25TH MARCH 2020

FIXED INCOME STRATEGY - GLOBAL BANK STRESS TEST ASSESSMENT

Exposure to the banking sector is a key strand of the London& Capital Fixed Income strategy. As the Covid-19 crisis has escalated, the sector has come under pressure, along with other credit sectors.

Several points are worth highlighting in light of recent market moves are:

1. The market stress has come from the Covid-19 pandemic, and the expectation is that it will push the global economy into recession. The global banking system has not been at the centre of these developments, unlike the Great Financial Crisis (GFC).
2. The DW banking sector is extremely strong, and this can be seen by the extremely high CET1 and Leverage ratios, typically around 13.5% and 5.5% respectively.
3. London & Capital Strategy is geared to only the strongest of the global DW banks, the G-SIBs and national champions, see the appendix for the list of our selected banks below.
4. The authorities (central banks, the IMF and governments) have made it clear that policy is prioritised to ensure that credit continues to flow through to the real economies during these extraordinary times and to do this, banks must be the lifeblood of the economic system.

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Overview

London & Capital (L&C) have designed, built, and conducted their own bank stress test models on the L&C universe of investable banks by applying our adverse scenario risk analysis. The conditions were harsh, including a 20% rise in Risk Weighted Assets (RWA) and a simultaneous 20% fall in CET1 capital. The increase in RWAs resulted from the deterioration in asset quality, predominantly from an increase in credit risk from corporate and retail exposures. CET1 capital fell as a result of lower NII, NFCI, trading income, impairments on financial assets, and a rise in NPAs across the energy, resource and service sectors. In this adverse scenario, all banks maintained a ratio above the 'high' regulatory trigger threshold level of 7%, giving the green light to the payment of AT1 coupons, without special regulatory dispensation/ intervention.

Morgan Stanley have conducted their own Bank Capital Assessment, and specifically looked at the events that could lead to coupon suspension. Like L&C, Morgan Stanley imposed severe stress on the European banking universe. Their results show that the capital cushions are substantial and, importantly, under stress, all bank AT1 capital levels exceed the required Maximum Distributable Amount (MDA). The margin variance is quite wide for the banks, ranging from 2% for Santander to a huge 18.3% for Nationwide Building Society.

A summary of the stress testing analysis conducted by the Fed, ECB and BoE is presented overleaf. The tests are severe, indeed more extreme than the experience of the GFC. The fact that all major banks performed well under stress is testament to the design and success of the new global regulatory system.

Market factors to note:

- Regulatory countercyclical buffers have been eliminated/reduced, and banks encouraged to use this extra capacity to lend. For example, the ECB have announced a package of measures to support the economy by:
    1. providing banks with ample liquidity in order to lend to SMEs
    2. providing regulatory relief, allowing banks to temporarily draw on certain capital and liquidity buffers
- JP Morgan and eight other leading US banks borrowed at the Fed's discount window this week explicitly to reduce the 'stigma' associated with tapping this facility, in an effort to encourage smaller banks to follow suite.
- Central banks do not lend directly to the non-banking sector. The conduit for this is the commercial banking system. It is therefore imperative that this remains open and fully functioning.
- It is near inconceivable that the authorities will allow these systemically important banks to fail given the scale of the challenges faced today, and the past few years progress made on making bank balance sheets safe.
- The fall in the market value of equity shares does not undermine the capital base of each of the banks (paid-up share capital is what counts, and this is unchanged).
- Banks will now have to scale back/eliminate distributions, staff bonuses, share buy-backs and dividend payments. Share buybacks have been significant at c$120bn alone for the main US banks. At this point in time, JP Morgan, Goldman Sachs, Morgan Stanley and Citi are among eight banks that have agreed to suspend share buybacks until Q3.
- In practice, AT1 coupon payments have been prioritised over other distributions. These were maintained throughout the GFC – this is expected to be repeated. Authorities do not wish to compound the real economy problems with a financial crisis.
- In recent days, both Deutsche Bank and ABN have announced calls on AT1s at the 1st call date, as expected.
- Overall, the AT1 market is expected to continue to function as designed in coming weeks and months, paying coupons and redeeming bonds at the first call dates. Mark-to-market pricing is expected to remain volatile.

COVID-19 Stress Tests

London & Capital, Mar-20

In addition to the regulator stress tests mentioned above, London & Capital has applied our own scenario analysis to a list of widely held European and US banks. Despite the negative impact on CET1 ratios, all banks maintained a ratio above the regulatory high trigger level of 7%. It is imperative to note that the trigger is related to CET1 capital of the banks and is not linked to the share price.

The conditions of the London & Capital stress-test scenario simultaneously include

- 20% Increase in Risk Weighted Assets (RWA)
- 20% Decrease in CET1 Capital

Impact of CET1 Decrease

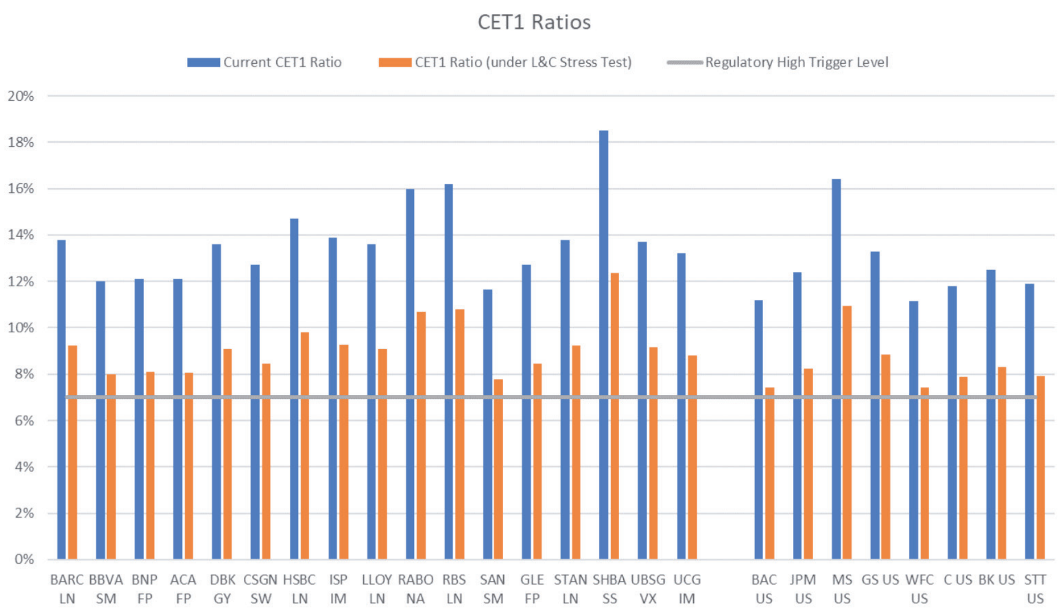
- Affected by the cumulative decrease of the main sources of income (NII, NFCI, Net Trading Income), leading to lower contributions to capital compared to unstressed scenario.
- Banks' earnings will be impacted by lower sovereign rates, leading to a contraction in Net Interest Margins.
- Potential credit risk losses arising from the impairment of financial assets not measured at fair value through profit and loss (unsecured exposures).
- Rise in oil NPAs resulting in increased asset provisioning, and in some cases a release of retained earnings.

Impact of RWA Increases

- Banks' capital ratios are impacted not only by the capital depletion on the numerator side, but also by the increase of the total volume of RWA.
- Stress of 20% increase – driven by deterioration in asset quality, predominantly from increase in credit risk from corporate and retail exposures.

Final comments

- CET1 ratios are not impacted by share price movements.
- Most investors in AT1 debt are long term institutional investors.
- The Fed, ECB and BoE have all eased capital requirements over the past few days, giving banks the green light to advance credit to the economy and use the capital buffers accumulated during the expansionary period of the cycle.
- Most European banks have significant headroom above MDA post easing measures (2-4%) (see supporting work from Morgan Stanley overleaf).



Morgan Stanley Bank Capital Assessment

One aspect of the Morgan Stanley analysis focuses on identifying events that could lead to coupon suspension. These include:

1. The supervisor deciding that AT1 coupons won't be paid; this is viewed as unlikely given the very adverse impact it could have on the bank's own share/bond prices.
2. Bank management may decide AT1 coupons won't be paid; same risk as above.
3. The bank drops below its 'combined buffer' capital requirement, dividends & coupons can be restricted, linked to how far the CET1 ratio has fallen through the combined buffer. The amount of coupon that can be paid then depends on a measure of profit, the 'Maximum Distributable Amount' (MDA).
4. Additional Distributable Items (ADI) are not enough: A separate measure of reserves dictates whether dividends and AT1 coupons can be paid. Banks are typically well in excess of this limitation.

Morgan Stanley impose severe stress on the European banking universe using their own Bank Capital Assessment. Two key tables have been reproduced below which show the compression in CET1 ratios under stress, the absolute amount of capital this involves, and how this compares to regulatory MDA requirements for each bank.

The results show the capital cushions are substantial. Importantly, under stress all bank AT1 capital levels exceed the required amount of MDA. The variance between the banks is quite wide, ranging from an excess of 2% of the CET1 ratio for Santander to 18.3% for Nationwide Building Society.

Banks are well above combined buffer levels

The ECB recently eased capital requirements for banks, improving AT1 coupon risk.

	Capital Ratios			Headroom to MDA Post-Easing Measures		
Bank	CET1 ratio	Tier 1 ratio	Total capital ratio	Binding Level	Headroom (bp)	Headroom (€ mn)
SANTAN	11.6%	13.1%	15.0%	Tier 2	2.0%	12,385
UBIIM	12.3%	12.3%	15.9%	Tier 1	2.1%	1,248
BKTSM	11.6%	12.2%	13.9%	Tier 2	2.2%	757
BNP	12.1%	13.5%	15.5%	Tier 2	2.3%	15,058
BACR	13.8%	17.7%	21.6%	CET1	2.3%	7,412
LLOYDS	13.6%	16.7%	21.3%	CET1	2.4%	5,241
DB	13.6%	15.0%	17.4%	Tier 2	2.4%	7,901
SABSM	12.4%	13.9%	15.7%	Tier 2	2.7%	2,195
CMZB	13.4%	14.3%	16.4%	Tier 2	2.9%	5,271
SANUK	14.3%	17.9%	21.6%	CET1	3.1%	2,455
BBVASM	12.0%	13.6%	15.9%	Tier 2	3.2%	11,558
ERSTE	13.8%	15.0%	18.6%	Tier 1	3.2%	3,798
CABKSM	12.0%	13.5%	15.7%	Tier 2	3.5%	5,138
INTNED	14.6%	16.7%	19.1%	CET1	3.6%	11,697
SOCGEN	12.7%	15.0%	18.3%	CET1	3.7%	12,804
STANLN	13.8%	16.5%	21.2%	CET1	3.9%	9,268
HSBC	14.7%	17.6%	20.4%	CET1	4.0%	30,185
ACAFP	12.1%	13.7%	17.5%	Tier 1	4.1%	13,144
UCGIM	13.2%	14.9%	17.7%	Tier 1	4.1%	15,465

Source: Company data, Morgan Stanley Research

	Capital Ratios			Headroom to MDA Post-Easing Measures		
Bank	CET1 ratio	Tier 1 ratio	Total capital ratio	Binding Level	Headroom (bp)	Headroom (€ mn)
BAMIIM	14.6%	15.2%	17.5%	Tier 2	4.7%	3,062
CCBGBB	15.6%	16.4%	18.9%	Tier 2	4.9%	2,773
BKIR	14.8%	16.0%	18.3%	Tier 2	5.1%	2,576
ISPIM	13.9%	15.3%	17.7%	Tier 1	5.1%	15,270
IPMID	17.6%	18.5%	19.1%	Tier 2	5.1%	514
NDASS	16.3%	18.3%	20.8%	CET1	5.3%	7,921
RABOBK	16.3%	18.8%	25.2%	CET1	5.3%	10,990
BKIASM	14.3%	15.9%	18.1%	Tier 2	5.3%	4,150
KBCBB	16.1%	17.6%	19.6%	Tier 2	5.8%	5,756
DNBNO	18.6%	20.8%	22.9%	CET1	6.6%	5,514
ABNANV	18.1%	19.9%	25.9%	Tier 1	6.9%	7,618
SWEDA	17.0%	19.4%	21.8%	CET1	7.0%	4,169
DANBNK	17.3%	20.4%	22.7%	CET1	7.3%	7,486
RBS	16.2%	19.3%	22.8%	CET1	7.3%	14,343
SEB	17.6%	20.8%	23.3%	CET1	7.6%	5,225
SHBASS	18.5%	20.7%	23.2%	CET1	8.5%	5,640
AIB	20.3%	21.5%	23.3%	Tier 2	9.3%	4,843
NYKRE	19.6%	20.6%	23.7%	Tier 1	10.1%	5,110
NWIDE	31.7%	33.5%	42.4%	Tier 1	18.3%	6,658

Source: Company data, Morgan Stanley Research

US Federal Reserve Stress Tests, July 2019

All US banks demonstrate a resilience which withstands severely adverse economic and financial conditions, and an ability to continue to function with sufficient capital in their primary role of advancing credit to the economy.

The conditions of the 2019 stress-test were conducted for all major banks under the Dodd-Frank Act Stress Test (DFAST) and employed the Comprehensive Capital Analysis and Review (CCAR) which includes a quantitative assessment for capital planning practices.

In the severely adverse scenario under the July 2019 stress test (DFAST) cycle, the aggregate CET1 ratio for the 18 banks declined to a minimum of 9.2% from 12.3% in December 2018. In aggregate, the losses amount to $410bn, some 2.4% of total assets.

Under the severely adverse scenario, the simultaneous conditions are:

- US GDP falls by more than 2.25% peak to trough.
- Recessions in UK and Euro area (moderate) and more protracted in Japan.
- Short term rates and bond yields fall, reflecting a weak US economy.
- Unemployment rate peaks at 10% (vs 3.5% today).
- Equity prices fall by 50%.
- Risk asset prices fall by similar and appropriate amounts.
- Asset market volatility spikes.
- Residential and Commercial property prices experience significant falls, c. 35%.
- Global commodity prices decline.

Table 7. Projected loan losses by type of loan for 2019:Q1–2021:Q1 under the severely adverse scenario: 18 participating firms
Percent of average balances[1]

Firm	Loan losses	First-lien mortgages, domestic	Junior liens and HELOCs, domestic	Commercial and industrial[2]	Commercial real estate, domestic	Credit cards	Other consumer[3]	Other loans[4]
Bank of America Corporation	4.4	1.2	1.9	4.8	6.7	14.7	2.0	3.0
The Bank of New York Mellon Corporation	2.5	1.7	8.7	3.2	7.0	0.0	9.9	1.6
Barclays US LLC	10.3	0.0	0.0	22.6	6.3	15.1	13.7	0.7
Capital One Financial Corporation	15.1	2.2	5.1	11.8	5.3	23.0	9.1	6.3
Citigroup Inc.	6.6	2.1	4.3	4.4	8.5	15.2	10.5	3.0
Credit Suisse Holdings (USA), Inc.	0.6	0.0	0.0	0.0	0.0	0.0	13.7	0.6
DB USA Corporation	3.6	2.3	5.4	1.0	9.5	0.0	7.1	1.9
The Goldman Sachs Group, Inc.	8.9	22.9	3.6	13.1	14.2	5.6	14.0	5.8
HSBC North America Holdings Inc.	5.1	1.8	3.0	5.4	8.3	16.4	9.2	5.5
JPMorgan Chase & Co.	5.9	1.3	2.4	9.6	3.4	15.0	3.4	4.8
Morgan Stanley	3.2	1.4	3.6	8.6	7.6	0.0	0.6	3.1
Northern Trust Corporation	4.7	1.5	6.1	5.5	6.1	0.0	13.7	4.9
The PNC Financial Services Group, Inc.	4.7	1.2	1.5	6.0	7.0	16.3	3.7	2.3
State Street Corporation	3.8	0.0	0.0	6.9	6.2	0.0	0.6	3.0
TD Group US Holdings LLC	5.5	1.6	3.9	6.0	5.3	20.2	2.9	3.2
UBS Americas Holding LLC	2.2	1.7	0.0	8.5	5.5	16.4	0.7	3.1
U.S. Bancorp	5.6	1.4	3.9	6.3	8.2	16.4	3.6	4.6
Wells Fargo & Company	4.5	1.1	2.8	5.6	7.7	17.2	5.8	3.4
18 participating firms	5.7	1.4	2.6	6.3	6.4	16.8	4.7	3.6

Note: These projections represent hypothetical estimates that involve an economic outcome that is more adverse than expected.

[1] Average loan balances used to calculate portfolio loss rates exclude loans held for sale and loans held for investment under the fair-value option, and are calculated over nine quarters.

[2] Commercial and industrial loans include small- and medium-enterprise loans and corporate cards.

[3] Other consumer loans include student loans and automobile loans.

[4] Other loans include international real estate loans.

Source: Federal Reserve estimates in the severely adverse scenario.

Continued...

US Federal Reserve Stress Tests, July 2019 Continued...

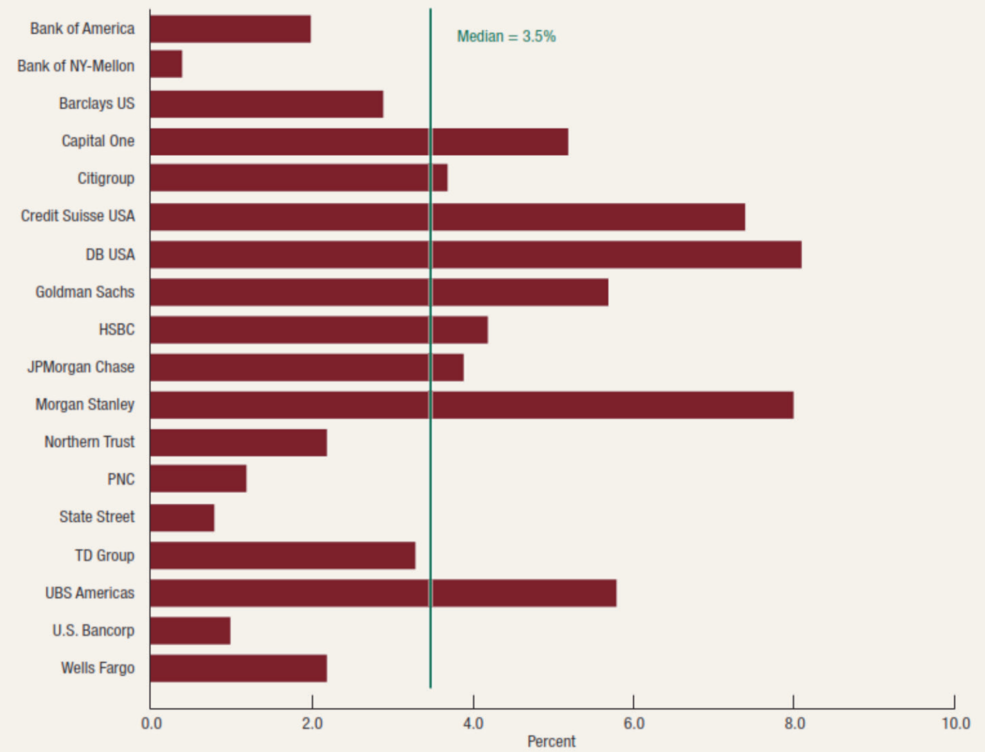
Table 3. Projected minimum common equity tier 1 ratio under the severely adverse scenario, 2019:Q1–2021:Q1
18 participating firms
Percent

Firm	Stressed ratios with DFA stress testing capital action assumptions
Bank of America Corporation	9.7
The Bank of New York Mellon Corporation	11.3
Barclays US LLC	11.6
Capital One Financial Corporation	6.0
Citigroup Inc.	8.2
Credit Suisse Holdings (USA), Inc.	18.4
DB USA Corporation	14.8
The Goldman Sachs Group, Inc.	7.6
HSBC North America Holdings Inc.	8.5
JPMorgan Chase & Co.	8.1
Morgan Stanley	8.9
Northern Trust Corporation	10.7
The PNC Financial Services Group, Inc.	8.5
State Street Corporation	10.9
TD Group US Holdings LLC	12.9
UBS Americas Holding LLC	16.0
U.S. Bancorp	8.1
Wells Fargo & Company	9.5

Note: The capital ratios are calculated using capital action assumptions provided within the Dodd-Frank stress testing rule. See 12 CFR 252.56(b). These projections represent hypothetical estimates that involve an economic outcome that is more adverse than expected. The minimum capital ratio presented is for the period 2019:Q1 to 2021:Q1. In accordance with the regulatory capital framework, all risk-based capital ratios are calculated using standardized RWAs, which became effective on January 1, 2015.

Source: Federal Reserve estimates in the severely adverse scenario.

Figure 13. Change from 2018:Q4 to minimum CET1 ratio in the severely adverse scenario



Note: Estimates are for the nine-quarter period from 2019:Q1–2021:Q1 as a percent of risk-weighted assets.

EBA/ECB Stress Tests, November -2018

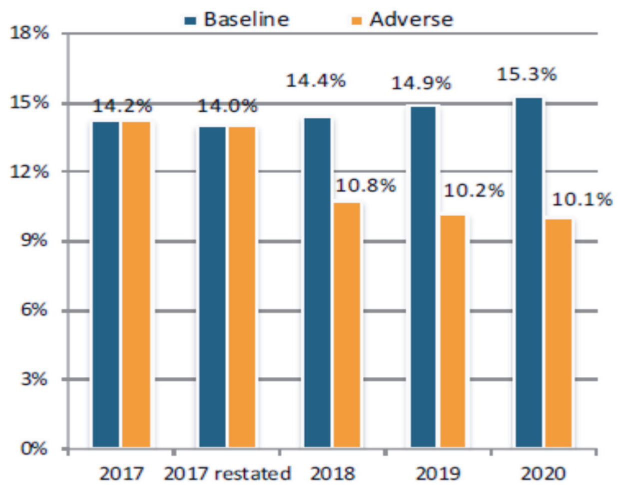
The comprehensive EU-wide stress test conducted by the European Banking Authority demonstrates the resilience of the European banking system, and the ability to withstand significant economic shock with its adverse impact on bank capital and asset quality.

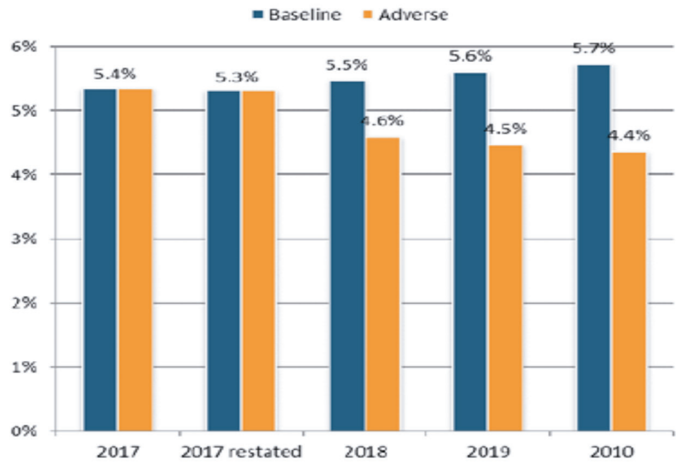
The 2018 EU-wide stress test exercise is designed to inform the Supervisory Review and Evaluation Process (SREP) carried out by European Banking Authority, the framework for European bank regulation.

Under the adverse scenario, the aggregate CET1 ratio for European banks declines by 410bps to 10.1% and the aggregate leverage ratio decreases from 5.1% to 4.2% (fully loaded). These results demonstrate a sound banking system, significantly better capitalised than was the case in the GFC, remaining significantly above regulatory requirements and AT1 trigger thresholds.

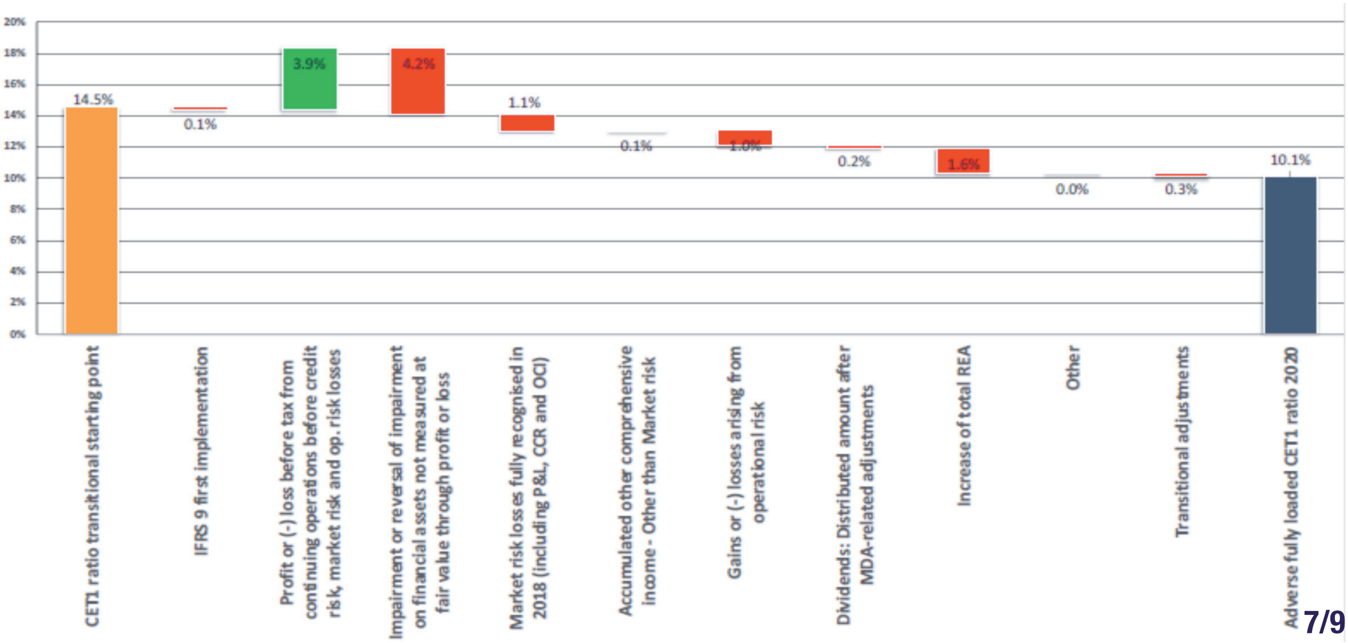
The adverse scenario maps out conditions of an EU wide recession, sharp rise in unemployment, rise in NPAs, and is accompanied by significant falls in asset prices including equities, credit, property and commodities.

CET1 and Leverage Ratios under Severe Stress Conditions





Contribution of the main drivers to the contribution of CET1



Source: European Banking Authority

UK Bank of England Stress Tests, December 2019

All banks passed the stress test, illustrating that the capital position of the sector is significantly more resilient – over three times higher - than at the start of the Global Financial Crisis (GFC).

The conditions of the 2019 stress-test scenario simultaneously include:

- World GDP falls by 2.6%.
- UK GDP falls by 4.7%.
- Bank Rate rises to 4% (from 0.75% today).
- UK unemployment rate rises to 9.2% (from 3.8% today).
- UK residential property prices fall by 33%.
- UK commercial property prices fall by 41%.

All banks passed the test scenarios, with the CET1 and Leverage ratios exceeding the ‘hurdle rates’ stipulated by the BoE with margin to spare, see table below. For instance, Barclays CET1 ratio fell to 8.9% under stress, exceeding the 8.1% hurdle rate, and the leverage ratio fell to 3.8% under stress, exceeding the 3.63% hurdle rate.

Major UK banks have over £1trn of high-quality liquid assets.

The BoE announced yesterday a reduction in the level of the UK countercyclical capital buffer (CCyB) rate to 0%. This will free-up capital £23bn of loss absorption capital, and support £190bn of bank lending.

Non-mandatory distributions remain tiered; AT1 coupon payments rank superior to bonus payments, share buy-backs and dividend payment.

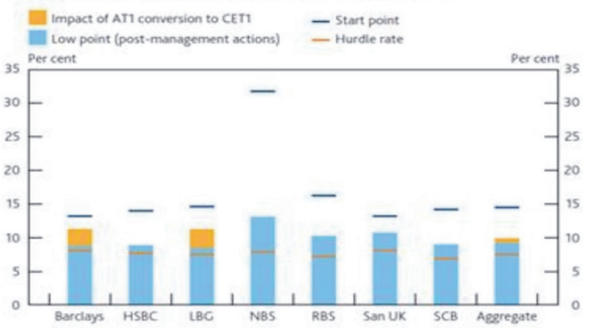
Results in Tables & Charts

So **Results of the 2019 ACS on a transitional IFRS 9 basis**

	CET 1 capital ratios			Tier 1 leverage ratios		
	Dec. 2018	Low point	2019 ACS hurdle rate	Dec. 2018	Low point	2019 ACS hurdle rate
Barclays	13.2	8.9	8.1	5.1	3.8	3.63
HSBC	14.0	8.9	7.7	6.0	5.3	3.86
Lloyds Banking Group	14.6	8.5	7.5	5.5	4.3	3.47
Nationwide	31.7	13.1	7.9	5.0	4.8	3.57
The Royal Bank of Scotland	16.2	10.3	7.2	6.2	4.7	3.56
Santander UK	13.2	10.8	8.1	4.5	3.8	3.57
Standard Chartered	14.2	9.0	6.9	5.6	5.1	3.55
Aggregate	**14.5**	**9.3**	**7.5**	**5.6**	**4.8**	**3.69**

Chart A.3 All banks clear their CET1 capital ratio hurdle rates in the test

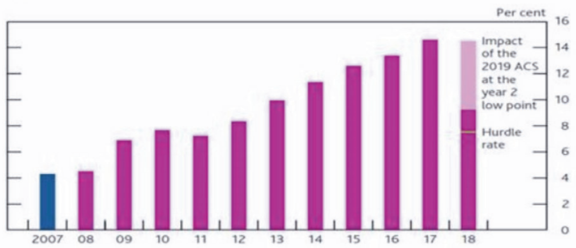
Projected CET1 capital ratios in the stress scenario(a)(b)(c)



Sources: Participating banks' STDF data submissions, Bank analysis and calculations.

Chart A.1 Even at the low point of the stress the aggregate CET1 ratio is more than twice its pre-crisis level

Aggregate CET1 capital ratio of major UK banks since the financial crisis(a)(b)(c)



Sources: PRA regulatory returns, published accounts, participating banks' Stress Testing Data Framework (STDF) data submissions, Bank analysis and calculations.

(a) The CET1 capital ratio is defined as CET1 capital expressed as a percentage of risk-weighted assets (RWAs). Major UK banks are Barclays, The Co-operative Bank (until 2013), HSBC, Lloyds Banking Group, Nationwide, The Royal Bank of Scotland, Santander UK and Standard Chartered (from 2014). From 2011, data are CET1 capital ratios as reported by banks. Prior to 2011, data are Bank estimates of banks' CET1 ratios.
(b) Capital figures are year-end.
(c) The impact of the 2019 ACS does not include the conversion of AT1 instruments.

Chart D Banks have significant liquid asset buffers

Major UK banks' aggregate level of LCR standard(a)

Sources: PRA regulatory returns and Bank calculations.

Appendix

L& C Investable Banking Universe
G-SIBs & National Champions

US BANKS	UK & EU BANKS
BANK OF AMERICA	BARCLAYS PLC
JPMORGAN CHASE	BBVA
MORGAN STANLEY	BNP PARIBAS
GOLDMAN SACHS	CREDIT AGRICOLE
WELLS FARGO & CO	CREDIT SUISS-REG
CITIGROUP INC	HSBC HOLDINGS
BANK NY MELLON	LLOYDS BANKING
STATE ST CORP	COOPERATIEVE RAB
	ROYAL BK SCOTLAN
	BANCO SANTANDER
	SOC GENERALE SA
	STANDARD CHARTERED
	SVENSKA HAN-A
	UBS GROUP AG