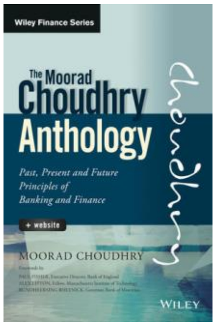

Internal Capital Adequacy Assessment (ICAAP) Review and Challenge Case Study and Specimen Table of Contents

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(extracted from the companion website to *Moorad Choudhry Anthology: Past, Present and Future Principles of Banking and Finance*, John Wiley & Sons Ltd 2018)

Review and challenge the approach taken by the business lines in the following areas of the bank's ICAAP process:

A. Management actions and internal limits

The results of stress tests are used in part to derive management actions in response, which are designed to address potential or actual shortfalls in capital, liquidity and P&L. Management actions may be invoked in the event of stress and/or in the event that the bank's key risk indicators (KRI) fall below a certain limit level.

The bank uses a "traffic light" early-warning classification system (Red-Amber-Yellow-Green) for KRIs, with specific triggering action should key KRIs fall into Amber or Red zones.

The Amber zone for capital and liquidity KRIs is set at the regulatory minima.

B. Stress testing

i) Loans Growth Assumptions by Wholesale Banking Division:

"Run-offs relates to loans settled as per maturity date. During economic stress situations, some customers are expected not to be able to service their payment commitment. In the absence of historical data, it is expected that a significant portion of customers may not be able to service this obligation, hence we adopt a 50% of the Business-As-Usual settlements. This threshold assumption applies to both stress scenario I & II." Refer to **Appendix II** for full details.

ii) Deposit growth assumptions by Wholesale Banking

Under Scenario 1: "…….a reasonable outflow of 20% is expected in year 1, followed by 15% outflow and recovery back to FY14,". Refer **Appendix II** for the full details.

iii) Fee income growth assumptions by Wholesale Banking

iv) Retail Banking's assumptions for loans growth and assumptions for fee income are based on two different historical data i.e. loans growth is based on trend observed since the Global Financial Crisis and deposit growth is based on a World Bank report. Refer **Appendix III** for the full details.

v) The ICAAP Working Committee relied on Head Office's Economic Research Unit to identify the stress testing scenarios and key stress parameters listed as per **Appendix I(a).**

C. For risks that cannot be quantifiable, the following risk mitigation measures have been identified:

Material risks cannot be quantified	Risk mitigating measures established
Reputational risk	Operational Risk Management Committee set up to manage reputation risk. Develop Reputational Risk Framework/ policies/ procedures/ guideline and include three categories of control to address different types of risks that lead to reputational risks. These three categories of controls are Preventive, Detective & Recovery.
Legal Risk Technology risk Regulatory Compliance risk Strategic risk Business risk	▪ Not easily quantified. ▪ Established frameworks and policies. ▪ Managed through qualitative methods such as implementation of limits, operational controls, contingency plans and insurance.

As Risk Management commented, some risks are difficult to quantify, hence managing non-quantifiable risks through policies and procedures are sufficient.

From the regulator's point of view, are the above approaches sufficient?

Review and challenge points

A. Management actions and internal limits

Whilst the use of RAYG zones to assist in providing early warning and to act as triggering of management actions represents good practice, setting the zones too close to regulatory minima risks the bank running into breach of supervisors required levels for balance sheet metrics, with potentially insufficient time available for management actions to impact KRIs and restore them to "green" zones. This in turn risks a loss of confidence in the bank in the wider markets.

The bank should ensure that internal risk limits are set sufficiently high above regulatory minima, to ensure there is sufficient time for management actions in stress to impact the balance sheet and restore key metrics to the "green" zone.

B. Stress testing

(i) Wholesale Banking, in their loans growth assumptions, relied on their (qualitative) judgment in adopting the "50% of the Business-As-Usual (BAU) settlements". Improvement opportunities:

- Rationale for adopting 50% of BAU settlements to be explained/ supplemented/ supported with expert judgment (is the view from Wholesale banking taken as expert judgment?).
- Lack of challenge process made by business unit on the "50% of the Business-As-Usual"?

(ii) Deposit growth assumptions by Wholesale Banking

- The outflow of 20% (year 1), 15%(Year 2) and recovery to financial year 2014(Year 3) are not supported with robust discussion and linkages made to macroeconomic factors.
- Lack of challenge process made by business unit on deposit growth projections and its assumptions

(iii) Fee income growth assumptions by Wholesale Banking

- 30% decline in corporate portfolio for S1 and 20% decline in corporate portfolio for S2 were based on 18.7% y-o-y since Global Financial Crisis. An analysis detailing how 30% (under S1) and 20% (under S2) was not documented. Refer **Appendix IV** for details.
- Lack of challenge process made by business unit on fee income projections and its assumptions

(iv) Retail Banking's assumptions for loans growth and assumptions for fee income are based on two different historical data i.e. loans growth is based on trend observed from the Financial Crisis and deposit growth is based on World Bank report.

Refer **Appendix III** for the full details.

- Limitations of using two different sets of historical data were not disclosed to fortify the analysis and stress testing results for more informed decision making. Each crisis exhibits its own characteristics and correlations.
- No explanation/ justification linking loan growth to fee income growth.
- Lack in-depth discussion/ deliberation on the linkages between the double digit (%) withdrawal by retail depositors and the stress test (macroeconomic) parameters (refer to Appendix 1).
- Retail Banking assumption for deposit growth: "……The deposit balances is projected to improve gradually in the subsequent years in view of the market recovery". Refer **Appendix III** for full details.
  The "projection" of deposit balance is not supported with analysis.

The business areas need to identify key areas and points in order to demonstrate that the historical data that they used for business projections or risk assessment were sufficiently forward looking.

Processes (e.g. more robust discussions) need to be in place in order to demonstrate that the risk assessment and business projections made by business units are a forward-looking assessment.

(v) The ICAAP Working Committee relied on Head Office's Economic Research Unit Unit to identify the stress testing scenarios and key stress parameters listed as per **Appendix I(a).**

After reviewing the minutes extracted [Refer **Appendix I(b)** for details], there is still a lack of in-depth deliberation/ challenges by the ICAAP Committee members.

More needs to be demonstrated in order to justify that there is an adequate process to challenge the key stress parameters.

General comment on stress testing: the stress scenarios are not sufficiently firm-specific, they are general market-wide scenarios and not tailored to the bank in question, its specific business model and strategy.

C. For risks that cannot be quantifiable, the following risk mitigation measures have been identified

As Risk Management commented, some risks are difficult to quantify, managing non-quantifiable risks through policies and procedures are sufficient.

From the regulator's point of view however, this is unlikely to be sufficient.

ICAAP Specimen Table of Contents: ChoudWest Bank 2018

Appendix I (a)

Key Stress Parameters for Stress Scenario 1 (S1) and Stress Scenario 2 (S2)

		Actual 2014	**2015**	**2016**	**2017**	**2018**	**Stress Scenario 1 Recession**	**Stress Scenario Global recession**
1	GDP (yoy growth)							
2	Sectoral growth							
	Agriculture							
	Manufacturing							
	Construction							
	Transport							
	Finance, services							
3	CPI (yoy growth)							
4	Property prices (yoy growth)							
5	Unemployment rate							
6	Equity prices							
7	Interest rates							
	Base rate							
	3M Libor							
8	Exchange rates							
	GBPUSD							
	GBPEUR							
	GBPJPY							

Appendix I (b)

Discussion on stress test parameters

- For the Business As Usual (BAU) key economic parameters, we assumed that:
- GDP growth will slow down from 5.9% in 2014 to 5.2% in 2015 and 2016 and slightly increased to 5.3% in 2017.
- Agriculture will have a higher growth of 2.4% in 2014 and slight slowdown to 2.0%, 2.1% and 2.0% for 2015-2017.
- Manufacturing will have a stronger growth of 6.8% in 2014 and slow down to 4.8%, 4.7% and 4.9% for 2015-2017.
- Construction will remain higher growth of 10.8% in 2014 but slightly lower compared to 10.9% in 2013. The growth for this sector is assumed to slow down from the 10.8% to 8.5%, 8.6% and 8.0% for 2015-2017.
- Transport, storage & communications will have a modest growth of 7.0% in 2014 extended to 7.6% in 2017.
- Finance, insurance, real estate, business services will have a modest growth from 4.0% in 2014 to 6.0% in 2017.
- CPI for 2015 is estimated at 4.3% due rise in fuel oil price and other factors
- Property prices growth will rebound from 1.5% for 2014-2015 to 5.0% for 2016-2017.
- Unemployment rate remained stable at 3.1% for 2014-2015 and slightly reduced to 3.0% in 2016 and 2.9% in 2017.
- Equity price changes remained stable at 8.0% for 2014-2017.
- Base Rate remained at 3.25% in 2014 and expecting another 25 basis points (bps) hike in 2015.
- 3-month interbank rate was adjusted slightly higher to 3.75% for 2014 and 4.00% for 2015-2017 to be in line with current levels.
- Exchange rate for GBPUSD, GBPEUR and GBPJPY are based on the latest revision after BoE's move

Discussion on the selection of stress testing scenarios

Stress scenario 1 (S1), we assumed that:

- GDP growth will be hard-hit in 2015 and continue to worsen in the second half of 2016 before a recovery later in the year. GDP growth is assumed at 2.8% for 2015, -2.5% for 2016 and 3.2% for 2017. With reference to Global Financial Crisis (GFC), there was a weaker recovery in GDP growth.
- Manufacturing sector is assumed to be hardest-hit as to the 2008-2009 Global Financial Crisis (GFC) with the collapse in the global demand. During GFC, the growth in manufacturing sector was declined sharply from 1.3% in 2008 to -9.3% in 2009.
- Within the services sector, transport & commerce industries will likely be most affected as trade services as well as demand from consumers suffer from the downturn.

- Taking into consideration of the feedback received from ICAAP members, there were some changes made to the sectoral growth under stress scenario 1, i.e. reduced the severity (2015: from 1.1 to 1.9; 2016: from -8.8 to -8.5) for the manufacturing sector and increased that for finance sector (2015: from 3.0 to 2.2; 2016: from 2.0 to -0.1; 2017: from 3.0 to 2.8) so overall GDP is not affected. The forecast was made based on the relatively more resilient performance of the finance, insurance and real estate industry during the Global Financial Crisis (2008: 9.4% ; 2009: 4.1%) even though the overall GDP contracted by 1.5% in 2009. This might be because the sector could have benefited from the outflows from the developed markets. Note the growth in the finance sector has been weaker in 2013-2015 so we would have a lower base of comparison so this would also explain why the contraction in 2016 is likely to be less severe than others.
- CPI will have a spike of 5.5% in 2015 (1998: 5.3%; 2008: 5.4%) due to depreciation of GBPUSD leading to higher import prices. However, the spike in inflation will be reduced in the following years (2016: 2.5%; 2017: 2.6%) like previous crises
- Property prices will have a huge drop of 15% in 2015 and stay flat in 2016 amid the uncertainties. This is more severe than previous crisis (1998:-12.52%; 2008:-3.48%).
- Unemployment rate is expected to peak at 4.3% in 2016 and remain high at 4.0% in 2017. This is slightly lower than the unemployment rate of 4.5% recorded in Mar 1999.
- Equity prices are assumed to drop by as much as 45% in 2015 before recovering of 10% in 2016 and 30% in 2017, reflecting the risk aversion in the markets. The assumed magnitude of decline is similar to the peak-to-through drop in 2008-2009. The equity market is expected to recover in the later part of 2016 as growth bottomed out and the economy begins to turn around after the government's measures.
- 3-month interbank rate is assumed to rise to 6.0% in 2015 from 3.6% in 2014 due to higher risk premium and tightening liquidity condition. However, the rates will be declined to 2.2% and 2.7% for 2016-2017 to reflect the monetary easing.

For stress scenario 2, we assumed the impact on the key economic parameters for stress scenario 2 is to be less intense compared to stress scenario 1 because the direct impact of the European recession is expected to be more manageable for this economy compared to the fallout from a global hard-landing as it would also have larger ramifications on global trade. Financial contagion will likely be lesser in scenario 2 as the capital outflows from markets are expected to be much more contained.

Appendix II

The following broad “top-down” business assumptions (including potential second order impact from rating downgrade and stress liquidity event for the purpose of ICAAP and ILAAP liquidity stress test have been considered in the business assumptions for loans and deposits) were reviewed and endorsed by the management.

<u>Wholesale Banking Stress Test Business Assumptions</u>

Wholesale Banking Stress Test Assumptions for Loans & Deposits

Loans	S1 Hard Landing in global crash – local debt contagion (worst case)	S2 (exceptional but plausible)	Remarks
Prepayments	None	None	Minimal for BAU Assume Nil under stress
Runoffs	50% of BAU for 3 years	50% of BAU for 3 years	-
New loans/ disbursements	Year 1: 5% of BAU Year 2: 20% of BAU Year 3: 35% of BAU	Year 1&2: replaced run-offs (no loans growth) Year 3: 40 % of BAU	Under stress conditions, Corporates will draw down on “undrawn commitments”, converting to on-balance sheet loans from off-balance sheet exposures.

Deposit	S1 Hard Landing in global crash – local debt contagion (worst case)	S2 (exceptional but plausible)	Remarks
Deposits	Year 1: -20% year-on-year Year 2: -15% year-on-year Year 3: Recovery to Financial Year ended 2014	Year 1: -15% year-on-year Year 2: -10% year-on-year Year 3: Recovery to Financial Year ended 2014	Assume large Corporate hold more cash for working capital under crisis. Small & Medium Enterprise deemed cash-strapped & will withdraw cash for working capital. Large corporates can raise long-term debt and better able to cope under Scenario II (less severe).

BAU= Business-As-Usual

Detailed stress business assumptions for loans & deposits for Wholesale Banking (WB) is explained below:

	Scenario 1 (S1) Hard Landing in global crash – local debt contagion (worst case)	S2 (exceptional but plausible)
Assumptions for Loan Growth	Prepayments refers early settlement which is not significant in WB business hence deemed as "Nil" Run-offs relates to loans settled as per maturity date. During economic stress situations, some customers are expected not able to service their payment commitment. In the absence of historical data, it is expected that a significant portion of the customer may not be able to service this obligation, hence adopt a 50% of the Business-As-Usual settlements. This threshold assumption applies to both stress scenario I & II." New loans/ disbursements: loans growth from new loans is expected to slow down in the initial years as credit appetite tightens. However, we do foresee a small growth in overall loans attributed i) Customers converting the undrawn commitments (off-balance Sheet) to loans (on-balance sheet) ii) Drawdown on committed loans previously approved prior to economic downturn iii) Case-to case basis on working capital needs	This is being less severe stress conditions (compared to S1), the run-off rates are expected to be the same as in S1. The above rationale is applied to S2, which is less severity, hence the annual loans growth is less drastic. Initial first 2 years expected to record flat growth, with a small growth expected on Year 3 as economic condition improves.
Assumptions for Deposit Growth	During economic downturn, WB customers (listed and large corporations, large SMEs) would require cash for working capital needs. As a result, there will be less placements of new deposits and higher withdrawals are expected. In the absence of historical data, a reasonable outflow 20% is expected in year 1, followed by 15% outflow and recovery back to FY14 in Year 3 for Scenario 1. As market recovers, business activities and liquidity improve and this eventually leads to higher deposits placements with the bank.	The economic condition is less severe compare to S1. Hence outflow expected in Year 1 & Year 2 will be less drastic at 15% outflow and 10% outflow respectively, as there is still market opportunity for listed and large corporates to raise mid-to long-term debts to meet their business requirements. As market recovers, business activities and liquidity improve and this eventually leads to higher deposit placements with the bank.

Appendix III

<u>Retail Banking Stress Test Business Assumptions</u>

Retail Banking Stress Test Assumptions for Loans & Deposits

Loans	S1 Hard Landing in global crash – local debt contagion (worst case)	S2 (exceptional but plausible)	Remarks
Prepayments	Year 1: 50% of BAU Year 2: 60% of BAU Year 3: 70% of BAU	Year 1: 70% of BAU Year 2: 75% of BAU Year 3: 80% of BAU	Redemption estimated lower due to sluggish property market. Redemption expected to improve from Year 3 onward in both scenarios.
Runoffs	Year 1: 70% of BAU Year 2: 60% of BAU Year 3: 65% of BAU	Year 1: 80% of BAU Year 2: 75% of BAU Year 3: 85% of BAU	Repayment lower due to the assumption of higher unemployment rate and repayment deteriorated when the unemployment rate reached its peak in Year 2 and gradually improve from Year 3 onwards.
New loans/ disbursements	Year 1: 55% of BAU Year 2: 40% of BAU Year 3: 47% of BAU	Year 1: 75% of BAU Year 2: 57% of BAU Year 3: 64% of BAU	Property markets stay soft and deteriorated further in Year 2 when GDP recorded negative growth. Disbursement improved gradually when GDP improving from Year 3 onwards.

	S1 Hard Landing in global crash – local debt contagion (worst case)	S2 (exceptional but plausible)	Remarks
Deposits	Year 1: -12% of BAU Year 2: 5% of BAU Year 3: 6% of BAU	Year 1: -10% of BAU Year 2: 5% of BAU Year 3: 10% of BAU	The percentages of retail deposits that may be withdrawn in stress scenario will be low double digits as retail depositors would be comforted by deposit insurance,

Detailed stress business assumptions for loans & deposits for Retail Banking is explained below:

	Scenario 1 (S1) Hard Landing in global crash – local debt contagion (worst case)	S2 (exceptional but plausible)
Assumptions for Loan Growth	The projected positive loan growth in 2015 follows by marginal negative growth in 2016 and 2017 respectively is in line with the industry trend observed during the Global Financial Crisis (2007-09) The growth in loan balance in Year 1 mainly due to lower repayment and redemption rate based on the assumption of high unemployment rate (3.9%) and drop in property house price (-15%) but partly offset by lower disbursement, With stable property price (0% vs last year), redemption rate is expected to improve coupled with more significant drop in disbursement, the loan book will record a negative growth in Year 2. The loan book will continue to record a marginal negative growth due to increase in repayment and redemption as the economy improves.	As S2 being less severe stress conditions compare to S1, the reduction in repayment and redemption rates are expected to be lower than S1 together with less impact on disbursement , the loan book will record a positive growth in Year 1. The loan book balances in the subsequent years are better than S1 based on better GDP, unemployment rate and property price.
Assumptions for Deposit Growth	As de-growth of 12% in 2015 is based on the study of the World Bank report "Access to Bank Deposit and Growth of Deposits in the Global Financial Crisis, where growth of bank deposit dropped by over 12 percentages points globally during 2006 to 2009. The study also suggested that the % of retail deposits that may be withdrawn in stress scenario will be in low double digits a retail depositors would be comforted by deposit insurance. The deposit balances is projected to improve gradually in the subsequent years in view of the market recovery.	In S2, the economic condition is less severe compare to S1. As such, the reduction in 2015 is lower than S1. With better economic indicators in S2, the balances growth is projected to be higher especially in Year 3 (Year 2017).

Appendix IV

1. Assumption for New Loans/Disbursements
   - Risk profile for new loans booked during stress period to be based on the stress environment as rating downgrade during the stress periods is expected.
   - Loans margins assumed to increase by 50bps for 2015, 2016 and 2017 as typically under stress, margins are expected to increase due to widening of credit spreads.
   - New loans booked in 2015 will be default in 2017, at the credit risk stress test default rate.
2. Collective Impairment (CI) Provisions Assumptions

   The bank-wide CI provisions for ICAAP stress test will be increased by 30% of BAU for 2015-2017. The regulatory requirement is to have CI ratio of above 1.2% by 31 December 2015.

3. Other Key P&L Assumptions

   Wholesale Banking Assumptions for Fee Income

   Banking fee income is assumed to apply the Corporate Banking fee income historical trend during the Global Financial Crisis 2007-2009 for both stress test scenarios. The rationale to apply the same historical trend for Commercial Banking is to reflect a more conservative fee income impact as very minimal shock for the Commercial Banking portfolio was noted during the Global Financial Crisis.

Loans	S1 Hard Landing in global crash – local debt contagion (worst case)	S2 (exceptional but plausible)
Fee Income	Year 1: -30% year-on-year Year 2: -20% year-on-year Year 3: -10% year-on-year	Year 1: -20% year-on-year Year 2: -10% year-on-year Year 3: -5% year-on-year

Detailed stress business assumptions for fee income for Wholesale Banking (WB) are explained below:

	Scenario 1 (S1) Hard Landing in global crash – local debt contagion (worst case)	S2 (exceptional but plausible)
Assumptions for Fee Income	Based on 2007/2008 financial crisis, a y-o-y decline of 18.7% was observed in the Corporate Banking portfolio. In a severe stress condition (under S1), overall Wholesale Banking (Corporate & Commercial) on a conservative approach, is projected to adopt a 30% decline (more severe than 2007/2008 crisis).	Based on 2007/2008 financial crisis, a y-o-y decline of 18.7% was observed in the Corporate Banking portfolio. In a less stress condition (S2), overall Wholesale Banking (Corporate and Commercial) on a conservative approach, is projected to adopt a 20% decline (similar to that for Corporate portfolio during 2007/2008 crisis).

	Lower market confidence level and drop in business opportunities/ activities are main reason for this sharp decline in fees in year 1. As market gradually recovers, business activities & opportunities are expected to quickly turnaround leading to credit demand as well as growth in the needs for investment advisory and raising capital (through bonds or equity), indicated by a slower decline in fee income growth of -20% and -10% respectively for the subsequent two years. Growth y-o-y is expected in Year 4. Treasury income, very much reflective of business activities and market opportunities, is expected to adopt similar trend to the fee income in general.	In this scenario, a much lower decline quantum in fee income, -10% and -5% y-o-y growth, is expected for the subsequent two years; reflecting a gradual improvement. Growth y-o-y is expected in year 4. Treasury income, very much reflective of business activities and market opportunities, is expected to adopt similar trend to the fee income in general.

4. <u>Retail Portfolio Assumption For Fee Income</u>

Retail portfolio assumed margin compression for both unit trust (in view of investors' flight to safer investments) and retail bond (in order to encourage sales).

Loans	S1 Hard Landing in global crash – local debt contagion (worst case)	S2 (exceptional but plausible)
Fee Income	Year 1: -19% year-on-year Year 2: -4% year-on-year Year 3: 11% year-on-year	Year 1: -16% year-on-year Year 2: 8% year-on-year Year 3: 15% year-on-year

Detailed stress business assumptions for fee income for Retail Banking are explained below:

	Scenario 1 (S1) Hard Landing in global crash – local debt contagion (worst case)	S2 (exceptional but plausible)
Assumptions for Fee Income	As de-growth of fee income by 19% in 2015, followed by growth in the subsequent years is based on the assumption of increase in unemployment rate and lower GDP growth, wealth revenue is impacted significantly due to drop in volume coupled with margin compression, and increase in insurance lapsed rate. Card spend is also impacted and recorded a negative growth in the first year of recession.	In S2, the economic condition is less severe compare to S1. As such, the reduction in 2015 is lower than S1 mainly contributed by card and insurance. With the better economic indicators in S2, the fee income growth is projected to be higher than S1.

Note: the fee income assumptions for Wholesale and Retail Banking are adopted to estimate the FX income for Wholesale and Retail Banking during stress periods

- Provision for operational risk losses during stress periods will be incorporated into the stress P&L from the operational risk stress test.
- Assumed no reduction in the expenses during stress periods in order to reflect a more conservative stress P&L.

5. Assumption for Interbank Borrowings/Placements
   - Assumed the Bank will not be able to maintain L/D ratio during stress scenarios (taking into consideration interbank credit quality and liquidity squeeze).
   - With the assumption of deposit outflows under stress scenarios, the shortfall will be covered by borrowings.

6. Assumption for Bond/Equity Investments
   - Assumed no new investments/replacements for runoffs during stress periods

7. Assumption for Liquidity Stress Test
   - Although there was no deposit outflow during Asian Financial Crisis and Global Financial Crisis, for the purpose of liquidity stress test, it is assumed 2-notch rating downgrade under both stress scenarios which will trigger significant deposit withdrawal.

8. Assumption for Capital Adequacy Objective during stress periods:-
   - To meet the minimum regulatory requirements;
   - To ultimately restore capital levels to preferred capital target levels/mix within one year (taking into consideration of Contingency Capital Planning).
   - Assumed not able to be maintained capital mix target during stress periods.