

Impact of Economic Stress on Retail Credit Portfolios Across Europe

Europe Retail Credit Risk Webinar Series

Episode 1
Wednesday, 24 June
10:00 BST | 11:00 CEST

COVID-19:
360° View of the Dutch
Mortgage Loan Market

Episode 2
Tuesday, 30 June
14:00 BST | 15:00 CEST

Impact of Economic
Stress on Retail Credit
Portfolios Across Europe

Today's Speakers

Economics & Business Analytics



Juan Licari, PhD
Managing Director



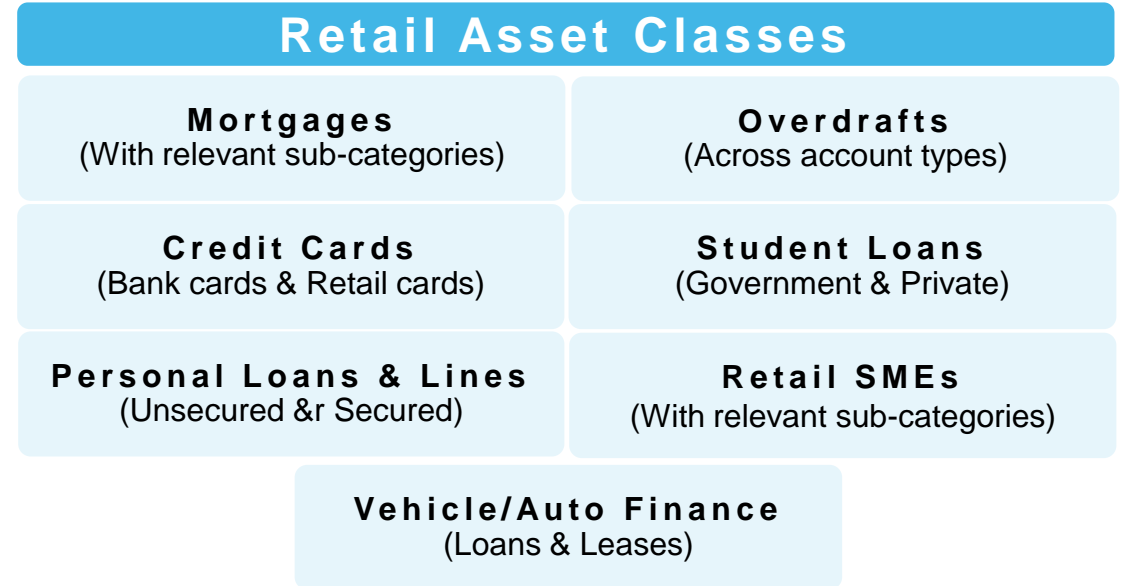
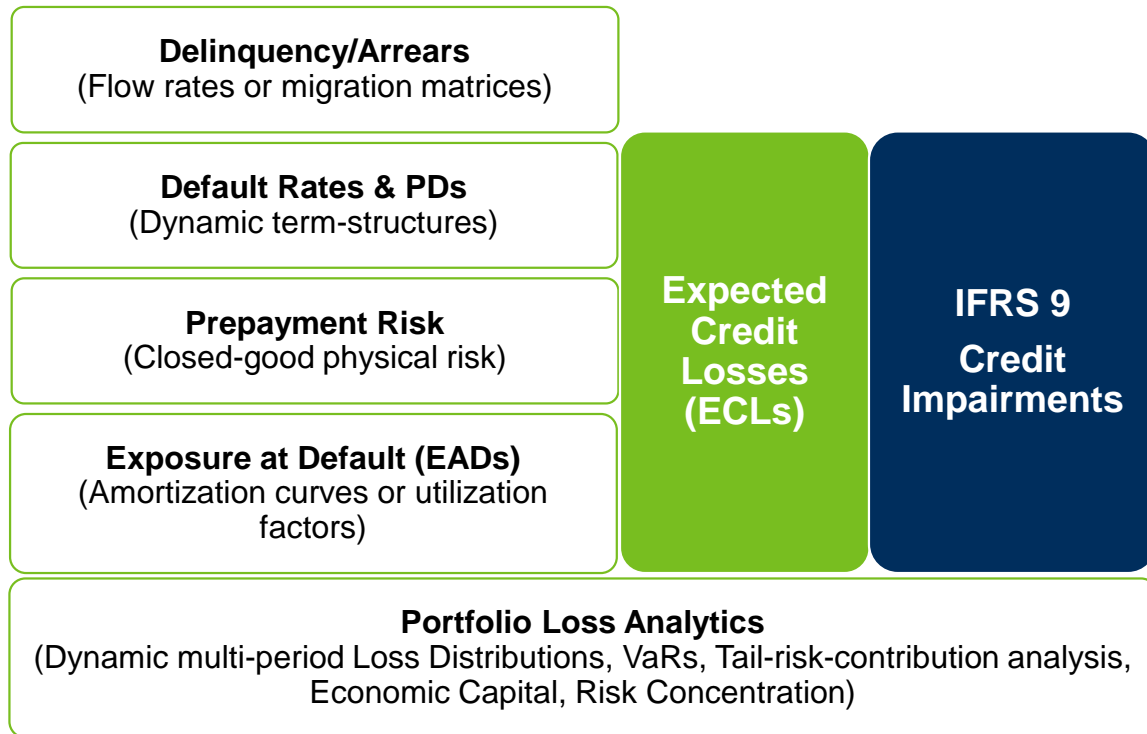
Pouyan Mashayekh, PhD
Senior Director



Brenda Solis Gonzalez
Risk Modeler

Portfolio Analyzer (PA) Suite of Models

Retail loan-level econometric models for credit and impairment metrics



Agenda

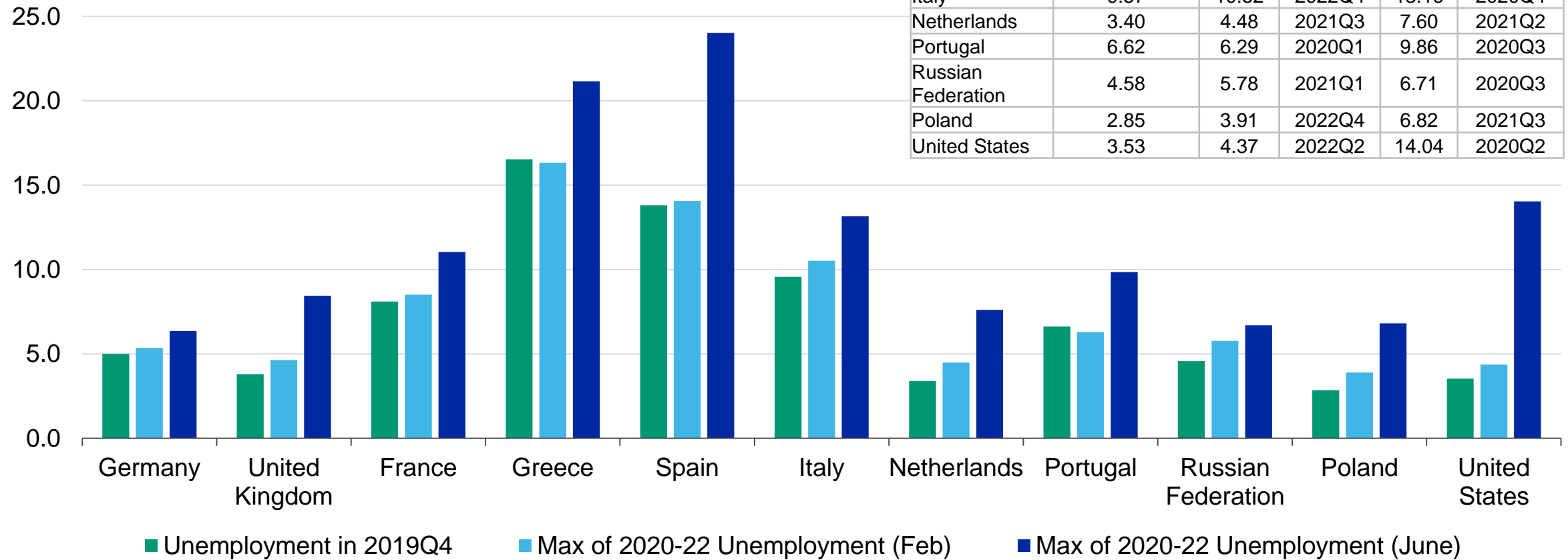
1. Modular Approach to Model Credit Risk for Retail Credit Portfolios
2. Case Studies for Mortgages, Consumer Loans, and Credit Cards
3. Auto Loans in Europe: Pan-European Perspective
4. Characterizing Non-Performing Loans

1

Modular Approach to Model
Credit Risk for Retail Credit
Portfolios

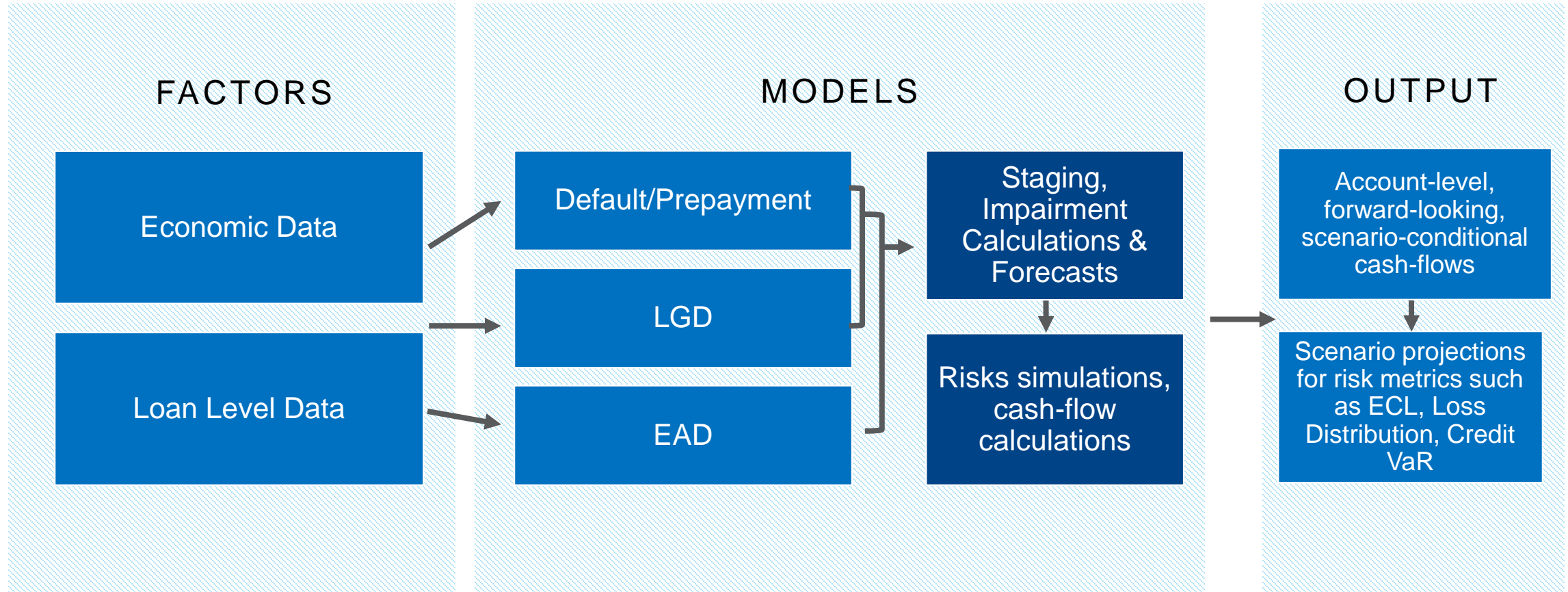
Unemployment Increases

Shift of baseline scenarios



Modular Structure for Consumer Loans Analysis

Using Moody's Portfolio Analyzer

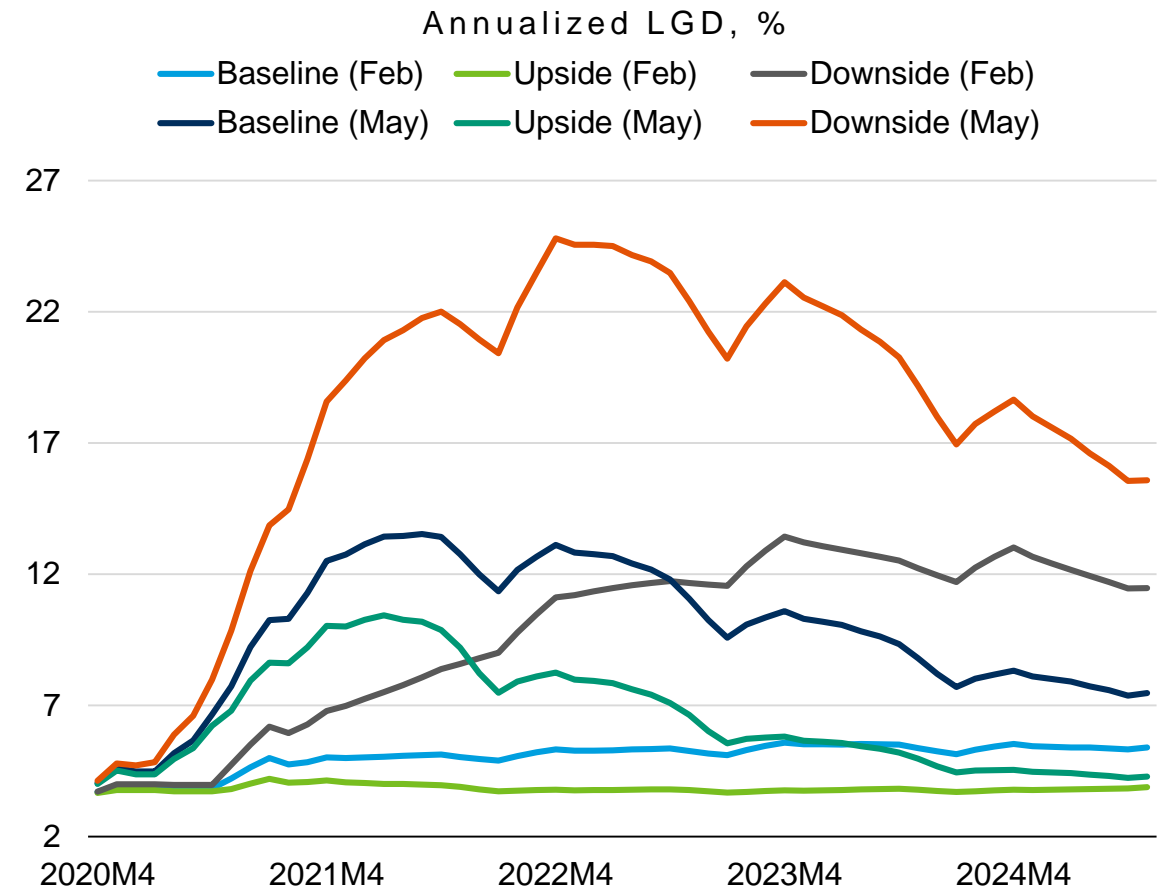
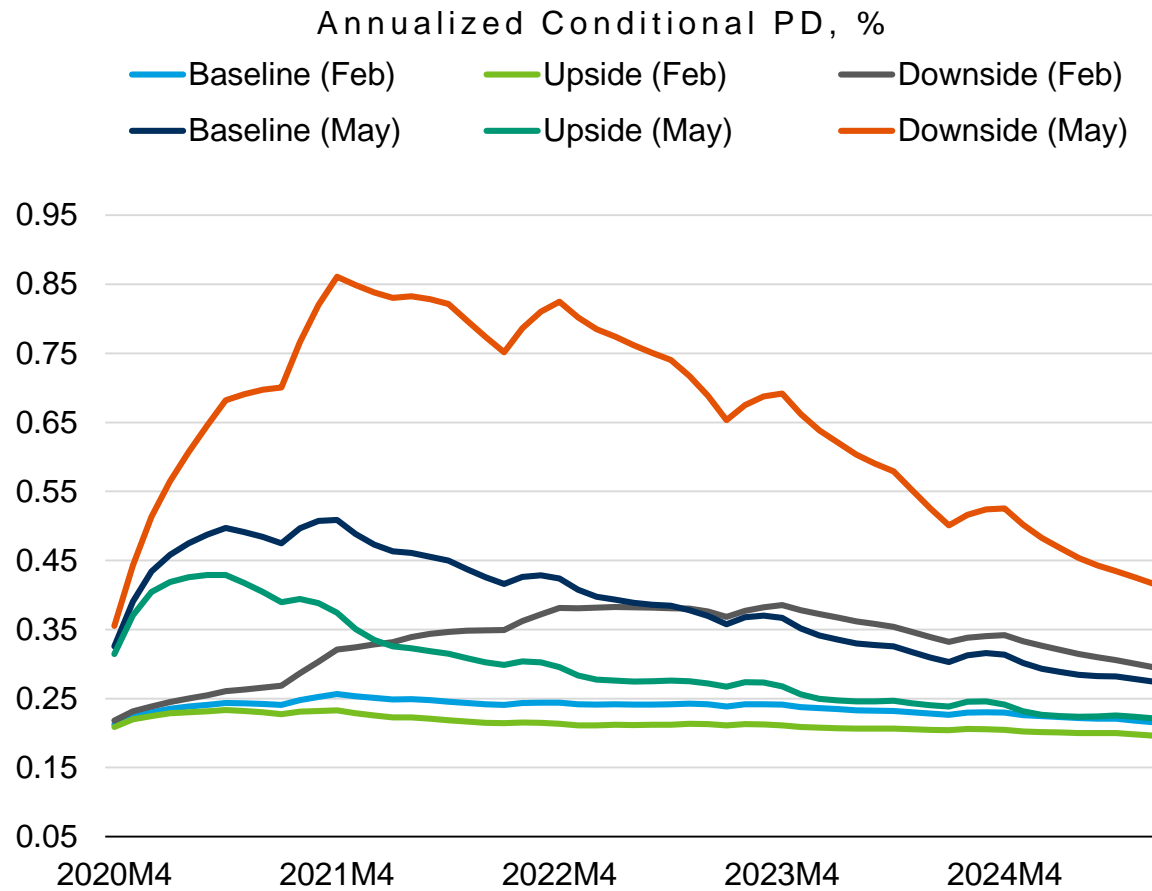


2

Case Studies for Mortgages, Consumer Loans, and Credit Cards

UK Mortgages

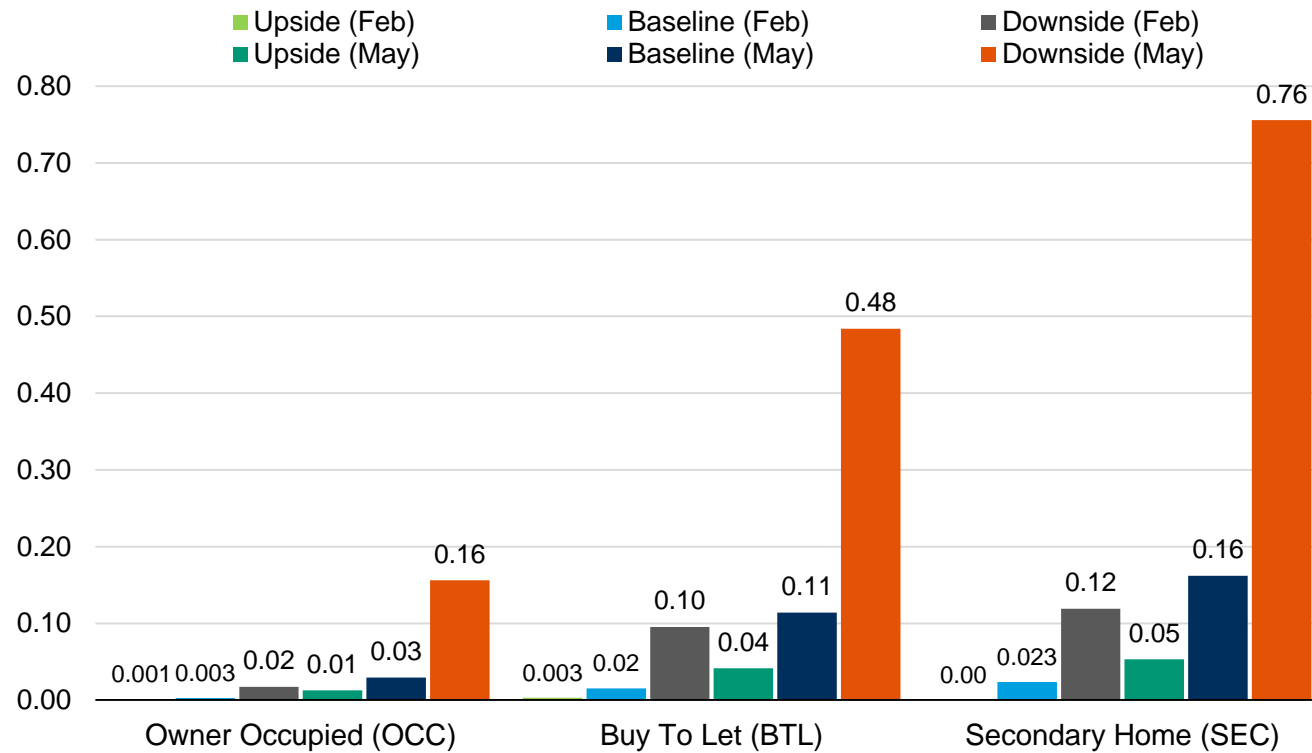
Impact on the forecast of key risk metrics



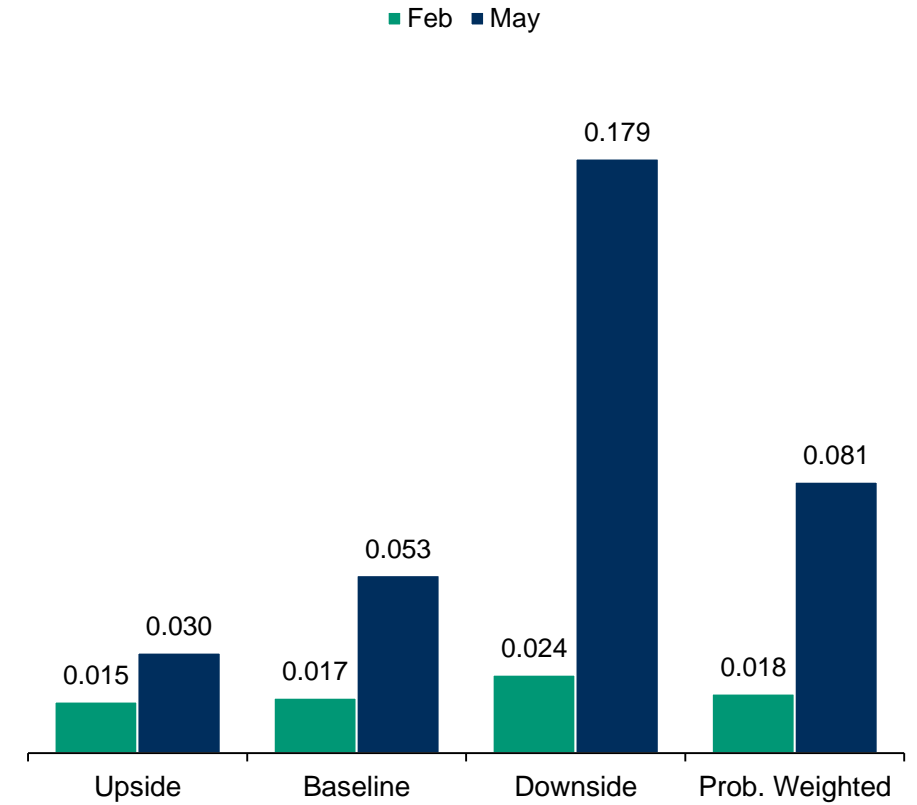
UK Mortgages

Impact on expected losses

Expected losses by Occupancy, %



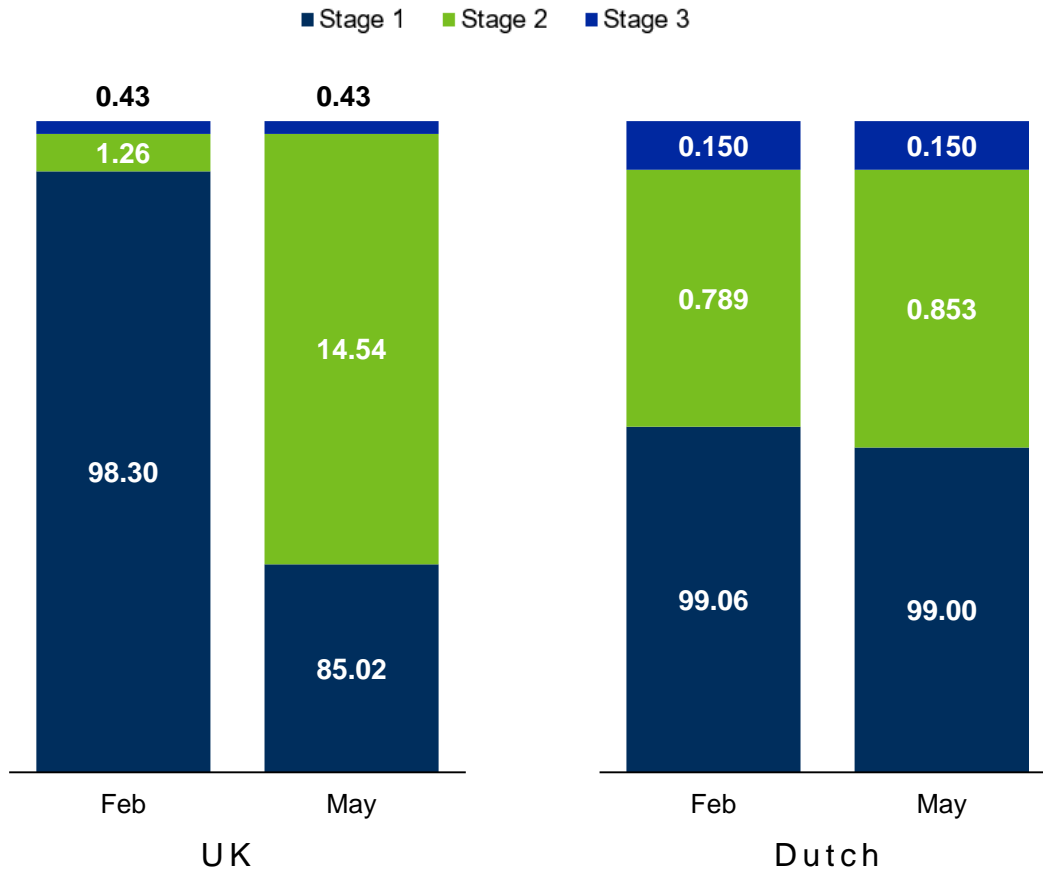
Expected losses by Stages, %



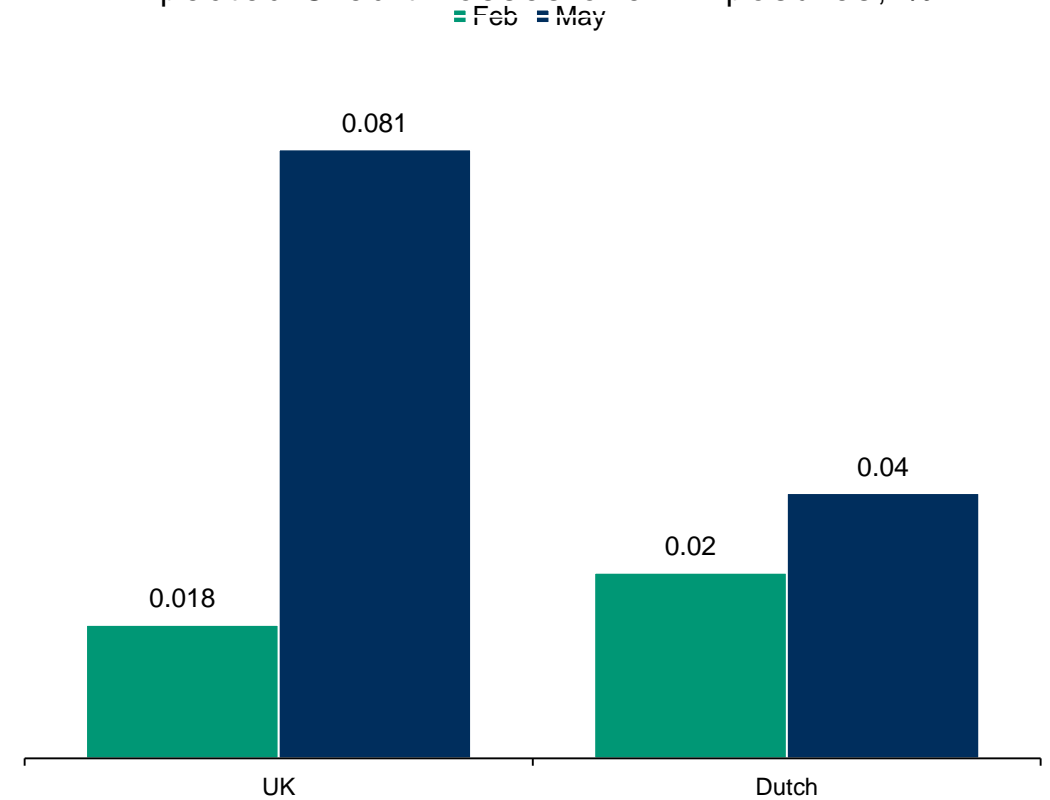
UK Mortgages: Cross-country Comparison

IFRS 9 staging and expected losses

Distribution of Exposure across Stages per Scenarios, %



Expected Credit Losses over Exposures, %

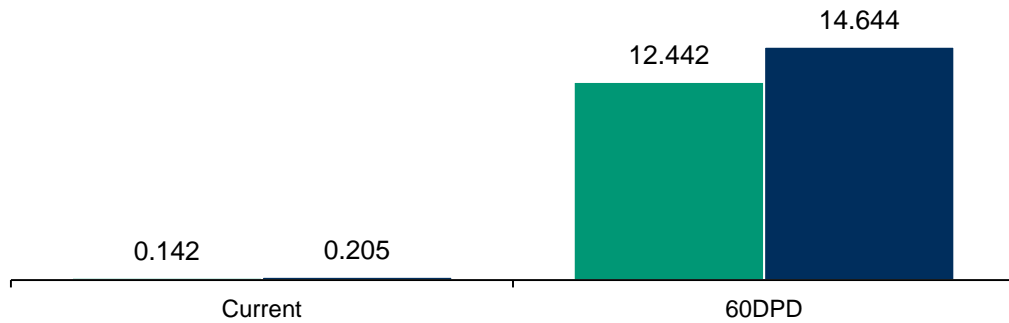


UK Mortgages: Impact on One Account

Changing DPD status & scenario vintages, all else unchanged

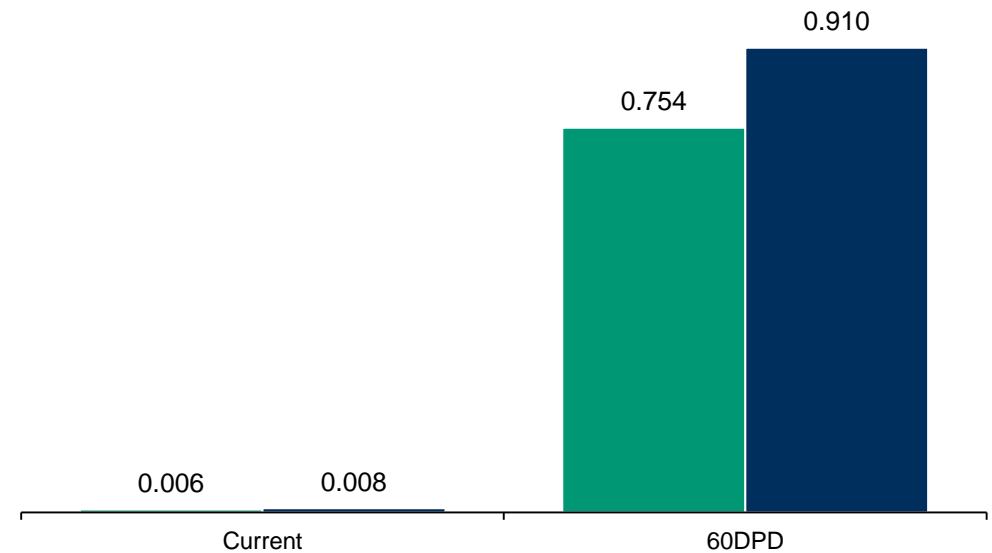
12 month PD, %

■ Feb ■ May



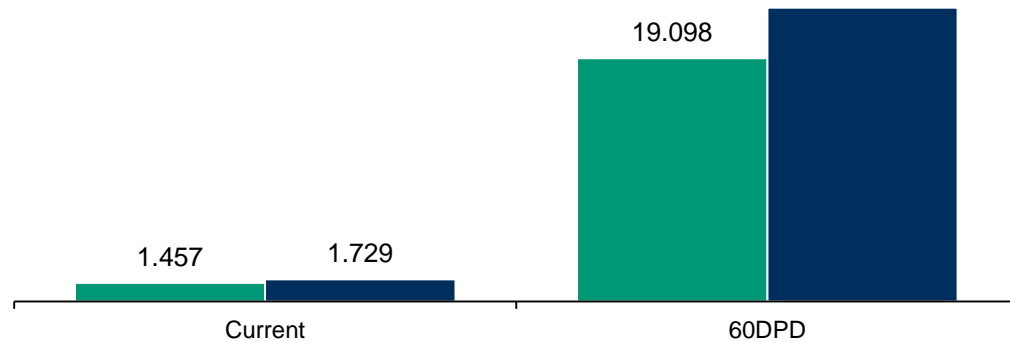
Expected Losses, %

■ Feb ■ May



Lifetime PD, %

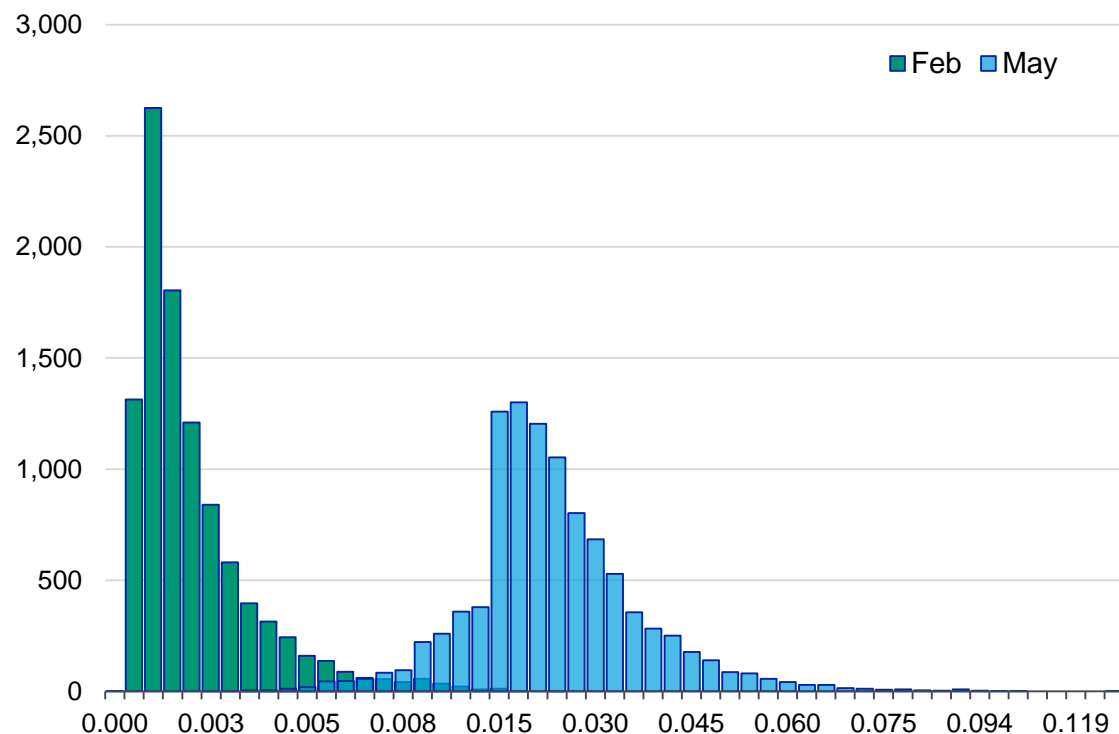
■ Feb ■ May



UK Mortgages

Simulations – Distribution of Expected Losses

Distribution of ELs Across Scenario Vintages, Baseline



February

Loss Summary Baseline Feb 2020

Expected Loss 0.002

Loss Summary S3 Feb 2020

Expected Loss 0.004

Loss Summary S4 Feb 2020

Expected Loss 0.006

Aggregate Statistics Feb 2020 – BL

Simulations	10,000
Mean	0.0019
SD	0.0016
IQR	0.0016
Skewness	2.3716
Kurtosis	8.7207
95th/50th Pct	3.7547

May

Loss Summary Baseline May 2020

Expected Loss 0.022

Loss Summary S3 May 2020

Expected Loss 0.055

Loss Summary S4 May 2020

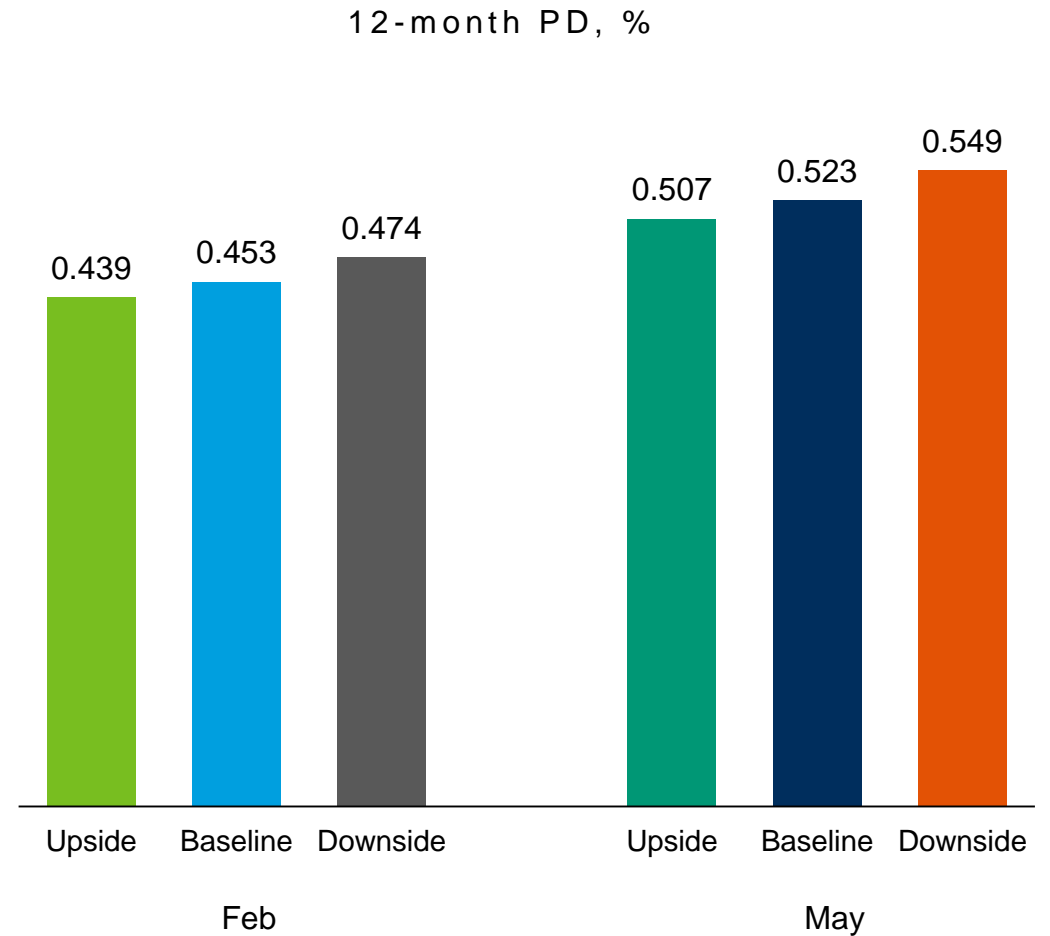
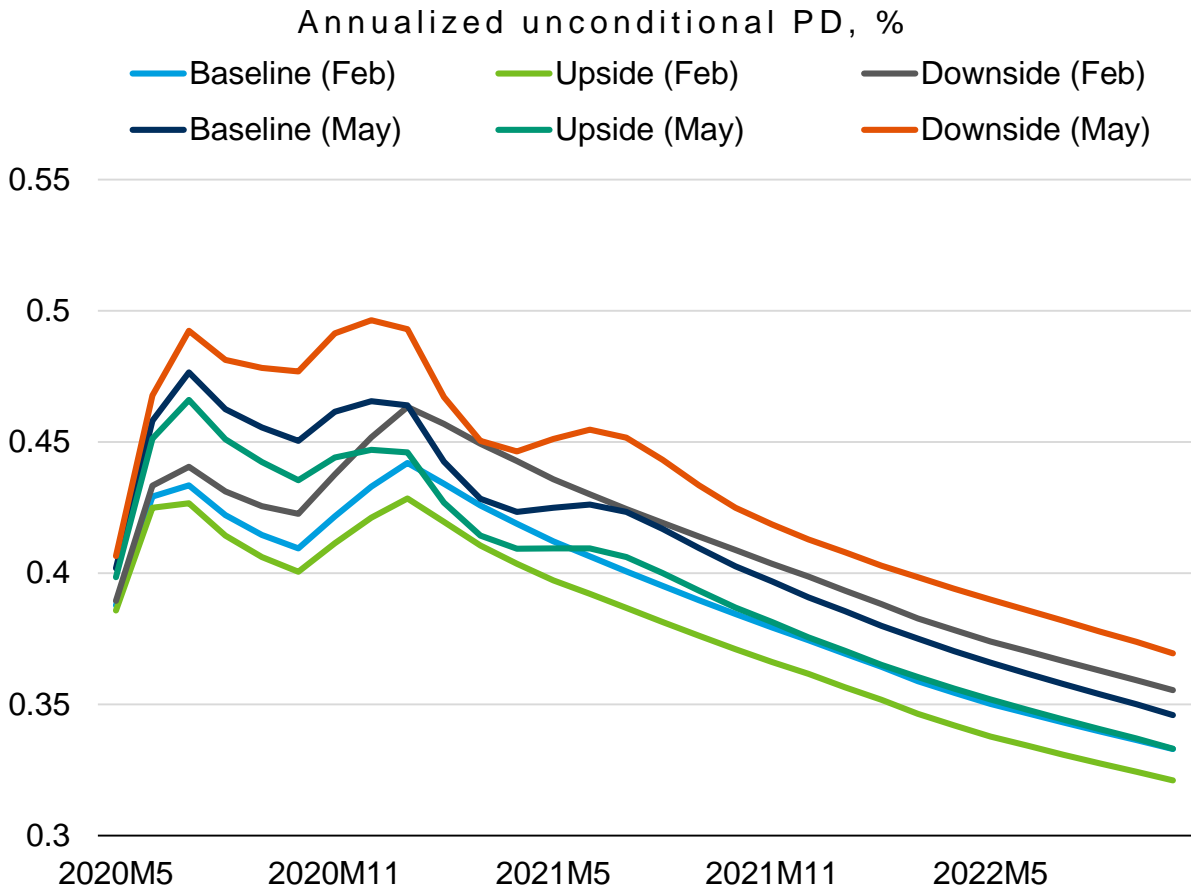
Expected Loss 0.076

Aggregate Statistics May 2020 – BL

Simulations	10,000
Mean	0.0222
SD	0.0118
IQR	0.0141
Skewness	1.489
Kurtosis	3.6922
95th/50th Pct	2.2905

UK Credit Cards

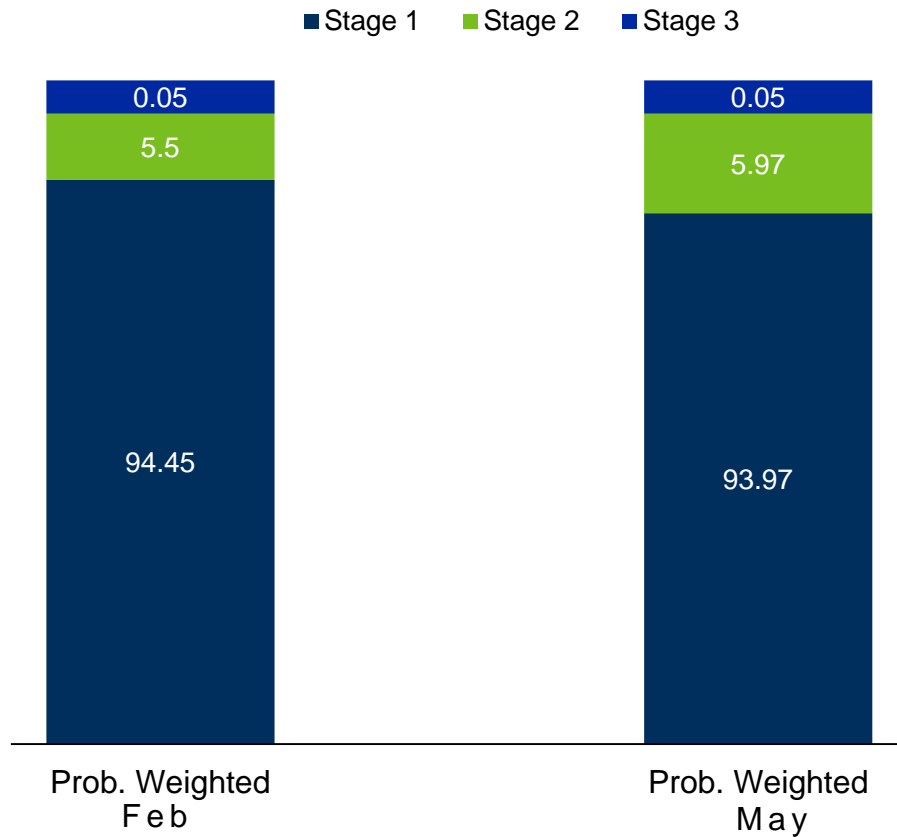
Impact on PD



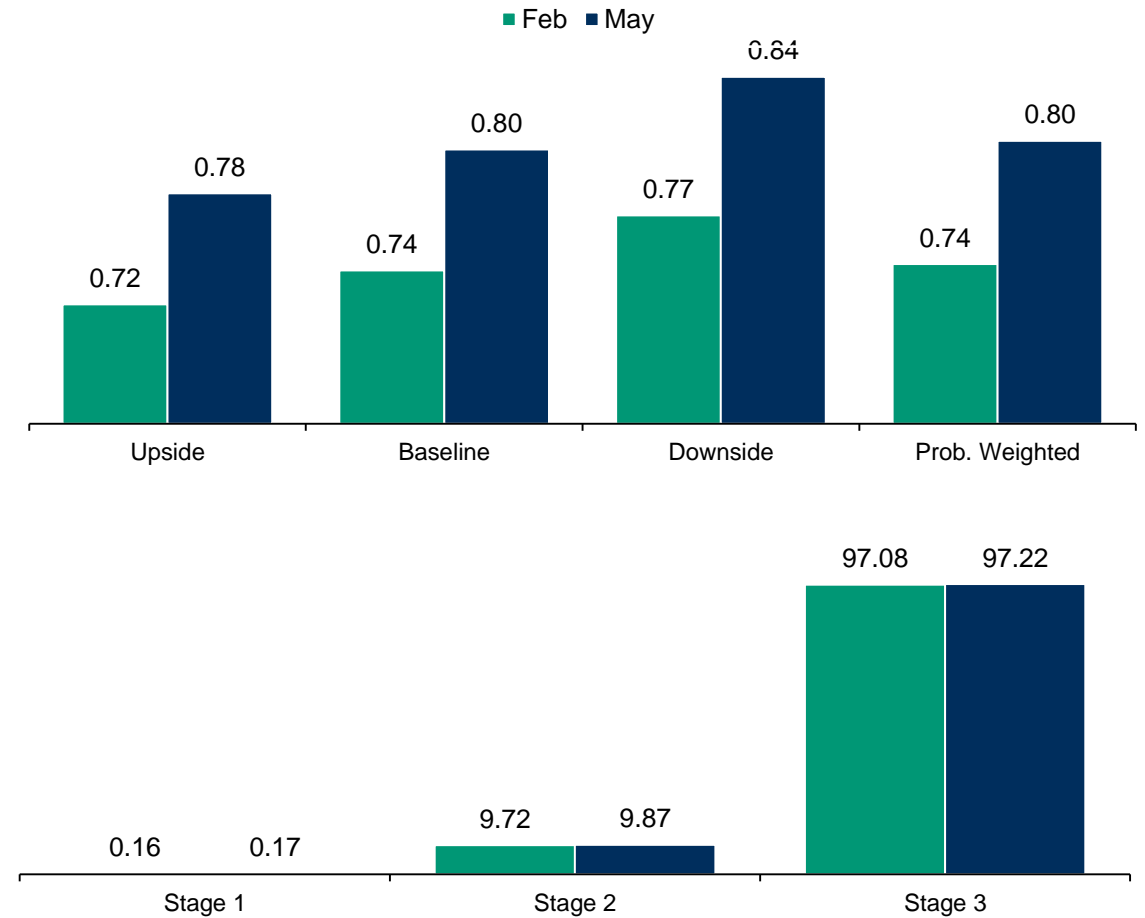
UK Credit Cards

Impact on stages and ECL

Distribution of Exposure across Stages, %

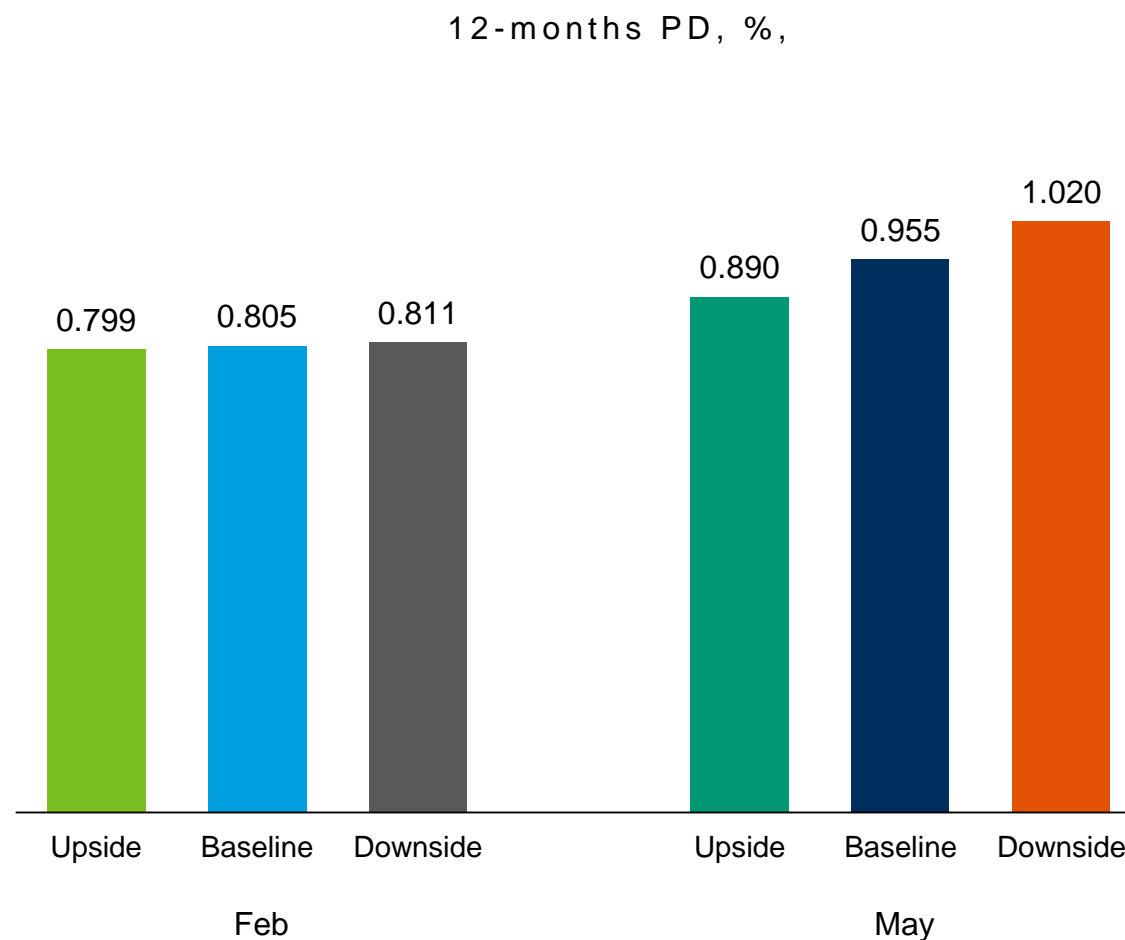
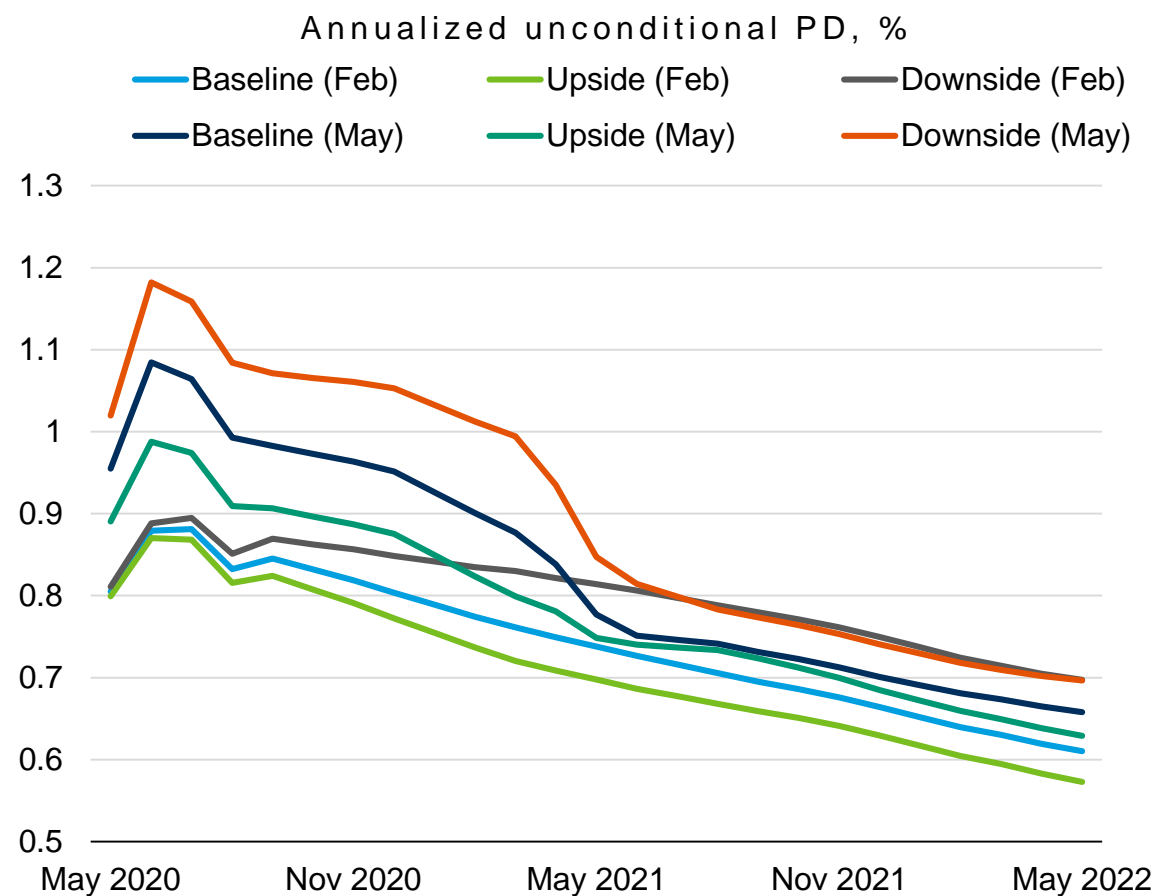


Expected Credit Losses over Exposures, %



German Personal Loans

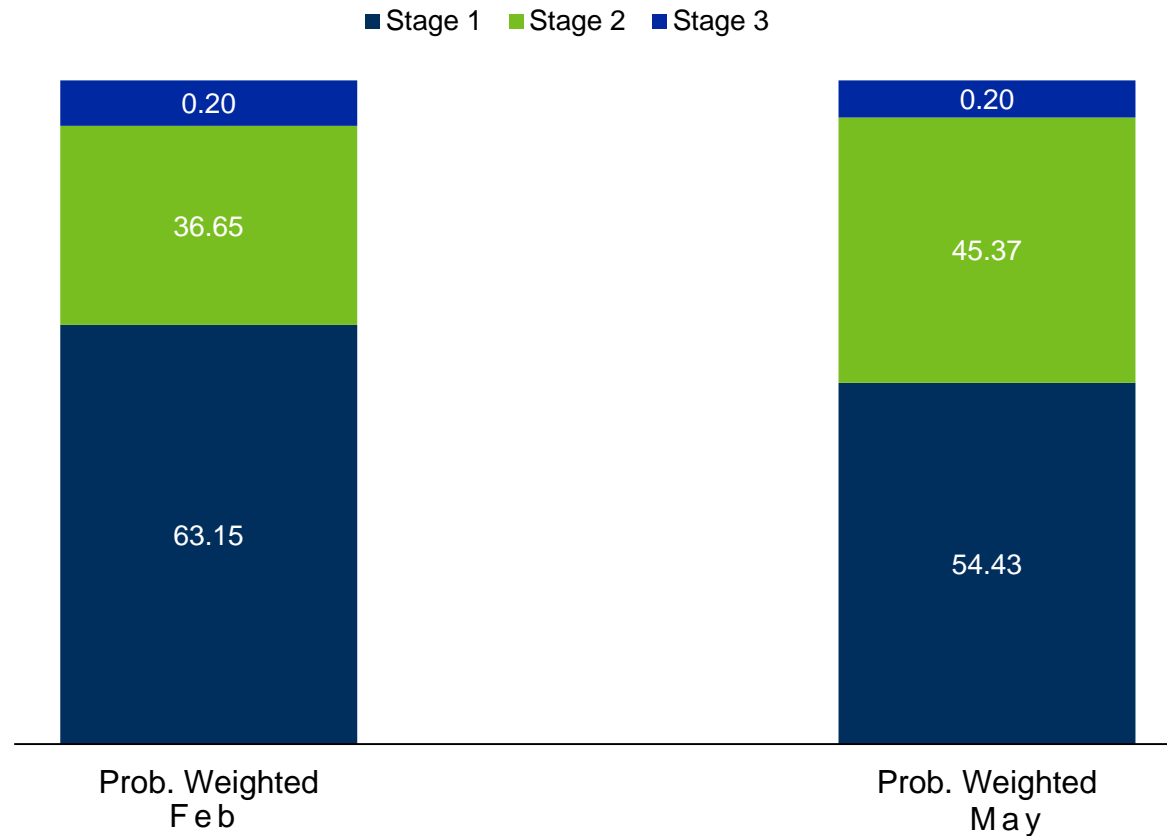
Impact on PD



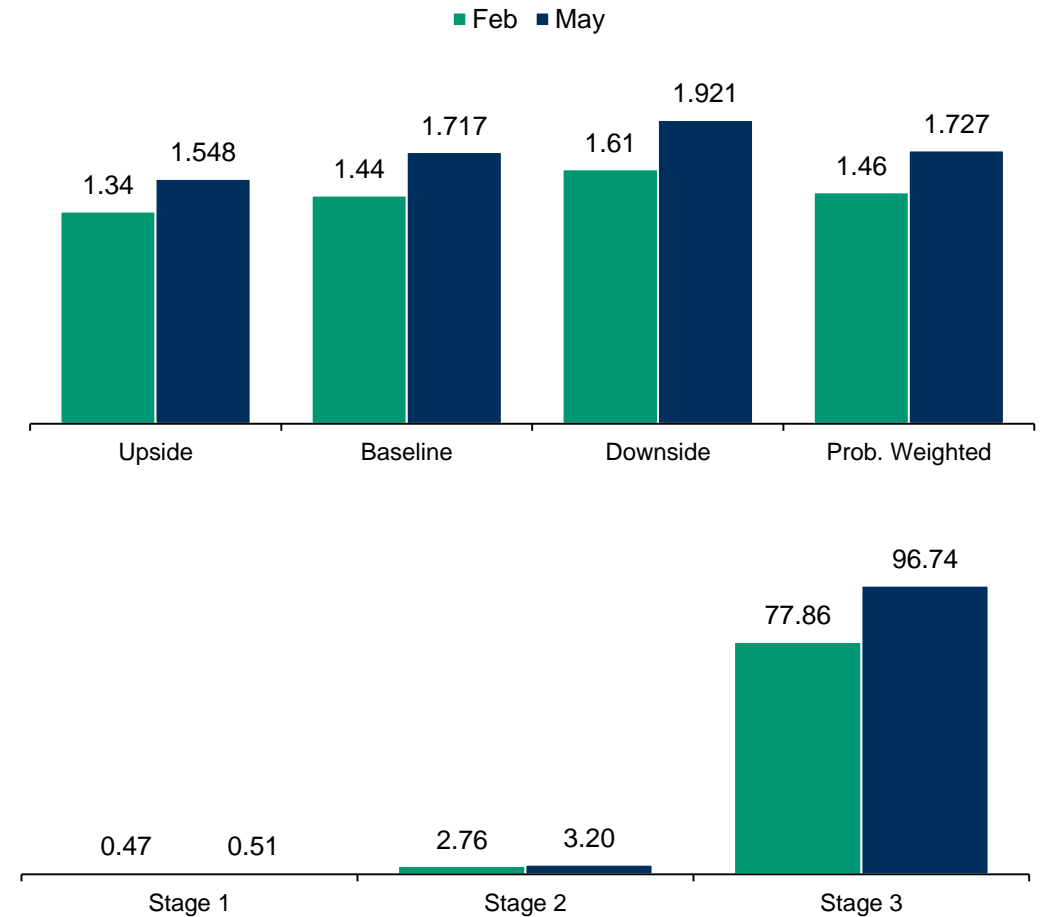
German Personal Loans

Impact on stages and ECL

Distribution of Exposure across Stages, %



Expected Credit Losses over Exposures, %



3

Auto Loans in Europe: Pan-European Perspective

Explanatory Variables of PP, PD & LGD models

PD & Prepayment

LTV
New/Used
Car age at origination
Loan age
Employment status
Borrower income
Income verification
Unemployment rate
Home price changes



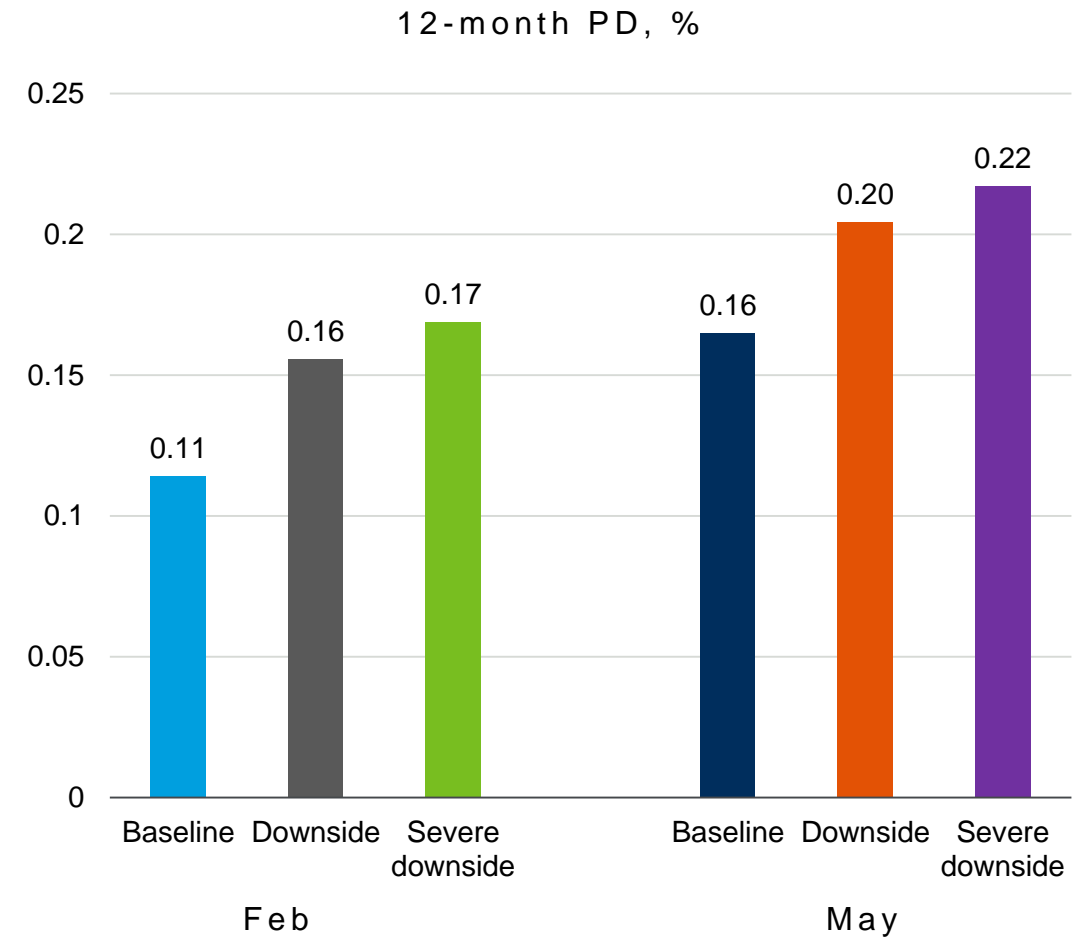
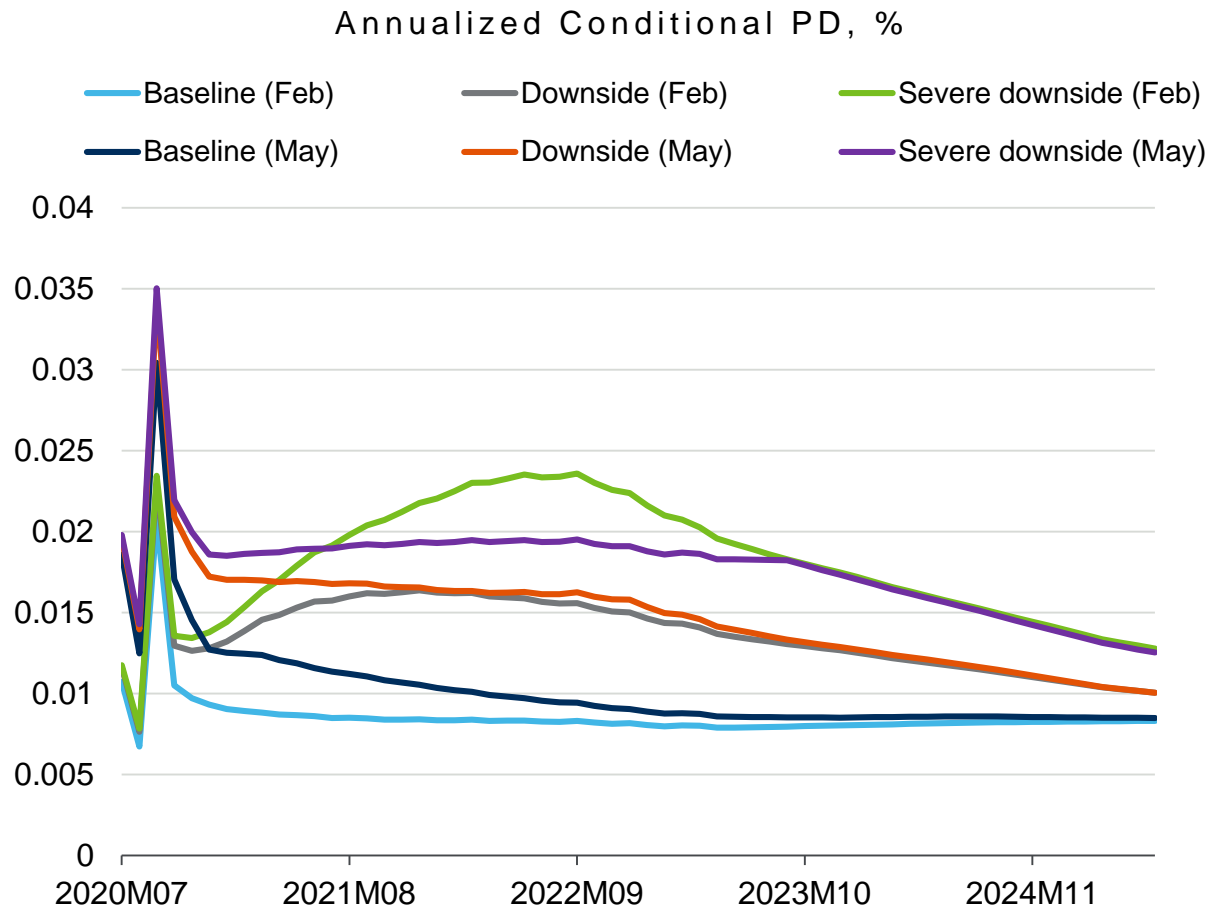
Loss Given Default

LTV
New/Used
Car age at origination
Borrower income



Spain: PD Forecast

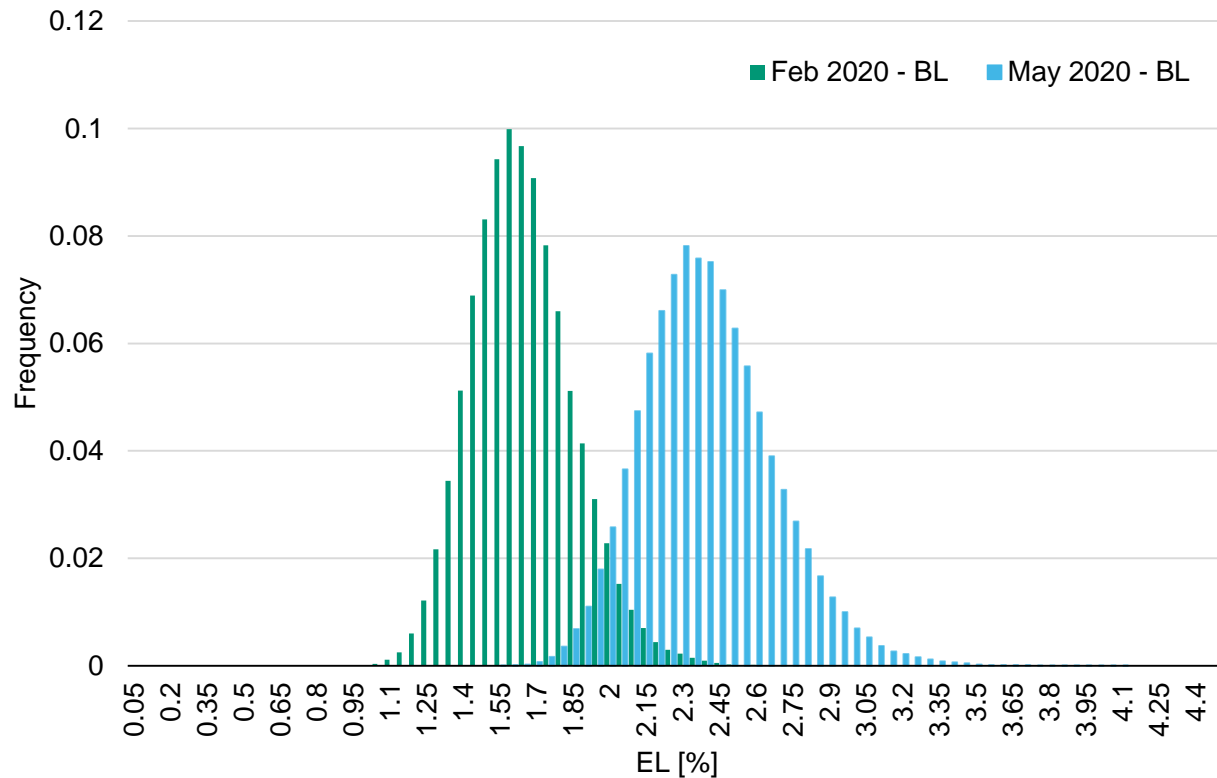
For a representative portfolio



Spain: Simulations – Distribution of Expected Losses

Expected Loss - VaR Approach

Distribution of ELs Across Scenario Vintages, Baseline

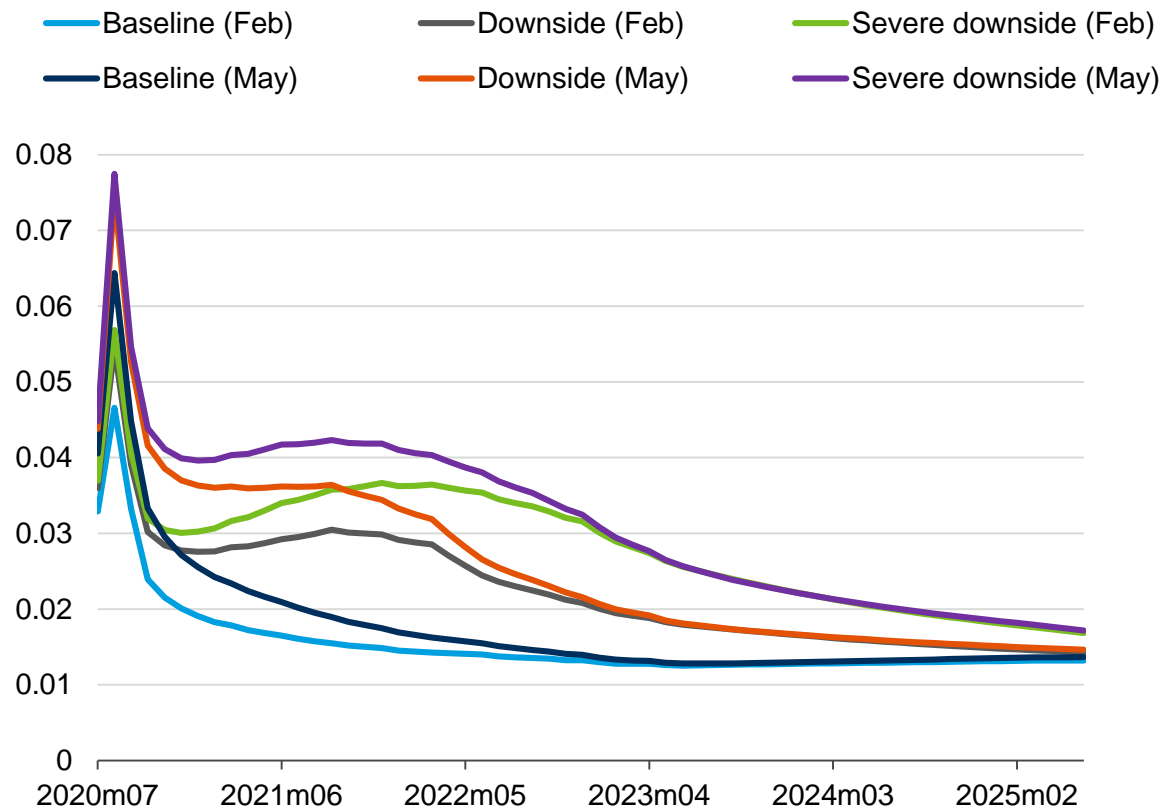


February		May	
Loss Summary Baseline Feb 2020		Loss Summary Baseline May 2020	
Expected Loss	0.8545	Expected Loss	1.2842
Loss Summary S3 Feb 2020		Loss Summary S3 May 2020	
Expected Loss	1.2376	Expected Loss	1.6385
Loss Summary S4 Feb 2020		Loss Summary S4 May 2020	
Expected Loss	1.4576	Expected Loss	1.8186
Aggregate Statistics Feb 2020 – BL		Aggregate Statistics May 2020 – BL	
Number of Simulations	100,000	Number of Simulations	100,000
Mean (Portfolio EL)	0.8966%	Mean (Portfolio EL)	1.2786%
Standard Deviation	0.2019	Standard Deviation	0.1875
Interquartile Range	0.2183	Interquartile Range	0.2108
Skewness	2.2294	Skewness	1.7532
Kurtosis	12.8530	Kurtosis	9.3869
95th / 50th Percentile	1.4642	95th / 50th Percentile	1.2835
Value-at-Risk		Value-at-Risk	
99.5	1.77	99.5	2.03
99.0	1.59	99.0	1.89
95.0	1.26	95.0	1.61
90.0	1.14	90.0	1.51

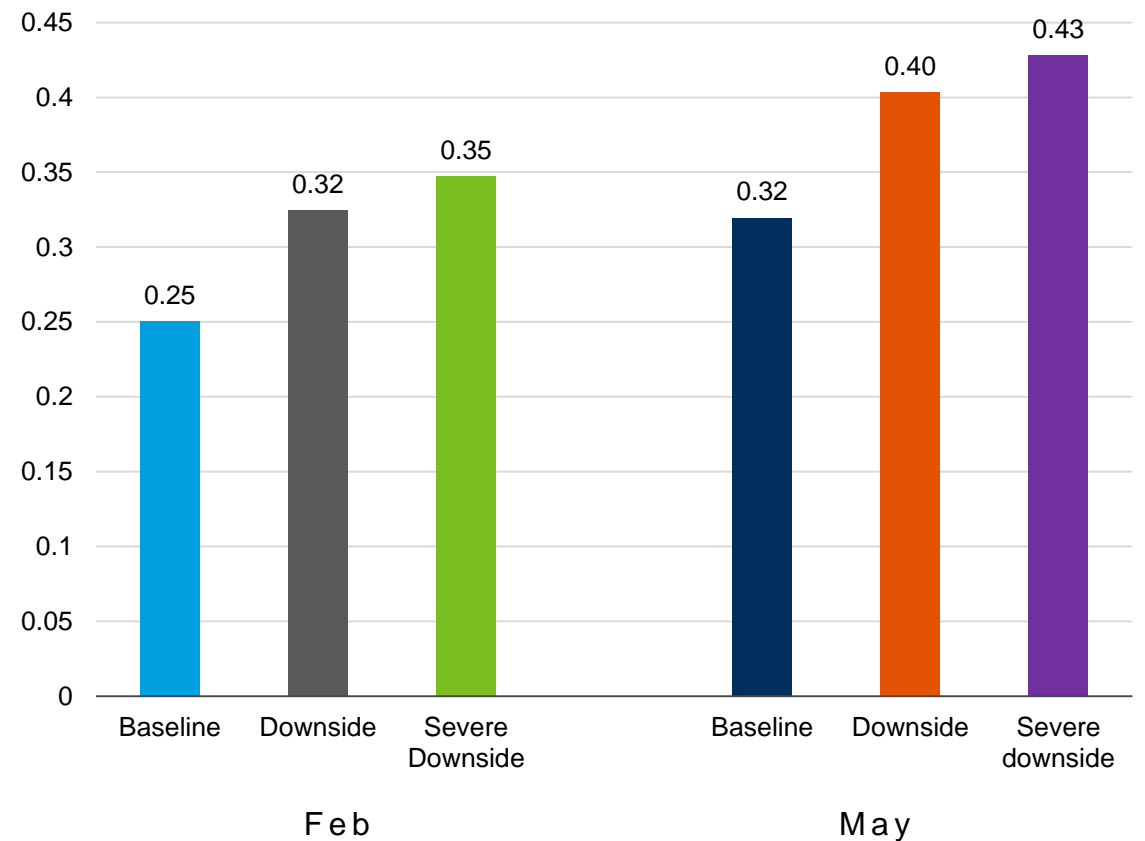
Portugal: PD Forecast

For a representative portfolio

Annualized Conditional PD, %



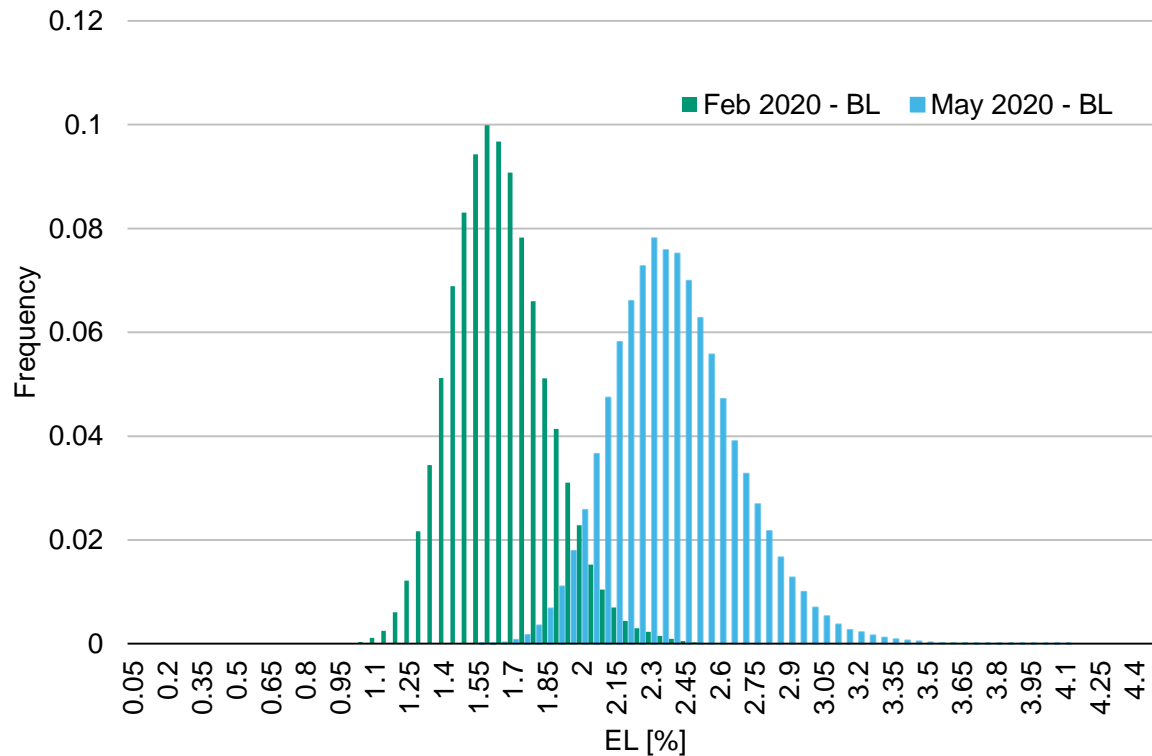
12-month PD, %



Portugal: Simulations – Distribution of Expected Losses

Expected Loss - VaR Approach

Distribution of ELs Across Scenario Vintages, Baseline



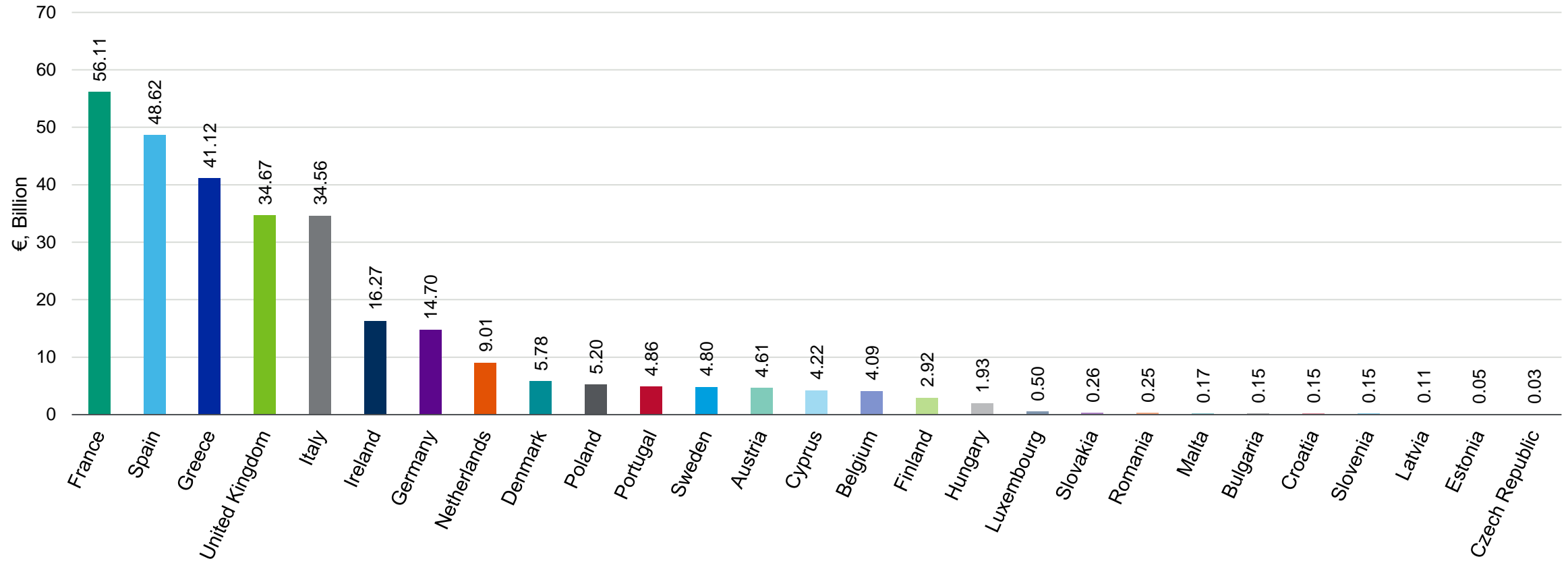
Feb		May	
Loss Summary Baseline Feb 2020		Loss Summary Baseline May 2020	
Expected Loss	1.6050	Expected Loss	2.3670
Loss Summary S3 Feb 2020		Loss Summary S3 May 2020	
Expected Loss	2.2687	Expected Loss	3.2398
Loss Summary S4 Feb 2020		Loss Summary S4 May 2020	
Expected Loss	2.6486	Expected Loss	3.7340
Aggregate Statistics Feb 2020 – BL		Aggregate Statistics May 2020 – BL	
Number of Simulations	100,000	Number of Simulations	100,000
Mean (Portfolio EL)	1.6269%	Mean (Portfolio EL)	2.3703%
Standard Deviation	0.2087	Standard Deviation	0.2707
Interquartile Range	0.2737	Interquartile Range	0.3538
Skewness	0.4496	Skewness	0.5357
Kurtosis	0.5071	Kurtosis	0.6505
95th / 50th Percentile	1.2342	95th / 50th Percentile	1.2127
Value-at-Risk		Value-at-Risk	
99.5	2.27	99.5	3.23
99.0	2.19	99.0	3.12
95.0	2.00	95.0	2.85
90.0	1.91	90.0	2.73

4

Characterizing Non-performing Loans

NPLs By Country

Household NPL exposure 2018, € Billion



Source: Moody's Analytics, ECB

Models for Predicting NPL Cash Flow

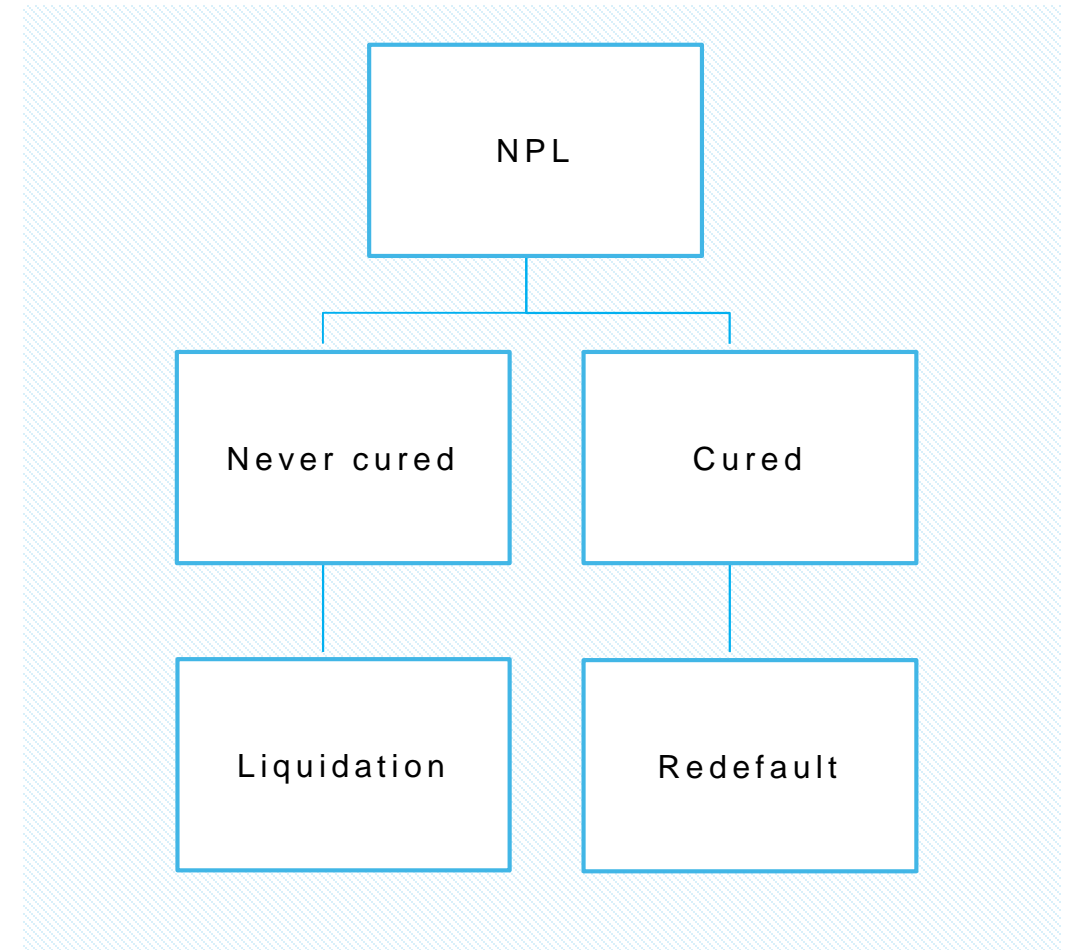
Models Needed

1 Cure model

2 Expected time to liquidation in case cure never happens

3 Loss given default in case of liquidation

4 Redefault model for cured loans

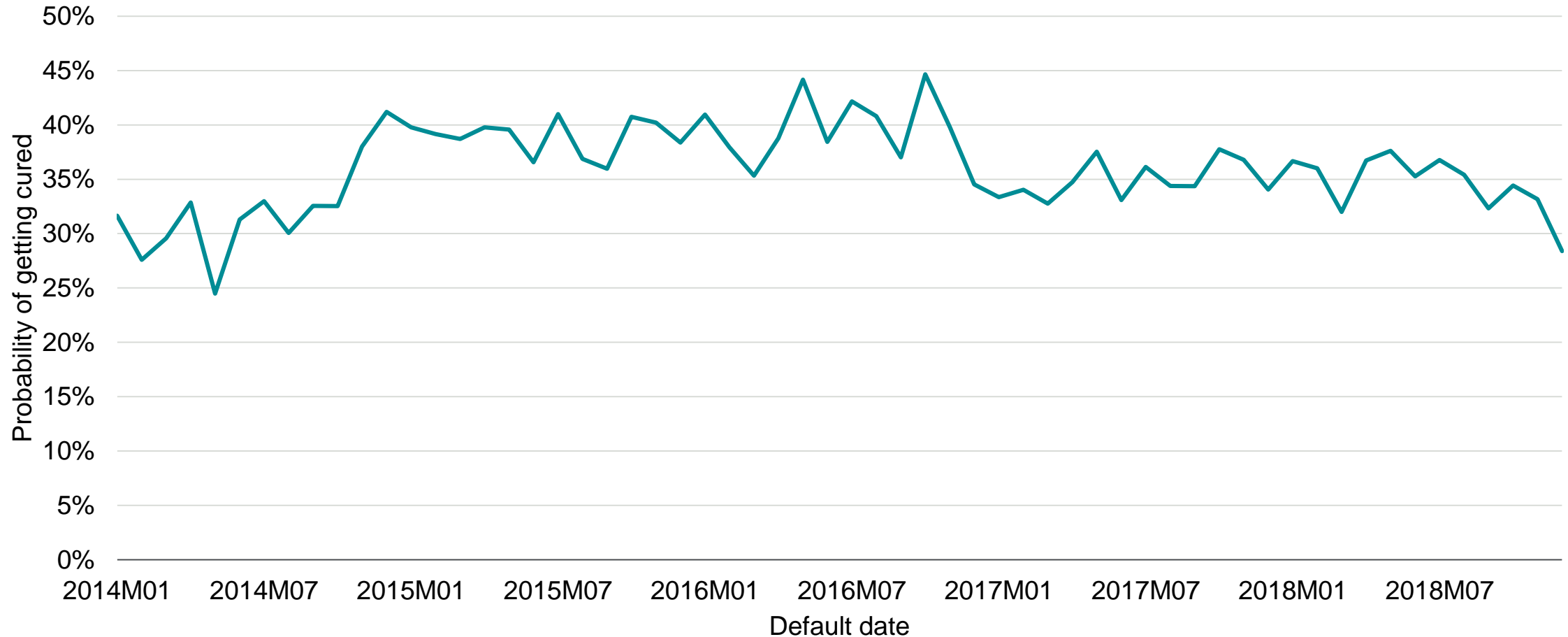


Case 1

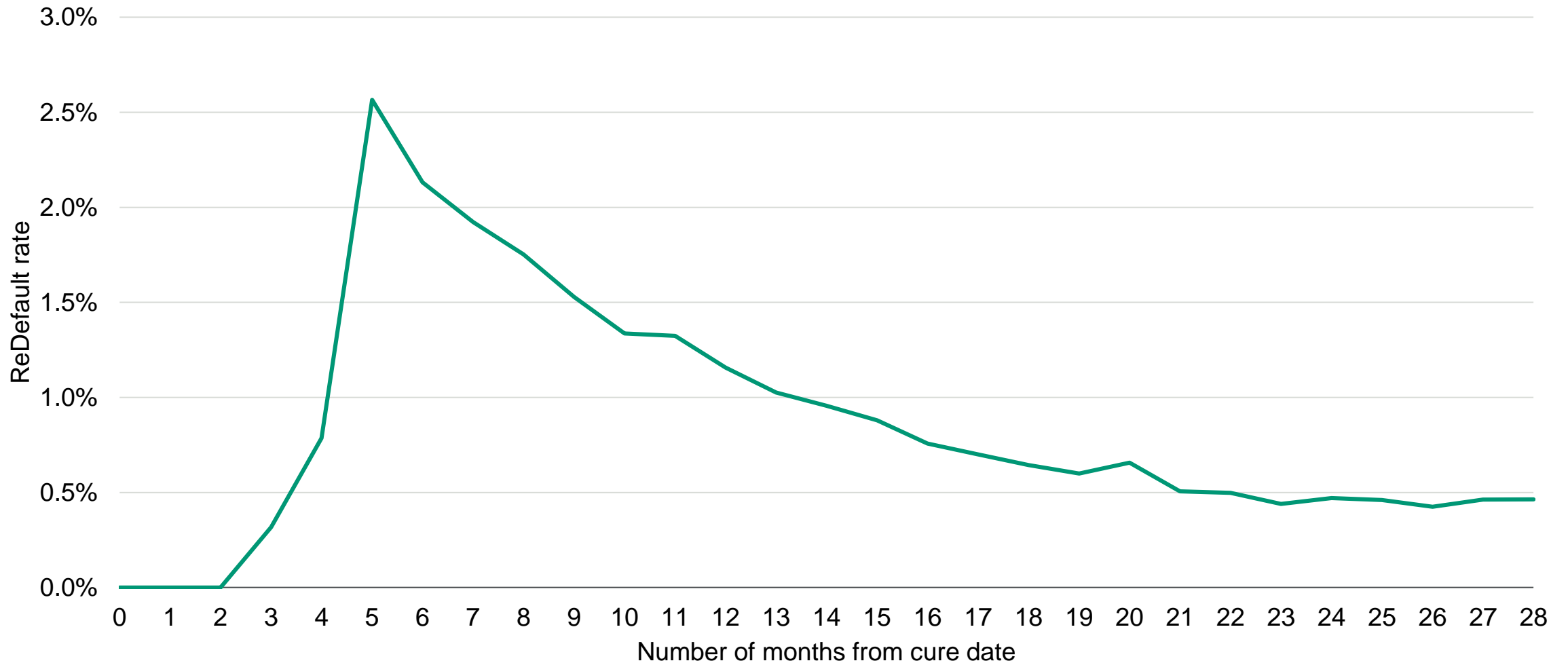
Auto Loans in Europe

Probability of Getting Cured Thru Time

Cured = at least 3 months of being in current after 90DPD

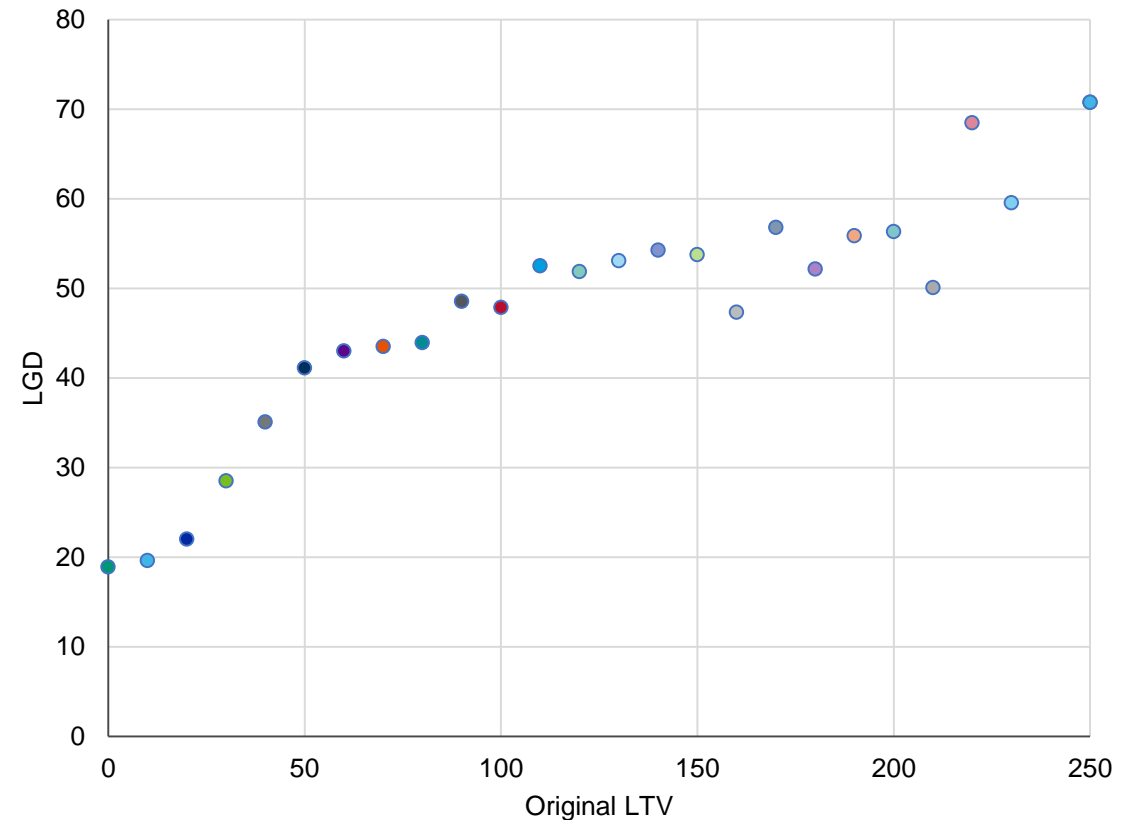
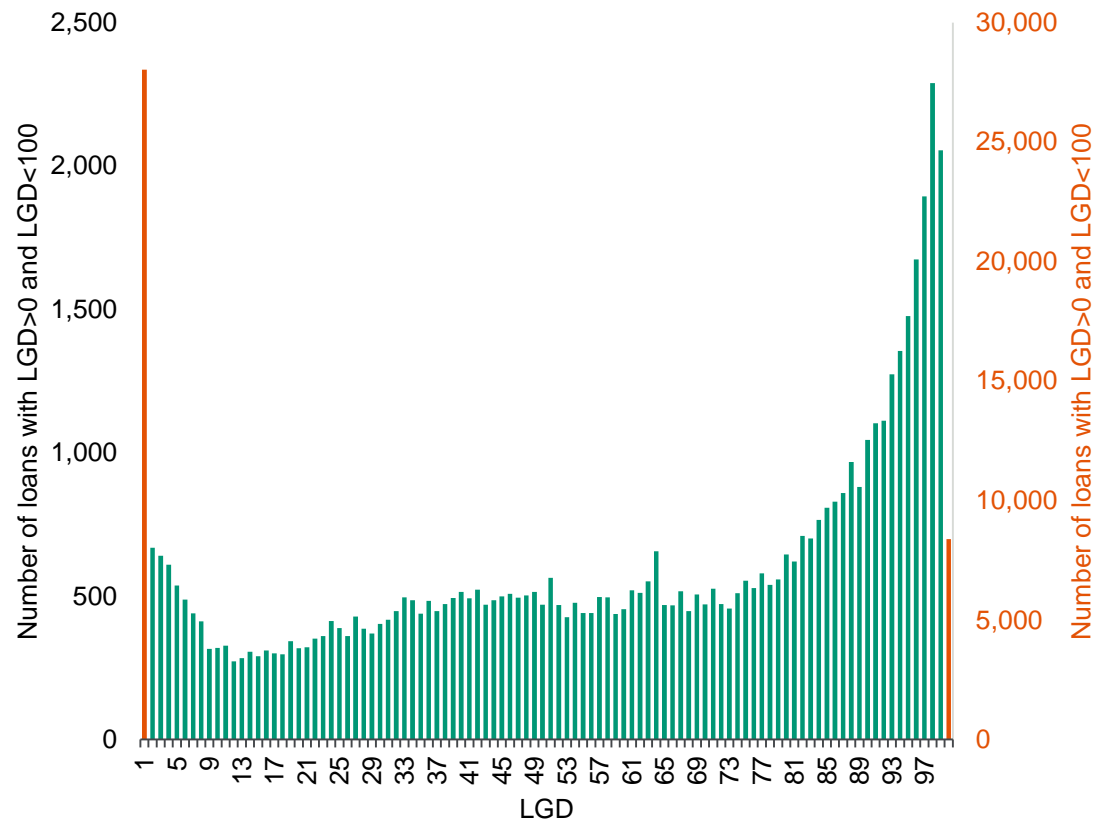


Redeefault Rate is Relatively High for Cured Loans



LGD in Case of Not Getting Cured

On average it takes 6 months to liquidation after default



Case 2

Cure Model
for Mortgages in Italy

Explanatory Variables of the Cure Model

CLTV (-)

Time since default (-)

Loan Characteristics



GDP annual growth at origination (-)

Unemployment annual growth at origination (+)

Spread of interest rate at origination (-)

Macroeconomic Factors



Owner occupied flag (-)

Mortgage purpose: construction flag (-)

Additional



Seasonality

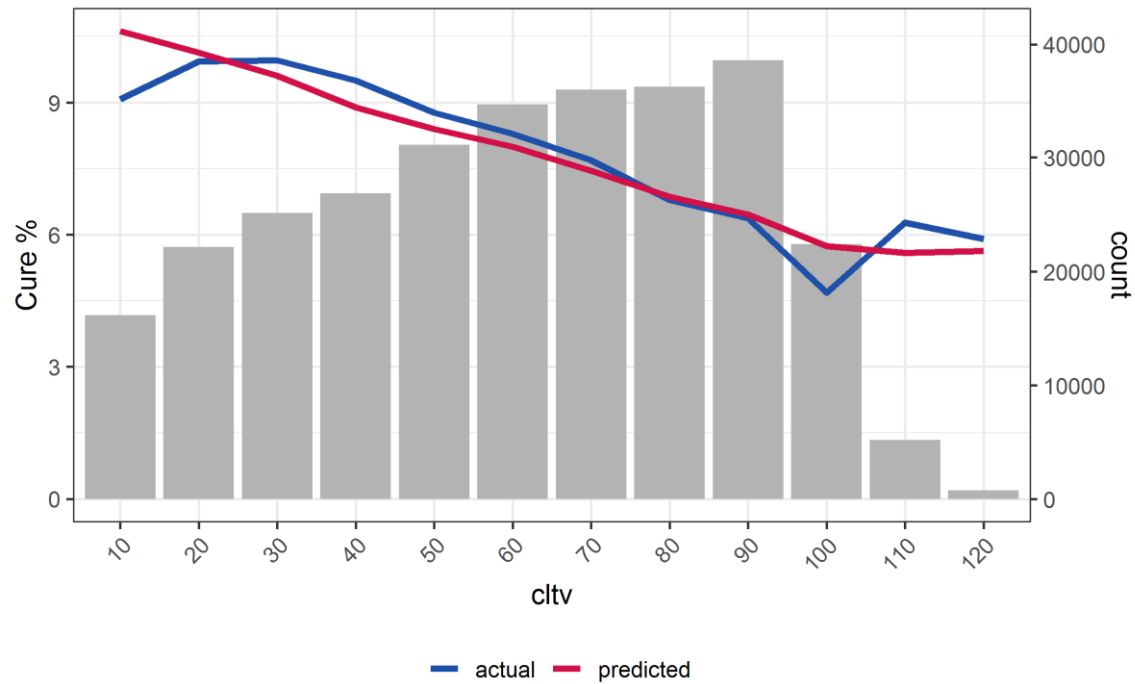
NUTS 1 regions flags

Fixed Effects

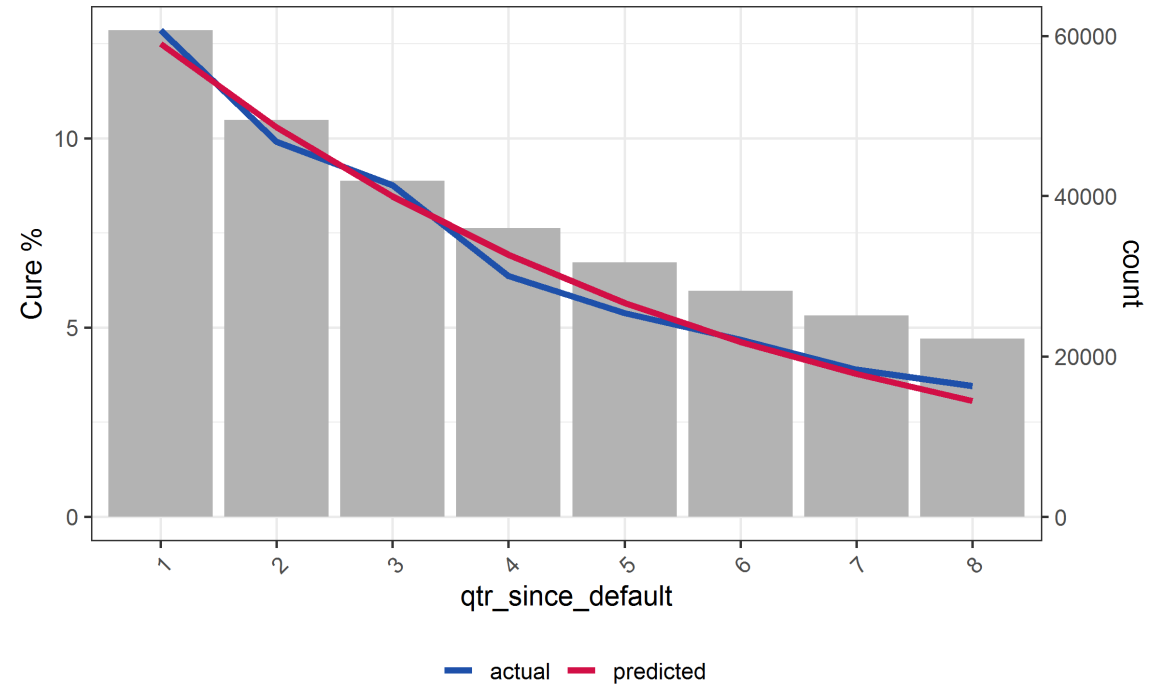


In-sample Fit of the Cure Model

CLTV



Time since Default



Q&A

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