2014 Bank Stress Tests

In the second half of 2014 the Commission requested that subsidiary banks licensed in the jurisdiction participate in an industry-wide, supervisory prescribed, bottom-up stress testing exercise. The last round of bank supervisory stress testing was conducted in 2010 as part of the IMF's Financial System Stability Assessment and, while the use of some stress testing as an internal risk management tool is now embedded in industry practice for Pillar 2 capital purposes, there is still a need for periodic supervisory stress testing to assess risk sensitivity across the sector as a whole and identify any emerging sources of risk.

It should be noted that the purpose of these stress tests is to assess the strength of the banking sector as a whole and identify areas of risk. These tests are not being used to assess capital adequacy of individual banks.

The stress testing exercise comprised the following two elements:

- A series of single factor shocks (based on that prescribed by the IMF in 2010)
- A reverse stress test

1. Single Factor Stress Tests

The stress tests were designed to assess the sensitivity of banks to single factor shocks in terms of interest rates, exchange rates, credit quality, asset prices, and liquidity. Table 1 shows the single factor shocks that were considered as part of this exercise. The tests were based on data as at 30 June 2014.

2. Reverse Stress Test

A reverse stress test requires banks to identify scenarios under which the bank would fail and use this information to ensure that the identified risks are adequately assessed and managed. The Commission provided relevant guidance to banks on reverse stress testing, but this was largely non-prescriptive in nature as it was for each institution to identify the risks relevant to its own business.

Coverage

The stress testing exercise covered all 14 licensed banks incorporated in the jurisdiction.

1. Single Factor Stress Tests

Table 1

Area	Specific Test
Interest Rate Risk	I1: Parallel upward shift of the pound sterling yield curve by 200 basis points. I2: Parallel downward shift of the pound sterling yield curve by 200 basis points. I3: Parallel upward shift of the dollar yield curve by 200 basis points. I4: Parallel downward shift of the dollar yield curve by 200 basis points. I5: Parallel upward shift of the euro yield curve by 200 basis points. I6: Parallel downward shift of the euro yield curve by 200 basis points.
Foreign Exchange Rate Risk	F1: The pound depreciates by 20 percent against all other currencies. F2: The pound appreciates by 20 percent against all other currencies. F3: The dollar depreciates by 20 percent against all other currencies. F4: The dollar appreciates by 20 percent against all other currencies.
Credit Risk	C1: Doubling of all probabilities of default (PDs) on loans (if applicable). C2: Increase of all probabilities of default (PDs) on loans by 300% (if applicable). C3: Default of the three largest exposures excluding the parent bank. C4: 10 percent of banks' domestic non-interbank bank loan portfolio fails. C5: 10 percent of banks' mortgage loan portfolio fails. C6: 10 percent of UK non-interbank loan portfolio fails. C7: 10 percent of banks' claims on their parent banks fail.
Asset Price Risk	A1: Prices of all shares listed on foreign stock markets decline by 35 percent. A2: Rated securities are downgraded by two notches. A3: Rated securities are downgraded by four notches.
Liquidity Risk	L1: Simulation of the impact of a 5 days consecutive daily drawdown of liabilities on demand (including fiduciary deposits) and due within one month by 30 percent. Interbank market and intra-group funding is unavailable. L2: As test 1 but in addition securities held become illiquid.

Results of Solvency Tests

The results of the solvency stress tests are displayed in Table 2. The table shows the asset-weighted average Risk Asset Ratio ("RAR") after stress, the minimum and maximum post-shock RAR calculated for a single bank under each stress, the number of banks breaching their Individual Capital Guidance ("ICG") and the aggregate recapitalisation needed to bring all breaching banks back above respective ICGs.

Table 2

Test	Weighted Average Risk Asset Ratio	Minimum RAR	Maximum RAR	No. of banks breaching ICG	Aggregate Recapitalisation needs
	Percent				GBP m
Pre Stress Test	20.82%	13.12%	39.55%	-	-
Interest Rate Risk					
I1: Parallel upward shift of the pound sterling yield curve by 200 basis points.	20.89%	13.12%	39.98%	-	-
I2: Parallel downward shift of the pound sterling yield curve by 200 basis points.	20.83%	13.12%	39.55%	-	-
I3: Parallel upward shift of the dollar yield curve by 200 basis points.	20.88%	13.12%	39.66%	-	-
I4: Parallel downward shift of the dollar yield curve by 200 basis points.	20.82%	13.12%	39.55%	-	-
I5: Parallel upward shift of the euro yield curve by 200 basis points.	20.90%	13.12%	39.59%	-	-
I6: Parallel downward shift of the euro yield curve by 200 basis points.	20.82%	13.12%	39.55%	-	-
Foreign Exchange Rate Risk					
F1: The pound depreciates by 20 percent against all other currencies.	19.55%	13.02%	35.33%	-	-
F2: The pound appreciates by 20 percent against all other currencies.	21.12%	13.04%	40.41%	-	-
F3: The dollar depreciates by 20 percent against all other currencies.	21.32%	13.12%	36.66%	-	-
F4: The dollar appreciates by 20 percent against all other currencies.	19.00%	13.12%	32.91%	-	-
Asset Price Risk					
A1: Prices of all shares listed on foreign stock markets decline by 35 percent.	20.71%	13.12%	39.55%	-	-
A2: Rated securities are downgraded by two notches.	20.34%	13.12%	39.55%	-	-
A3: Rated securities are downgraded by four notches.	19.68%	13.12%	39.55%	-	-
Credit Risk					
C1: Doubling of all probabilities of default (PDs) on loans (if applicable).	20.80%	13.12%	39.55%	-	-
C2: Increase of all probabilities of default (PDs) on loans by 300% (if applicable).	20.79%	13.12%	39.55%	-	-
C3: Default of the three largest exposures excluding the parent bank.	13.75%	-7.26%	30.78%	8	151.70
C4: 10 percent of banks' domestic non-interbank bank loan portfolio fails.	20.37%	13.17%	39.60%	-	-
C5: 10 percent of banks' mortgage loan portfolio fails.	20.07%	13.15%	39.55%	-	-
C6: 10 percent of UK non-interbank loan portfolio fails.	20.40%	13.16%	39.56%	-	-
C7: 10 percent of banks' claims on their parent banks fail.	10.97%	-6.76%	32.89%	5	405.86

Market risk

The results of the tests for market risk confirm that the Guernsey banking system continues to exhibit limited exposure to market risk shocks.

The interest rate risk tests examined banks' ability to absorb sudden changes in the yield curve of key interest rates but resulted in no significant impacts on sector capital adequacy. This reflects the low re-pricing risk in the sector associated with well-matched maturities in the banking book. It should also be noted that the enduring low interest rate environment has limited the application and impact of the downward shift stresses.

The asset price risk stress tests considered the impact of a sudden fall in equity prices and significant downgrades in security credit ratings. Again, the impact on the sector is limited, in the case of these tests owing to the negligible equity exposure of the sector and the absence of any trading books.

Of all the risks under the Market Risk umbrella foreign exchange risk stress testing makes the greatest impact but this is still relatively limited. Banks capital is, on the whole, denominated in sterling and a significant proportion of the sector's balance sheet is denominated in foreign currencies with US dollars making up the larger proportion (as at 30 June 2014 71% and 50% of deposits were denominated in foreign currency and USD respectively, 56% and 44% of claims in foreign currency and USD respectively). The stress tests involving depreciation of

sterling versus other major currencies (F1) and appreciation of the USD (F4) therefore create a negative capital impact, but this is limited by both matching of foreign currency assets and liabilities and the use of foreign exchange contracts. The results are consistent with the net foreign exchange open position of the sector which is relatively small (less than 1% of regulatory capital). In the case of individual banks exposed to higher levels of foreign exchange risk, relative to the sector as a whole, such banks tend to be strongly capitalised and therefore no individual bank would require additional capital in relation to any of these stresses.

Credit Risk

Credit risk is identified here as the most significant risk impacting the Guernsey banking system, approximately 93% of the regulatory capital which the average bank is required to hold under Pillar 1 relates to credit risk. Seven stress tests were run by the banks, five aimed at assessing credit risk in the credit portfolio as a whole or sub-portfolios (C1, C2, C4, C5 and C6) and two focusing on areas of credit concentration (C3 and C7).

The tests stressing credits portfolios were of limited impact to the banking sector as a whole. Tests C1 and C2 required an increase in probabilities of default ("PDs"), where available. Banks generally use the Standardised Approach and therefore are not using PDs to calculate regulatory capital requirements at present. Actual default experience in the sector is very low and therefore where banks have attempted to increase current levels of default the resulting stress has been relatively low. There were therefore no banks requiring recapitalisation as a result of tests C1 and C2.

Tests C4, C5, C6 required a 10% default rate on banks' domestic non-interbank loan portfolios, mortgage loan portfolios and UK non-interbank loan portfolios respectively. Again, these test had a muted impact on the sector as a whole and on banks individually. This result is not surprising when considering that non-group related and non-interbank lending comprises less than 10% of sector assets.

It is the tests which focus on concentration of credit risk which display the greatest effect on the regulatory position of the banking sector. Stress test C3 measures the impact of the simultaneous default of the three largest exposures excluding the parent bank. This test results in 8 banks falling below their Individual Capital Guidance level with total recapitalisation requirements of £152 million (approximately 7% of GDP). The likelihood of simultaneous default is very low and the assumed recovery rate of 50% does not fully take account of high quality collateral in place in many cases. Nevertheless the Commission views credit concentration risk as a significant area of risk and has recently taken steps to enhance restrictions on, and reporting of, large exposures with the coming into force of new rules in July 2014.

Test C7 looks at the impact of a failure of 10% of lending to parent. Such "up-streaming" represents a substantial proportion of the sector's balance sheet (approximately 67% of assets) and therefore this test has a material impact on the sector. 5 banks fell below their Individual Capital Guidance level with total recapitalisation requirements of £406 million (approximately 19% of GDP). The Commission recognises that for many subsidiary banks up-streaming remains an important part of the business model and that the parent group is an important provider of support and capital. In certain stressed scenarios, however, the stress experienced by the parent may be transmitted to the Guernsey bank. The Commission

therefore, as part of ongoing supervision continues to monitor closely the strength of parent institutions and to co-operate with relevant home supervisory bodies.

Liquidity Risk

The liquidity stress tests examined how many days banks could withstand a daily withdrawal of their deposits with no access to additional external funding, including from their parent bank. The tests simulate the liquidity position of banks if 30% of the (then) remaining deposits are withdrawn during five consecutive days resulting in 83% of deposits being withdrawn within a business week. The tests simulate a run on deposits assuming that interbank funding remains mostly accessible (L1) and is more or less closed (L2). It is also assumed that no additional intragroup funding is available. The tests were run under two assumptions with respect to the liquidity of the assets: (i) the liquid assets comprise cash and all marketable securities and (ii) all marketable securities except for government bonds become illiquid. The results are shown in table 3 below.

Table 3

	(A) All Marketable Securities are Liquid (as is Cash)	(B) Only Government Securities Remain Liquid (and Cash)
	Number of illiquid banks	Number of illiquid banks
Test L1 (interbank funding remains available, no additional intragroup funding)		
Day 1	3	4
Day 2	4	5
Day 3	5	7
Day 4	5	8
Day 5	8	8
Test L2 (interbank funding essentially closed, no additional intragroup funding)		
Day 1	3	4
Day 2	4	5
Day 3	5	7
Day 4	5	8
Day 5	8	8

The liquidity stress tests have a considerable effect on Guernsey bank's liquidity position. For each variation of the liquidity test, 8 banks would have insufficient liquidity after 5 business days. It is acknowledged that the design of the liquidity stress test (consistent with that set by the IMF during the 2010 Assessment) is such that any bank engaged in a traditional model of maturity transformation would be unlikely to survive the 5 day test. Given the extreme severity of the scenarios, the results are as might be expected. The liquid status of 6 of the banks at day 5 indicates the highly liquid position of a number of institutions. It should also be noted that the stress test does not take account of parental support which would ordinarily be available in a liquidity stress scenario (where the source of stress is not the parent). It should further be noted that the existence of the Guernsey Banking Deposit Compensation Scheme would reduce the likelihood of a run scenario featured in the stress tests.

Nevertheless, the stress tests show that liquidity risk continues to be highly relevant to the sector. The Commission requires all subsidiary banks to comply with its Enhanced Liquidity

Approach requiring ongoing compliance with minimum regulatory liquidity requirements and internal liquidity risk management requirements. The Commission continues to keep under review the approach to liquidity regulation and in due course enhancements will be made to ensure consistency with the new Basel Committee liquidity standards.

2. Reverse Stress Test

Participation and quality of submissions

Performance of reverse stress testing is not an established practice throughout the sector at present with only two banks indicating that reverse stress testing is currently used on an ongoing basis as part of their internal risk management framework. Given that this would have been a new process for the majority of banks, the quality of submissions was generally of high standard with most banks demonstrating an understanding of the process and its purpose. There was, however, one institution which took the view that levels of capital and risk management controls in place were such that no further consideration of risk in the form of reverse stress testing was appropriate. Such a view is perhaps understandable as there is a natural reluctance to consider unlikely and extreme events leading to institutional failure but such consideration is the foundation of the reverse stress testing process. By identifying the circumstances under which failure would occur it is possible to assess whether this lies within the bank's identified risk tolerance and consider additional mitigants where it does not.

It is also noted that certain banks appeared to struggle with the reverse stress concept, presenting their results as traditional stress tests i.e. identifying severe scenarios and assessing adequacy of the capital cushion as opposed to starting from a position of capital requirement breach and then identifying a related scenario and assessing against the institution's risk appetite.

Negative outcome

The Commission requested that banks identify scenarios which would lead to a breach of the set Individual Capital Guidance. All participating banks considered this measure as part of the exercise but it was encouraging to note that some participants chose to widen the exercise to consider other measures of non-viability such as point of illiquidity and loss of confidence of counterparties.

Reverse Stress Testing

While certain common sources of risk were identified across the sector overall there was a wide range of stress scenarios identified, given the modest sample of banks reporting results. This may reflect both the diversity of business models across institutions and the non-prescriptive nature of the stress testing guidance.

Scenarios

While no two banks considered identical stress scenarios there were certain common scenario types. The table below summarises the scenarios most frequently considered by reporting banks.

Top 5 Scenarios

Macroeconomic stress leading to credit book losses	1
Parent stress event leading to up-streaming default	2
Third party bank counterparty failure	3
Customer large exposure default	4
Regulatory breach	5

The most common scenario identified involved macroeconomic stress negatively impacting both customers' ability to service debt and the value of assets acting as collateral. The next most common scenario was that of parent group financial difficulty resulting in default on up-streamed funding provided by the bank. The third most common scenario was failure of a third party bank (or banks) acting as clearer or other significant counterparty to the bank. Fourth was the scenario of default of specific customer large credit exposures. Fifth was the consideration of scenarios involving significant breaches of regulations with direct impacts such as fines, redress, legal fees and sanctions and the indirect impact of loss of reputation and business relationships.

Other scenarios included: tax regime change, terrorist attack, jurisdictional reputational decline, failure of outsourced service provider and counterparty credit rating downgrade.

In designing scenarios it was noted that only a small number of institutions considered combinations of stress events (e.g. simultaneous but unrelated operational and credit risk related loss events). Certain banks identified many severe stress scenarios but few failure scenarios. Consideration of simultaneous stress events may present an opportunity for such institutions to broaden future stress tests.

Nature of Shock

Banks' approaches to defining the shock event varied. Some institutions sought to outline in detail the event or events causing the stress. Others focused on the impact to the institution, with the shock only described in more general terms. Shocks identified were classified as follows:

Shock	%
Macro-economic	43%
Banking System	27%
Bank specific	30%

Macro-economic shocks encompassed both severe stresses to the real economy and drops in asset prices in specific markets. Others scenarios identified problems originating in the banking sector as the source of risk. There is clearly some blurring between these shocks, both being clearly connected, as the financial crisis of 2008 showed. The other form of shock was that impacting the bank (or its group) in isolation. These tests involve idiosyncratic stresses such as the failure of specific large credit exposures or severe failures in bank operations.

It is noteworthy that very few institutions considered that a shock originating within the jurisdiction could lead to institutional failure. This could reflect a failure to consider such risks as being credible or strong confidence in local risk management. It is more likely, as was supported by some submissions, that the position of the majority of banks as subsidiaries of large international groups reduces the likelihood of a local shock resulting in institutional failure. Parent banks can act as sources of additional capital to mitigate local stress (but also potentially conduits of stress where a shock originates outside this jurisdiction).

Risk Type

Each scenario considered was allocated to one key underlying risk factor. Scenarios are broken down into risk categories in the following table[1]:

Risk Category	%
Credit Risk	68%
Operational Risk	16%
Liquidity Risk	8%
Reputational Risk	5%
Market Risk	3%

The dominance of credit risk in this analysis is consistent with the regulatory capital model view of risk (approximately 93% of the regulatory capital which the average bank is required to hold under Pillar 1 relates to credit risk, operational risk accounting for the majority of the remainder with minimal market risk.)

Another observation that can be made is that there was, generally, an absence of operational risk shocks as a result of inadequate or failed internal processes, people or systems. The tendency was to identify scenarios involving external sources of stress such as the failure of a third party service provider. As previously stated, part of respondent's assessment may be that an internal event would be of insufficient impact to warrant inclusion in a reverse stress

[1] It should be noted that the statistics in this paper are offered only as a general indication of the view of risk across the sector.

test. In many cases this may be a reasonable assessment but banks may wish to consider in future stress testing whether there is a reluctance to contemplate potential internal operational failure.

Reverse Stress Test Results

The majority of banks offered an assessment of the likelihood of the stress events against the bank's risk tolerance/appetite or the level of capital currently employed in the firm, although some banks simply identified the non-viability scenarios without offering any explicit analysis against the institution's agreed risk tolerance. It was the case, however, that no bank proposed new capital, controls or other measures to mitigate risk as a result of the exercise[2], indicating that all banks were of the view that the stress scenarios identified were within their respective acceptable risk tolerances.

Future Use of Reverse Stress Testing

It is the Commission's expectation that banks will continue to use reverse stress testing as part of their on-going risk assessment framework and that the Commission will be provided with details and results of this process as part of the ICAAP.

[2] One institution did identify a risk scenario for which mitigating action was necessary and in the process of being taken which had been identified from previously performed internal risk assessment.