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Continued Stress of the U.K. Mortgage Market

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INTRODUCTION

The economic outlook for the U.K. started to deteriorate rapidly in March as the impact of the COVID-19 pandemic started to emerge. The U.K. government imposed a nationwide lockdown on March 23 but subsequently provided a significant amount of fiscal support to the economy. A key element of the fiscal policy has been the job retention scheme, scheduled to expire at the end of October. The end of the furlough scheme will likely trigger a large increase in the U.K. unemployment rate. In addition, U.K. borrowers were granted payment holidays until the end of October. The payment holidays to some extent hide the expected insolvency of some of the borrowers. Assuming that nondeclining mortgage balances identify accounts affected by the payment holidays, we construct a portfolio based on these synthetic arrears. We compare the performance of this portfolio with a portfolio where delinquency is accounted for in a standard fashion. The performance is analysed through the lens of the deteriorating economic outlook in January, April and July. As expected, the synthetic portfolio suffers from much larger losses, though this performance can be viewed as a worst-case scenario in the sense that not all accounts whose balance does not decline will default. An interesting by-product of this exercise is the usefulness of the significant increase in credit risk, or SICR, in the IFRS 9 stage allocation, which appears to capture most of the impact of the payment deferral.

Continued Stress of the U.K. Mortgage Market

BY: JUAN LICARI, PETR ZEMCIK, BRENDA SOLIS GONZALEZ AND CHIARA VENTURA

The economic outlook for the U.K. started to deteriorate rapidly in March as the impact of the COVID-19 pandemic started to emerge. The U.K. government imposed a nationwide lockdown on March 23 but subsequently provided a significant amount of fiscal support to the economy. A key element of the fiscal policy has been the job retention scheme, scheduled to expire at the end of October.[1] The end of the furlough scheme will likely trigger a large increase in the U.K. unemployment rate. In addition, U.K. borrowers were granted payment holidays until the end of October. The payment holidays to some extent hide the expected insolvency of some of the borrowers. Assuming that nondeclining mortgage balances identify accounts affected by the payment holidays, we construct a portfolio based on these synthetic arrears. We compare the performance of this portfolio with a portfolio where delinquency is accounted for in a standard fashion. The performance is analysed through the lens of the deteriorating economic outlook in January, April and July. As expected, the synthetic portfolio suffers from much larger losses, though this performance can be viewed as a worst-case scenario in the sense that not all accounts whose balance does not decline will default. An interesting by-product of this exercise is the usefulness of the significant increase in credit risk, or SICR, in the IFRS 9 stage allocation, which appears to capture most of the impact of the payment deferral.

Economic outlook for the U.K. deteriorates

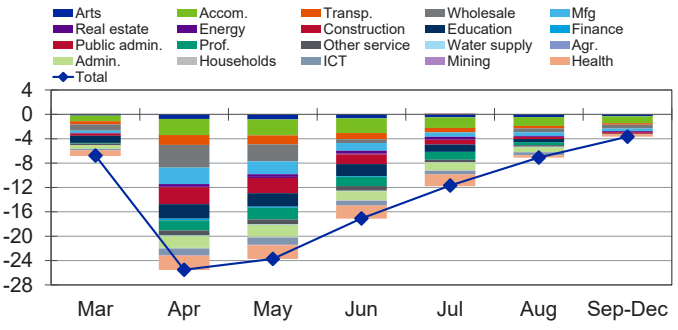
The U.K. was in a strict lockdown due to the pandemic for most of the second quarter. This has been reflected in the 20.4% decline of GDP. The breakdown by industry is depicted in Chart 1, with, for example, the accommodation and construction industries taking a hit. We have used the industry breakdown of GDP and assumptions regarding capacity utilisation for each industry due to lockdown measures to generate a projection for the GDP path. GDP output will likely remain below the pre-pandemic level despite the beginning of the recovery visible in the monthly GDP data in Chart 2.

Table 1 illustrates the evolution of the economic outlook for the U.K. economy. Second-quarter GDP was forecast to grow by 0.3% in February, before the forecast deteriorated to -14.2% in May. The actual contraction based on the data published in August was 20.4%. Given the lower base, the recovery is projected to be 17.3% in the third quarter. The decline reflects a fairly strict lockdown in the U.K. lasting for most of the second quarter. The performance of the U.S. economy in the second quarter was better, and so was the performance in the euro area, although the cumulative decline in output from the beginning of the year is comparable. Output is forecast to decline by 9.8% in 2020.

The unemployment rate and house prices will likely fall by the end of 2020 as the job retention scheme and payment holidays are phased out. The outlook for 2021 is affected by both the evolution of the pandemic and

Chart 1: Output Plummets in Q2

Deviation from normal level of activity, ppts, by industry, Aug 2020



Source: Moody's Analytics

1 On September 24, the Chancellor of the Exchequer Rishi Sunak announced additional measures would be introduced from November. Similar to policies introduced in Germany, the measures will likely include wage subsidies for employees put on short-time work. However, the new measures will be targeted to ease the structural transition to reflect the impact of the pandemic on different industries, and a large increase in unemployment is still expected.

Table 1: Global Economic Body Blow

Real GDP growth, % change, baseline scenario

		2020Q1	2020Q2	2020Q3	2020Q4	2019	2020
U.S.	February	0.3	0.5	0.5	0.4	2.3	1.7
	May	-1.2	-9.4	3.8	0.2	2.3	-5.7
	September	-1.3	-9.1	6.1	0.7	2.2	-4.3
Euro zone	February	0.4	0.4	0.4	0.4	1.2	1.3
	May	-3.8	-12.4	12.7	0.5	1.2	-7
	September	-3.7	-12.3	9.8	1	1.2	-8
U.K.	February	0.3	0.3	0.3	0.3	1.3	1
	May	-2.3	-14.2	10.9	2.2	1.4	-7.4
	September	-2.2	-20.4	17.3	1.8	1.4	-9.8
Italy	February	0.2	0.2	0.2	0.2	0.2	0.4
	May	-4.8	-16.4	18	1.7	0.3	-9
	September	-5.5	-12.8	11.6	1.8	-0.3	-9.5
Spain	February	0.4	0.4	0.5	0.5	2	1.8
	May	-3.4	-15.7	18.4	0.4	2	-6.7
	September	-5.2	-18.5	13.7	2.6	2	-12
Ireland	February	2.1	1.2	0.5	-0.3	5.6	4
	May	-2	-15.9	11.8	1.2	5.5	-6.5
	September	1.2	-19.9	11.6	-0.1	5.5	-7.3
Global output	February	0.4	0.9	0.8	0.7	2.5	2.4
	May	-3.1	-6.7	5.2	1.6	2.4	-4.5
	September	-2.9	-7.6	6.1	1.9	2.4	-4.6

Source: Moody's Analytics

the outcome of Brexit negotiations with the EU. There are currently two sticking points: fisheries and state aid. The U.K. government has stirred controversy by proposing a law that would restrict the Early Withdrawal Agreement, which was ratified only in January. Passing this law would amount to a violation of international treaty. This type of brinkmanship of the U.K. government has increased the risk of a negative outcome. In the Moody's Analytics webinar "Continued Stress of the U.K. Mortgage Market" on September 9,[2] we asked the audience a question regarding the likely outcome of Brexit negotiations. Chart 3 shows that 56.1% believe the outcome will be a no-deal Brexit. In our baseline forecast, we still assume that a sort of stripped-down agreement will be negotiated.

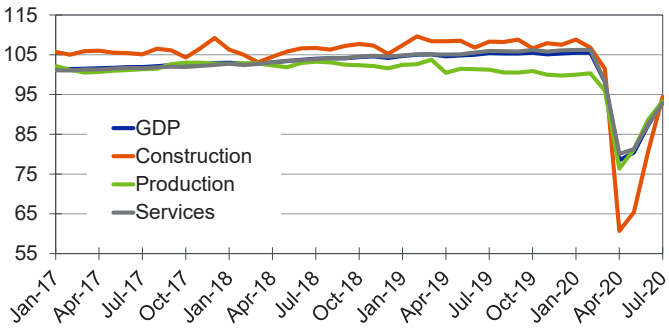
The Office for National Statistics reports that the number of job redundancies increased from 107,041 in January through March (not seasonally adjusted) to 155,531 in May through July. We expect the unemployment rate to peak at 8.4% in the first quarter of 2021—see Table 2, which also shows an international comparison and a three-year outlook for 2020-2022. The long-term outlook plays a key role in the calculation of the lifetime losses on the mortgage portfolio that we present below.

Starting in September, the number of COVID-19 infections confirmed by testing started to rise both in continental Europe and in the U.K. (see Chart 4). Some 10 mil-

2 https://www.moodysanalytics.com/webinars-on-demand/2020/continued-stress-of-the-uk-mortgage-market

Chart 2: Recovery Begins

Index level, monthly indexes



Sources: ONS, Moody's Analytics

Chart 3: Polling Question - Brexit

Moody's Analytics webinar, Sep 2020 - 57 votes

What will be the outcome of Brexit negotiations between the U.K. and the EU by the end of 2020?

A. No-deal Brexit: 56.1%

B. Hard Brexit: 28.1%

C. Soft Brexit: 14%

D. Other: 1.8%

Source: Moody's Analytics

Table 2: Unemployment Rate Increases

Country	Unemployment in 2019Q4, %	Max of 2020-2022 unemployment, % (Feb) Value	Max of 2020-2022 unemployment, % (Feb) Date	Max of 2020-2022 unemployment, % (Sep) Value	Max of 2020-2022 unemployment, % (Sep) Date
Germany	5	5.36	2022Q4	6.25	2020Q4
U.K.	3.8	4.64	2022Q4	8.38	2021Q1
France	8.1	8.51	2020Q1	10.59	2021Q1
Greece	16.53	16.34	2020Q1	19.83	2020Q4
Spain	13.81	14.06	2020Q2	19.61	2020Q3
Italy	9.57	10.52	2022Q4	12.79	2022Q2
Netherlands	3.4	4.48	2021Q3	6.66	2021Q3
Portugal	6.62	6.29	2020Q1	9.45	2020Q4
Russian Federation	4.58	5.78	2021Q1	6.45	2020Q3
Poland	2.85	3.91	2022Q4	6.34	2021Q3
U.S.	3.53	4.37	2022Q2	13.03	2020Q2

Source: Moody's Analytics

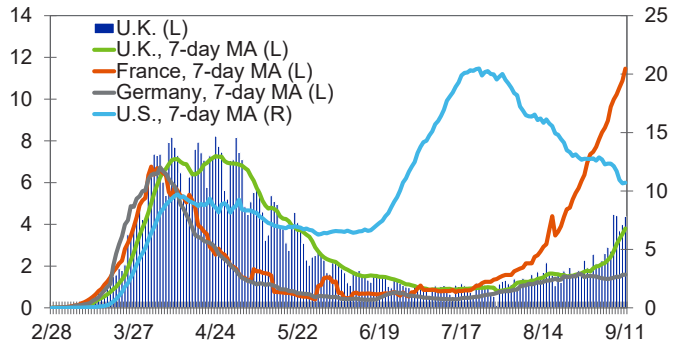
lion people have been in various regional lockdowns across the U.K. since the beginning of September. The numbers started rising by the end of summer, and the rate accelerated as schools and universities opened, plus more workers went back to the office. The U.K. government is considering a restricted two-week lockdown to coincide with school holidays by the end of October. There is a link between the number of infections and the change in the unemployment rate since the start of the pandemic (see Chart 5). Although the unemployment rate in the U.K. has only ticked up to 4.1% from 3.9% during the pandemic, it is likely to double in the second half of 2020.

We capture the risks associated with the increased number of infections in two downside scenarios that we denote S3 and S4. S3 is a 1-in-10 type of a recession, as measured by the average deviation of GDP from the baseline forecast over the next three years (12 quarters) in 10,000 simulations (see Chart 6). According to the same metric, S4 is a 1-in-25 type of recession. Chart 6 depicts the downside scenarios from June and compares them with the forecast from February.[3] The current baseline forecast is relatively close to S3 in February, which indicates that we are currently experiencing a fairly severe recession. We will focus on the S3 scenario as the downside scenario in our analysis. In this case, we assume that there will be a total of 660,000 confirmed infections, 5.7 million total cases, 138,000 deaths,[4] and infections will abate only by October 2021.

The GDP path combined with the path for the unemployment rate and other drivers such as interest rates is converted into the projection for house prices (see Chart

Chart 4: Rising Number of Infections

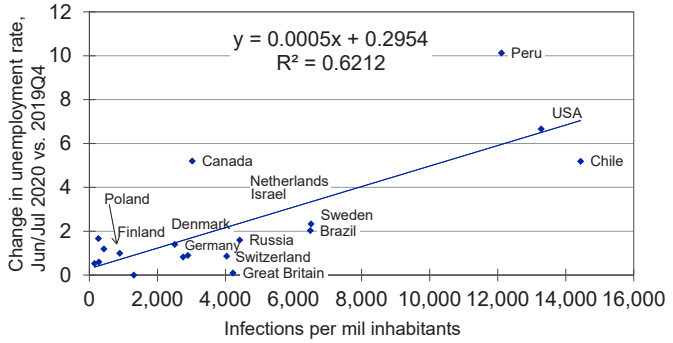
Reported coronavirus cases per 100,000 population, 2020



Sources: WHO, Moody's Analytics

Chart 5: More Infections, Weaker Economy

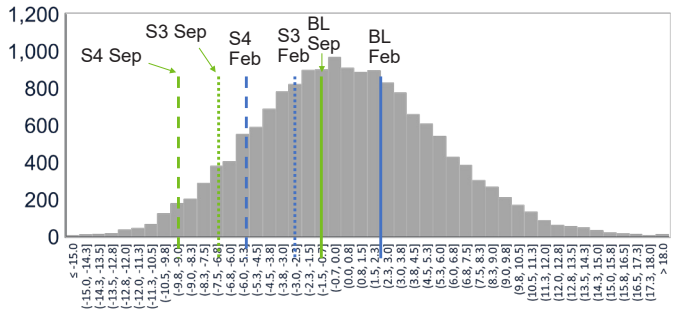
Confirmed infections vs. change in unemployment



Sources: WHO, government sources, Moody's Analytics

Chart 6: Severity

Avg deviation from baseline, % (standard deviation=5.2)



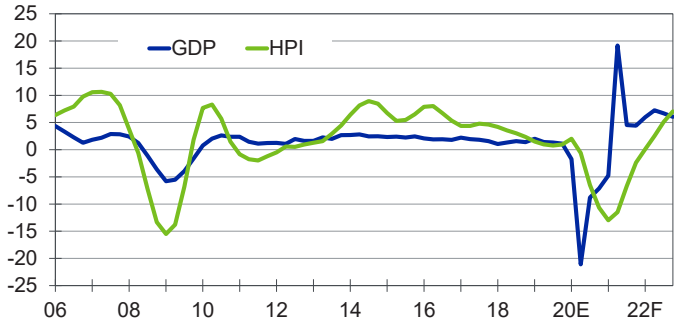
Source: Moody's Analytics

3 Note that we use scenarios from July in our subsequent analysis. However, the September and July scenarios are very close in terms of severity.

4 The U.K. government currently reports deaths within 28 days of the positive COVID-19 test.

Chart 7: House Price Hit Comparable to GFC

% change yr ago



Sources: ONS, Moody's Analytics

Chart 8: Polling Question - House Prices

Moody's Analytics webinar, Sep 2020 - 68 votes

What will be the % change yr ago in the level of U.K. house prices in December 2020?

A. More severe than -5%: 20.6%
B. Greater than -5% and smaller than 0%: 61.8%
C. Greater than 0% (positive growth): 17.6%

Source: Moody's Analytics

7). Despite recent increases in house prices, Moody's Analytics forecasts a 10.5% y/y decline in the fourth quarter of 2020 and a 2.3% y/y decline in the fourth quarter of 2021. Chart 7 compares the current status with the Global Financial Crisis, when a smaller contraction in GDP resulted in a larger drop in house prices. In contrast to the COVID-19 pandemic, the housing market contributed to the GFC. However, the unprecedented exogenous decline in output in the second quarter of 2020 combined with a lagged increase in unemployment will likely cause house prices to adjust by the end of the year. Based on our poll during a webinar including attendees from the major U.K. financial institutions and building societies, our forecast is on the conservative side of the spectrum, as most respondents believe that the change in house prices will be 0% to -5% (see Chart 8). Chart 9 provides a regional breakdown, in which regions with moderate growth in 2019, such as Scotland and South East England, will likely experience a decline in real estate prices of 7% to 9%.

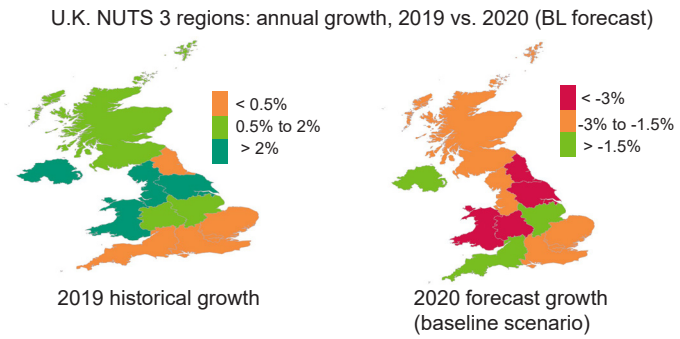
Payment holidays on the U.K. mortgage market

In response to the adverse economic impact of the virus, the U.K. implemented payment deferrals, or payment holidays, for different types of credit exposures, including mortgages. The payment deferrals were made available to most borrowers, including those who were facing difficulties in making near-term payments due to a temporary loss of income. Financial institutions were given guidelines by regulators that taking up the COVID-19-related payment deferral should not automatically cause a loan to be regarded as in default or as an indicator of SICR, since it does not trigger the counting of days past due.

Our objective is to investigate what could be the expected impact on provisions given the worse economic outlook and the end of deferrals and job retention schemes. For this analysis, we quantify the impact on a representative portfolio of U.K. residential mortgages obtained from the European Data Warehouse, which reports monthly loan-level data of transactions for asset-backed securities. We construct a "synthetic arrears status" for those loans that most likely opted for the payment deferral. Specifically, we assume that when a balance on a loan does not decline, the borrower used the option of payment holidays. We then quantify what would be the expected losses and loss distribution if the borrowers had not had access to this scheme. We also analyse the change in expected losses and loss distribution due to deterioration of the economic outlook between January, April and July.

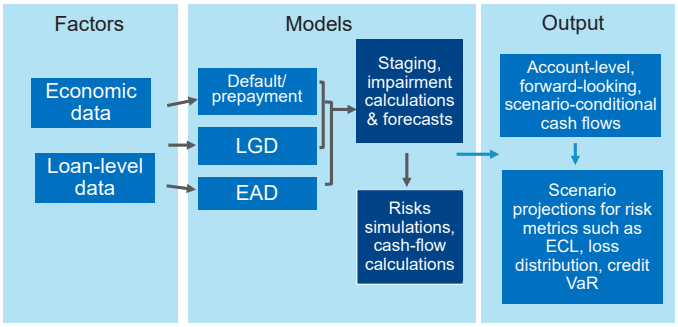
To conduct the analysis, we employ the Moody's Analytics Mortgage Portfolio Analyzer that hosts loan-level econometric models for the probability of default, loss given default, and prepayment of U.K. residential mortgages. Chart 10 summarizes the key steps that the tool follows to produce the analysis. The econometric models are

Chart 9: Regional Shocks to HPI



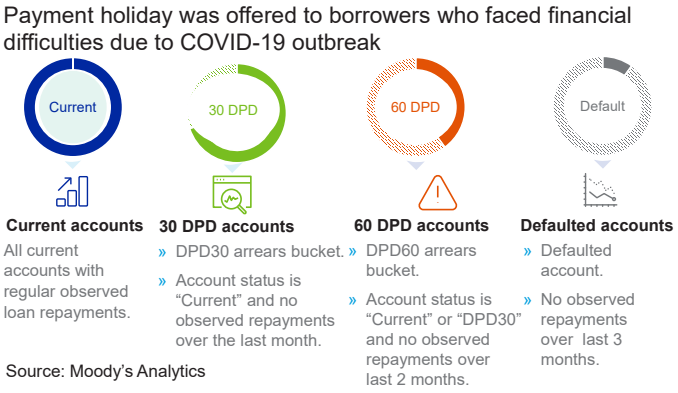
Source: Moody's Analytics

Chart 10: MPA Modular Structure



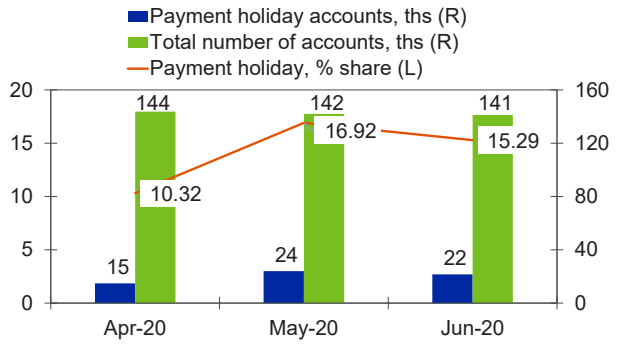
Source: Moody's Analytics

Chart 11: Synthetic Arrears Status Definition



Source: Moody's Analytics

Chart 12: Payment Holiday Accounts



Sources: EDW, Moody's Analytics

integrated to produce a loan-level forecast for each of the risk metrics and loan-level cash flow across alternative scenarios, which are then summed to produce portfolio-level cash flows and expected credit losses. The trajectories of the economic scenarios are also used to simulate corresponding default events, prepayment events and loss given default, to produce the simulated losses across all loans, and an estimate of the distribution of losses for the portfolio. With the worsening economic outlook and the end of the coronavirus job retention and payment deferral schemes next quarter, we can expect a wave of defaults at the end of this year.

The construction of the synthetic arrears status consists of identifying loans that most likely took the payment deferral and assigning them an arrears status based on the number of months they have not repaid their loans (that is, their balance has not declined as expected when payments are made monthly). We considered annuity mortgages whose status was reported monthly between January and June. Since the payment deferral does not trigger the counting of days past due, we identify loans whose arrears status did not change, and no repayment was observed from April. We define a synthetic arrears status by adding the time when the balance does not decline to the delinquency measure DPD. This definition is summarized in Chart 11. Our assumptions can be interpreted as the worst-case scenario, as a smaller portion of loans that satisfy conditions in our definition will actually be in default.

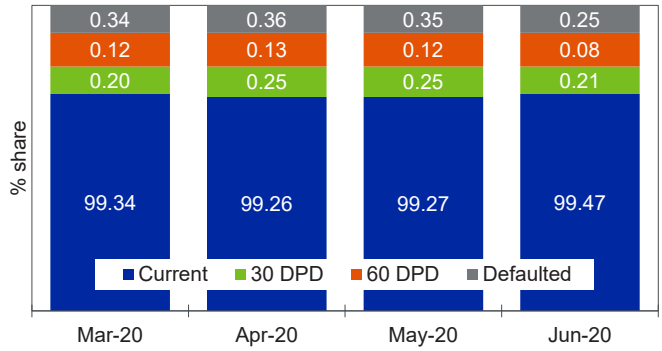
Chart 12 displays the number of accounts observed at each snapshot and the evolution of the share of accounts that applied to payment holidays using our definition. The number of accounts from April until June remained stable, while the share of accounts applying to the scheme increased by 5% from April to May and decreased slightly from May to June, potentially driven by the loosening of lockdown measures.

Charts 13 and 14 illustrate the evolution of the arrears status distribution at different snapshots for the original dataset and for the same dataset but applying our synthetic arrears status. Using the original delinquency status, we observe that the distribution of accounts by DPD does not change dramatically between March and June even though the U.K. economy experienced a deep recession in this period. On the other hand, the percentage of defaulted accounts using the synthetic delinquency status soars from 0.34% of exposure in March to 10.64% in June. We also see a jump in accounts 30 DPD, from 0.15% in April to 8.78% in May—some of these accounts are in the synthetic default by June.

Deteriorating economic environment implies rising PDs & LGDs

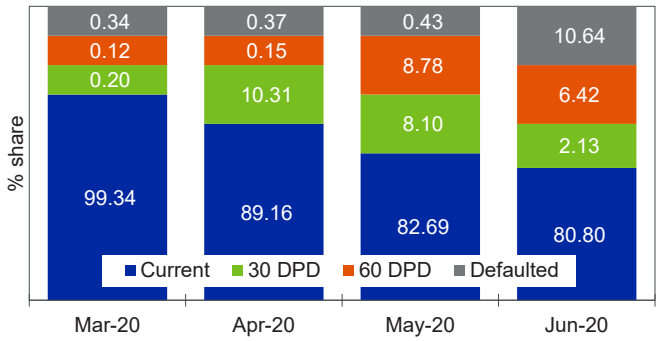
To quantify the impact of the economic environment on the portfolios with the original and the synthetic delinquency statuses, we use the portfolio data from June. Charts 15-20 display the distribution of the portfolio by loan characteristics for the full sample with the original delinquency status

Chart 13: Original Delinquency Status



Sources: EDW, Moody's Analytics

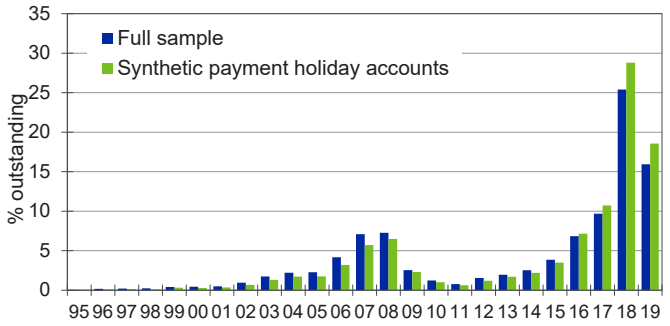
Chart 14: Synthetic Delinquency Status



Source: Moody's Analytics

Chart 15: Balance Across Origination Vintages

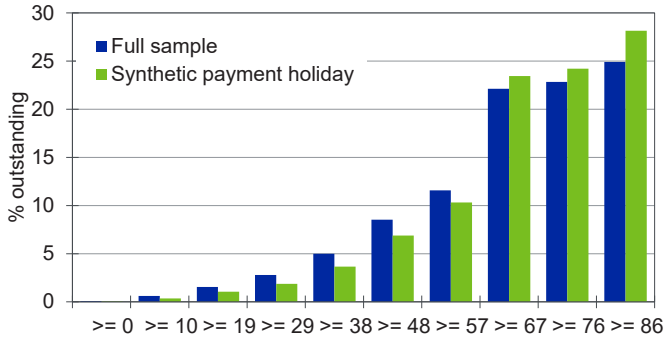
Distribution, full sample vs. loans identified to be on payment holidays



Sources: EDW, Moody's Analytics

Chart 16: Balance Across LTV at Origination

Distribution, full sample vs. loans identified to be on payment holidays



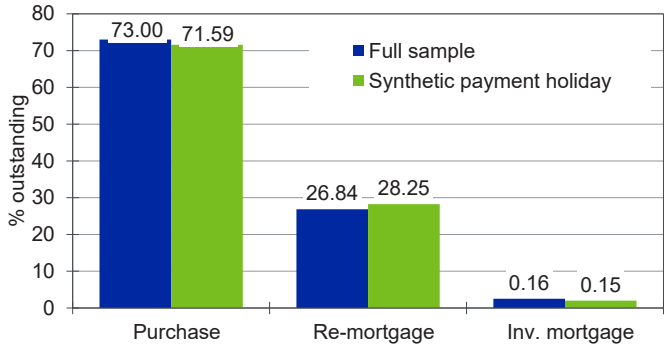
Sources: EDW, Moody's Analytics

and only for the loans that were identified as taking the option of the payment holiday. The full-sample portfolio consists of more than 141,000 loans worth over £13 billion. A greater portion of the accounts in synthetic arrears as compared with the original sample originated in 2017 to 2019. These accounts also tend to have a greater loan-to-value ratio. A moderately greater portion of these accounts includes loans to re-mortgage as compared with the original sample, while a smaller portion is used for property purchase. A majority of the accounts in synthetic arrears have a loan size between £97,382 and £292,145. The maturity of these accounts tends to be greater than the maturity of the accounts in the original sample. Many of the accounts on payment holiday have maturity greater than 30 years (360 months). Compared with the full sample with the original status, the accounts on synthetic payment holiday have a smaller portion of employed borrowers and a greater portion of self-employed borrowers. We can therefore see a pattern here, as many of these features are associated with a greater risk of default.

Charts 21 and 22 display the annualized conditional PD and LGD projections for the baseline, downside and upside scenarios generated respectively in January, April and July. These represent the beginning of the first, second and third quarters of the year. We use January scenarios as a reference, as the economic impact of the global pandemic did not yet materialize at the time. The calculation in this case is done using the original portfolio, as we first focus mainly on the impact of the economic environment. The PDs and LGDs are rising as the economic environment is gradually deteriorating, especially the rising projections for unemployment. In January, the baseline PD forecast peaks at 0.8% in the last quarter of 2022. In contrast, the April baseline projection peaks at 1.5% in 2021, and for July the peak increases to 2%. For LGD, the chart illustrates a similar evolution. However, the LGD almost triples from January to April as

Chart 17: Balance by Purpose

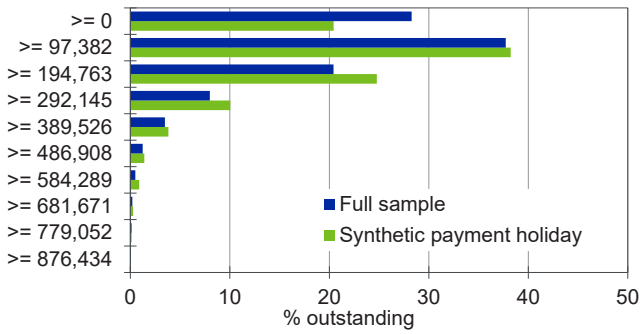
Distribution, full sample vs. loans identified to be on payment holidays



Sources: EDW, Moody's Analytics

Chart 18: Balance by Loan Size

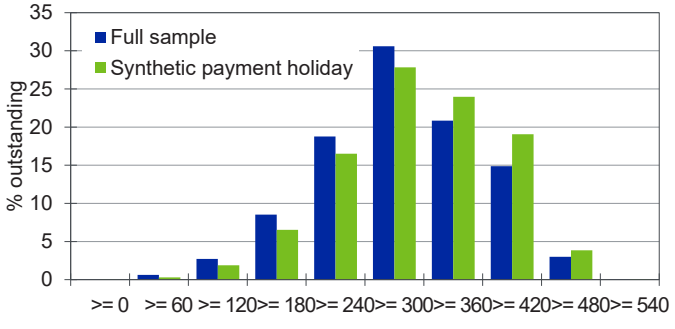
Distribution, full sample vs. loans identified to be on payment holidays



Sources: EDW, Moody's Analytics

Chart 19: Balance by Loan Term

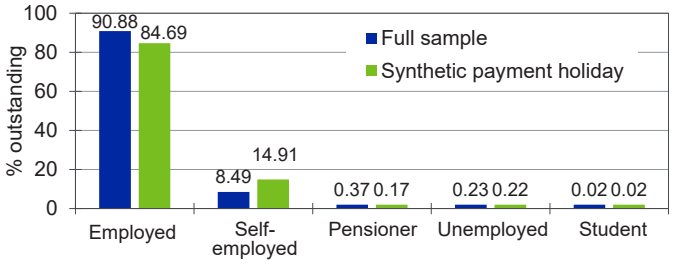
Distribution, full sample vs. loans identified to be on payment holidays



Sources: EDW, Moody's Analytics

Chart 20: Balance by Employment Status

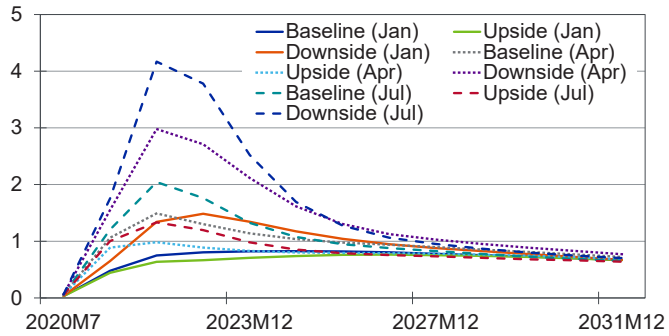
Distribution, full sample vs. loans identified to be on payment holidays



Sources: EDW, Moody's Analytics

Chart 21: Annualized Conditional PD

%, Jun 2020 snapshot



Source: Moody's Analytics

the crisis hit the U.K. economy. The baseline scenario indicates a maximum LGD of 5% for the second quarter of 2022, whereas in April the peak for the same scenario increases to 16% in 2021 and in July to 19% in the same period. For both risk metrics, we observe that the peak of the downside projection in January is similar to the baseline projection in April. Therefore, the baseline outlook corresponds to a 1-in-10 type of recession as viewed at the beginning of the year. The peak of the baseline scenario in July is at 20%, even higher than the downside projection in January because of the revisions to the economic outlook.

We now concentrate on comparing the impact of economic fundamentals as well as the impact of the payment holiday. As our risk metric, we focus on the 12-month PD projections, which exhibit a pattern similar to the one observed for the conditional forecasts of risk parameters. Chart 23 thus compares not only the effect of different scenario vintages but also the effect of the synthetic arrears status for the June snapshot portfolio. In the case of the synthetic portfolio, we only consider accounts not in default so as not to skew the PD, as the PD of the defaulted accounts is 1 by definition. When payment deferrals are not available to the borrowers, the 12-month PD is on average 118% higher across the three scenarios. By contrast, it is only 88% higher for the original portfolio. Therefore, the difference in 12-month PDs is more dramatic for the original portfolio than the synthetic portfolio. We observe the greatest jump in 12-month PD, by 125%, for the synthetic portfolio in the downside scenario, from 1.86% in January to 4.18% in July.

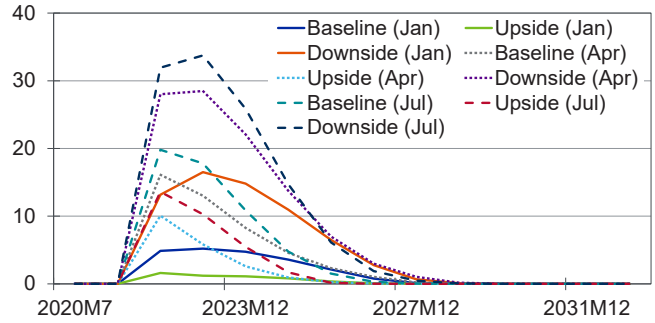
IFRS 9 expected credit losses

Given the current level of economic uncertainty, financial institutions should aim to make an all-around assessment to identify borrowers using payment deferrals that have suffered an SICR beyond the available information regarding delinquencies. A solution to this is to consider the impact of updated economic scenarios through the calculation of the lifetime PDs. In addition, institutions can apply qualitative overlays based on expert judgement to complement the staging rules. In other words, the IFRS 9 methodology is very useful in this context.

We demonstrate how the macroeconomic environment has affected stage allocation of loans and the expected credit losses calculated according to the IFRS 9 accounting rules. The payment deferral does not necessarily mean the loan has suffered an SICR or has defaulted. However, it is also unlikely that none of the loans in synthetic arrears were affected and some of them will transfer to Stage 2 or default by the end of the year. By assuming that all accounts with balances not declining are in arrears, we paint a worst-case scenario of what the expected losses at the end of the year may be once the payment holiday support and job retention schemes end in October.

Chart 22: Conditional LGD

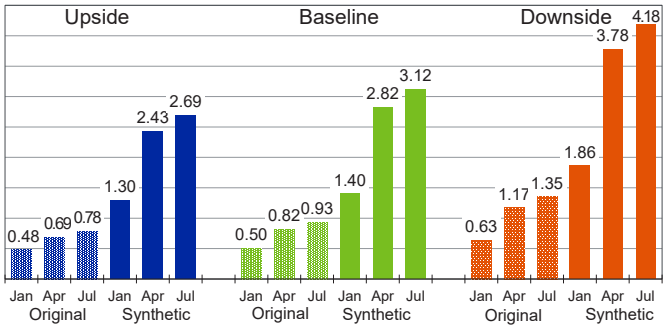
%, Jun 2020 snapshot



Source: Moody's Analytics

Chart 23: 12-Month PD

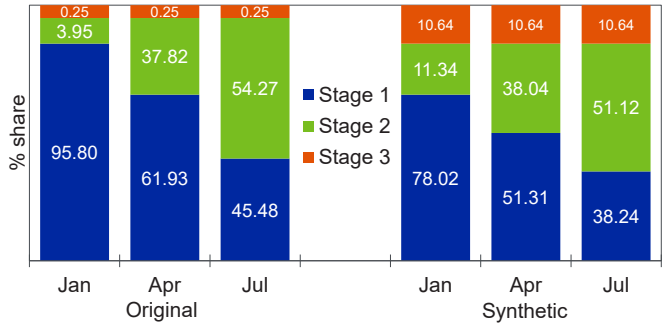
Exposure-weighted 12-mo PD, %, Jun 2020 snapshot



Source: Moody's Analytics

Chart 24: Stage Allocation

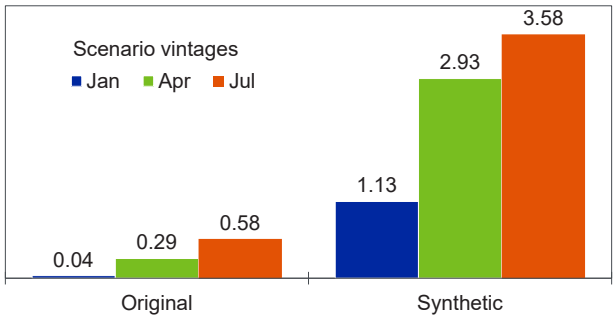
% of exposure, scenario vintages



Source: Moody's Analytics

Chart 25: Expected Credit Loss

Coverage ratio, %

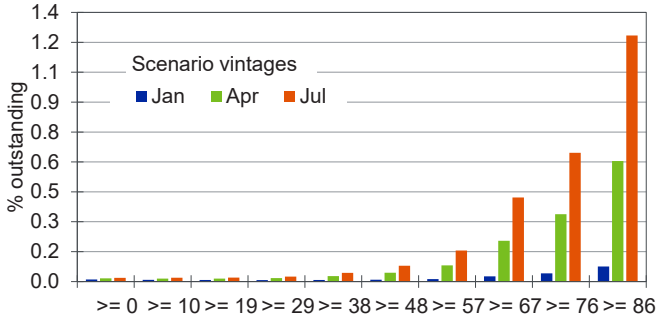


Source: Moody's Analytics

Following this methodology, we measure the SICR using a quantitative approach comparing the loans' lifetime PD at reporting date with the lifetime PD at origination. We transfer a loan to Stage 2 if the increase in lifetime PD from origination is higher than a threshold obtained from an optimization problem that maximizes the chances of allocating bad accounts into Stage 2 and good accounts into Stage 1. We complement this quantitative staging rule by applying a qualitative overlay based on the European Central Bank backstops. The European Banking Authority qualitative overlay keeps accounts with a very low level of absolute risk in Stage 1. Low risk is defined by 12-month PD below 30 basis points. Accounts with a high level of absolute risk greater than 20% for 12-month PD are in Stage 2.

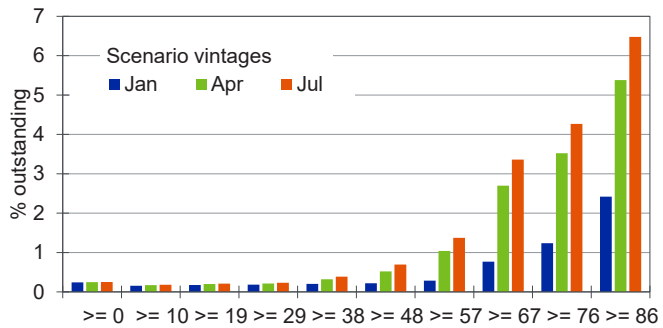
Chart 24 depicts the impact of COVID-19 on the stage distribution for the June snapshot data using the original and synthetic arrears status across scenario vintages. Even when the arrears status remained unchanged for loans with payment deferral, the proportion of loans in Stage 2 significantly increased due because of the worsening economic conditions in April and July. The large increase in the amount of loans in Stage 2 is explained mainly by the shift in the lifetime PDs at reporting date once the economic projections account for the pandemic. These are compared with lifetime PDs at origination whose scenario projections did not include the pandemic. Once we eliminate the impact of payment holidays in the synthetic portfolio, the share of Stage 2 accounts increases from 11.3% using scenarios from January to 37.8% in April and 51.1% in July. This demonstrates that our staging rule can successfully detect accounts that suffered an SICR or credit impairment beyond arrears status by using only observed loan characteristics and economic scenarios, though the overall share of Stage 2 and 3 accounts is at 61.8% for the synthetic portfolio—somewhat greater than the 54.5% for the original portfolio.

Chart 26: ECL by LTV - Original Portfolio



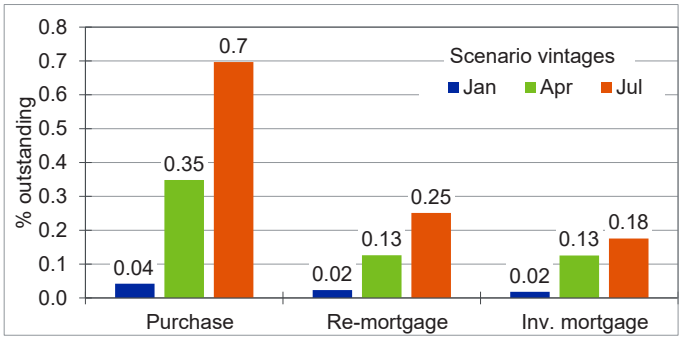
Source: Moody's Analytics

Chart 27: ECL by LTV - Synthetic Portfolio



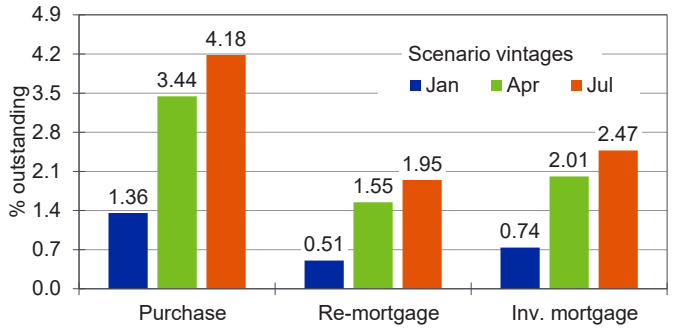
Source: Moody's Analytics

Chart 28: ECL by Purpose - Original Portfolio



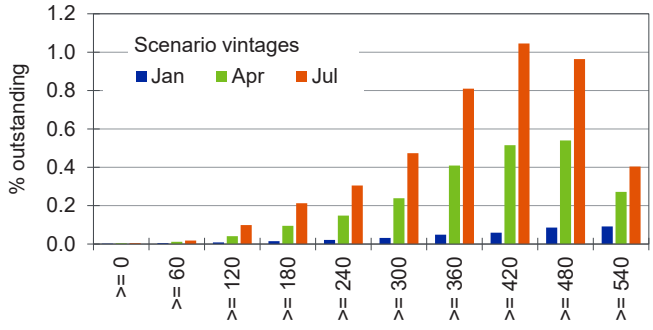
Source: Moody's Analytics

Chart 29: ECL by Purpose - Synth. Portfolio



Source: Moody's Analytics

Chart 30: ECL by Loan Term - Original Portfolio



Source: Moody's Analytics

Chart 25 provides the expected credit loss calculated according to IFRS 9 rules. The calculation uses probability weights 30% for the upside scenario, 40% for the baseline scenario, and 30% for the downside scenario. On average, the ECL with the synthetic arrears status is 10.6 times higher than the one obtained using the original arrears status. The impact of the rapidly deteriorating outlook embedded in the economic scenarios is clearly visible for both the original and synthetic portfolios. The worst-case scenario provisions are 6.2 times greater than provisions calculated using the actual arrears status and the July economic forecasts.

Charts 26-33 display the stratifications of the expected credit losses using the original and synthetic arrears status. For the sample with the original arrears status, the expected credit losses are mainly driven by loans with LTV above 86%, purchase purpose, loan term between 360 and 540 months, and an owner-occupied status. Interestingly, the stratifications for the sample with the synthetic arrears status show a slightly higher impact on re-mortgage and investment mortgages, loans with higher LTV and occupancy buy-to-let, highlighting the most vulnerable segments of accounts. Finally, we asked the audience during the webinar how useful they find the IFRS 9 calculation (see Chart 34). More than two-thirds of the professionals responding to the poll find the IFRS 9 calculation at least somewhat useful. In our case, we believe the exercise is very informative.

Loss distribution shift

In addition to the IFRS 9 exercise, we have considered a standard loss calculation that effectively uses a product of PD and LGD, while the IFRS 9 losses account for SICR as well as the time value of the future cash flows. We generated 10,000 Monte Carlo simulations for a 12-month horizon to obtain the distribution of expected losses for scenario vintages from January, April and July for both original and synthetic arrears statuses. Charts 35 and 36 show the distribution of losses for the baseline scenario across the different scenario vintages. Similar to the previous results, we see a shift of the distribution of losses between the three scenario vintages. However, for the dataset with the original arrears status, the distribution is more concentrated toward small losses.

Table 3 displays the mean expected losses for the baseline and downside scenarios for both cases, as well as the value-at-risk for the baseline scenario. Based on our approach, in July the expected loss and VaR at 5% probability would be 10 times higher with the synthetic arrears status. The expected mean loss for the July baseline projection is 2.51% of exposure for the synthetic portfolio, versus 0.14% for the original portfolio. Similarly, the VaR at 5% probability is 3.81% and 0.3%, respectively. However, the impact of the changes on the economic expectations is larger for the dataset considering the payment deferral scheme.

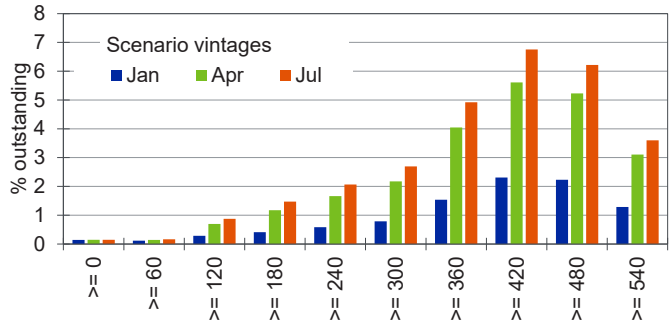
We also analyse the distribution of accounts by ratings using the Moody's Idealized Cumulative Expected Default Rates over 12 months, as displayed in Charts 37 and 38. The rating is assigned based on PDs. For example, the 12-month PD is 0.0001% for the Aaa rating, 0.09% for the Baa1 rating, and 50%

Table 3: Loss Distribution - VaR Approach

	Original			Synthetic		
	20-Jan	20-Apr	20-Jul	20-Jan	20-Apr	20-Jul
Expected loss						
Baseline	0.02	0.1	0.14	0.73	2.11	2.51
Downside	0.07	0.26	0.4	1.47	3.53	3.98
Aggregate statistics (baseline)						
Simulations	10,000	10,000	10,000	10,000	10,000	10,000
Mean	0.02	0.1	0.14	0.73	2.11	2.51
SD	0.01	0.06	0.08	0.41	0.68	0.74
IQR	0.02	0.07	0.1	0.56	0.91	0.99
Skewness	1.4	1.33	1.43	0.69	0.41	0.41
Kurtosis	2.68	2.86	3.72	0.38	0.2	0.25
95th/50th pct	3.05	2.36	2.29	2.18	1.6	1.54
Value-at-Risk (baseline)						
50%	0.02	0.09	0.13	0.68	2.07	2.47
75%	0.03	0.13	0.18	0.99	2.54	2.98
90%	0.04	0.18	0.25	1.29	3.01	3.49
95%	0.05	0.21	0.3	1.49	3.31	3.81

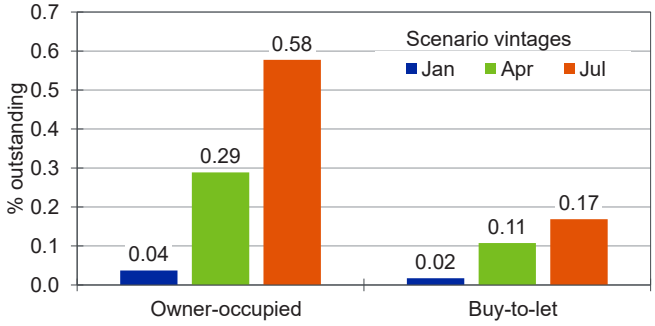
Source: Moody's Analytics

Chart 31: ECL by Loan Term - Synth. Portfolio



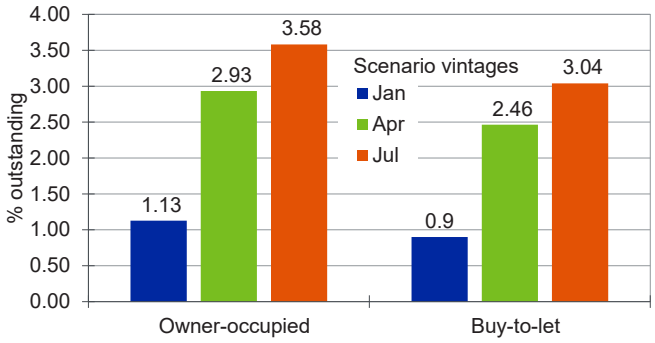
Source: Moody's Analytics

Chart 32: ECL by Occupancy - Original Portfolio



Source: Moody's Analytics

Chart 33: ECL by Occupancy - Synth. Portfolio



Source: Moody's Analytics

Chart 34: Polling Question-IFRS 9 Use Case

Moody's Analytics webinar, Sep 2020 - 53 votes

Are the IFRS 9 accounting rules and the corresponding projections conditional on economic drivers informative in light of the global pandemic?

A. Yes: 28.3%
B. Somewhat: 39.6%
C. Not really: 32.1%

Source: Moody's Analytics

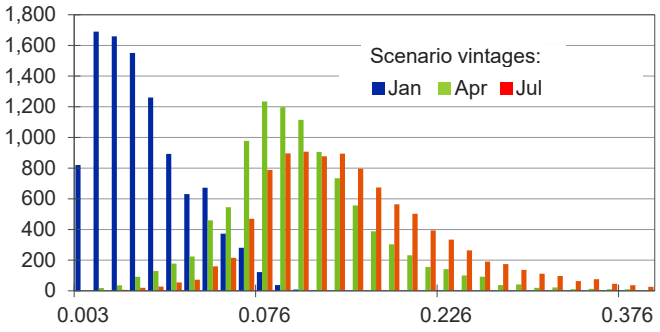
for the Caa3 rating. The distribution for investment-grade ratings under the baseline scenario for both cases does not change dramatically using January or July projections. However, the charts show that there is an increase of accounts in the lower ratings under investment grade-rated accounts. Moreover, Chart 38 illustrates that the distribution of ratings under the downside scenario for investment-grade accounts slightly decreases, transitioning to below investment-grade ratings.

Conclusion

The COVID-19 pandemic has had a severe economic impact on the U.K. economy and subsequently on the U.K. mortgage market. As the U.K. job retention scheme and the mortgage payment holidays are winding down, the second half of 2020 will be critical for mortgage providers. An expected dramatic increase in unemployment will likely be followed by a wave of defaults on mortgages. There are additional risks associated with yet again rising infections. To assess the impact, we use the Moody's Analytics U.K. Mortgage Portfolio Analyzer, a tool that embeds a set of models for risk parameters linked to macroeconomic drivers. To analyse the effect of ending payment holidays, we construct a synthetic portfolio under the assumption that rising or nondeclining balances imply delinquencies. The contrast between performance of this synthetic portfolio and a standard portfolio without this effect is dramatic. The 12-month PD increases to 3.1% for the synthetic portfolio, in contrast to just 0.9% for the portfolio with delinquencies not accounting for the payment holidays.

Chart 35: Loss Distribution - Original Portfolio

Baseline forecast, 12-mo expected loss, %

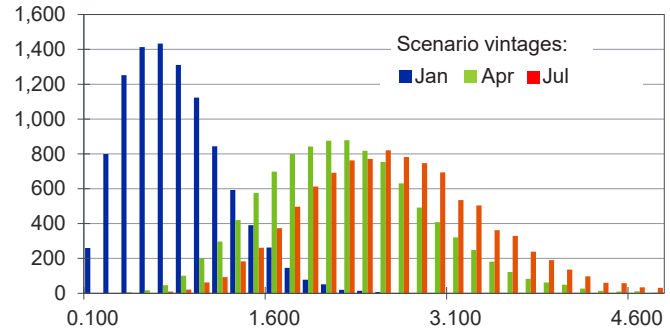


Source: Moody's Analytics

The IFRS 9 expected losses for the synthetic portfolio rise from 1.13% using the January economic projections to 3.58% using the July projections. By contrast, the provisions increase from 0.04% for the standard portfolio using the January forecasts to 0.58% using the July forecasts.

Chart 36: Loss Distribution - Synthetic Portfolio

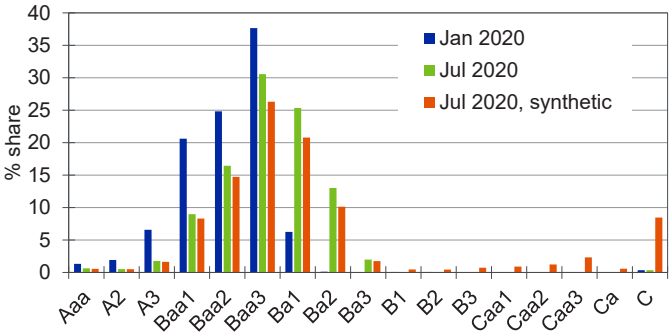
Baseline forecast, 12-mo expected losses, %



Source: Moody's Analytics

Chart 37: Loan Ratings Distribution

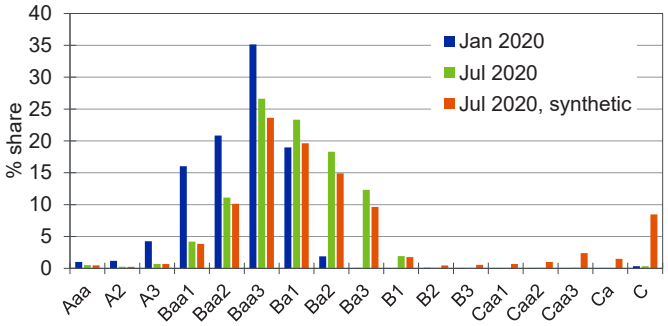
Based on 12-mo PD, baseline forecast across scenario vintages



Source: Moody's Analytics

Chart 38: Loan Ratings Distribution

Based on 12-mo PD, downside forecast across scenario vintages



Source: Moody's Analytics

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Juan M. Licari is a managing director at the Moody's Analytics London office. He is the global head of the Business Analytics team consisting of risk modelers, economists and statisticians in the U.K., the U.S., China, the UAE, the Czech Republic, and Singapore. Dr. Licari's team provides consulting support to major industry players, builds econometric tools to model credit phenomena, and implements several stress-testing platforms to quantify portfolio risk exposure. His team is an industry leader in developing and implementing credit solutions that explicitly connect credit data to the underlying economic cycle, allowing portfolio managers to plan for alternative macroeconomic scenarios. Dr Licari has extensive hands-on experience as a project lead with respect to development, validation, calibration and monitoring of IRB, IFRS 9, and stress-testing credit risk models, especially for U.K. banks and financial institutions, for both retail and corporate portfolios. He is actively involved in communicating the team's research and methodologies to the market, including senior management and board members. He often speaks at credit events and economic conferences worldwide. Dr. Licari holds a PhD and an MA in economics from the University of Pennsylvania and graduated summa cum laude from the National University of Cordoba in Argentina.

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Brenda Solis Gonzalez is an assistant director within Moody's Analytics EMEA Economic and Consumer Credit. She is responsible for leading consulting projects that involve time series and panel data econometric techniques with major banks and other financial institutions worldwide. Brenda and her team have been developing methodologies for IRB, IFRS 9, and stress-testing of market risk parameters and credit risk models such as PD, LGD, EAD and Stage Allocation. Before joining Moody's Analytics, Brenda worked for SITA in Prague as a Treasury analyst responsible for the cash flow, currency risk management, and bank relationship. In addition, she worked as a senior transfer pricing consultant for Ernst & Young in Mexico. Furthermore, she worked in the Mexican Ministry of Finance, focusing on the liability management of the public debt in local and international markets. Brenda obtained her BS in economics from Instituto Tecnológico Autónomo de México and master's degree in economics and finance with honors from Charles University in Prague, where she is currently working on her PhD thesis.

Chiara Ventura is an assistant director at the Moody's Analytics London office. She is responsible for data-driven modelling projects that involve time series and panel data econometric techniques. Recently, she has provided extensive client support regarding the U.K. Mortgage Portfolio Analyser, a tool for stress-testing and impairment calculation and forecasting. Besides developing market risk and credit risk models for stress-testing purposes, Chiara has developed models for A-IRB purposes (Application and Behavioural PD, LGD and EAD) and IFRS 9 (PD) credit risk models for retail and corporate portfolios. This work has included incorporating climate change factors as drivers in stress-testing models. Chiara first joined Moody's Analytics as an intern in 2015 and continued her career development within the company. Chiara obtained her MSc and BS in mathematical engineering from Politecnico di Milano in Italy and graduated after a collaboration with Imperial College London. She is an MPhil student at Henley Business School – University of Reading in the U.K.

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