

East Africa Webinar Series: Stress Testing and ICAAP

November, 2020

Agenda

1. Introduction: Dr Habil Olaka, KBA

- Regulatory, Fiscal and Monetary Interventions to contain the impact of pandemic
- Banking industry support for the enterprises and households.
- The importance of credit risk capital for financial institutions.

2. Enterprise Stress Testing Framework

- Elements of a sound credit risk stress testing and capital adequacy assessment framework
- Recent regulatory guidance on ICAAP
- Target End State and Best practices

3. Leveraging Existing Tools and Technologies for Compliance and Management

- How to address practical challenges and leverage latest available technologies
- How to leverage regulatory compliance tools for the management of the business.

Speakers

- » Dr Habil Olaka, CEO, Kenya Bankers Association
- » Nash Subedar, Director, Moody's Analytics
- » Wasim Karim, Director, Moody's Analytics
- » Metin Epozdemir, CFA – Director, Moody's Analytics

1

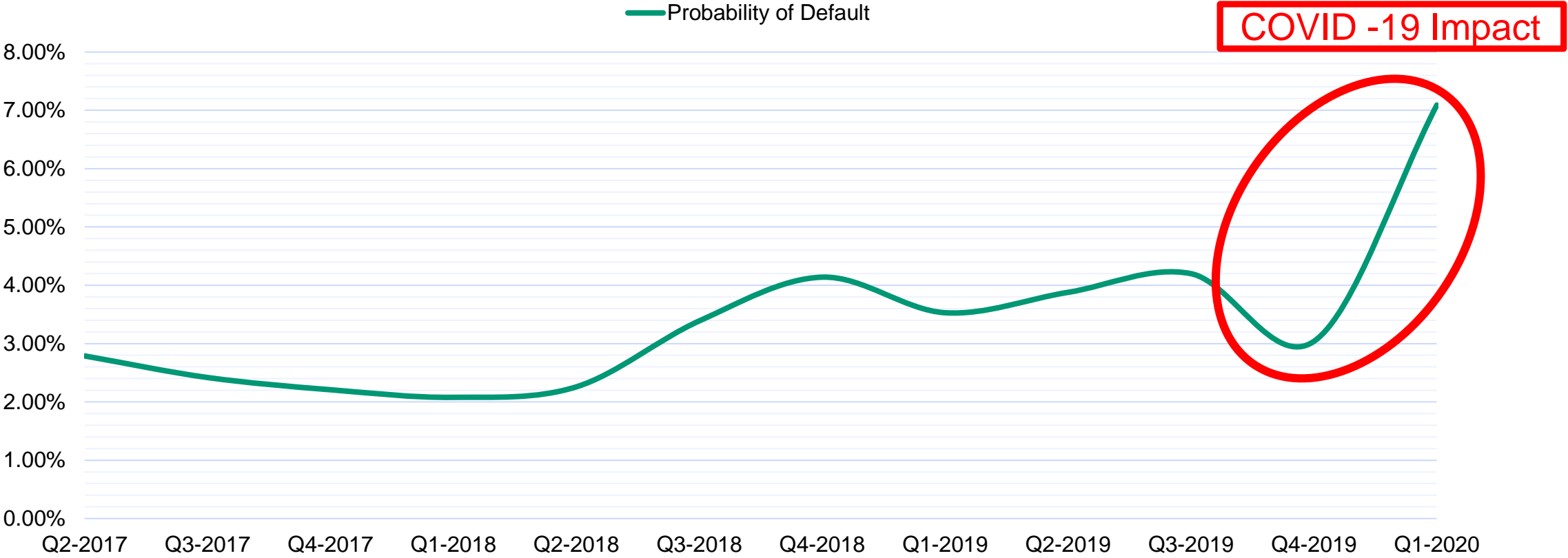
Introduction: Regulatory
and Banking Industry
Support During Pandemic

2

Enterprise Stress Testing
Framework

COVID-19 Impact on Credit Risk for Kenya

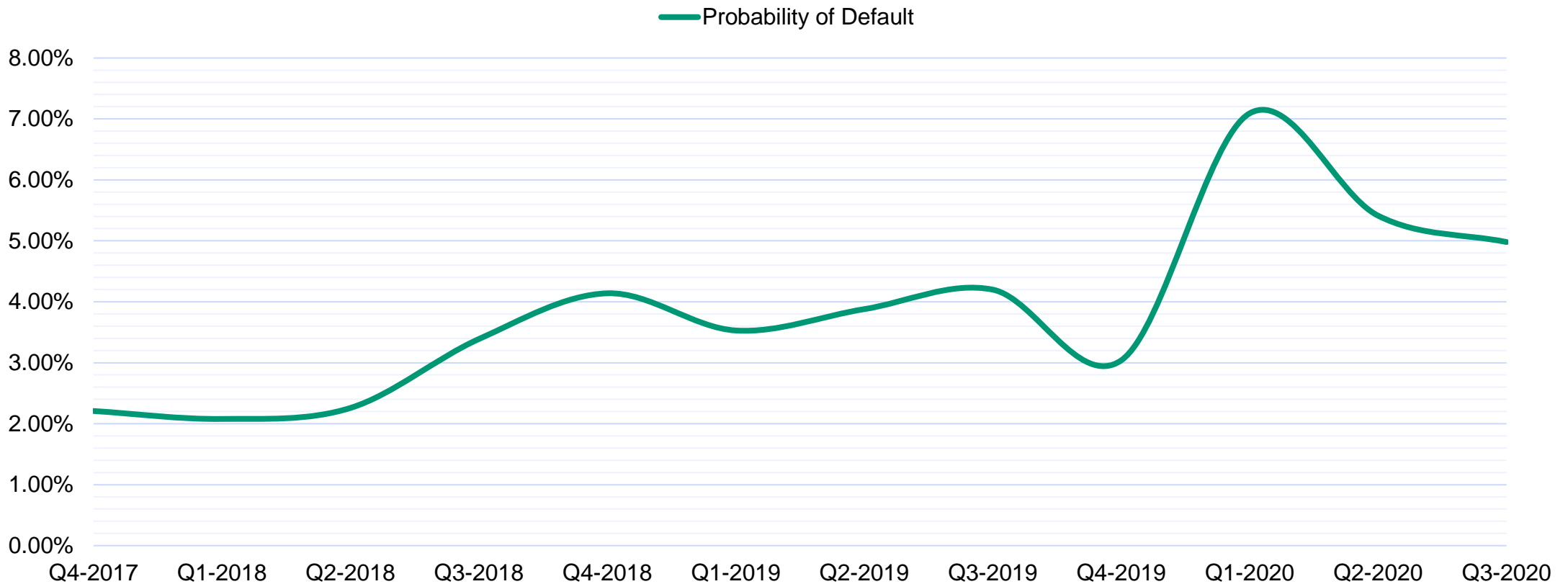
Average Probability of Default for Corporate (All Industries)



Source: Based on Moody's Analytics EDF™ Credit Measure and Point in Time Converter Model

Credit Risk Remains Elevated

Widespread Disruption Hurts Borrower Repayment Capacity.

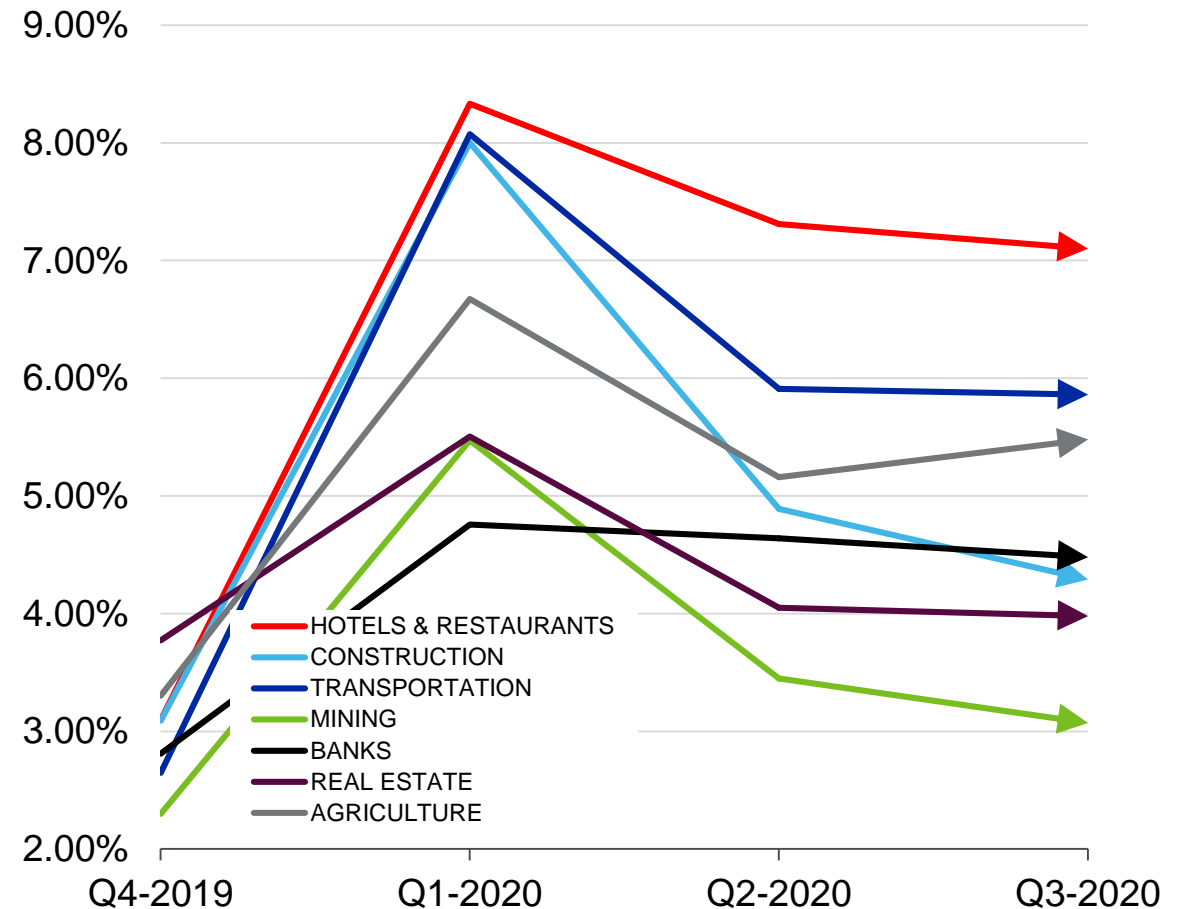


Source: Based on Moody's Analytics EDF™ Credit Measure and Point in Time Converter Model

Sectoral Differences in Credit Risk Exists

COVID -19 Impact on Significant Industries

- » Corporate sectors to which Banks are exposed (based on Moody's rated bank portfolios' sector analysis)
- » All Industries across the board has seen an increase in risk in Q1
- » Relative riskiness of the industry sectors has changed
- » During Q2 and Q3 Construction, Transportation, Real Estate has seen some improvement
- » **Banks, which had not increased as dramatic as some other sectors, have not seen much improvement since Q1.**
- » Implications for IFRS 9 Provisions of Banks



Source: Based on Moody's Analytics EDF™ Credit Measure and Point in Time Converter Model

Regulatory Guidance

KCB Guidance Note on Internal Capital Adequacy Assessment Process

GN o ICAAP
(Nov 2016)



Supervisory Review & Evaluation Process

Supervisory dialogue covering internal governance, organization of the institution's business and how it allocates capital against risk. Based on SREP, the Central Bank may require any bank to, among other things, take action to improve its capital and risk management processes if it is not satisfied with an institution's ICAAP.



Principal of Proportionality

Banks to determine the scope and detail of their ICAAP, the methodologies used, the type of stress tests conducted, the treatment of correlations among risk types and the structure of risk control systems based on the nature and complexities of business activities.



Stress Testing & Scenarios

Assess vulnerability to exceptional, but plausible, events. Stress-testing should form an integral part of the overall governance and risk management culture of a bank. Written policies and procedures to govern the ST programme. Document its operation.



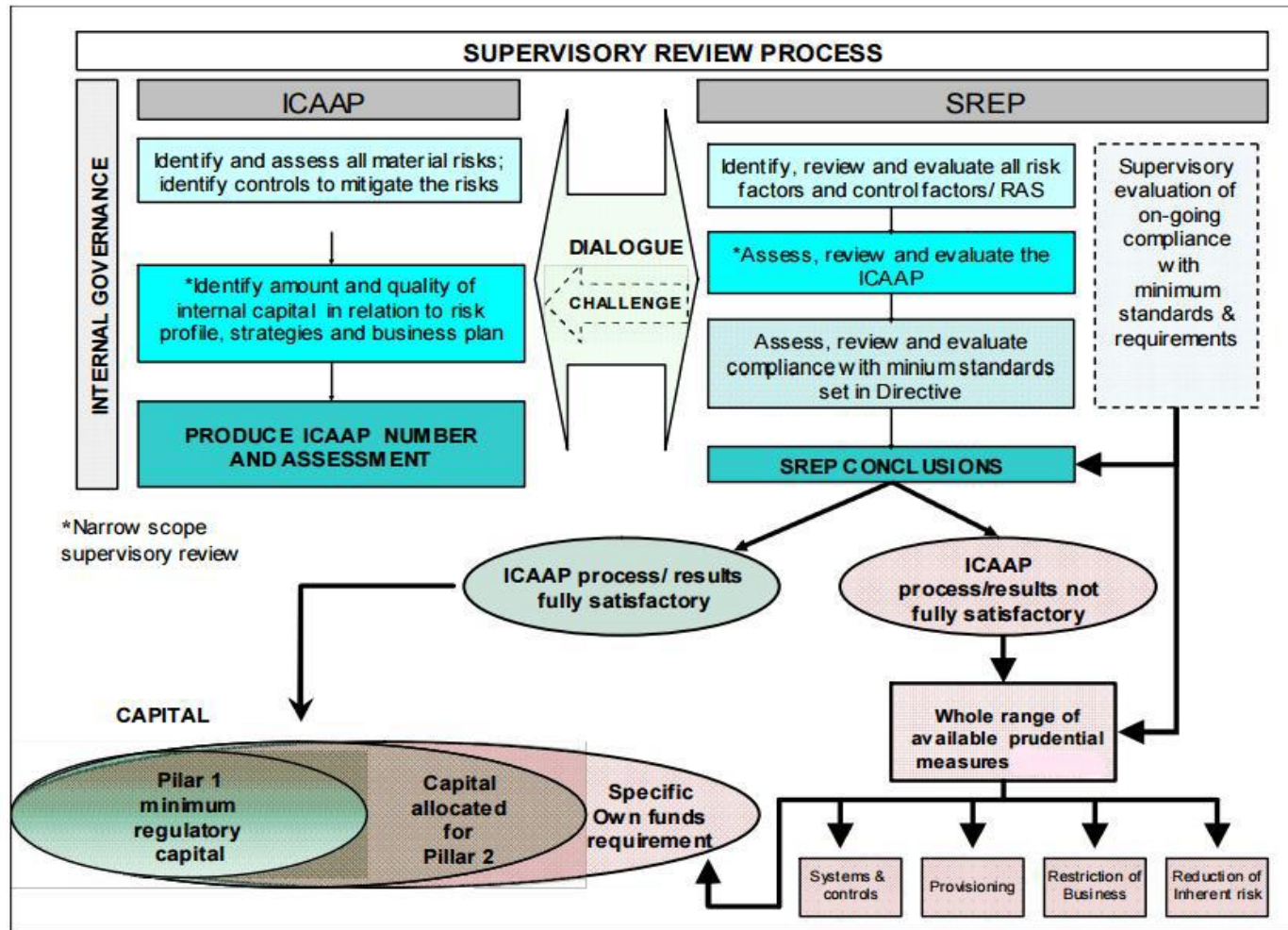
Robust Infrastructure and Reporting

Appropriate infrastructure and Management Information Systems. Third party inputs and tools are subject to initial and ongoing validation. CBK will engage institutions on the appropriateness of the ICAAP adopted vis-à-vis CBK's expectations. Outline of ICAAP report provided by KCB.

General ICAAP Rules

Guidance reflects on SREP aligned with best practice

- Formal and Documented
- Link to Strategy and Business Plan
- All Material Risks Covered



- Normal & Stressed Conditions
- Updated for Pandemic (Oct 2020)
- Regularly Validated

Global Stress Testing Framework

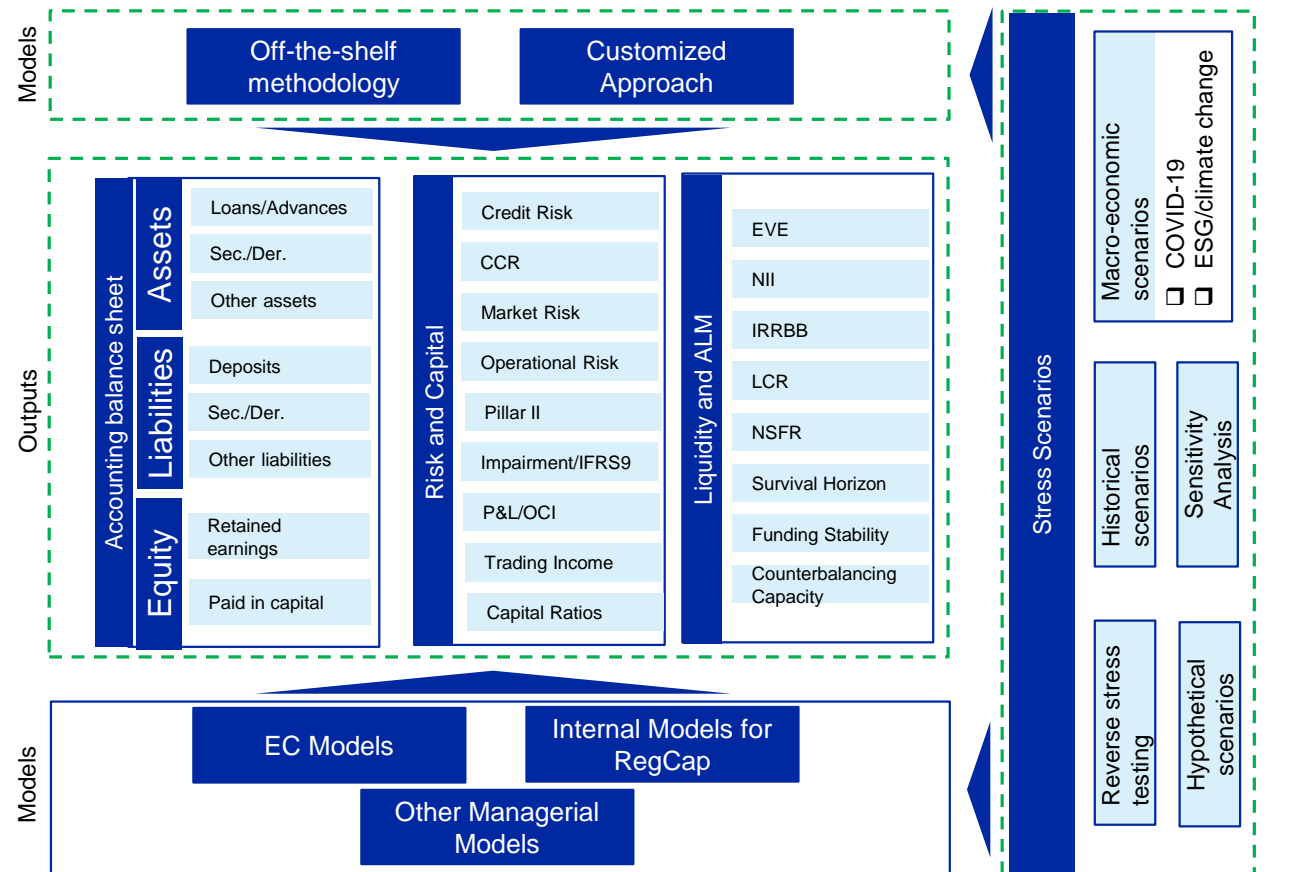


Objective

- ❑ Quick response to strategic decision
- ❑ Quick scenario analysis in crisis management/major macro-economic scenario changes (i.e. COVID-19)
- ❑ Facilitate risk dialogue among top management
- ❑ Based on general or systemic assumptions / scenarios and aggregate institution data

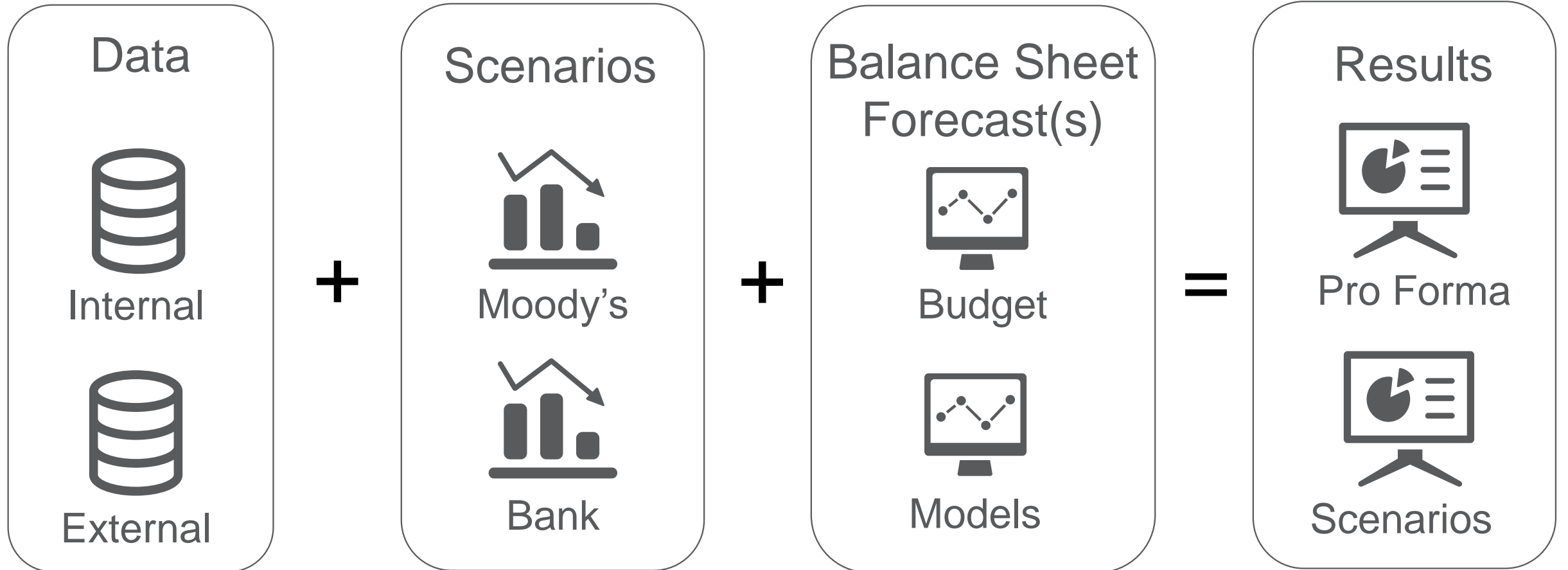
- ❑ Internal Risk-specific stress testing (i.e. Regulatory, ICAAP, ILAAP, IFRS9, RRP, etc...)
- ❑ Institution's own models, assumptions or scenarios
- ❑ Own data and high level of data granularity, possible use of external data and benchmarks
- ❑ Detailed results on the impact of exposure concentrations, linkages and contagion probabilities

Methodological approach

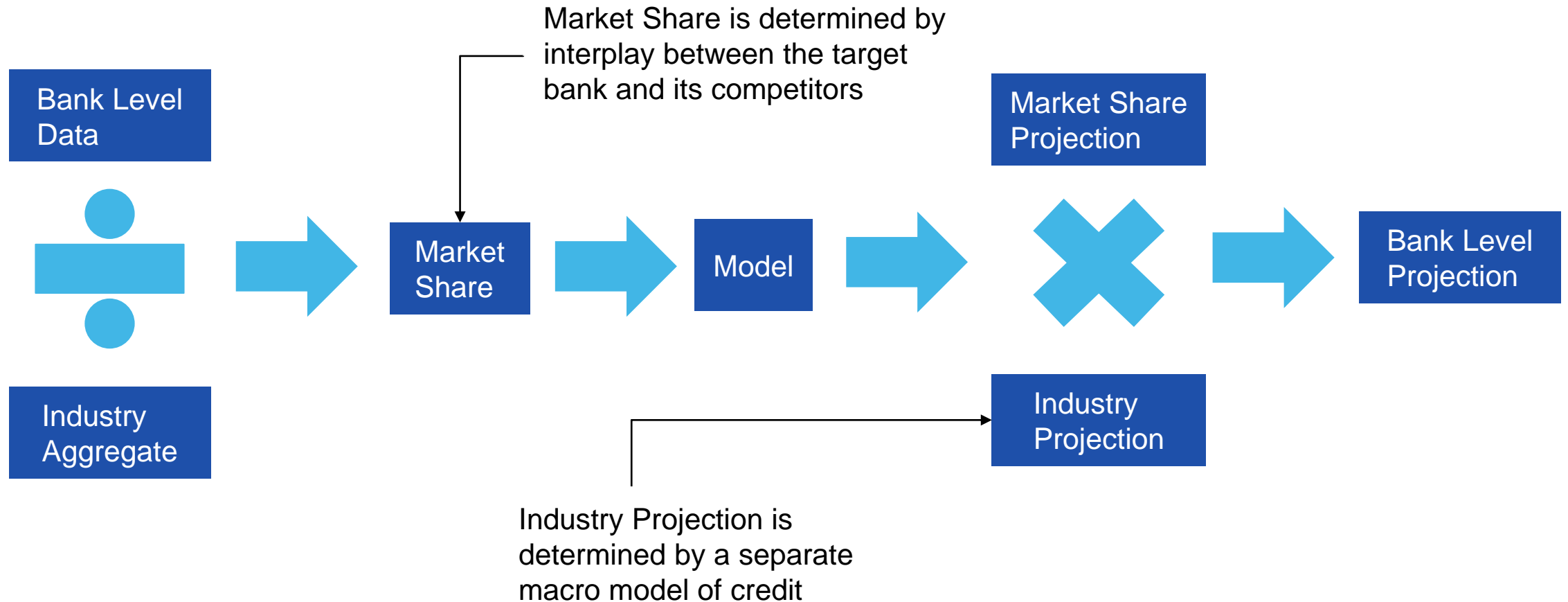


Simplified Process Overview

Stress Testing Data and Analytics

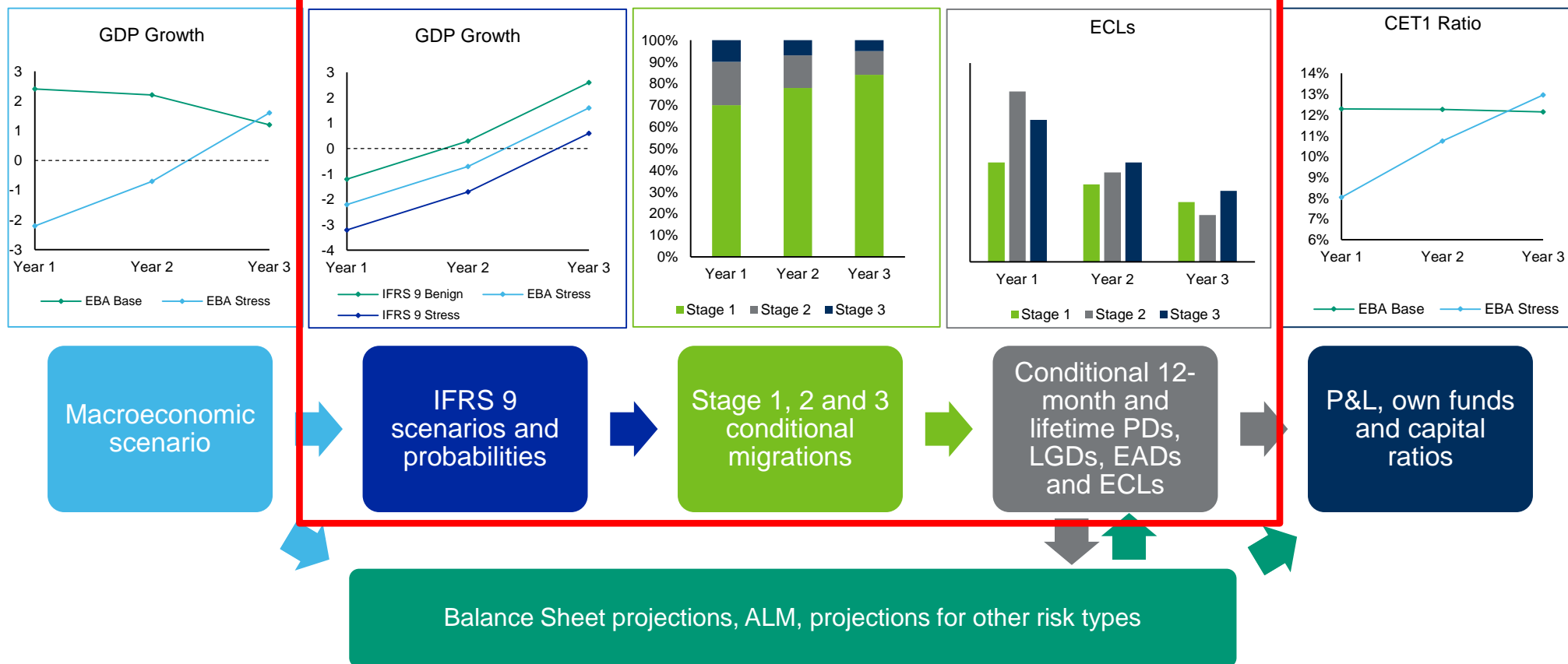


Example: Top Down Forecasting



Example: Bottom Up Stress Testing

Process under IFRS 9



Bottom Up Stress Testing Challenges

Forecasting Stage 2 Assets	<ul style="list-style-type: none"> Direct modelling of stage migrations Only possible if the bank can backfill staging Transition matrices Forecasting transition matrices for wholesale exposures and days past-due for retail exposures Lifetime PDs and qualitative criteria Computationally demanding to forecast lifetime PDs and difficult to forecast qualitative judgement
Scenario Design	<ul style="list-style-type: none"> Perfect foresight Best estimate complicates scenario generation and ECL calculations Number of IFRS 9 scenarios Single scenario reduces calculation time, multiple scenario capture better the non-linearities Horizon of scenario Assumptions post stress/planning scenario horizon



<ul style="list-style-type: none"> Aggregation Replicating the full IFRS 9 calculations at each point of the stress scenario very computationally intensive Approximation Simplified PD, LGD and EAD modelling or approximations might be needed Simplification Single scenario or perfect foresight bypassing the need for computationally demanding calculations 	Complexity
<ul style="list-style-type: none"> Static/new lending Replacing loans during the forecast horizon would increase the stock of stage 1 assets Capital Treatment Transitional vs fully loaded: The former treatment can help smooth out the effects of IFRS 9, but the market might focus on the latter 	Treatment of IFRS 9

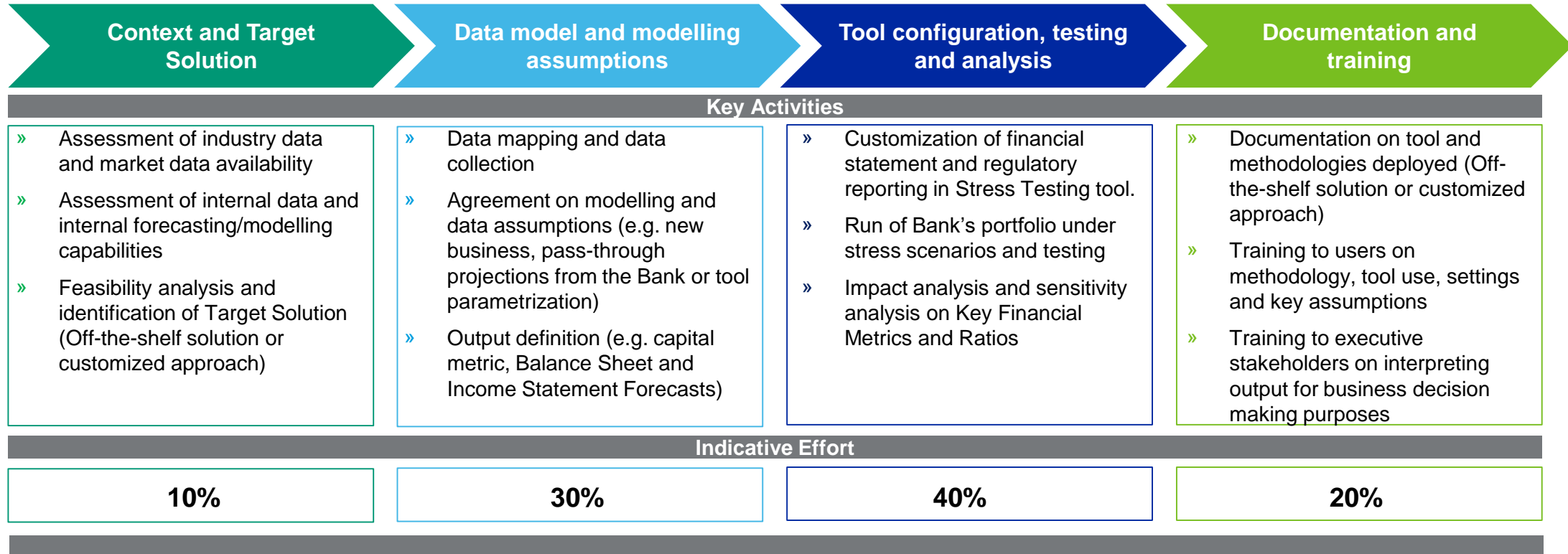
Building a Framework for the Future

The target end-state

	Weak Position	Strong Position	Strategic Advantage
Board & Senior Management Engagement	<ul style="list-style-type: none"> ○ Board does not fully understand the risks in ST ○ SM spends most of the time reconciling output ○ Inadequate challenge 	<ul style="list-style-type: none"> ○ Board understands ST results and periodically revalues exposures and risk tolerance ○ SM spends more time reviewing/challenge results 	<ul style="list-style-type: none"> ○ Board fully understands areas of vulnerability and regularly revalues risk/exposures ○ Board and SM provide the right amount of challenge
Process	<ul style="list-style-type: none"> ○ Silo-based process ○ Lack of automation ○ Inadequate resources ○ Results not easily auditable ○ ST driven by regulation 	<ul style="list-style-type: none"> ○ Some automation ○ Dedicated resources ○ Audit in place ○ ST driven by both regulation and business needs 	<ul style="list-style-type: none"> ○ Fully integrated income, balance sheet and RWA forecasting ○ ST inputs into business strategy ○ Process fully automated, easily repeatable and auditable
Infrastructure	<ul style="list-style-type: none"> ○ Significant data manipulation ○ Lack of common ST platform ○ Reliance on spreadsheets ○ No reconciliation between Risk & Finance 	<ul style="list-style-type: none"> ○ Infrastructure partially based on spreadsheets ○ Data reconciliation still a problem ○ Resource constraints make tight requests challenging 	<ul style="list-style-type: none"> ○ Common ST platform that integrates scenarios, Finance & Risk applications ○ Flexible functionality: multi-scenario & sensitivity analysis
Methodologies	<ul style="list-style-type: none"> ○ No common framework across PI and PII ○ Robust modelling only in Credit ○ Poor governance ○ Correlations not fully captured 	<ul style="list-style-type: none"> ○ Methodologies continue to evolve, NII still lags behind ○ Simple approach to modelling instead of integrated framework ○ Appropriate governance 	<ul style="list-style-type: none"> ○ Common framework and consistent methodologies under PI & PII ○ Robust modelling of all risk types ○ Input and full buy-in from the BU

“Journey is the Reward”

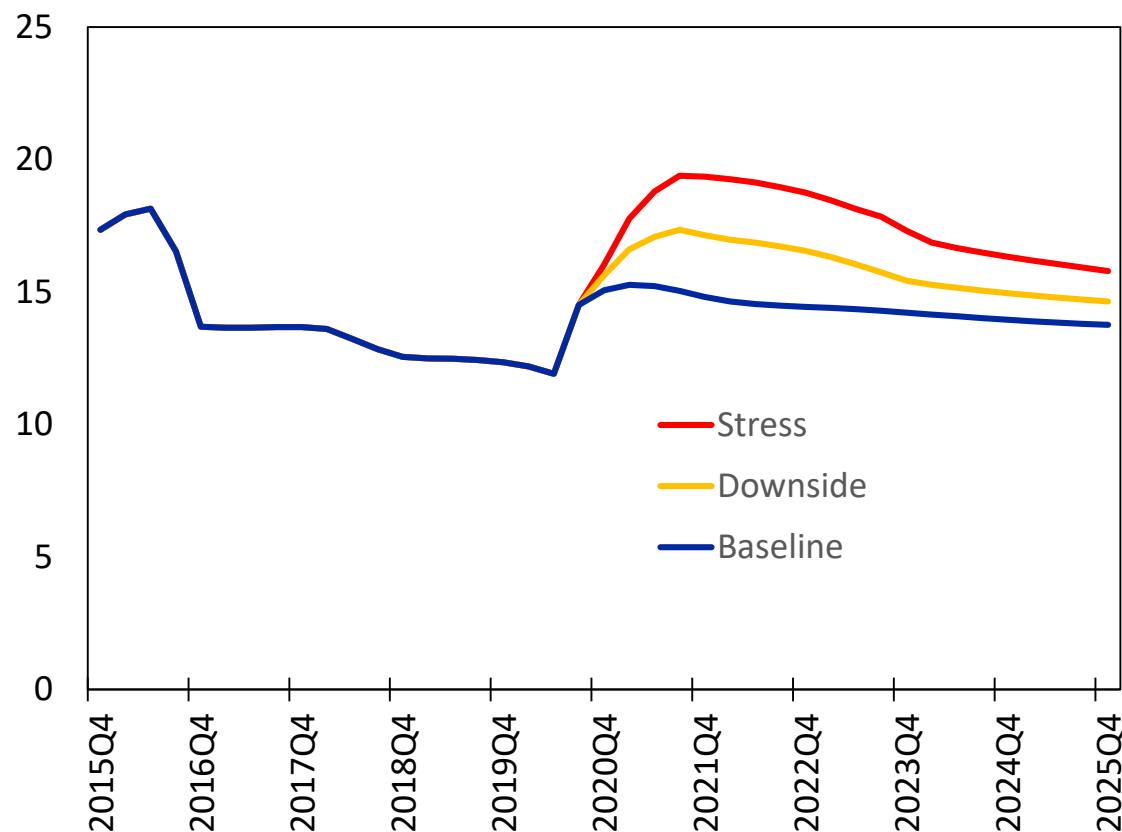
Planning a Tailored Approach for Bank’s Requirements



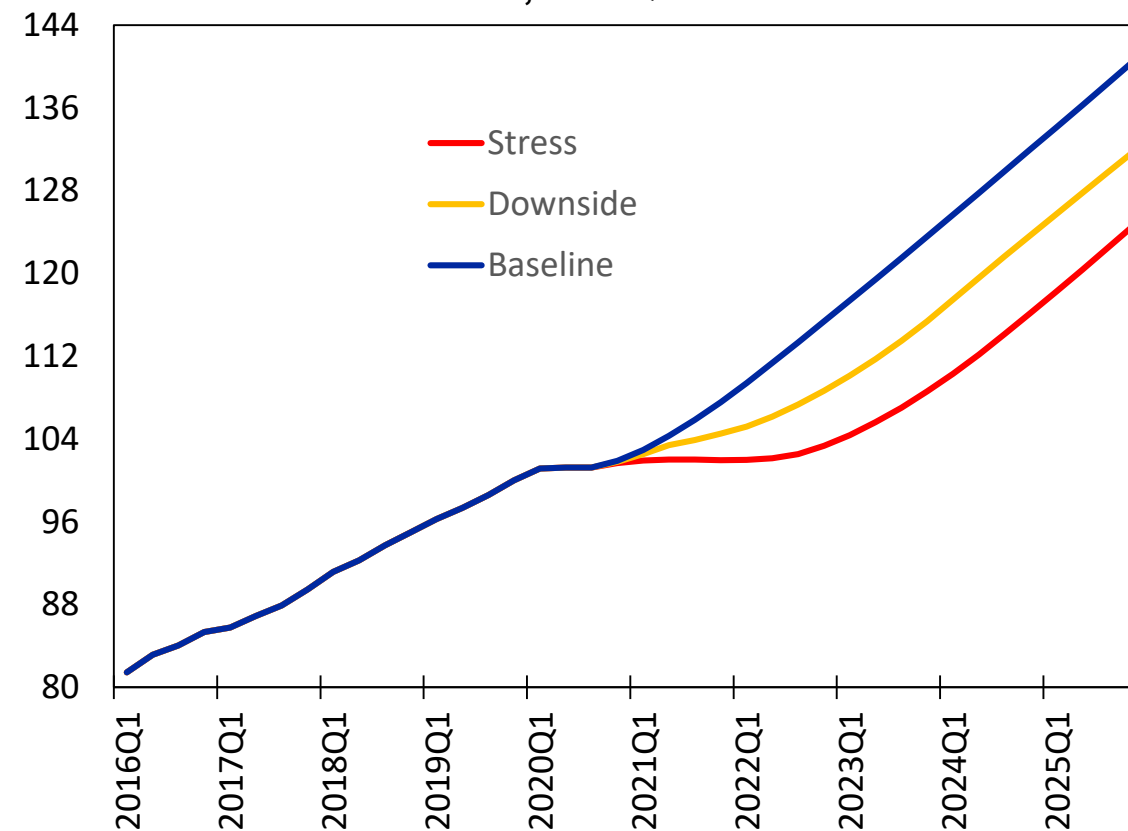
Economic Scenarios

Essential to Obtaining Forward-looking Views on Capital Adequacy

Commercial bank - Lending rate, (% , NSA)

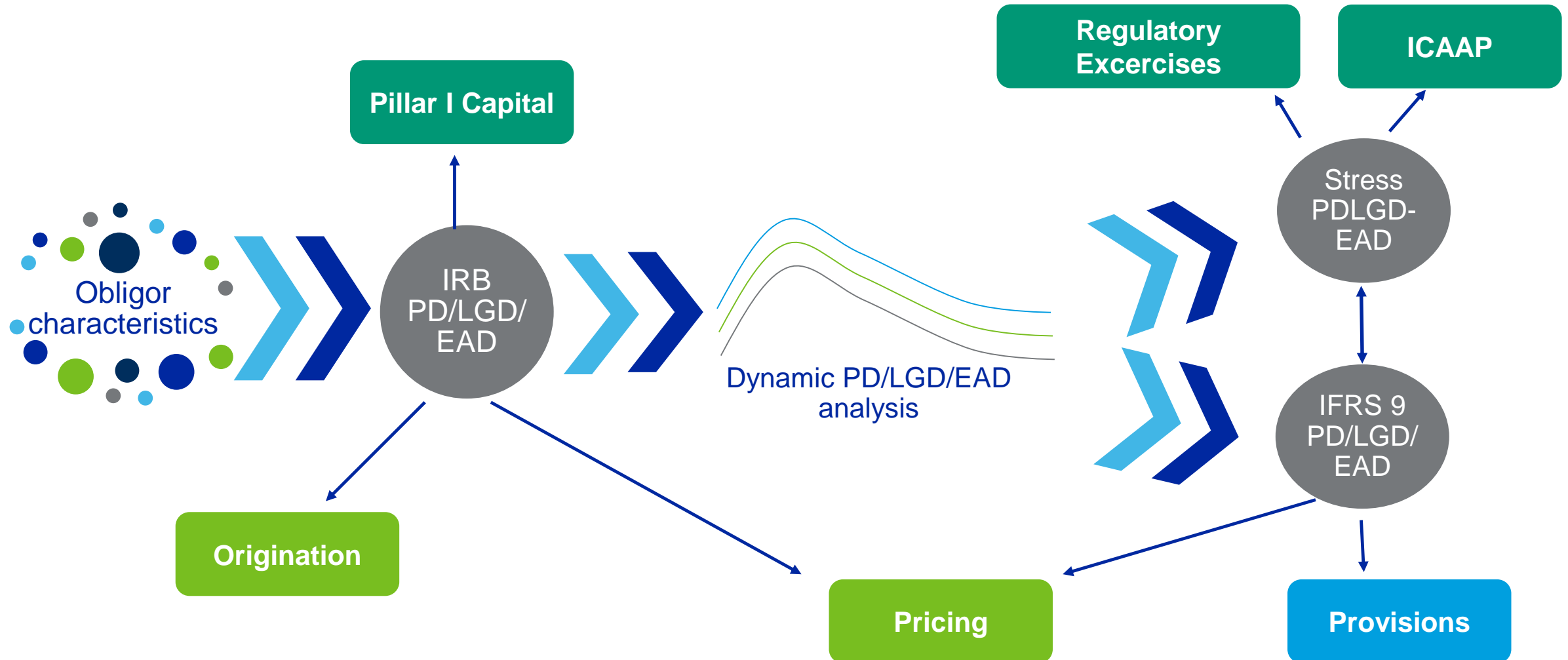


Real GDP, 2019Q4 = 100



Sources: Central Bank of Kenya, Kenya National Bureau of Statistics; United Nations Statistics Division (UNSD); The World Bank; Moody's Analytics Forecasted

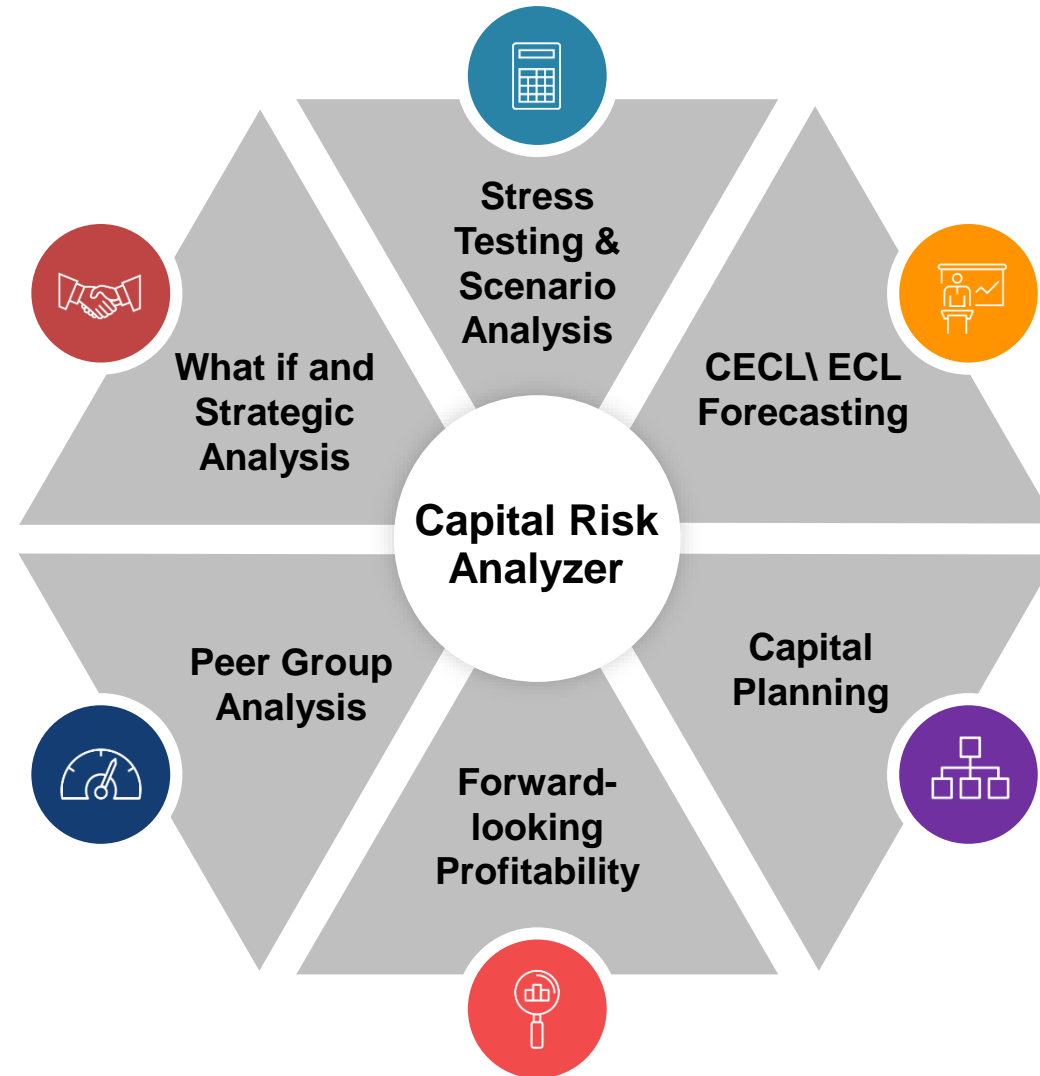
Leveraging Existing Models and Tools



4

Tools and Technologies for Compliance and Management

Strategic Capital Planning and Forecasting Tool



Awards

Credit stress-testing product of the year

Enterprise-wide stress-testing product of the year



Risk Technology Awards 2020

2020 WINNERS

White Paper

Stress Testing Under COVID-19

- » Published on the [MA website](#)
- » Published in the [American Banker](#)

Moody's ANALYTICS Insights Solutions Professional Development Events About

Stress Testing Under COVID-19

By Olivier Brucker, Sunayana Mehra, Ed Young

CORONAVIRUS

Stress testing is a challenging exercise as a regular process to assess a bank's level of risk or capital adequacy.

Banks need to build numerous models and try to separate bank-specific decisions from macroeconomic effects. Projecting the balance sheet and income statement under the most likely scenarios is certainly no easy task—and banks cannot rely solely on internal performance data.

When stress testing needs arise from an ad hoc situation such as the COVID-19 pandemic, the challenge is even more complex as the process lies outside of business as usual. Timelines are compressed and validated models might not be adapted for the specific stress.

In this paper, we discuss an approach that addresses those issues. We propose an alternative simple, coherent methodology that allows us to forecast and stress test the entire balance sheet and profit and loss statement for all of the roughly 6,000 banks in the United States consistently. This methodology can be used as a primary approach for banks without the means to produce such stress testing exercises, or as a challenger

DOWNLOAD

PRINT

AMERICAN BANKER POLICY & REGULATION TECH BANKTHINK EVENTS MORE LOGIN SUBSCRIBE

Stress Testing Under COVID-19

Explore a stress testing methodology banks can adopt to address challenges in the face of COVID-19

Article Stress Testing Under COVID-19

June 01, 2020, 3:02 a.m. EDT

PARTNER INSIGHTS SPONSOR CONTENT FROM

Moody's ANALYTICS

The events of the COVID-19 crisis will continue to affect the economy for many months to come. As a result, banks will struggle to make informed decisions in the face of unprecedented uncertainty. The first step toward planning in this environment is to produce credible and reliable projections of their balance sheet and income statement under a range of possible scenarios. The potential issues banks are facing include capital planning and stress testing, quantitative analytics, and response time.

Moody's Analytics presents a methodology and a solution that banks can easily adopt to address these issues. As a primary or challenger approach, the framework presented can help management augment existing planning infrastructure or develop a new process to make faster, better business decisions. Each new crisis often comes with unforeseen levels of stress to specific drivers of the economy and/or financial risks. The more tools finance and risk professionals have to formulate their decisions, the better positioned they are to address these events. The speed and robustness of this approach makes it an invaluable

Moody's ANALYTICS

Stress Testing Under COVID-19

Explore a stress testing methodology banks can adopt to address challenges in the face of COVID-19

TRENDING

CARES ACT

What happens to struggling homeowners when CARES Act relief ends?

Some lawmakers fear that when forbearance plans and enhanced unemployment coverage expire, the consequences for mortgage borrowers still affected by the pandemic will be severe.

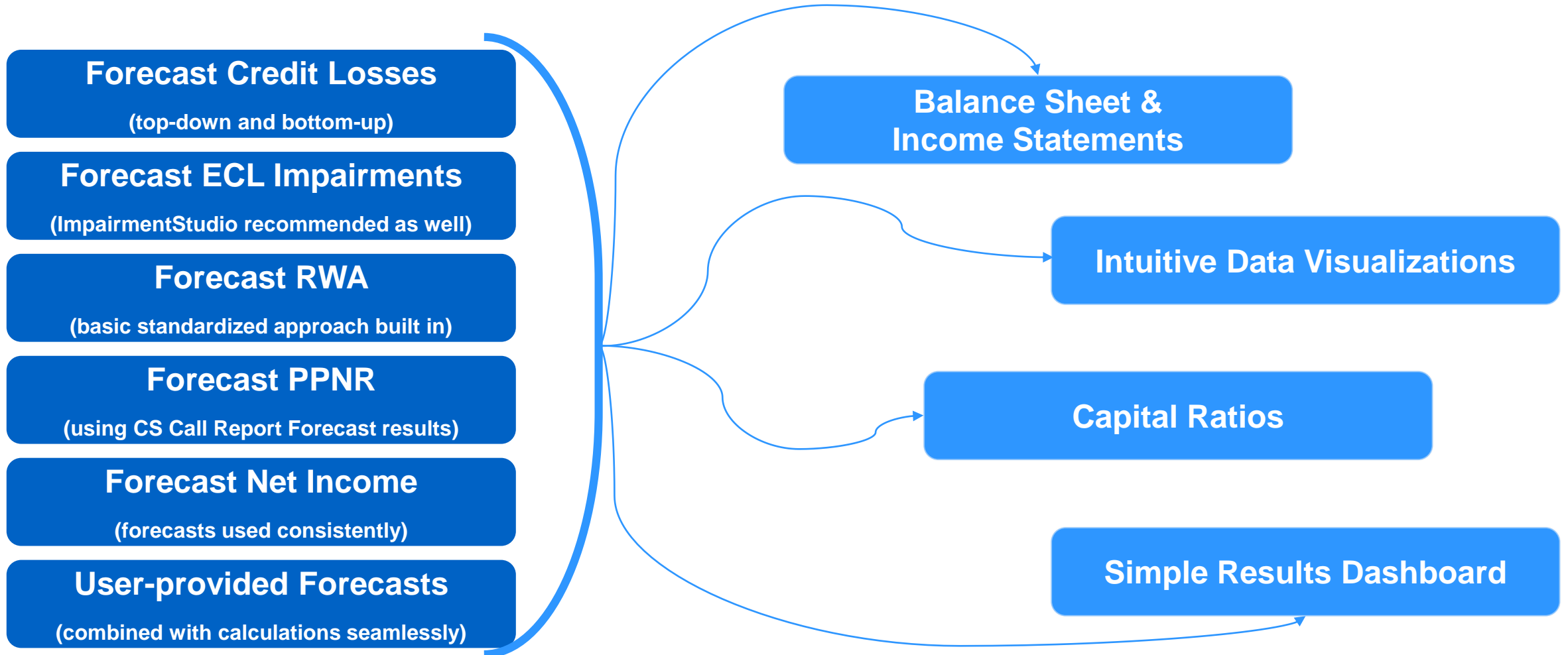
By Hannah Lang 6m ago

PAYCHECK PROTECTION PROGRAM

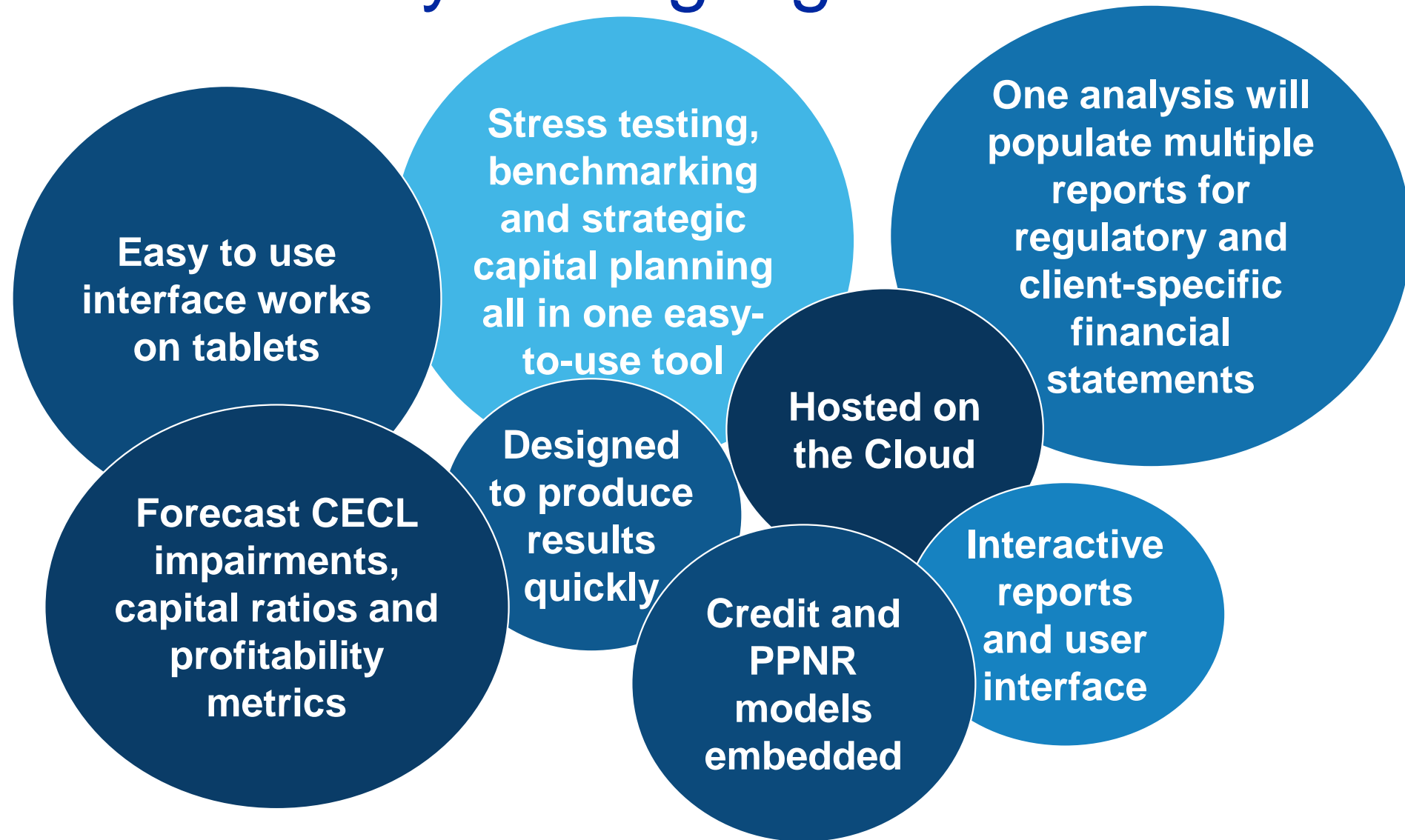
As PPP deadline approaches,

Our Solution: Capital Risk Analyzer (CRA)

Analytics are embedded to support critical management outputs



Capital Risk Analyzer Highlights





Stress testing is a significant undertaking



Requires data, analytics and technology infrastructure



...and upskilling specialist resources

© 2020 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S INVESTORS SERVICE, INC. AND ITS RATINGS AFFILIATES ("MIS") ARE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MOODY'S PUBLICATIONS MAY INCLUDE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT OR IMPAIRMENT. SEE MOODY'S RATING SYMBOLS AND DEFINITIONS PUBLICATION FOR INFORMATION ON THE TYPES OF CONTRACTUAL FINANCIAL OBLIGATIONS ADDRESSED BY MOODY'S RATINGS. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS AND MOODY'S OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. CREDIT RATINGS AND MOODY'S PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. NEITHER CREDIT RATINGS NOR MOODY'S PUBLICATIONS COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS AND PUBLISHES MOODY'S PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS OR MOODY'S PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT INTENDED FOR USE BY ANY PERSON AS A BENCHMARK AS THAT TERM IS DEFINED FOR REGULATORY PURPOSES AND MUST NOT BE USED IN ANY WAY THAT COULD RESULT IN THEM BEING CONSIDERED A BENCHMARK.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing the Moody's publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY CREDIT RATING OR OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt

securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any rating, agreed to pay to Moody's Investors Service, Inc. for ratings opinions and services rendered by it fees ranging from \$1,000 to approximately \$2,700,000. MCO and MIS also maintain policies and procedures to address the independence of MIS's ratings and rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold ratings from MIS and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moody.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."

Additional terms for Australia only: Any publication into Australia of this document is pursuant to the Australian Financial Services License of MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657AFSL 336969 and/or Moody's Analytics Australia Pty Ltd ABN 94 105 136 972 AFSL 383569 (as applicable). This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001. MOODY'S credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors.

Additional terms for Japan only: Moody's Japan K.K. ("MJKK") is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly-owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO. Moody's SF Japan K.K. ("MSFJ") is a wholly-owned credit rating agency subsidiary of MJKK. MSFJ is not a Nationally Recognized Statistical Rating Organization ("NRSRO"). Therefore, credit ratings assigned by MSFJ are Non-NRSRO Credit Ratings. Non-NRSRO Credit Ratings are assigned by an entity that is not a NRSRO and, consequently, the rated obligation will not qualify for certain types of treatment under U.S. laws. MJKK and MSFJ are credit rating agencies registered with the Japan Financial Services Agency and their registration numbers are FSA Commissioner (Ratings) No. 2 and 3 respectively.

MJKK or MSFJ (as applicable) hereby disclose that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MJKK or MSFJ (as applicable) have, prior to assignment of any rating, agreed to pay to MJKK or MSFJ (as applicable) for ratings opinions and services rendered by it fees ranging from JPY125,000 to approximately JPY250,000,000.

MJKK and MSFJ also maintain policies and procedures to address Japanese regulatory requirements.