BERMUDA MONETARY AUTHORITY

Annual Update

STRESS TESTING IN THE CAPITAL ASSESSMENT AND RISK PROFILE (CARP) FOR BERMUDA'S BANKING SECTOR

February 2018

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I. EXECUTIVE SUMMARY

The purpose of this annual update is to communicate the Authority's changes for the 2018 CARP Stress Testing cycle. All provisions of the BMA's April 2014[1] stress testing guidance remain in full effect unless amended in this document.

Templates 1-3 outlined in Appendix 1 **must be submitted along with a full reconciliation to the Q4 2017 PIR** on both a **Consolidated and Solo basis**.

Should you have any questions pertaining to this document, please contact your BMA Relationship Manager.

The following stress testing changes are required for the 2018 CARP submission:

Residential mortgages (See Appendix 1 - Template 1):

- All current LTV's must reflect the historical post-2008 average decline of 35%. This needs to be reflected in the current LTVs, prior to the application of the standardized shocks listed below.
  - ❖ Additional shocks of 10% and 20% from the LTV Baseline or current valuation (i.e. moderately severe and adverse scenarios).
  - ❖ Past due loans ("PDLs") must be excluded from the LTV Template 1.
  - ❖ Troubled debt restructures ("TDRs") must be excluded from the LTV Template 1.
  - ❖ The liquidation assumption should be realistic (includes maintenance, taxes, real estate commissions, legal fees, etc.) and no less than 10%.

  If the BMA has reason to suspect that any Bank's LTV Baseline is understated, it will use a standard assumption that is more reflective of actual market conditions. At that point, it will be required that the Bank provide specific factual data to rebut the Authority's view.

Commercial mortgages:

- Class B buildings or lower must reflect a shock of 30% from the current valuation.
- Other commercial mortgages must reflect a shock of 20% from the current valuation.
- Reporting template should reflect the cumulative erosion in the LTV Baseline.
- Cost of liquidation should be realistic (includes maintenance, taxes, real estate commissions, legal fees, etc.).

[1] 'Guidelines on the Enhancement of Stress Testing In the Capital Assessment and Risk Profile (CARP) For Bermuda's Banking Sector'

Capital:

The bank should provide a complete reconciliation from the CET1 reported in the PIR (consolidated) to what is reported in the stress testing template (Table 1)

Investments:

- CUSIP numbers or other common identifiers are required for all investments, where available.
- The Investment template needs to be completed for bonds and other claims, respectively. Details should be provided on the other claims to understand the underlying exposures.
- The bank should use a credit spread shock for the investment portfolio. Credit spread should be provided in the investment template.
- Template 3 must include: Balance (in millions), Duration (years), PD (%) and Credit Spread (%).

Interest Rate Risk in the Banking Book ("IRRBB")

- With the implementation of the Basel's IRRBB Standards[2], the Authority expects banks to report IRRBB on the basis of their internally developed reporting and stress testing parameters.
- The Authority requires that banks independently validate internal models using External Expert Assessors ("EEA"). EEAs are expected to validate, at a minimum, the quality and completeness of inputs, modelling assumptions, model governance framework, and individual components of the internal measurement system as it relates to the overall profile of the institution.
- For the 2018 CARP cycle, Banks are asked to provide along with or ahead of their CARP submission, the EEA's full report summarizing the results of the independent IRRBB model validation exercise.
- Lastly, Banks are required to comply with IRRBB standards set out by Basel in relation to interest rate shocks and stress scenarios as stated in Authority's updated guidance for Basel III[3], paragraphs 30 to 33.

Other:

- All the required templates and information should be submitted at the same time as the CARP submission.
- The bank should provide all calculations to reconcile from the loan exposures and investments to the expected losses. **These reconciliations must include sufficient detail to allow the Authority to account for all exposure listed in the requested tables with the PIR and we ask that particular attention be paid to this requirement.**
- The bank should complete Table 1 (below) with all the required lines.

[2] Basel Interest Rate Risk in the Banking Book Standard - April 2016

[3] Basel III Rules For Bermuda Banks Update - November 2017

II. APPENDIX I: STRESS TEST RESULTS AND FINANCIAL PROJECTIONS

Summary of Stress Test Results

Table 1 below is a suggested template for presenting the results of the stress testing exercise. The Authority requires banks to follow the same or a similar format when presenting the summary of their stress test results.

The current balance should be based on the most recent financial year-end results while financial projections should be provided under a base case scenario, supported by adequate assumptions to justify projected numbers. The impact of the stress test scenario (shock) is assumed to be instantaneous. **All results should be presented for both the solo and the consolidated entity**.

In this section the Authority will require that all RWA computations be subject to the following risk weighting floors:

Performing Residential Mortgages – 50%

Performing Commercial Mortgages – 100%

All Past due loans – 150% or 100% if LTV<=80%

Troubled Debt Restructurings (TDRs) – 100% (if performing in accordance with modified terms)

In addition, any assets that are fully deducted from a bank's capital base will not be subject to stress testing <u>and should be noted as such for reconciliation purposes</u>.

Table 1: Summary results of the stress test scenario

	Current	Projections (base case)		
		Year 1	Year 2	Year 3
Pre-stress test				
Common Equity Tier 1 Capital (CET1)	XXX	XXX	XXX	XXX
Total Capital (TC)	XXX	XXX	XXX	XXX
Risk Weighted Assets (RWA)	XXX	XXX	XXX	XXX
CET1 Ratio	**XX%**	**XX%**	**XX%**	**XX%**
TC Ratio	**XX%**	**XX%**	**XX%**	**XX%**
Stress test				
Losses arising from stress test scenario				
Residential mortgages	XXX			
Residential mortgages liquidation cost	XXX			
Commercial mortgages	XXX			
Commercial mortgages liquidation cost	XXX			
Unsecured lending	XXX			
Other retail loans	XXX			
Past due loans	XXX			
TDRs	XXX			
Claims on Sovereigns	XXX			
Claims on PSE	XXX			
Claims on Corporates	XXX			
Claims on Banks	XXX			
Equities, Mutual funds and others	XXX			
Off-balance sheet exposures	XXX			
Total losses arising from the stress test scenario	**XXX**			
Post-stress test				
RWA				
Residential mortgages	XXX	XXX	XXX	XXX
Commercial mortgages	XXX	XXX	XXX	XXX
Past due loans	XXX	XXX	XXX	XXX
Claims on Sovereigns, PSE, Corporates, Banks, etc.	XXX	XXX	XXX	XXX
Other Balance Sheet Exposures	XXX	XXX	XXX	XXX
Total RWA	XXX	XXX	XXX	XXX
Capital				
Stressed CET 1	XXX	XXX	XXX	XXX
Stressed CET1 Ratio	XX%	XX%	XX%	XX%
Capital required to get to the minimum CET1 (7.0%)	XXX	XXX	XXX	XXX
Management actions				
Raising of additional capital	XXX	XXX	XXX	XXX
Revision of dividend policy	XXX	XXX	XXX	XXX
Other management actions (please describe)	XXX	XXX	XXX	XXX
Additional Capital Required	**XXX**	**XXX**	**XXX**	**XXX**
CET1 post- management actions	XX%	XX%	XX%	XX%
TC post- management actions	XX%	XX%	XX%	XX%

a. In determining the target capital position, **the focus should be on the CET 1 capital ratio**, reported under Basel III and formally adopted by the BMA in 2015.

b. The Authority requires banks to include all material off-balance sheet exposures in their stress testing, including but not limited to those reported in the quarterly Prudential Information Return (PIR). Specifically, banks should also take into account any material off-balance sheet exposures which are not fully reflected in the PIR but that can be estimated and included via an established credit conversion factor. In addition, to the extent that an off-balance sheet exposure may pose a material reputational or business-strategic risk to the bank, such exposure also needs to be stressed.

c. The basis for assessing the estimated losses arising from the stress test of interbank exposures must take into account the underlying characteristics of the individual exposures and all the material components of risk, which could include potential default by counterparties and adverse changes in the valuation of pledged collateral securities as a result of movements in market factors.

d. Banks are advised to incorporate realistic assumptions regarding the recovery period under the bank's base case scenario while also taking into account any possible lingering effects resulting from the stress test event. Any assumptions made will be subject to careful review by the Authority.

Financial Projections

The Authority will require the projection of the regulatory capital (Table 2) and the projection of the movement in retained earnings (Table 3) for a minimum of three (3) years going forward **from banks reporting a capital deficit as a result of the stress test exercise**. The projections should be provided under the base case scenario and should be consistent with the bank's specific forward-looking business plan. The current balance should be based on the most recent audited financial year-end results. The results should be presented for both the solo and the consolidated entity.

a. Regulatory Capital

Table 2: Projection of regulatory capital (base case)

Amounts in millions	**Current Balance**	**Projections**		
		Year 1	**Year 2**	**Year 3**
Common Equity Tier 1 (CET1) capital				
Qualifying common stock instruments and related surplus	XXX	XXX	XXX	XXX
Accumulated Other Comprehensive Income (if applicable)	XXX	XXX	XXX	XXX
Qualifying Common Equity Tier 1 Minority Interest	XXX	XXX	XXX	XXX
Less: Deductions	XXX	XXX	XXX	XXX
Total CET1 capital	**XXX**	**XXX**	**XXX**	**XXX**
Additional Tier 1 (AT1) capital				
Additional tier 1 capital instruments	XXX	XXX	XXX	XXX
Tier 1 minority interest not included in CET1 capital	XXX	XXX	XXX	XXX
'Other qualifying Tier 1 capital inclusions	XXX	XXX	XXX	XXX
Less: Deductions	XXX	XXX	XXX	XXX
Total AT1 capital	**XXX**	**XXX**	**XXX**	**XXX**
Total Tier 1 Capital				
Tier 2 capital				
Total Tier 2 capital	XXX	XXX	XXX	XXX
Other qualifying Tier 2 capital inclusions	XXX	XXX	XXX	XXX
Less: Deductions	XXX	XXX	XXX	XXX
Total regulatory capital	**XXX**	**XXX**	**XXX**	**XXX**

b. Retained Earnings

Table 3: Projection of retained earnings (base case)

	Current	**Projections**		
		Year 1	**Year 2**	**Year 3**
Retained earnings at the beginning of the year	XXX	XXX	XXX	XXX
Net interest income	XX	XX	XX	XX
Non-interest income	XX	XX	XX	XX
Non-interest expenses	XX	XX	XX	XX
Others components of profit and loss statement	XX	XX	XX	XX
(including income from off-balance sheet positions)				
Net profit and loss	**XXX**	**XXX**	**XXX**	**XXX**
Other adjustments (e.g., dividends)	**XXX**	**XXX**	**XXX**	**XXX**
Retained earnings at the end of the year	**XXX**	**XXX**	**XXX**	**XXX**

Capital Stress Testing Templates

The Authority has created four specialized templates for all banks to report the specific stress testing results by asset type with disclosure of the EL and adjusted RWA now being required.

We have illustrated the templates in the following pages and will provide the actual input portion of the spreadsheets upon request. The Authority seeks to standardize the manner in which all banks report their stress testing results as to be able to aggregate exposures for analysis of sector-wide risk levels and trends. These templates will be critical for the Authority in its parallel analysis of each bank's stress testing results and we ask that they be completed diligently and reviewed by senior risk and/or finance managers prior to submission. The fourth and final template, which requests a listing of securities by CUSIP or other common identifier, is attached as an excel spreadsheet that can be used to provide the information.

The **first template** is the Loan to Value (LTV) and Vintage breakout for both the residential and commercial loan books.

Template 1

LTV (%)	Age of the loan (Years since origination – Vintage)							Total Exposure	Weighted Average LTV
	<1	1-2	2-3	3-4	4-5	5-6	>6		
<50									
50-60									
60-70									
70-80									
80-90									
90-100									
>100									
Total in BD$ '000									

The **second template** is the age distribution of the residential and commercial mortgages by loan type.

Template 2

Age (years)	Residential mortgages			Commercial Mortgages			Total
	Occupied by the owner	Rented out	Subtotal	Occupied by the owner	Rented out	Subtotal	
<1							
1-2							
2-3							
3-4							
5-6							
>6							
Total in BD$ '000							

The **third template** requests a breakout of the investment book (bonds) (all liquidity portfolios) by credit grade utilising a rating agency credit grade scale. The same template is **requested also for claims other than bonds**.

Template 3

Bonds	Balance (in millions), Duration (years), PD (%) and Credit Spread (%)					
Ratings	Sovereigns	PSE[4]	Corporates	Banks (<3 months)	Banks (>3 months)	Securitisations
AAA						
AA+						
AA						
AA-						
A+						
A-						
BBB+						
BBB						
BBB-						
BB+						
BB						
BB-						
B+						
B						
B-						
Below B-						
Unrated						
High Quality MDB[5]						
Total						

[4] Public Sector Entities

[5] Multilateral Development Banks

The **fourth template** requests a complete investment portfolio listing and is attached for use in compiling and submitting the information.

Template 4

BMA Capital Stress Testing -- 2015								
December 31, 2015								
Investment Securities Template								
Description	ISIN or CUSIP	Security Type	Total Par Value	Total Amortized Cost	Stated Maturity	Coupon	Current market Price	HTM / AFS

APPENDIX II: SUPERVISORY STRESS TEST ASSUMPTIONS

Background

In coming up with the following assumptions, the Authority continued to take into **consideration the comments received from the Bermuda Bankers Association Credit Sub-Committee**; however, in this cycle we are guided more heavily by the most recent stress testing exercises that were performed in Bermuda and in several major jurisdictions where Bermuda banks are active.

Key Macroeconomic Drivers

The Authority suggests the use of the following macroeconomic drivers:

a. Continued high unemployment rate, which also encompasses an international business drawdown with expatriates exiting or reducing their previous footprint on the island;

b. Decline or stagnation in commercial and residential real estate prices with carry forward of currently stressed PD and LGD rates as the floor rates;

c. Decline in residential and commercial rental income, including consideration of a significant increase in the number of vacant rental properties due to bank repossessions and borrower cash flow difficulties;

d. Reduction or stagnation in personal and/or corporate income;

e. Decline in tourism revenue.

In addition, the Authority will expect further consideration related to drivers that are expected to have an impact on the investment and the interbank books, such as interest rate, equity price, spread movements and rating migrations. The impact of the unsecured portfolio, if material, also needs to be considered.

Banks should also take into account the impact of concentration of income sources, used to service mortgages, on the default rates during times of stress. Specifically, banks should consider the likely increase in default rates, during times of stress, for borrowers with multiple rental properties supporting one or more mortgages. The Authority also recommends that banks take into consideration the potential number of vacant rental units arising as a result of the increase in the unemployment rate and/or expatriates leaving the island.

Banks should provide, as part of their stress testing exercise, detailed analysis as to how the macroeconomic parameters listed above translate into specific shocks to the individual portfolios of the bank.