Stress Testing Bank Operations under

COVID-19 Scenario

July 2020

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Introduction

- The outbreak of COVID-19 and the impact on the wider economy has placed unprecedented pressure on businesses. The pandemic continues to put severe strain on people and businesses across the globe.
- The banking industry in particular is being hit hard by daily pivoting market conditions and deteriorating credit among others.
- The speed and size of the economic impact that COVID-19 has on bank's bottom line has brought into stark reality the importance of robust stressing testing, beyond what many banks were undertaking in the past.
- These are unprecedented times for CEOs, CROs, risk functions and business. ***"Stress Testing Banking Operations under COVID-19 Scenario"*** seeks to discuss the need to stress test banking operations to identify risk and opportunities, and ultimately to understand the capacity of the bank to be compliant and generate value in the era of COVID-19.
- KPMG shares its 4-step approach to stress testing and offers advice based on deep expertise and experience in Financial Risk Management within the banking sector.
- The learnings from the webinar will help banks re-align their products and investment strategies to the changes in the local and global market dynamics.

Impact on Ghana's Economy

Revenue Shortfall

GHC15.7 **Billion**

Projected shortfalls:

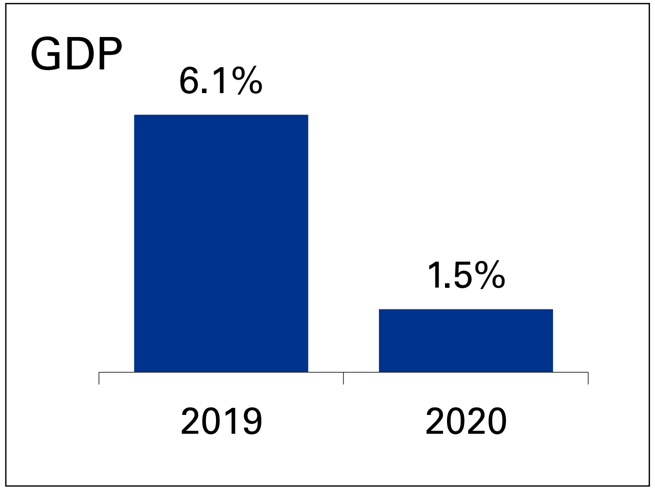
- Petroleum to fall by GHC5.7 billion
- Non-oil tax & non-tax revenue loss is projected to be GHC10 billion

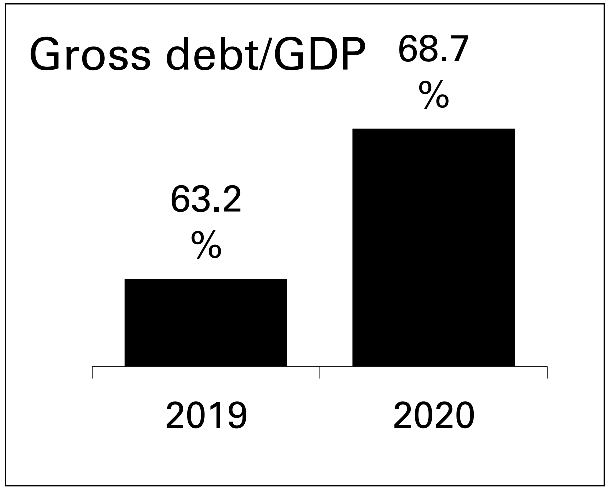
Expenditure

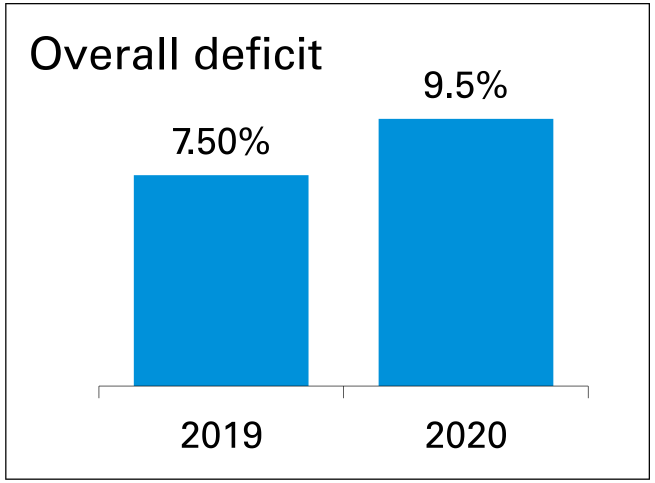
GHC2.8 **Billion**

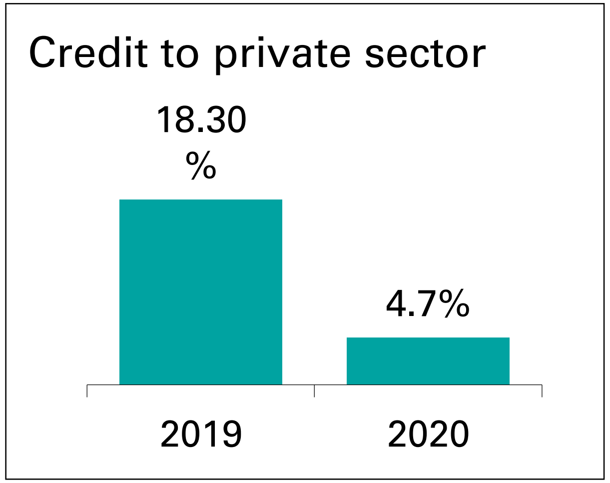
- Cost of a COVID-19 preparedness plan is estimated to be GHC 572 million
- Coronavirus Alleviation Programme (CAP) - 1.25 billion
- Utilities – GHC1.0 billion
- Secured syndicated facility of GHC3.0 billion from banks to support key industries

Key macro indicators









Source: MoF and IMF Press Release 13 April 2020

Supervisory and Other Measures

Supervisory and related measures in Ghana

Bank-Specific Supervisory Measures	Reduction in the Primary Reserve Requirement from 10% to 8%	Reduction in the Capital Conservation Buffer from 3.0% to 1.5%, hence reducing Capital Adequacy Ratio (including CCB) from 13% to 11.5%	Reduction in provisions for loans in the "Other Loans Especially Mentioned" (OLEM) category from 10% to 5% for all banks and Special Deposit Institutions (SDIs)	Suspension of dividend payments and distributions to shareholders, to ensure banks have liquidity to support their operations
Other Supervisory Measures by BoG and Related Institutions	Cut of key interest rate to 8-year low by 150 basis points (bps) from 16% to 14.5%	BOG Asset Purchase Programme up to GH¢10 billion. BOG has purchased a GH¢5.5 billion Ghana COVID-19 Relief Bond with 10 year tenor and 2 year moratorium on principal and coupon pegged at MPR	Ghana Interbank Payment and Settlement Systems Limited (GhIPSS) removed charges, on all electronic payments services used by its partner financial service providers	Banks, through the Ghana Association of Bankers, have collectively agreed to reduce interest rates on lending by 2%

Impacts on Bank's Risk Management - Liquidity Risk

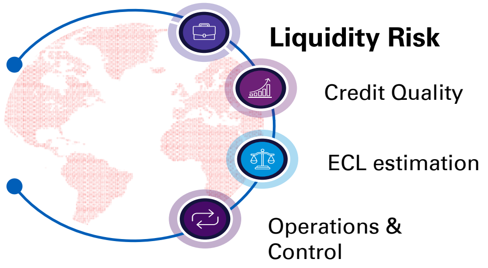
"Liquidity is cushioned by Bank of Ghana policy announcement relating to capital reserve reduction"

"Treasury needs to work more closely with business to understand asset repayment and disbursement requirements better in a fast changing environment"

"Short term to medium term liquidity risk will need to be stress-tested"

"Repayment events due to moratorium period need to be remodeled

Impact of heightened delinquencies likely to surface by Q2 and Q3 post the moratorium period to be worked out"



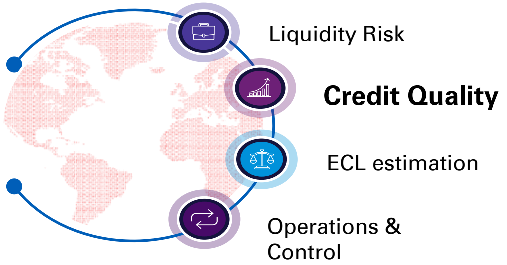
Impacts on Bank's Risk Management - Credit Quality

"Aviation, travel and hospitality, auto and auto ancillaries, real estate and construction to generate stressed assets
Banks profitability will come under pressure"

"Infrastructure sector to come under immense pressure
Sharp decline in demand will further compound the effect"

"SMEs involved in discretionary goods and services are likely to be adversely impacted
The segment needs liquidity and credit support"

"Borrowers would require their credit facilities to be restructured based on revised business cash flows thus necessitating one time restructuring of loans"



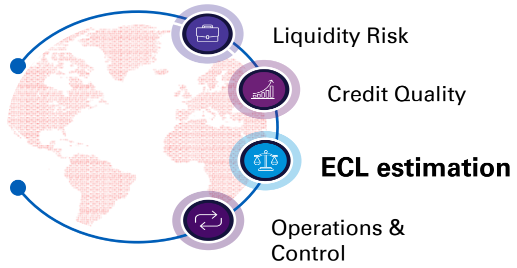
Impacts on Bank's Risk Management - ECL Estimation

Due to moratorium provided to the borrowers and deferment of NPL classification norms, default definition and significant increase in credit risk (SICR) will remain the same

Probability of Default (PD) estimates for various portfolios going to increase when forward looking macro economic parameter adjustments are applied
Loss Given Default (LGD) is also expected to increase due to lower recoverability of assets

Exposures At Default (EADs) expected to increase due to higher drawdowns of credit facilities and moratorium / payment feature enablement in loans
Due to lack of data availability, management estimates will pay a larger role

Expected Credit Loss (ECL) as a whole is going to increase due to higher weight applied to severe downturn scenario while conducting scenario analysis
Management will have the responsibility of higher disclosure in their quarterly reports



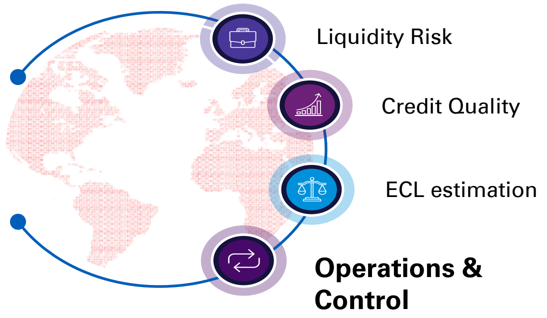
Impacts on Bank's Risk Management - Operations & Control

"Proportion of banking services availed through digital channels particularly payments to increase"

"Banks have now to adopt innovative approaches to digitization of processes, optimization of its workforce and a more active BCP sites"

"Banks required to revisit their internal rating models based on revised macro economic and idiosyncratic risks"

"Social engineering scams are on the rise using social media and telecommunication channels due to work-from-home enablement"



Summary of key observations

1 Economic decline as projected GDP is expected to fall from 6.8% to 1.5%

2 Public debt rising and will put pressure on government's debt sustainability

3 Stock market experiencing falls with drops in price-to-book value of listed companies

4 Second quarter performance of banks showing revenue decline but expected to pick up

5 Continued pressure on bank's to deploy assets efficiently for recovery

6 NPLs likely to rise due to impact on key sectors like tourism, exports, manufacturing etc.

How can stress testing help Banks?

How stress testing can help

Explore portfolio vulnerabilities by assessing borrower interdependence

Enables stabilization of the asset quality and prevent further deterioration in credit

Realign the product and investment strategy to changes in the local and global market dynamics

Enables development of contingency plans to ensure funding stability

Manage volatility in the earnings and profitability, and manage shareholder expectations

Prevents liquidity drain and any contagion effect

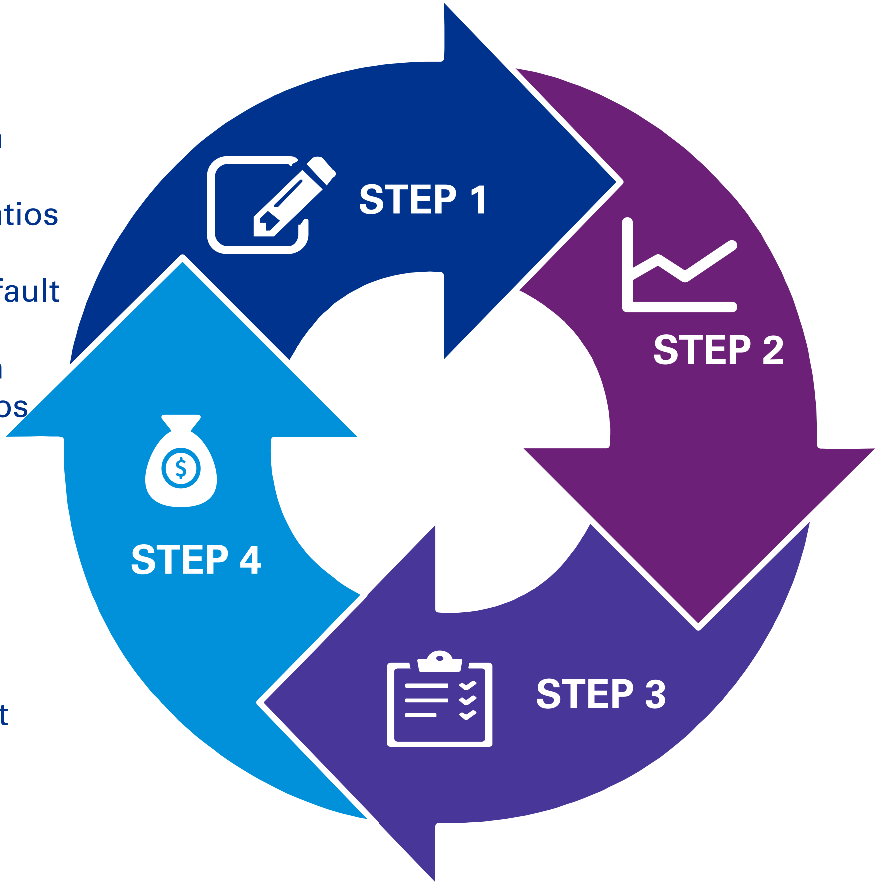
Build up Financial Resilience

Stress Testing as a Business Driver…

Impact Areas	Focus Areas	Benefits
■ Integration of business and capital planning ■ Identify rewarding business opportunities ■ Internationally recognized ICAAP process ■ Compliant with industry standards	**Business**	■ Key Performance Indicators for Business Units ■ Increase ROE for shareholders ■ Capital Raising from Foreign Markets ■ Increases market confidence in bank
■ Define and diligently monitor Risk Appetite ■ Reduction in loss with better risk management practices ■ Integrated view of risk profile	**Risk**	■ Results in safe and sound Bank at all times ■ Lower NPL and improves profits ■ Bigger & Better Asset Base ■ ERM – one view of risk
■ Limits and Contingency plans ■ Optimal Use of Capital ■ Efficient Allocation of Capital across Business ■ Risk driven insights to business units	**Efficiency**	■ Adaptability to changing market conditions ■ Available Capital for Expanding Asset Base ■ Better Ability to take Risks ■ Efficient Policy and Processes of the bank
■ Improve ROE and ROA ■ Improved value creation for shareholders ■ Attractive for potential investors	**Financial**	■ Better External Rating ■ Lower Cost of Raising Capital ■ Enhanced Risk reward profile

KPMG's 4-Step Approach to Stress Testing

KPMG recommends to Banks to run "targeted stress tests" to identify vulnerable credit, sector and supply chains and take proactive action



STRESS LOAN PORTFOLIOS

- Design scenarios (i.e. travel bans, supply chain shocks, retail shocks)
- Stress underlying cashflow and debt service ratios for all obligors
- Transmit impact to loan level probability of default (PD)
- Calculate expected loss and RWA for each loan
- Re-run simulation based on a range of scenarios and aggregate results

SIMULATE IMPACT ON LOSS PROVISIONS

- Input updated macroeconomic forecasts into models
- Update PDs and loss given default (LGD) based on simulation results
- Calculate loss provisions for each loan

IDENTIFY VULNERABLE SECTORS

- Individually assess any loans where obligors appear highly vulnerable to hemorrhage cash as per the stress test results
- Sector analysis reviewing aggregated impact on RWA and provisions
- Contagion impact and supply chain analysis for large corporates that appear more vulnerable, potentially leveraging analytics
- Review collateral and guarantees in place

TAKE PREVENTIVE ACTIONS

- Proactively target customers and sectors that have shown to be weaker as per the stress test results
- Further refine relief measures based on target groups

Key Metrics for Banks to focus on

Overall Asset Quality

- **Supply chains** (auto, technology, commodities), **Oil and Energy** as well as **Discretionary spending portfolios** could see higher defaults
- Defaults in **Leveraged portfolios** likely to increase
- Pockets of **Commercial real estate** in certain geographies could worsen

Liquidity Gaps

- With volatility in markets on the rise**, short term debt** can likely dry up
- FIs depending on overt reliance on the short term funding will face a likely **liquidity crunch** along **with higher borrowing costs**

Pre Provision Net Revenues

- **Loan growth** likely to take a hit among uncertainty since budgeted capex expenditures will be put on hold
- **Retail spends driven by discretionary spending** also likely to see a decline

Capital Adequacy and Provisions

- Deteriorating asset quality could mean **increase in lifetime expected losses (ECL)**
- **NIM under pressure due to rate cuts**
- Both factors could lead to **downward pressure on profitability**

Key Considerations for Banks

Key points to consider while developing a stress testing program

Development of Robust Stress Testing Framework

- What first principles should one employ in putting together a stress testing framework?
  How can one undertake reverse stress testing especially in a cost effective manner using first principles?
- Sample stress test models compliant with Basel II and III to purchase for you?

Stress Testing as part of overall Enterprise Risk Management

- How important is stress testing in overall ERM framework?
- What linkages do other ERM component such as Risk Appetite, Governance, Credit models have on the stress testing?
- Is it possible that stress testing alone can be used for assessment of risk without other components?

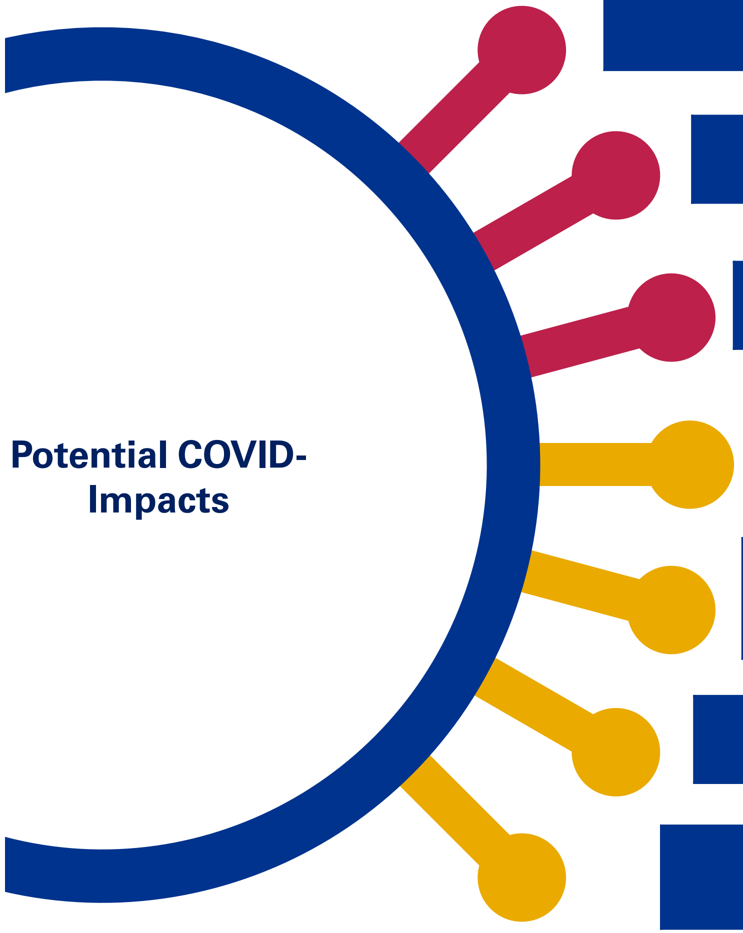
Identification of stresses sectors

- The key parameters to consider in stress testing under COVID-19 scenarios and sample templates to be used?
- Will all companies survive this pandemic? How prevalent is the possibility of an L shaped post COVID - 19 Curve in certain sectors of the portfolio, which sectors in your view demonstrate such risk?

Corrective Action based on the results of stress tests

- Stress testing typically results in building buffers to withstand stresses. These buffers typically come with significant costs. How do you position the trade off between stress buffers and profitability?
- If market conditions change, how could liquidity needs and cash availability change?
  What actions could we take in the event of a liquidity crisis, and how long could we sustain operations?
  How is Covid-19 an impact to our society and corporate environment and how can we overcome the challenge?

Areas for Applying Stress Testing

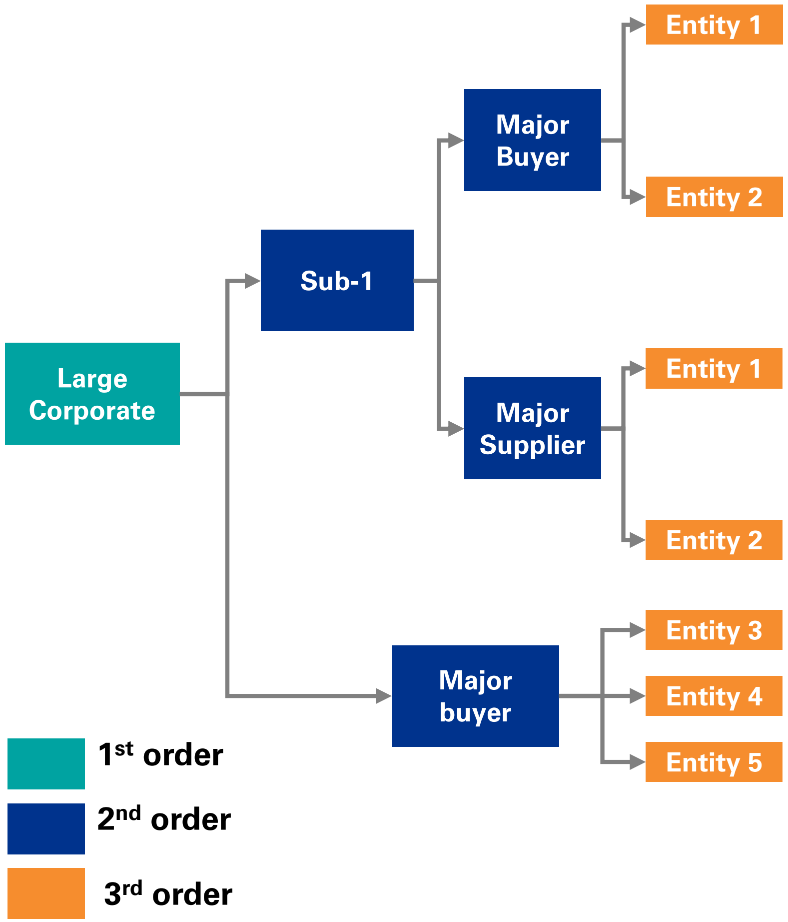


A) Credit risk	Increased defaults and credit risk provisions, governmental support and supervisory reliefs should be optimally made use of by banks Collateral coverage to be assessed Borrower Ratings to be reassessed taking into account expected impact on certain sections
B) Liquidity risk	Increasing liquidity outflows due to large facilities drawn- by customers and stressed equity and bond markets
C) Market Risk	Increased noise in market data, dispersion of spreads, and high intra day and day to day volatility lead to limit breaches
D) ERM and capital	Financial market crash and respective volatility and worsening of credit quality put significant strain on capital adequacy – short-term the key challenge is to identify current capital position and to provide reasonable forecasts
E) Operation Continuity	Triggering of BCP. Identification of critical services, locations from recovery plans. Guarding against increase in operational risk incidents due to all functions not operating optimally
F) Investment Risks	Impact on expected returns from Investments done in Mutual Funds or other market linked instruments
G) Reporting	Ad-hoc reporting's necessary for internal stakeholders as well as regulators to continuously monitor and understand the situation

High impact   Medium impact   Low impact

Modelling for Contagion Effect under COVID-19

One key objective of the stress tests will be to identify the vulnerable borrowers linked up and reliant on a single supply chain eco-system- particularly the top borrowers or suppliers of a large corporate



- **1st Order:** Large corporate entities that are identified as most vulnerable under the stress scenarios
- **2nd Order:** Key subsidiaries dependent on parent for financial support or operating in the same sector, Key buyers or suppliers of the parent entity or key subsidiary
- **3rd Order:** Suppliers and buyers to the 2nd order entities; typically the MSME sector which have the potential to go bust if 2nd order entities slow down or have payment delays

Our Approach

- Identify the most vulnerable 1st order entities through stress tests
- Identify **stressed correlation among entities** or **use alternate copulas with more extreme tail dependence** to account for impact of COVID-19
- Alternatively construct **credit stress propagation networks** and **calibrate contagion parameters** for infectious defaults
- Assess total amount of direct/indirect exposure to the 2nd and 3rd order impact entities; and estimate the loss based on the contagion effect

Embedding stress testing in other risk management post COVID scenario

Bank-wide steering and strategy	Risk Appetite Framework	Active Capital and Liquidity Management	Economic Value Management	Crisis Management	
Risk steering	Risk Reporting	Forecasting and Planning	Limit System	Control processes	Risk Decisioning and Performance
Risk aggregation	Economic Capital	Stress Testing	Risk Inventory	Liquidity gap analysis	
Risk identification and measurement	Credit Risk	Market Risk (incl. FX, IRRBB)	Liquidity Risk	NFR	
	Real Estate Risk	Business Risk	Other Risks		
Risk IT	Data quality	Risk engines, Analytics	Data Warehouse	RWA Calculator	

How KPMG can assist you

How KPMG can assist you

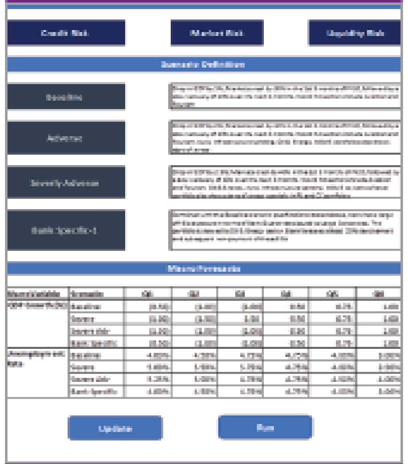
Key Activities	Timeline
• Review of bank's current approach of application of stress testing to assess the COVID impact • Coverage and adequacy • Framework and methodology • Scenarios constructed • Quantification techniques applied • Subjective assessments • Assumptions • Outcome • Conduct discussions with the bank to understand and share our viewpoints	• 1 week
• Review the computations conducted by the bank	• 1 week
• Benchmarking with industry leading practices • Provide areas of enhancements from an independent advisor standpoint	• 2 weeks
• Present and discuss our views with management	• 3 days

During the course of the engagement, at any point of time, if the bank wants our services to help them conduct any of the additional areas of stress test or assist them in implementation of our suggestions on enhancements, we will be happy to provide this support to the bank

Our Offerings in stress testing

We have tools that could be deployed by banks to carry out stress test and analyze the results for decision making. We also harness our experience derived from multiple implementations across banks to develop scenarios specific to a bank's portfolio, whilst keeping in mind the quality of available data

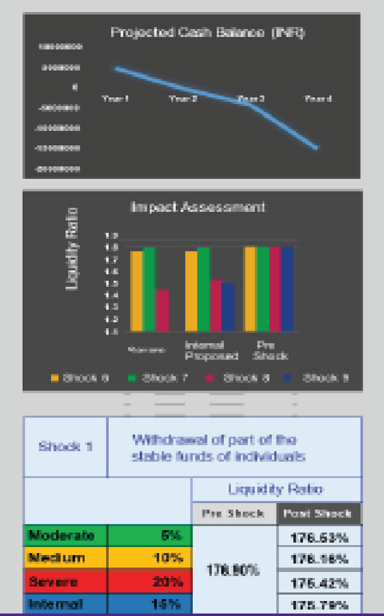
Tool



Key features include:

- Flexible interface to read the required shock factors as input.
- Adjustable format to input regulatory and hypothetical scenarios.
- Adaptability to portfolio
- specific risk characteristics.

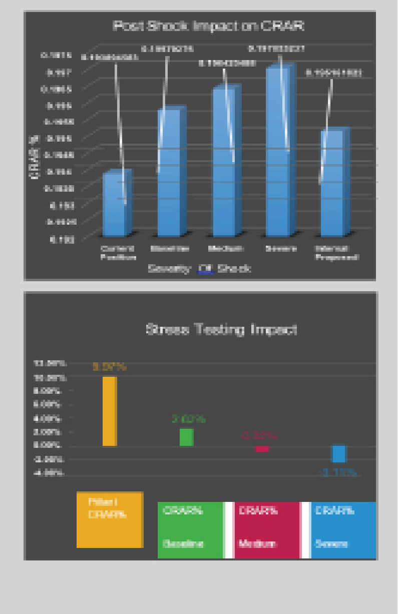
Output



Key features include:

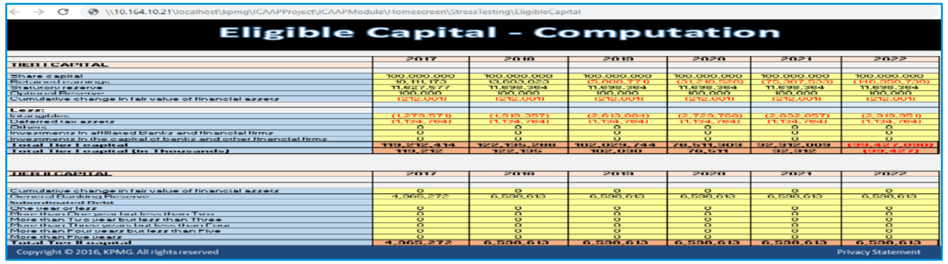
- Capability to comprehend impact on cash flows and requirement of immediate liquidity buffer; impact on the entity's balance sheet under stress etc.

Dashboard



Key features include:

- Intelligent dashboard to gauge the impact of stressed conditions.
- Graphical comparison of the impact on liquidity, capital adequacy, solvency and profitability.



Particulars	31-Dec-17	31-Dec-18	31-Dec-19	31-Dec-20	31-Dec-21	31-Dec-22
Income before tax	10,863,000	12,893,000	(14,661,794)	(20,901,758)	(39,397,004)	(66,901,205)
Tax	(4,500,000)	(4,700,000)	0	0	0	0
Income after tax	6,363,000	8,193,000	(14,661,794)	(20,901,758)	(39,397,004)	(66,901,205)
Statutory reserve	(1,665,036)	(1,298,364)	0	0	0	0
University and scientific fees	0	0	0	0	0	0
Banking Risk Reserve	(782,462)	(2,598,613)	0	0	0	0
	3,915,502	4,296,023	(14,661,794)	(20,901,758)	(39,397,004)	(66,901,205)
Board Remuneration	90,638	90,638	90,638	90,638	90,638	90,638
Research fees	0	0	0	0	0	0
Discount issue amortization	0	0	0	0	0	0
Distributable Income	3,915,502	4,296,023	(14,661,794)	(20,901,758)	(39,397,004)	(66,901,205)
Dividends	(7,000,000)	(7,500,000)	0	0	0	0
Net retained earnings	(3,084,498)	(3,203,977)	(14,661,794)	(20,901,758)	(39,397,004)	(66,901,205)

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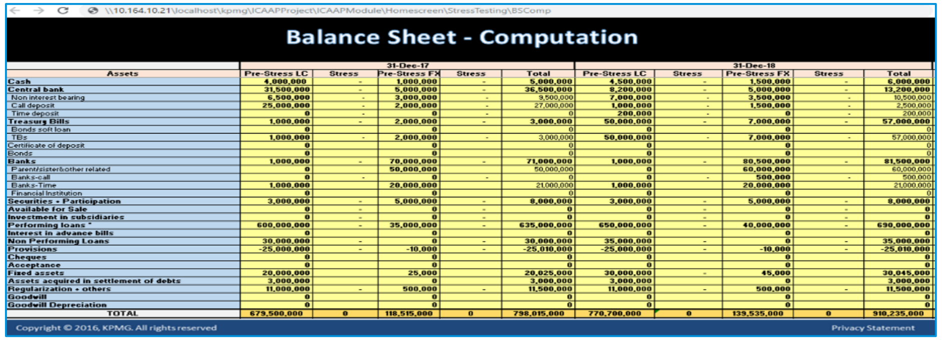
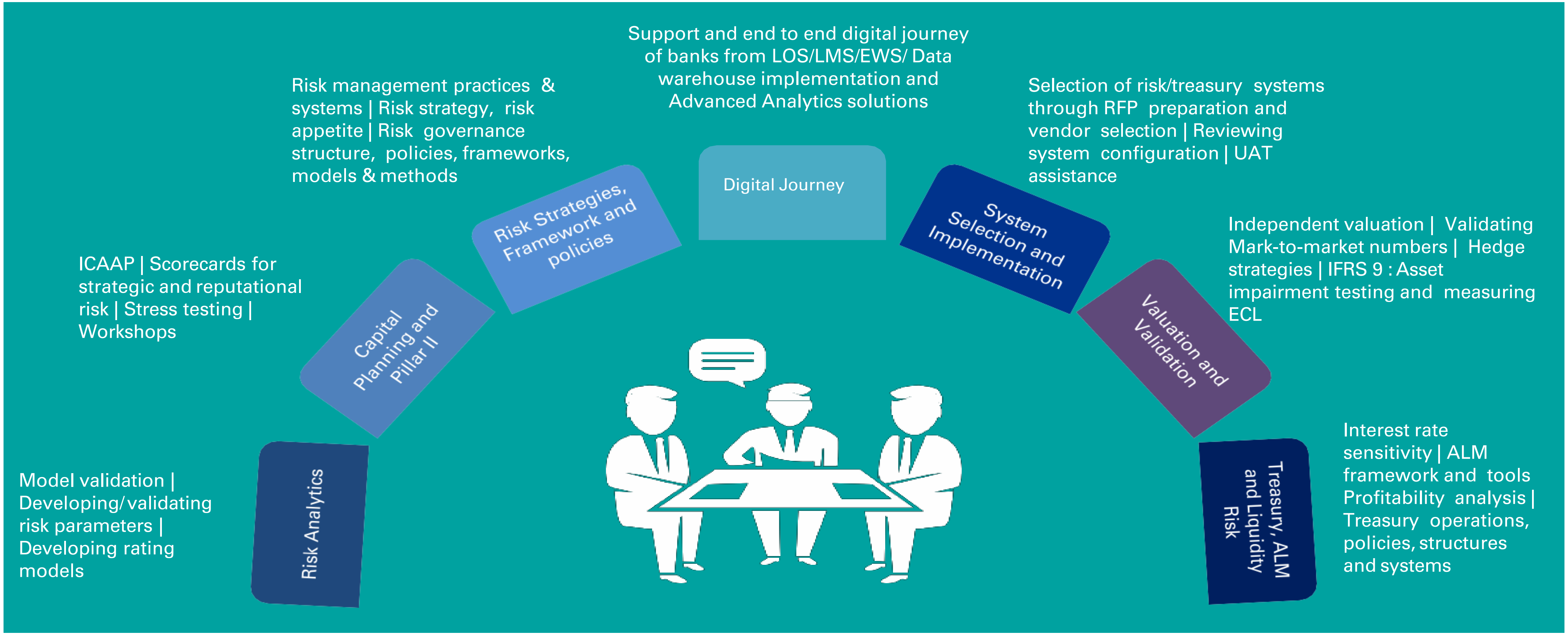


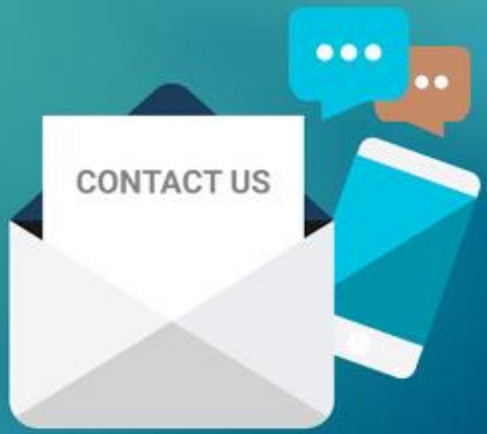
Our other range of services

Financial Risk Management (FRM) is an integral part of a global practice that offers a broad range of financial risk management services. We help banks, non-bank financial institutions, insurance companies, and corporate bodies to identify, assess, measure, manage and report various financial risks they face.



Contacts

For further information, please contact:



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Thank you