0.813481591628885	2.54858712901847	2.11528415519667
202003	NA	NA	NA	1.83672311035717	4.77855760241258	3.92441904552229	44.8830074002856	41.6632196957576	38.1596990622171	0.707781452635642	2.00745290605342	2.0733207331503
202006	NA	NA	NA	1.8621740483523	4.18551362390837	3.62473601945484	43.9812661243411	41.2058614554777	38.3334785904092	0.739778327933554	1.81424340812725	2.01981646730365
202009	NA	NA	NA	1.80673416483491	4.01368454561129	3.37964923426936	44.2329326216954	40.3621347967958	38.0749829950488	0.716256116789493	1.73670487922064	1.82351285631575
202012	NA	NA	NA	1.74543329068992	3.51035501566381	3.20569442199896	42.7570084752449	40.1506181203358	36.2144617995542	0.73269781126224	1.53021779362927	1.68680411185004
202103	NA	NA	NA	1.66883464154628	3.53313886915273	2.79069939217445	42.9750580570643	40.4070041316427	39.9403477794108	0.696845161535423	1.51188170004051	1.51313894984179
202106	−0.0315896415826338	−0.218751371517771	−0.00224930833861839	1.64693470942812	2.74452815030105	2.52373165411479	41.8297105491113	39.6756613092969	38.2264521687544	0.717001841784493	1.27416295358636	1.35416470608104

Table 10 Prudential Backstop data of size classification

	N_Pb_Large	N_Pb_Medium	N_Pb_Small	N_NPE_Ratio_Large	N_NPE_Ratio_Medium	N_NPE_Ratio_Small	N_Coverage_Ratio_Large	N_Coverage_Ratio_Medium	N_Coverage_Ratio_Small	N_NPE_Forb_Ratio_Large	N_NPE_Forb_Ratio_Medium	N_NPE_Forb_Ratio_Small
201903	NA	NA	NA	26	48	22	26	48	22	26	48	22
201906	NA	NA	NA	27	49	22	27	49	22	27	49	22
202003	NA	NA	NA	26	51	23	26	51	23	26	51	23
202006	NA	NA	NA	27	53	23	27	53	23	27	53	23
202009	NA	NA	NA	26	52	24	26	52	24	26	52	24
202012	NA	NA	NA	27	54	24	27	54	24	27	54	24
202103	NA	NA	NA	26	52	28	26	52	28	26	52	28
202106	27	54	28	27	54	28	27	54	28	27	54	28

Table 11 Number of observations for Prudential Backstop data of size classification

	Av_Pb_GSIB	Av_Pb_Ret	Av_Pb_Sp	Av_NPE_Ratio_GSIB	Av_NPE_Ratio_Ret	Av_NPE_Ratio_Sp	Av_Coverage_Ratio_GSIB	Av_Coverage_Ratio_Ret	Av_Coverage_Ratio_Sp	Av_NPE_Forb_Ratio_GSIB	Av_NPE_Forb_Ratio_Ret	Av_NPE_Forb_Ratio_Sp
201903	NA	NA	NA	2.60033613910604	6.1381372395307	0.45643249525268	46.6923285390571	42.348245793804	36.479433337285	0.84686206648216	2.70371047210935	0.16195469970563
201906	NA	NA	NA	2.50808262153237	5.64638333920005	0.438660915985032	46.3983018747615	41.6819696684223	16.0123374086515	0.833008717898319	2.48342894673611	0.14634908399111
202003	NA	NA	NA	2.1914132374312	4.73183968133372	0.392734338491013	46.3988901930035	42.8052855532426	30.9557132648849	0.723589251901715	2.06866819358242	0.110667850255428
202006	NA	NA	NA	2.17036486414987	4.17469076615682	0.426684253821868	45.6664356196286	42.1893747269205	30.305401917081	0.726621367942624	1.89550282370457	0.122633102680174
202009	NA	NA	NA	2.14014119751925	3.95195602148977	0.801850373670524	45.2714292502938	43.010668478117	14.7440527783882	0.704106988090686	1.78410302048262	0.19657752389941
202012	NA	NA	NA	2.07739666117554	3.53538370012299	0.71387780539347	45.1158005388846	42.1445097160886	14.8487241430216	0.701281977263368	1.61692295781331	0.221199778796168
202103	NA	NA	NA	2.07709410324324	3.49434076119846	0.650306346186665	44.4165292706191	42.2441261954936	27.7761888960611	0.711961377381285	1.60275783977791	0.184698283884868
202106	−0.00731571720594722	−0.131648327465092	−0.057886806864781	2.03787838784504	2.8009580375168	0.588715993490382	44.5282443864822	41.0249184138961	27.5438066638387	0.745589604083085	1.3726897807075	0.155975386794972

Table 12 Prudential Backstop data of business model classification

	N_Pb_GSIB	N_Pb_Ret	N_Pb_Sp	N_NPE_Ratio_GSIB	N_NPE_Ratio_Ret	N_NPE_Ratio_Sp	N_Coverage_Ratio_GSIB	N_Coverage_Ratio_Ret	N_Coverage_Ratio_Sp	N_NPE_Forb_Ratio_GSIB	N_NPE_Forb_Ratio_Ret	N_NPE_Forb_Ratio_Sp
201903	NA	NA	NA	8	61	6	8	61	6	8	61	6
201906	NA	NA	NA	8	62	6	8	62	6	8	62	6
202003	NA	NA	NA	8	64	7	8	64	7	8	64	7
202006	NA	NA	NA	8	66	7	8	66	7	8	66	7
202009	NA	NA	NA	8	65	8	8	65	8	8	65	8
202012	NA	NA	NA	8	67	8	8	67	8	8	67	8
202103	NA	NA	NA	8	65	10	8	65	10	8	65	10
202106	8	73	15	8	67	10	8	67	10	8	67	10

Table 13 Number of observations for Prudential Backstop data of business model classification

	Av_Pb_High	Av_Pb_Medium	Av_Pb_Low	Av_NPE_Ratio_High	Av_NPE_Ratio_Medium	Av_NPE_Ratio_Low	Av_Coverage_Ratio_High	Av_Coverage_Ratio_Medium	Av_Coverage_Ratio_Low	Av_NPE_Forb_Ratio_High	Av_NPE_Forb_Ratio_Medium	Av_NPE_Forb_Ratio_Low
201903	NA	NA	NA	23.9406983829825	6.34852414315222	1.91577667782031	50.2627749589045	48.9517318428001	38.0358593677189	10.4227074413417	2.61979533839273	0.922263838980326
201906	NA	NA	NA	22.2118915868592	5.81371269711525	1.82000166449145	49.6915138453401	48.2259907823434	36.2962227497289	9.62072911361906	2.45852433597693	0.858321418629692
202003	NA	NA	NA	18.6218478396801	5.09315134276986	1.62994959124434	50.0697663656452	47.8750926785635	39.0031623089616	7.91144794178788	2.25554749620631	0.755699429662462
202006	NA	NA	NA	15.6382985374434	4.88143700010992	1.62650479974716	49.1721214029983	47.8821036499374	38.6512912425674	6.90790454922243	2.2545791297567	0.767687330994069
202009	NA	NA	NA	14.8342457982535	4.37103401598256	1.62487037556769	50.6850400270565	48.5892507756605	37.5607552635307	6.54380716171854	2.06714341986395	0.736832863171576
202012	NA	NA	NA	12.7618488711664	3.95645270536613	1.60510772181812	49.9138087075149	48.9329538449995	36.4890506402295	5.65960299786551	1.82580783177209	0.743780839740296
202103	NA	NA	NA	12.3323312641435	3.45864296127105	1.575618377757	51.1715228014801	50.0917404545986	36.8610523228839	5.34788088299646	1.59669614702993	0.744606266879612
202106	−0.176173394986932	−0.00608550211181439	−0.127374219589598	8.37475724929796	3.23078952863327	1.49853921426175	51.120283754225	50.9677900068254	35.2630140889089	4.18022485645935	1.52350751182478	0.704375282356854

Table 14 Prudential Backstop data of country NPL classification

	N_Pb_High	N_Pb_Medium	N_Pb_Low	N_NPE_Ratio_High	N_NPE_Ratio_Medium	N_NPE_Ratio_Low	N_Coverage_Ratio_High	N_Coverage_Ratio_Medium	N_Coverage_Ratio_Low	N_NPE_Forb_Ratio_High	N_NPE_Forb_Ratio_Medium	N_NPE_Forb_Ratio_Low
201903	NA	NA	NA	9	19	68	9	19	68	9	19	68
201906	NA	NA	NA	9	19	70	9	19	70	9	19	70
202003	NA	NA	NA	9	19	72	9	19	72	9	19	72
202006	NA	NA	NA	9	19	75	9	19	75	9	19	75
202009	NA	NA	NA	9	19	74	9	19	74	9	19	74
202012	NA	NA	NA	9	19	77	9	19	77	9	19	77
202103	NA	NA	NA	9	22	75	9	22	75	9	22	75
202106	10	25	85	9	22	78	9	22	78	9	22	78

Table 15 Number of observations for Prudential Backstop data of country NPL classification