

# Stress Tests

From stressful times to business as usual — an updated point of view

Informational presentation for our clients  
May 2009



## Point of view

### From stressful times to business as usual

Stress test results unveiled by the banking agencies\* have lifted much of the uncertainty clouding banks over the past year. The results have instilled greater confidence that banks would be able to continue their lending activities while weathering a severe economic recession, the associated disclosures have addressed concerns for increased transparency in the banking industry by consistently applying criteria across firms. This document summarizes PwC perspectives on the stress testing results, including the implications of these changes going forward. Key messages include:

1. Stress tests – at least temporarily – create higher capital targets for the largest US banks; open questions remain on how stress tests will impact the evolution of the regulatory capital framework
2. Stress tests introduce new explicit targets focused on composition / quality of capital
3. The immediate focus for all banks is to develop capital plans to raise common equity and/or support the repayment of TARP funds
4. Bank executives will begin to focus on assessing business model implications and the impact on returns on capital across asset classes and activities
5. Comprehensive stress tests will be integrated into "business as usual" processes for management and supervisors going forward
6. Finally, as an outcome of the stress tests, risk management oversight will be reinforced and further disclosures expected

\* Note: The Supervisory Capital Assessment Program (SCAP): Overview of Results, May 7, 2009 – Board of Governors of the Federal Reserve System

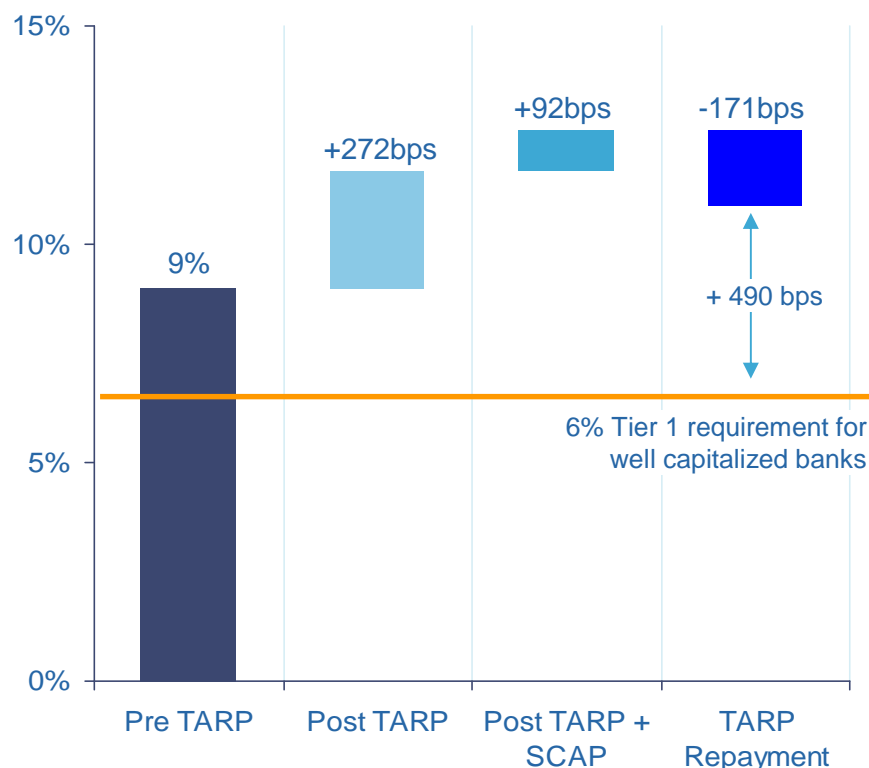
# 1. Stress tests – at least temporarily – create higher capital targets for the largest US banks; some open questions remain

As a result of the stress tests, banks are expected to hold higher capital buffers: Minimum Tier 1 risk-based capital ratio of 6% is the solvency requirement for well-capitalized banks preceding the stress tests. Under the stress tests, banks are expected to hold a minimum of 6% of Tier 1 after subtracting two-year worst case losses of their projected financials. This represents an effective capital increase from current levels of approximately 100bps, on average, assuming no TARP repayment (see graph). Although expected to be temporary, these increases in capital requirements have broader implications on the overall cost of doing business, impacting profitability prospects across the banking industry. Given that banks add strategic capital buffers to finance future growth and acquisitions – and to secure possible TARP capital repayment – banks will likely keep greater levels of capital in addition to the minimum thresholds proposed by the government. Open questions remain about the future capital adequacy framework:

- When will these additional capital targets be refined / lifted?
- Will the apparent pro-cyclical nature of the targeted capital buffers be eliminated under a new revised capital framework that is more counter-cyclical?
- Will there be higher targets for larger, more complex banks, or those with concentrated exposures/business models?
- How will Basel II, Pillar 2, and capital planning requirements relate to new stress test guidelines?
- Are the new stress test requirements applicable to other banks not included among the original 19 BHCs?
- Will there be any on CAMEL ratings post stress tests?

Current capital ratio as of 4Q 08 including TARP and SCAP considerations

Tier 1 Avg. for 19 Bank Holding Companies (BHCs)



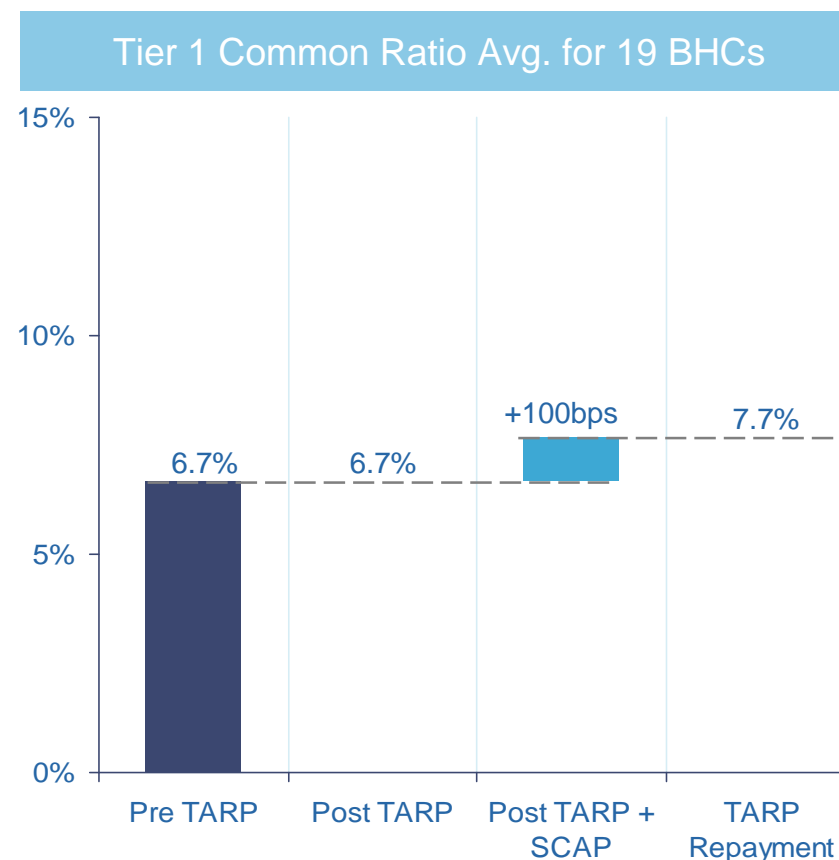
Note: TARP repayment calculated only for the institutions that do not need to raise additional capital as per government stress test

Source: SCAP and PwC Analysis

## 2. Stress tests introduce new explicit targets focused on composition / quality of capital

As anticipated, the stress tests introduce stricter expectations around the composition and quality of capital. Prior to the stress tests, there were certain component qualification and concentration limitations built into the definition of regulatory capital but no explicit requirements relating to tier 1 common equity. The US banking supervisors introduced a minimum level of Tier 1 common equity to risk-weighted assets of 4% after applying adverse scenario losses. In fact, most banks displayed pro-forma Tier 1 above 6% after applying stress tests, indicating that the vast majority of the required capital is raised to meet the new minimum Tier 1 common equity threshold. As a result, the relative attractiveness of preferred share instruments and other hybrid structures may be reduced as capital management tools turn greater attention to Tier 1 common equity levels going forward.

Current capital ratio as of 4Q 08 including TARP and SCAP considerations



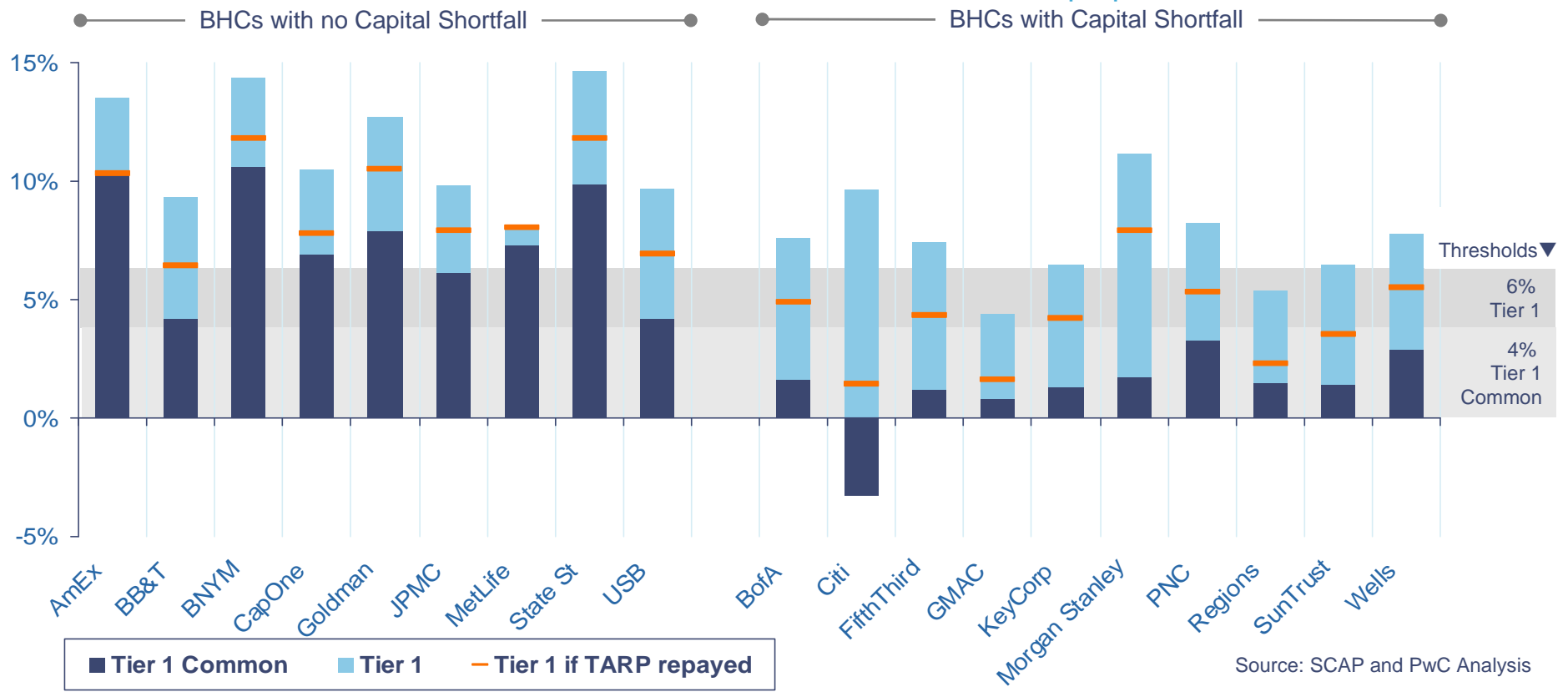
Note: TARP repayment calculated only for the institutions that do not need to raise additional capital as per government stress test

Source: SCAP and PwC Analysis

### 3. The immediate focus for all banks is to develop capital plans to raise common equity and/or support the repayment of TARP funds

As a result of the new capital quality expectations, banks requiring more capital will focus on generating new common equity through new issuance, business / asset sales, and potential conversion of preferred shares. Those banks with no identified capital shortfalls will focus on developing capital plans to facilitate discussions with regulators to repay TARP as soon as allowed. All banks that are not being asked to raise capital will meet the minimum of 6% Tier 1 pro-forma under an adverse scenario even after repaying all TARP capital (see below).

Pro-forma Tier 1 and Tier 1 common to RWA under adverse scenario vs. proposed thresholds

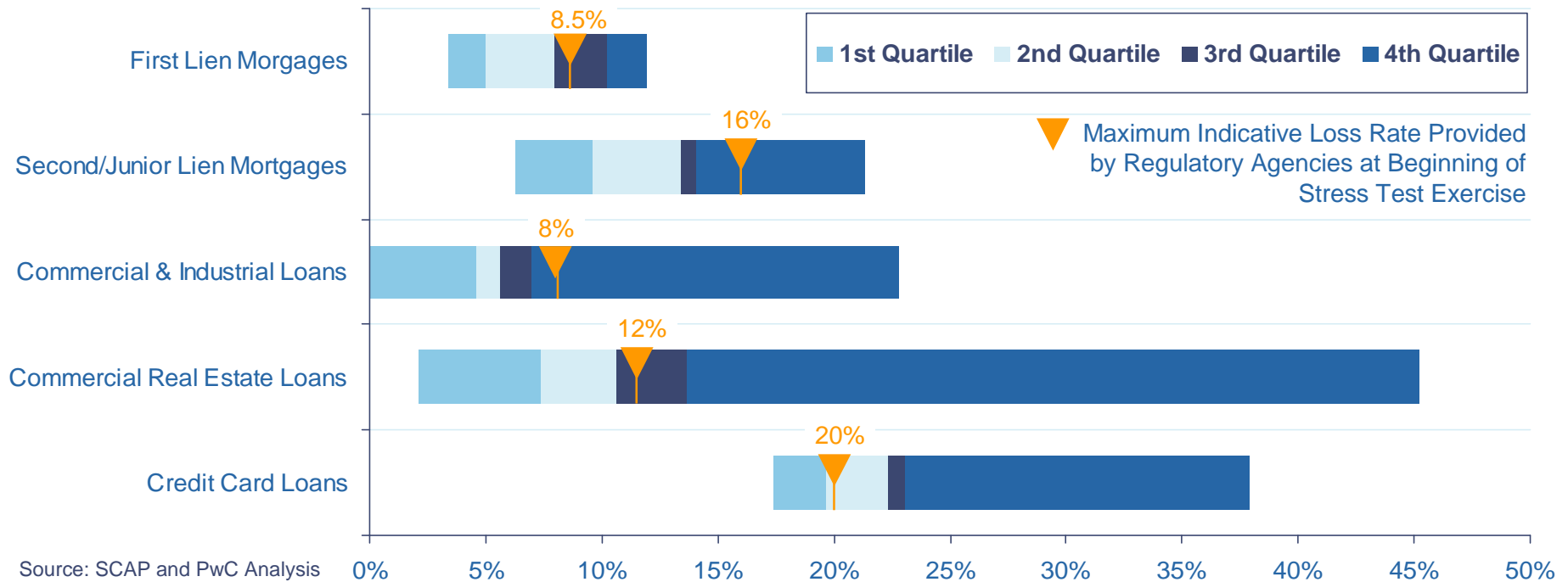


Source: SCAP and PwC Analysis

## 4. Bank executives will begin to focus on assessing business model implications and impact on returns on capital across asset classes and activities

In the medium term, management attention will quickly turn to evaluation of business model issues arising from declining returns on capital under the new restrictions. Questions remain as to whether stress test adjusted targeted capital levels and expectations for liquidity needs would allow banks to generate acceptable levels of profitability across all asset classes and activities. Opportunities to re-optimize business mix based on new capital targets and their impact on future performance and returns on capital will need to be considered. As evidenced by the size of future potential losses in some loan classes (see loss-rate distribution below), banks will be forced to consider: (1) carve outs / spin-offs of more stress capital intensive assets, portfolios or businesses, (2) re-pricing of lending risk and more differentiated pricing for more capital intensive customers / products / businesses, and (3) other restructuring options to optimize usage of capital.

Two-year loss rate distribution for 19 BHCs organized by quartile (adverse scenario)

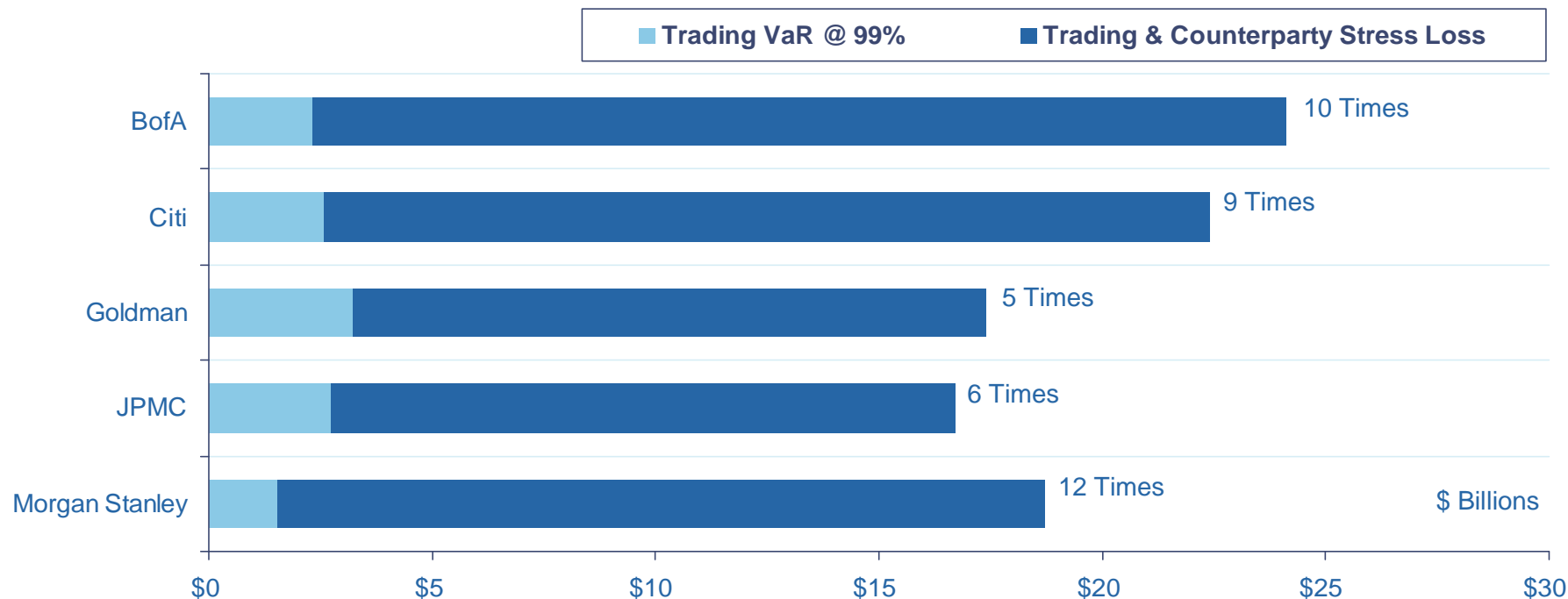


Source: SCAP and PwC Analysis

## 4. Bank executives will begin to focus on assessing business model implications and impact on returns on capital across asset classes and activities (cont.)

These business model considerations not only impact lending businesses, but also sales and trading activities. If the regulators and other stakeholders prompt management to consider such measures as a stress Value-at-Risk approach for capitalizing sales and trading businesses, capital requirements will be higher. Projected stress test losses for five selected BHCs with trading assets greater than \$100 billion represented, on average, nine times their 2-week Value-at-Risk, including regulatory capital multiplier of three (see below). As capital guidelines for sales and trading migrate from traditional VaR to stress VaR, implications on changing returns on capital and business mix should be evaluated.

### Analysis of trading VaR vs. stress loss for trading & counterparty



Note: Average 1 Q 2009 Trading VaR @ 99% confidence level adjusted for 10-day holding period and using a multiplier of 3. For Citi, Avg. 2008 Trading VaR is used.  
 Source: SCAP, Company Reports and PwC Analysis

## 5. Comprehensive stress tests will be integrated into "business-as-usual" processes for management and supervisors going forward

In addition, management stress tests will become more integral parts of business-as-usual activities, including business planning and forecasting, capital allocation, execution, and performance evaluation processes\*. Some institutions have struggled internally to capture the data and perform the analytics required to respond to their regulators in an organized and effective way. The process is complex, involving all business units, treasury, finance, and risk functions, and ultimately the CEO.

Developing sustainable stress testing capabilities and processes is essential going forward — stress testing and subsequent contingent capital and liquidity planning practices and qualification of new business activities will gain prevalence relative to other internal risk management techniques. New scenarios will need to be generated and calibrated over time to capture changing macroeconomic conditions and emerging risks. Alignment of stress testing with liquidity management will also be expected.

In addition, loss mitigation activities will continue to be at center stage, as those banks that acted quickly to mitigate losses have been able to create substantial benefits from their stress test results. This process is still in early stages in many consumer and commercial credit portfolios.

From a regulatory standpoint, the banking supervisors have elevated and formalized a more comprehensive, rigorous, forward-looking and collaborative process relative to prior supervision of capital adequacy and management practices\*\*. Some aspects of the stress test exercise will likely be incorporated into supervisory processes going forward.

\* See Appendix 1: PwC Strategic Capital Management Framework

\*\* See Appendix 2: Comparison of SCAP, Basel II and Economic Capital

## 6. Finally, as an outcome of the stress tests, risk management oversight will be reinforced and further disclosures expected

Risk management effectiveness needs to be certified by the executive management team and ultimately the Board. Supervisors expect that, as part of the capital planning process, firms will need to review both their existing management and the Board to assure the leadership of the firm has sufficient expertise and ability to manage the risks presented by the current economic environment. To meet this expectation – and to continuously improve the effectiveness of risk management – executive management teams will need to periodically assess their institution’s risk governance and oversight structures, culture and incentives, risk management and measurement processes, as well as resources and the supporting risk IT infrastructure. To be effective, this assessment should be conducted on a regular basis and independently of line management; it should be focused on identifying actionable improvement opportunities; and its results should be shared comprehensively with the board of directors for their review and consideration\*.

We expect banks to be transparent about stress test results and explain on an ongoing basis (i) their stress / scenario methodologies and any differences between their assumptions and those being used by the regulators, as well as (ii) the resulting capital management actions to investors.

\* See Appendix 3: PwC Risk Management Evaluation Framework)

## How PwC can help

### Assist in conducting stress testing

PricewaterhouseCoopers (PwC) can assist clients in conducting stress testing. We have developed a capital planning stress test model that follows a top-down risk modeling approach similar to the one used by the government. Using publicly available data to project losses across various balance sheet categories, the model enables the evaluation of capital requirements and strategic actions. Clients can use results to calibrate and validate their own internal estimates.

### Provide independent validation and benchmarking

We can review your stress testing process, model soundness, input and assumptions, data quality and infrastructure and produce an independent validation report. Based on portfolio data (exposure and loss performance) provided by client by portfolio or asset class, PwC can recalculate stress test results based on our own internal stress test modeling techniques and assess potential discrepancies.

Based on stress test results provided PwC can benchmark approaches and assumptions used by peers and compare stress test results across portfolios and asset classes. PwC can provide also provide insight into market practices and regulatory expectations related to stress testing practices including scope, methodology, process, management applications

### Stress Testing Framework and Process Enhancements

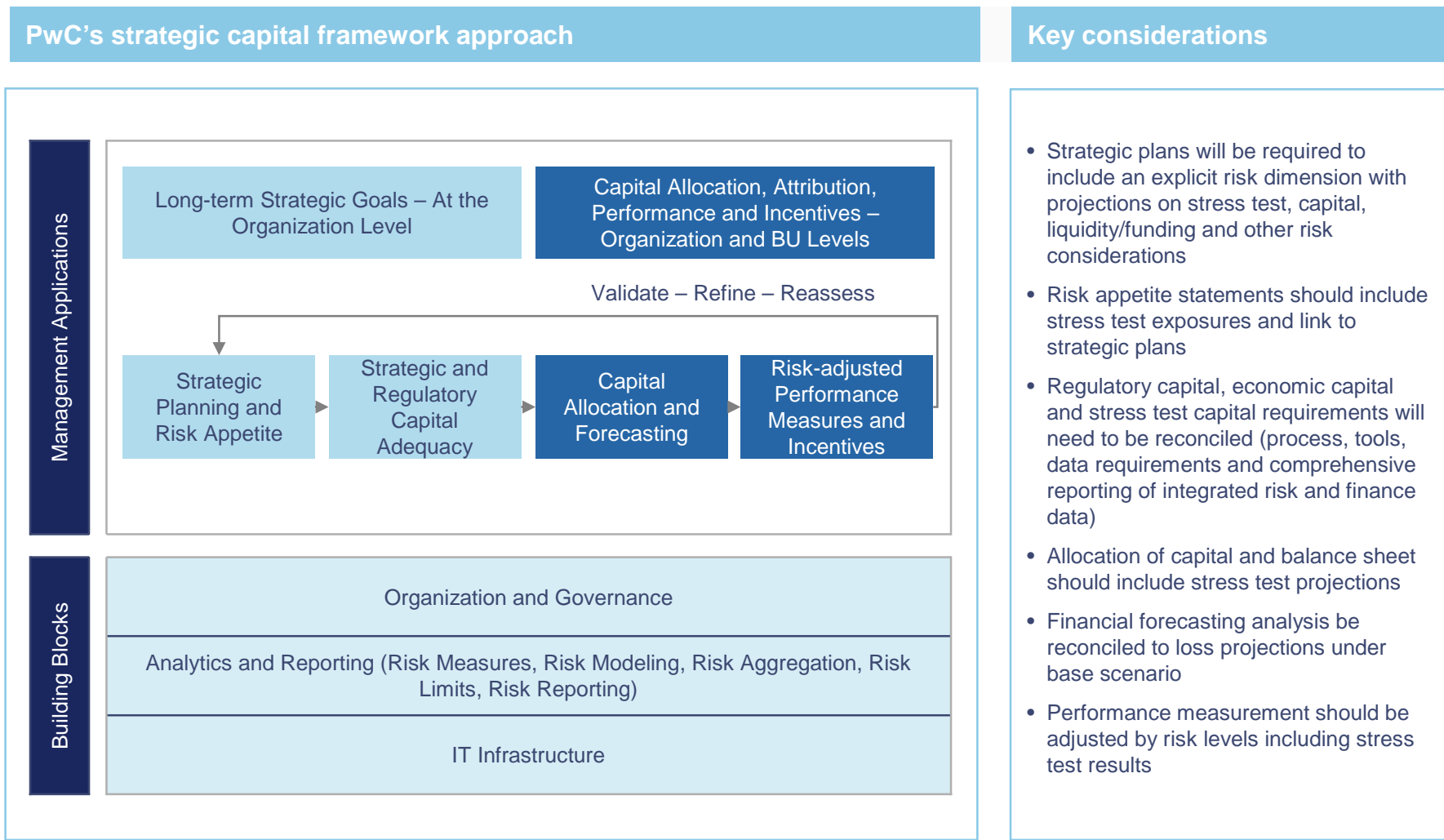
PwC can assist in the assessment or implementation of enhancements around the company's overall stress testing framework, process and approach including aspects such as: scenario design, scope of application, modeling techniques, financial projections and forecasting, capital planning and management actions, linkage to risk appetite setting and performance management, compliance with Basel II and other regulatory expectations, disclosures supporting systems and data infrastructure

## How PwC can help

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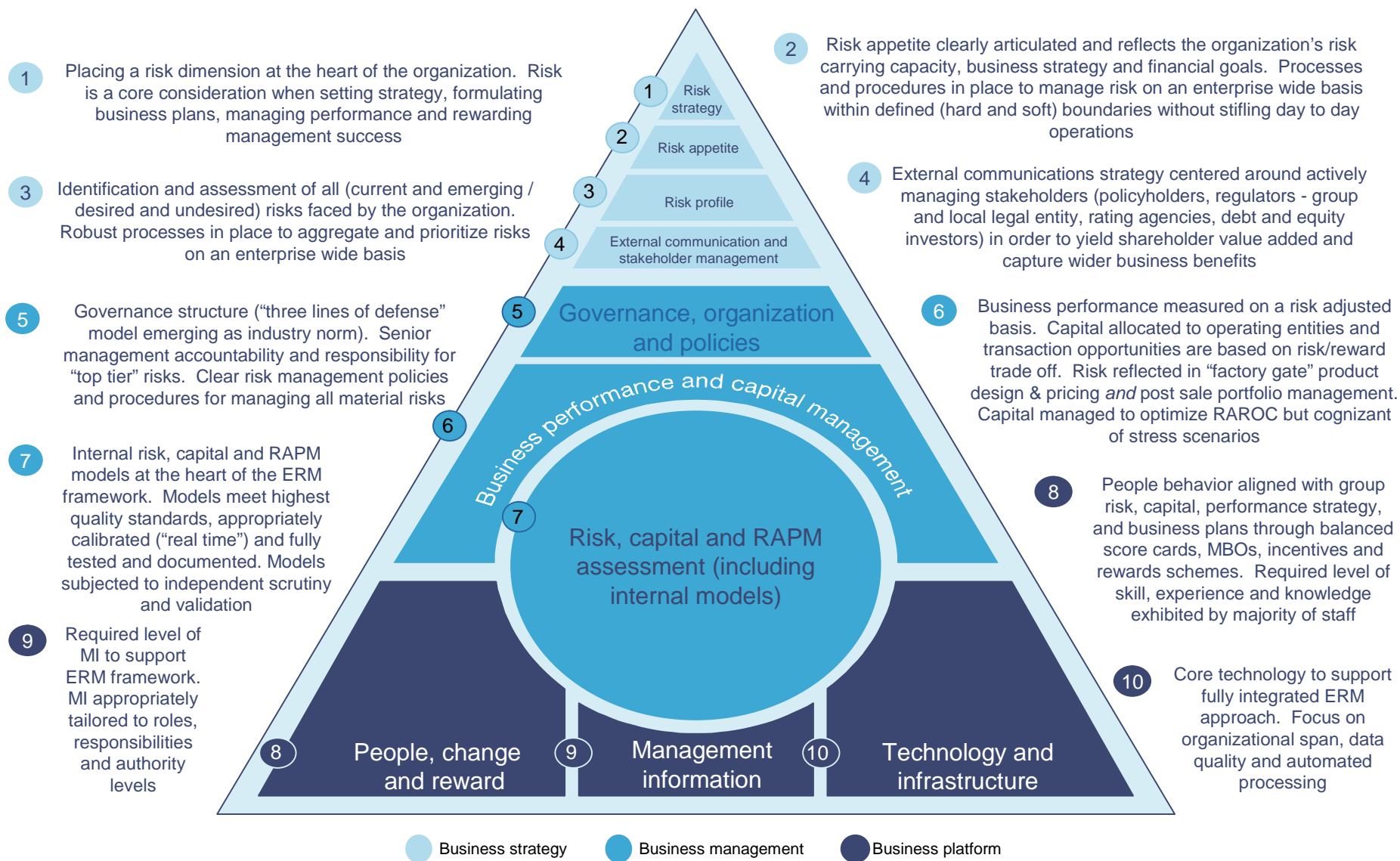
# Appendix 1: PwC Strategic Capital Management Framework



## Appendix 2: Comparison of SCAP, Basel II and Economic Capital

	Supervisory Capital Assessment Program (SCAP)	Basel II	Economic Capital (EC)
<b>Approach</b>	Forward looking assessment of capital based on impact of an adverse macro-economic scenario. The SCAP takes into account earnings (as a buffer), balance sheet projections and capital actions	Pillar I (minimum) is a point in time assessment of capital based on current exposures and internal risk models and calculation guidelines provided by the regulators. Pillar II (ICAAP) provides some flexibility including forward looking analysis of earnings as a buffer and potential mitigating actions	A point in time assessment of capital based on current exposures and internal risk models that use historical loss data. It does not include a dynamic view of earnings and balance sheet
<b>Nature of requirement</b>	Regulatory	Regulatory management tool under ICAAP	Management tool
<b>Time Horizon</b>	2 years (2009 and 2010)	One year	Typically one year
<b>Target rating</b>	No credit rating is targeted	Implied A rating	Typically, implied AA
<b>Type of risk</b>	Focused on credit and market risks	Pillar 1 includes credit, market and operational risks. Pillar 2 considers other risks such as liquidity, strategic, regulatory, etc.	Typically, considers market, credit and operational risks but all other risks are supported by the methodology
<b>Correlation</b>	Not considered	Pillar 1 minimum capital is calibrated for a well diversified firm. Inter-risk diversification is not allowed.	Intra-risk and inter-risk correlations are considered resulting in diversification benefits (i.e., less capital is needed)
<b>Quality of the capital</b>	Key component of the regulation	Not addressed	Can consider quality of capital (e.g., common equity versus preferred stock)
<b>Uses</b>	Assess sufficiency of capital under plausible adverse macro-economic conditions	Regulatory requirement	<ul style="list-style-type: none"> <li>▪ Assess sufficiency of capital</li> <li>▪ Capital allocation and pricing decisions</li> <li>▪ Risk-based limit framework</li> <li>▪ Risk-adjusted compensation</li> </ul>
<b>Comparison across firms</b>	Direct comparison is possible	Direct comparison should be possible although use of internal models can result in discrepancies	Direct comparison is contingent on consistency of approaches across firms
<b>Frequency of calculations</b>	One time exercise	Official numbers are released on a quarterly basis	Availability of information depends on management needs

# Appendix 3: PwC Risk Management Evaluation Framework



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