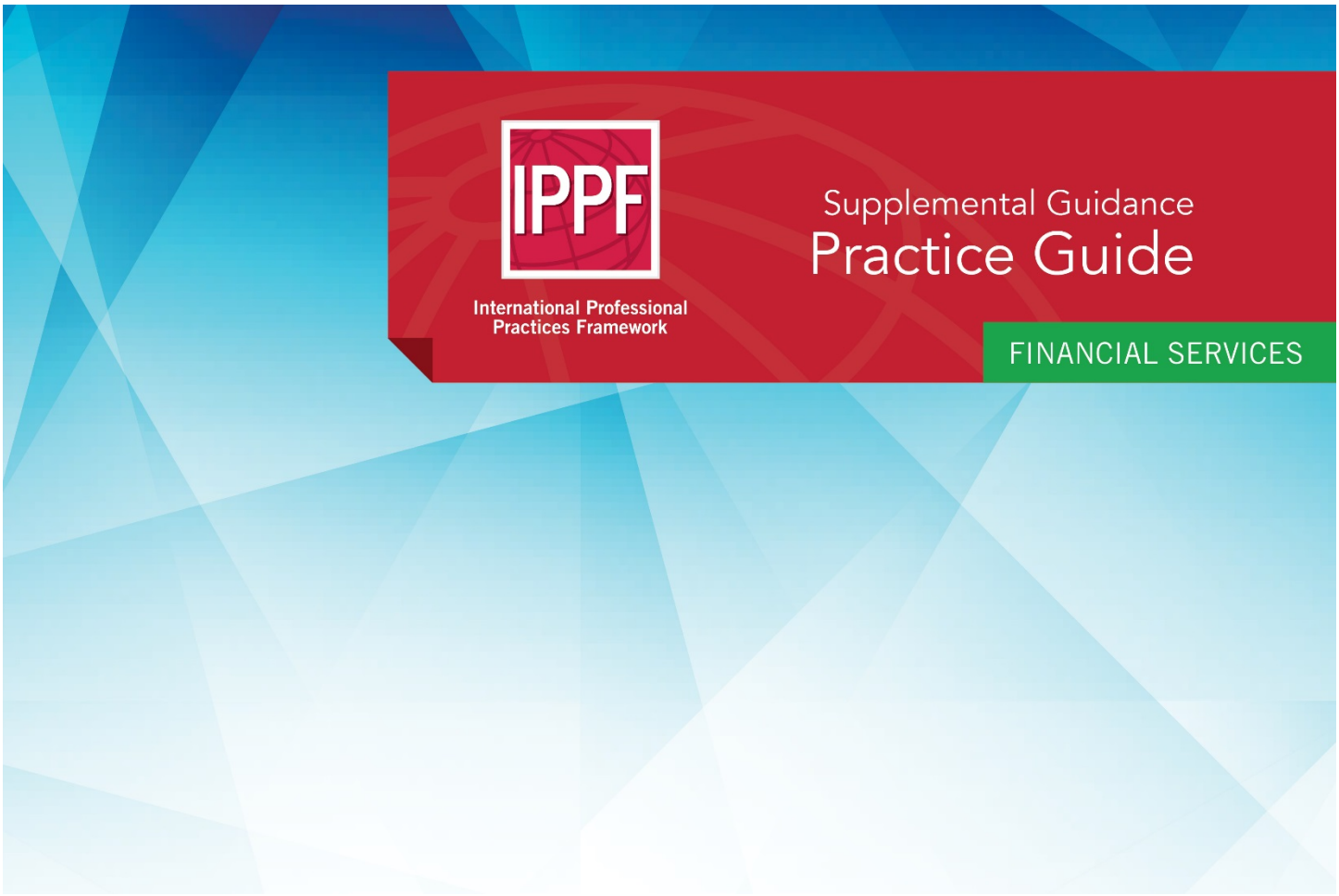


Auditing Capital Adequacy and Stress Testing for Banks

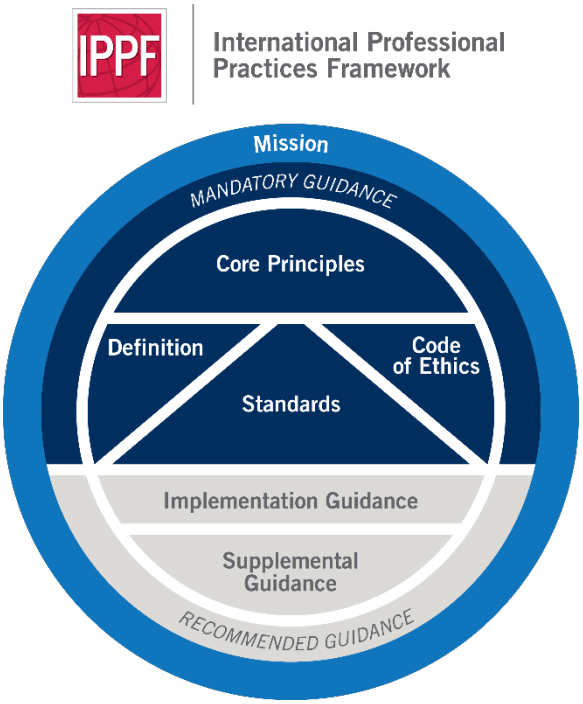
The Institute of Internal Auditors | Global

About the IPPF

The International Professional Practices Framework® (IPPF®) is the conceptual framework that organizes authoritative guidance promulgated by The IIA. A trustworthy, global, guidance-setting body, The IIA provides internal audit professionals worldwide with authoritative guidance organized in the IPPF as Mandatory Guidance and Recommended Guidance.

Mandatory Guidance is developed following an established due diligence process, which includes a period of public exposure for stakeholder input. The mandatory elements of the IPPF are:

- Core Principles for the Professional Practice of Internal Auditing.
- Definition of Internal Auditing.
- Code of Ethics.
- *International Standards for the Professional Practice of Internal Auditing*.



About Supplemental Guidance

Supplemental Guidance is part of the IPPF and provides additional recommended, nonmandatory guidance for conducting internal audit activities. While supporting the *Standards*, Supplemental Guidance is intended to address topical areas, as well as sector-specific issues, in greater procedural detail than the *Standards* or Implementation Guides. Supplemental Guidance is endorsed by The IIA through formal review and approval processes.

Practice Guides

Practice Guides are a type of Supplemental Guidance that provide detailed step-by-step approaches, featuring processes, procedures, tools, and programs, as well as examples of deliverables.

Practice Guides are intended to support internal auditors. Practice Guides are also available to support:

- Financial Services.
- Public Sector.
- Information Technology (GTAG®).

For an overview of authoritative guidance materials provided by The IIA, please visit www.globaliia.org/standards-guidance.

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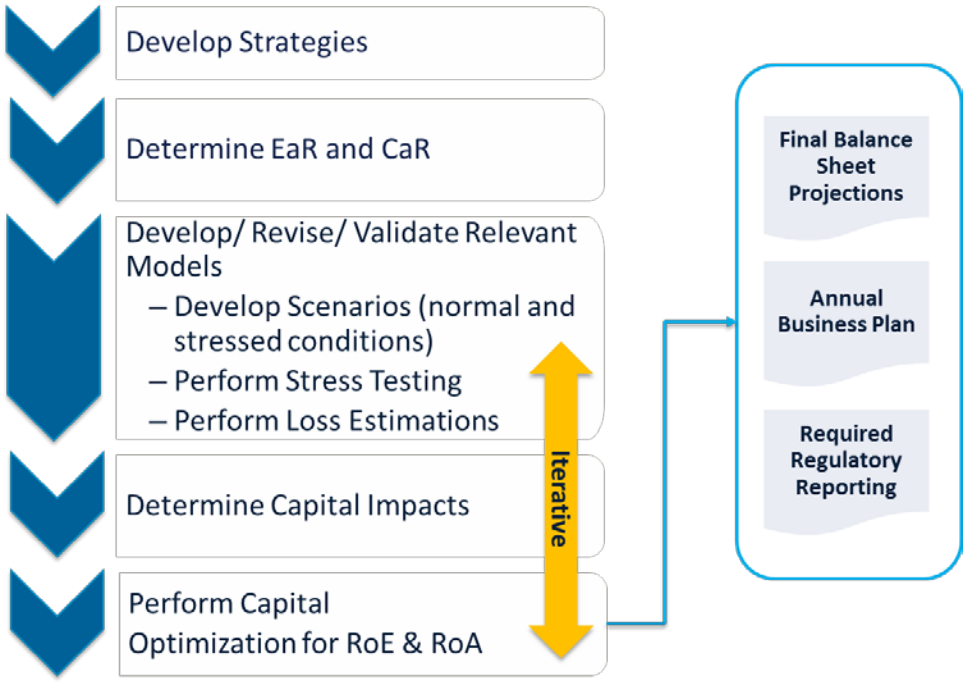
Executive Summary

In response to several financial crises that had global repercussions, the Basel Committee on Banking Supervision (BCBS) strengthened its guidelines regarding the **capital adequacy** of banks. Capital adequacy means that an institution has enough capital to run its business while still absorbing the risk and volatility of its credit, market, and operational risks.

The Basel Committee also emphasized the shared responsibility of senior management and the board to assess and ensure capital adequacy in banks.[1] Regulatory reporting and new metrics as set forth in Basel II and III are important procedural and methodological tools used to perform supervisory reviews and evaluations of banks.

The survival of banks (even "too big to fail" banks) depends on how well they are capitalized and how well they are prepared for changes in business cycles. Therefore, internal auditors must be qualified to understand, measure, and assess the appropriateness and completeness of the institution's capital planning process (see **Figure 1**) in terms of how well it accounts for the level of **capital** needed today and how well it predicts the level of capital needed under stressed financial and economic scenarios.

Figure 1: Capital Planning Process and Resulting Reports



[1] For the purpose of this practice guide, the term "bank" refers to banks, bank holding companies, or other companies considered by banking supervisors to be the parent of a banking group under applicable national law as determined to be appropriate by the entity's national supervisor.

The objective of this guidance is to provide an overview of the international standards and principles of capital adequacy management and explore the role of internal audit in evaluating the capital planning process.

Introduction

There were many reasons for the 2007–08 global financial crisis. Two important reasons were the accumulation by banks of low quality (i.e., nonloss absorbing) capital instruments, and the underestimation of risk impact (e.g., credit, market, operational). The crisis was further amplified by a procyclical deleveraging process and by the interconnectedness of globally systematically important banks.[2] The weakness in the banking sector was rapidly transmitted to the rest of the financial system and the real economy, resulting in a massive contraction of **liquidity** and credit availability.[3]

Note: Terms in bold are defined in the glossary in Appendix B.

During the crisis, formerly liquid investments fell drastically in value and quality, rendering them impossible to divest from banks' balance sheets and damaging banks' ability to borrow to fund operations. This scenario brought the issue of capital management to the forefront.

The quantity and quality of capital held in a bank depends upon the markets and businesses driven by the institution´s strategy and **risk appetite**. Failures in quantifying capital needs may have a pervasive negative effect on banks and the larger financial market.

Given the broad impact of capital adequacy on the operations of the bank and on the general economy, this guidance will include both education on the nature of capital adequacy and assistance in performing internal audit

How to Use This Guidance

It may be helpful to readers without experience in internal auditing for banks to:

Seek capital management taxonomy, regulatory requirements, and models relevant to their organization or jurisdiction.

Develop a basic understanding of how capital adequacy helps banks accomplish their long-term objectives and supports the financial viability of the global economy.

Please refer to Appendix G. References and Additional Reading, for more detailed information.

[2] Banking is a cyclical business. In times of growing economies and the free flow of capital, banking institutions tend to borrow enabling them to lend more. This is described as procyclical leverage. Procyclical deleveraging occurs when the economy contracts and banks are required to reduce their borrowing, restrict lending, and utilize their free capital to reduce liabilities on their balance sheets.

[3] Basel Committee on Banking Supervision. *Basel III: A global regulatory framework for more resilient banks and banking systems* (Basel, Switzerland: Bank for International Settlements, 2011). https://www.bis.org/publ/bcbs189.pdf.

engagements on the complex capital planning process, such as:

- Types of capital (i.e., numerator of **risk-based capital**) and their associated criteria.
- Risk Weighted Assets (RWAs) and methods to determine capital requirements for credit, market, and operational risk (i.e., denominator of risk-based capital).
- Capital planning including the bank's **Risk Appetite Framework**.
- Governance activities surrounding the capital planning process.
- **Leverage ratio** (i.e., non risk-based capital).
- Stress testing.

After reading this guidance, internal auditors should be able to:

- Define the different types of capital.
- Understand strategies and methods to model credit, market, and operational risk.
- Evaluate how the capital processes support the bank's stated risk appetite.
- Understand the bank's scenario development processes designed to stress the risk models.
- Understand the role of internal audit in providing assurance of the effectiveness of the bank's capital planning process.

This knowledge will allow internal auditors to assess how effectively management has designed and executed the processes required to maintain the capital adequacy of the bank.

Business Significance: Risks and Opportunities

Capital adequacy and liquidity are the two key measures used to understand the current and future wealth of a financial institution. Failing to hold an adequate level and quality of capital required by internal credit, market, and operational risk exposures may result in the occurrence of risks such as:

- Inability to expand the business.
- Inability to carry additional risk with available capital.
- Inability to distribute profits, such as dividends.

In the event of a serious economic downturn, failing to hold the minimum capital required by supervisors may result in the cessation of operations or necessitate governmental bailouts.[4]

[4] For the purpose of this practice guide, the terms "banking supervisor" and "supervisor" refer to a responsible authority with the necessary legal powers to authorize banking institutions, conduct ongoing supervision, address compliance with laws, and undertake timely corrective actions to address safety and soundness concerns. Adapted from Basel Committee on Banking Supervision. *Consultative Document: Core Principles for Effective Banking Supervision* (Basel, Switzerland: Bank for International Settlements, 2012). https://www.bis.org/publ/bcbs213.pdf

The strategy an institution employs so it maintains sufficient levels of capital to cover its risk exposures is not just a matter of accumulating any type of capital. The banking activity has to calculate capital in multiple ways given their business model, objectives, geography, and other factors. Regulatory capital requirements are, by definition, conservative as they are meant to protect an institution in the event of a crisis. Balancing regulatory capital requirements with the bank's objectives requires an understanding of the intent of regulatory capital requirements and how the bank's capital planning process allows it to maintain regulatory compliance while also generating expected results for its shareholders/stakeholders.

Capital Adequacy: Regulatory Requirements

The Basel standard requires banks to maintain minimum capital levels to cover losses in proportion to the risky assets held on their balance sheets. Each bank is responsible for maintaining a minimum capital adequacy ratio and should consider capital in every decision it makes. Banks with a regional or global presence should ensure they consider the capital requirements established by local regulations in addition to the Basel II and III requirements, as they may differ.

Capital, according to the Basel standard, is bifurcated into Tier 1 and Tier 2 capital. Tier 1 capital is considered the highest quality or "core capital" as introduced in Basel II. Tier 1 capital can absorb losses without requiring the bank to cease trading activities. Tier 1 capital, also known as "going concern capital," consists of Common Equity Tier 1 (CET1) plus Additional Tier 1 Capital. Under Basel III, only common equity is considered core capital.

Tier 2 capital (CET2) is also known as gone-concern capital, which means the business is no longer viable. This type of capital represents the less liquid, lower-quality assets that would be consumed in a fatal situation for the bank. (See Appendix C. Definitions of Capital.)

Basel Requirements for Tier Capital

Under Basel III, a bank's Tier 1 and Tier 2 capital must be at least 8 percent of its risk weighted assets (RWA).

By 2019, Basel III will require a capital conservation buffer of 2.5 percent of risk weighted assets.

The capital countercyclical buffer is only required when it is "triggered" by local regulators in periods of excess credit growth. It is an extension of the capital conservation buffer.

Supplementary Capital: Capital Conservation Buffers, Countercyclical Buffers

In addition to Tier 1 and Tier 2 capital, Basel III also requires capital buffers to further ensure safety and soundness:[5]

- *Capital Conservation Buffer* – Designed to ensure that banks build up capital buffers outside periods of stress that can be drawn down during periods of stress.
- *Capital Countercyclical Buffer* – Designed to achieve the macro-prudential goal of protecting the banking sector from periods of excessive credit growth, which has often been associated with the buildup of systemwide risk.

Capital buffers should consist of Tier 1 qualified instruments so they are readily accessible and liquid if needed.

Capital for Credit, Market, and Operational Risks

A bank's capital ratio is the percentage of its capital to its risk weighted assets. RWAs are an estimate of risk that determines the minimum level of regulatory capital a bank must maintain to deal with unexpected losses.[6] Banks must establish processes to measure and assess risks related to capital for credit, market, and operational risks against respective RWAs for the purposes of allocating appropriate capital. This section represents the center of the capital planning process.

[5] Basel Committee on Banking Supervision: *Basel III: Finalising post-crisis reforms* (Basel, Switzerland: Bank for International Settlements, 2017). https://www.bis.org/bcbs/publ/d424.pdf.

[6] Ibid.

Credit Risk

Capital for credit risk covers all assets in the bank's portfolio that have an element of credit risk, each weighted according to its respective riskiness. Banks must maintain a certain percentage of RWAs as capital to meet any losses that arise due to deterioration in asset quality. Capital for credit risk can be ascertained using the standardized approach or an internal ratings-based approach using models such as A-IRB and F-IRB (defined on pages 8 and 9). Banks that use modeled approaches must have those models approved by their regulator.

Use of Financial Models

With complex assets entering the market or even plain vanilla assets moving into complex forms of trading, quantitative modeling and analysis are becoming mandatory for valuation.

Unfortunately, no mathematical model comes without a set of drawbacks and assumptions.

The best approach is to keep the assumptions to a minimum and be aware of the implied drawbacks, which can assist in defining the usage and applicability of the models.

Each year a certain percentage of borrowers and counterparties will default. If the Probability of Default (PD) forecast is lower than the realized default rates, the bank will have additional write-offs. These write-offs may be offset by amounts collected during the institution's collections and recovery processes. The bank must also forecast their expected Loss Given Default (LGD). Multiplying the PD and the LGD results in the total Expected Loss (EL) for the time period. If the realized loss is larger than the EL, the return on equity (ROE) will be less than the amount targeted by management. If the realized loss is smaller than the EL, the ROE will be more than forecast by management. The EL can be calculated as a percentage (EL = PD*LGD) or it can be calculated in terms of money by multiplying PD, LGD, and the Exposure at Default (EAD). The dollar amount of EAD becomes concrete when calculating the value of an asset at the point of default or over time. Figure 2 illustrates the minimum parameters for the Internal Ratings Based (IRB) approaches for PD, LGD and EAD:[7]

[7] Basel Committee on Banking Supervision: *High-level summary of Basel III reforms* (Basel, Switzerland: Bank for International Settlements, 2017). https://www.bis.org/bcbs/publ/d424_hlsummary.pdf.

Figure 2: Minimum Parameters for IRB Approaches

Minimum Parameter Values in the Revised IRB Framework				
	Probability of Default (PD)	Loss Given Default (LGD)		Exposure at Default (EAD)
		Unsecured	Secured	
Corporate	5 bp	25%	Varying by collateral type: 0% financial 10% receivables 10% commercial or residential real estate 15% other physical	EAD subject to a floor that is the sum of (i) the on-balance sheet exposures; and (ii) 50% of the off-balance sheet exposure using the applicable Credit Conversion Factor (CCF) in the standardized approach
Retail classes: Mortgages QRRE transactors QRRE revolvers Other retail	 5 bp 5 bp 10 bp 5 bp	 N/A 50% 50% 30%	 5% N/A N/A Varying by collateral type: 0% financial 10% receivables 10% commercial or residential real estate 15% other physical	

Source: Basel Committee on Banking Supervision*: High-level summary of Basel III reforms* (Basel, Switzerland: Bank for International Settlements, 2017). https://www.bis.org/bcbs/publ/d424_hlsummary.pdf.

The A-IRB (Advanced Internal Rating Based) approach allows banks to estimate PD, LGD, EAD, and maturity of an exposure. The F-IRB (Foundation Internal Rating Based) approach applies fixed values to LGD and EAD parameters.

The second part of the EL equation is LGD. LGD tools assess the value and/or the quality of an asset the bank holds in exchange for providing a loan. Securities can be hard assets such as cars and machinery, mortgages, commodities, or any number of other options. The higher the value of the security, the lower the LGD and the lower the EL.

There are three approaches to determining LGD values per Basel II:

1. The Advanced Internal Ratings Based (A-IRB) or Advanced approach, in which banks use internal models to determine their own PD and LGD values.
2. The Foundation Internal Ratings Based (F-IRB) approach, in which banks are allowed to model only a specific set of parameters and must use prescribed calibrations for certain asset classes.
3. The Standardized approach, in which regulators prescribe risk weights for various asset classes.

Audit Considerations

Auditors should be aware of which approach their institution is using to measure credit risk. Further, if the institution is using A-IRB for any products, auditors should understand why and ensure appropriate validation and testing has been done regarding the models.

Banks may choose which method they will use by asset class (e.g., A-IRB for mortgages and F-IRB for corporates). However, most banks will use either A-IRB or F-IRB rather than picking and choosing by asset class. Globally, the standardized approach has been favored by supervisors in the initial phase of Basel II implementation.

Market Risk

Capital for market risk consists of banking assets that are exposed to movements of underlying market factors; that is, the potential that the value of a trading portfolio decreases due to changes in the value of market risk factors that contribute to the portfolio's end-value price. For example, exposure to currency and commodity prices, interest rates, and stock and security prices are all categorized as market risks. Banks weight the risks of such assets and must allocate capital as a percentage of RWA to ensure they are able to meet any losses arising due to movements in market prices. Capital requirements for market risks can be measured through either the standardized approach or internal models approach (IMA), described below, respectively.[8]

A key component of market risk is pricing. Banks divide their portfolios into two categories: 1) the trading book and 2) the banking book. The trading book consists of instruments the bank intends to actively trade. The banking book consists of instruments the bank intends to hold until maturity. Instruments in the trading book are marked to market on a daily basis. Instruments in the banking book are not priced until they reach maturity or are reclassified into the trading book. There is an opportunity to arbitrage between the two books, so BCBS has limited capital arbitrage by:

> "imposing strict limits on the movement of instruments between books, and, if the capital charge on an instrument or portfolio is reduced as a result of switching (in

[8] Basel Committee on Banking Supervision. *STANDARDS: Minimum capital requirements for market risk* (Basel, Switzerland: Bank for International Settlements, 2016). https://www.bis.org/bcbs/publ/d352.pdf.

the rare instances where this is allowed), the differences in charges (measured at the point of the switch) is imposed on the bank as a fixed, additional disclosed Pillar 1 capital charge."[9]

Internal Models Approach

BCBS has determined that use of the IMA will depend on the approval of the bank's supervisory authority. Home and host country supervisors are expected to work together to ensure consistency in the criteria used to approve or disallow a bank's use of IMA. This approval is based on the supervisor's assessment of the bank's overall risk management program, the skill of its staff, and its history in measuring risk exposures accurately. Approval will be granted on a trading desk by trading desk basis.

There are qualitative standards promulgated by various supervisors that banks must accomplish in order to use internal models. For example, according to BCBS, the bank must have an independent risk control unit that should produce and analyze daily reports on the output of the bank´s risk measurement model, and must conduct regular back testing and profit and loss attribution programs, among others.

The total IMA capital requirement is the aggregation of three components as shown in Figure 3:

- Global Expected Shortfall (ES).
- Default Risk Charge (DRC).
- Stressed Capital Add-on for Nonmodellable Risks (SES).

Figure 3: Three Components of the Total IMA Capital Requirement

Global Expected Shortfall (ES)	Default Risk Charge (DRC)	Stressed Capital Add-on (SES)
Equal weighted average of diversified ES and nondiversified partial ES capital charges for specified risk classes.	Captures default risk of credit and equity trading book exposures with no diversification effects allowed with other market risks (including credit spread risk).	Aggregate regulatory capital measure for nonmodellable risk factors in model-eligible desks.

Source: Basel Committee on Banking Supervision. *STANDARDS: Minimum capital requirements for market risk* (Basel, Switzerland: Bank for International Settlements, 2016). https://www.bis.org/bcbs/publ/d352.pdf.

[9] Ibid.

The Expected Shortfall is the conditional expectation of loss given that the loss is beyond the VaR level.[10]

Expected Shortfall is computed on a daily basis for each trading desk included in the IMA. In calculating the ES, a 97.5th percentile, one-tailed confidence level is to be used. The ES is adjusted using liquidity horizons unique to the instruments held in the portfolio. There are five liquidity horizons:

1. 10 days.
2. 20 days.
3. 60 days.
4. 120 days.
5. 250 days.

The liquidity horizons are shorter for liquid instruments (i.e., large capitalization stocks) and longer for illiquid instruments (i.e., noninvestment grade corporate bonds). The effect is that models are built with overlapping time periods. For example, a shock equal to the change in price between day 0 and 10 may be calculated for a large capitalization stock while a shock equal to the change between day 0 and 250 might be calculated for the credit spread on a non-investment grade corporate bond. The data for these shocks would need to closely resemble an ES charge that the bank's current portfolio would experience in times of stress.

BCBS also requires that data sets be updated monthly and when market prices are subject to material changes. Supervisors also have the authority to ask the bank to rerun the models for shorter periods of time if they have reason to believe the ES would be significantly different. Further, for stressed scenarios, banks must identify the 12-month period in which the portfolio experiences the most stress, and these time periods must, at a minimum, span back to and include 2007.[11]

VaR vs. Expected Shortfall

Until 2016, Value at Risk (VaR) was the most popular singular parameter used to calculate market risk, and VaR is still used in many countries. VaR estimates how much a set of investments might lose given normal market conditions over a set time period.

VaR can be calculated simply by taking past performance of a given investment and projecting it into the future, or it can be more mathematically complex. However, at its core, VaR relies on past values and a normal distribution which assumes there will be no extreme events, so banks should not use it as a definitive measure of risk exposure under stress conditions. Other related measures used to model market risks were stressed VaR (sVaR) and conditional VaR (cVaR).

Since market risk is a complex topic, this guidance will only provide a summary of market risk regulations per BCBS.

See BCBS publication, "Standards: Minimum capital requirements for market risk" for more information.

[10] For further comparison, see "Comparative analyses of expected shortfall and value-at-risk under market stress." https:www.bis.org/cgfs/conf/mar02p.pdf.

[11] Basel Committee on Banking Supervision. *STANDARDS: Minimum capital requirements for market risk* (Basel, Switzerland, Bank for International Settlements, 2016). https://www.bis.org/bcbs/publ/d352.pdf.

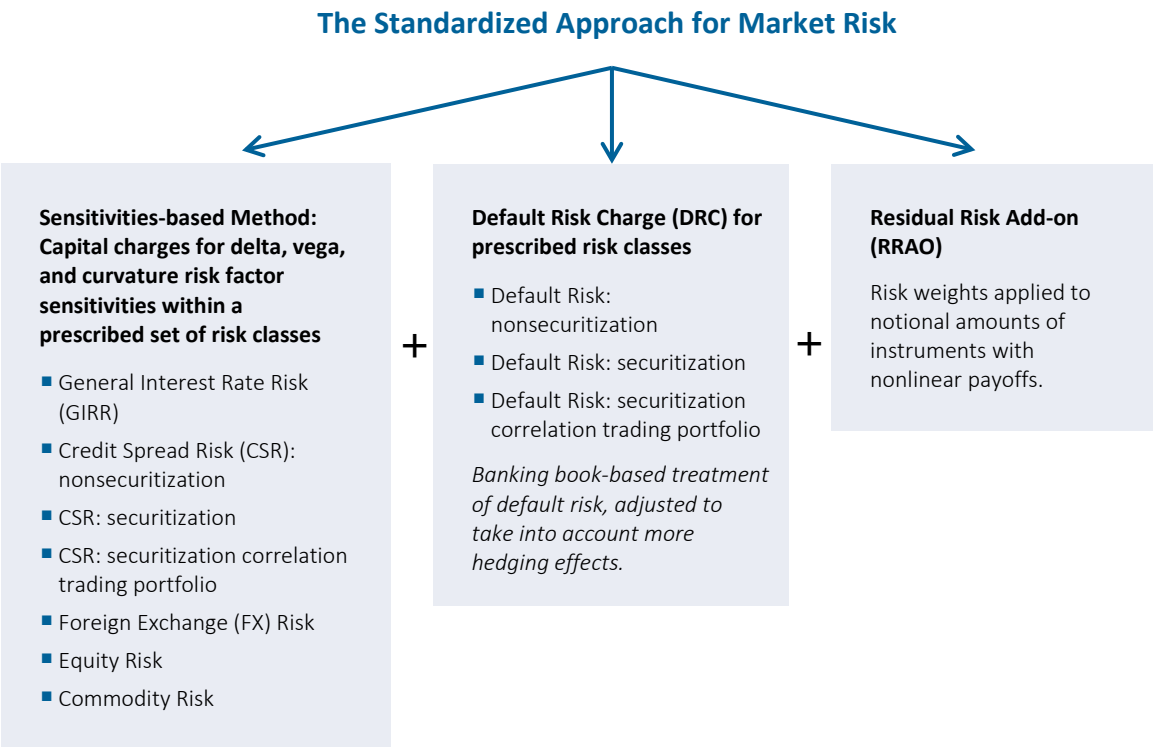
The other two components of the IMA are the Default Risk Charge (DRC) and the Stressed Capital Add-on (SES). The DRC captures default risk of credit and equity trading book exposures with no diversification effects allowed with other market risks. The SES is an aggregate regulatory capital measure for risk factors that cannot be modeled in model-eligible trading desks.

The total IMA capital requirement is an aggregation of ES, DRC, and SES. Securitization exposures in the trading book are not eligible for the IMA approach and must be capitalized using the standardized approach.

Standardized Approach

The BCBS has revised the previous standardized approach to make it more risk-sensitive and better able to gauge IMA results while still suited to banks that do not need to use the IMA approach for market risk. The standardized approach, as shown in **Figure 4**, consists of three elements: Sensitivities-based Method + Default Risk Charge + Residual Risk Add-on (RRAO). Unlike the IMA, the standardized approach applies to both securitization and nonsecuritization exposures in the trading book. The results from this approach must be communicated to bank supervisors on a monthly basis.

Figure 4: The Standardized Approach for Market Risk



Source: Basel Committee on Banking Supervision. *STANDARDS: Minimum capital requirements for market risk* (Basel, Switzerland: Bank for International Settlements, 2016). https://www.bis.org/bcbs/publ/d352.pdf.

The sensitivities-based method risk charge is calculated by aggregating these common risk measures used at trading desks: delta, vega, and curvature. These risk sensitivity measures are to be used as inputs into the aggregation formula described by BCBS. The bank must determine delta and vega sensitivity and curvature scenarios based on instrument prices or pricing models that an independent risk control unit within the bank uses to report risk exposures to senior management.

Brief definitions of each risk sensitivity measure appear below:

- Delta measures the sensitivity of a portfolio to a small increase in the value of the variable (risk factor) and the resulting change in the value of the portfolio.
- Vega is present in derivatives trading because it is a measure of the rate of change to the portfolio's value regarding the volatility of the underlying asset price.
- Curvature involves calculating two shock scenarios (one up and one down) with the delta effect removed. Both scenarios are shocked by risk weights, and the worst loss is used as an input into the aggregation formula provided by BCBS, which delivers the capital charge.

Positions are broken down by risk class and grouped into categories or "buckets." Three risk charge figures must be calculated for each risk class based on three individual scenarios. These scenarios use specified values for the parameter representing correlation between risk factors in a bucket and the parameter representing correlation across buckets within a risk class. No diversification benefit is permitted.

The second component of the standardized approach is the DRC. In this context, the DRC is used to capture jump-to-default risk (JTD). BCBS prescribes the following step-by-step approach to capture JTD:

1. Compute the JTD risk of each instrument separately. The JTD risk is a function of notional amount (or face value) and market value of the instruments and prescribed LGD.
2. Offsetting rules are specified that enable the derivation of net JTD risk positions.
3. Net JTD risk positions are then allocated to buckets and weighted by prescribed risk weights. Note there are different treatments for positions held in the banking book versus those held in the trading book.[12]

The third component of the standardized approach is the RRAO, which is to be calculated for all positions bearing residual risk separately and in addition to other components of the capital requirement. RRAO is meant to capture risk exposures not measured by the other components of the standardized approach in cases such as exotic underlying assets with exposures to longevity risk, weather, natural disaster, etc.

[12] Ibid.

The RRAO is the simple sum of gross notional amounts of the instruments bearing residual risks, multiplied by a risk weight of 1.0 percent for instruments with an exotic underlying assets and risk weights of 0.1 percent for instruments bearing other residual risks.[13]

Operational Risk

Capital for operational risk comprises the capital that must be maintained to offset operational losses due to exposure to internal or external events involving people, processes, and technology. The nature of some operational risk exposures (e.g., misconduct) are not conducive to measurement by models.

BCBS stated that the financial crisis highlighted two main shortcomings with the existing operational risk framework. First, capital requirements for operational risk proved insufficient to cover operational risk losses incurred by some banks. Second, the nature of these losses — covering events such as misconduct, and inadequate systems and controls — highlighted the difficulty associated with using internal models to estimate capital requirements for operational risk. Therefore BCBS has streamlined the operational risk framework.

The advanced measurement approach (AMA) for calculating operational risk capital requirements, which are based on banks' internal models, and the existing three standardized approaches are replaced with a single risk-sensitive standardized approach to be used by all banks.[14]

The standardized approach is based on three components: 1) the Business Indicator (BI), which is a financial statement-based proxy for operational risk; 2) the Business Indicator Component (BIC), which is calculated by multiplying the BI

Helpful Resource for Internal Auditors

The Federal Reserve Bank (FRB) in the United States has published several guides discussing approaches to modeling operational risk and the validity of those approaches in the context of its stress testing guidance for the Dodd-Frank Act. The most comprehensive is the *Dodd-Frank Act Stress Test 2016: Supervisory Stress Test Methodology and Results,* June 2016 guide.

As the risk is always "in the tails" of the distributions, the FRB has been experimenting with ways to adequately capture that risk for banking institutions that may not have experienced an exponential loss related to operational risk. The FRB information on how operational risk models and scenarios have evolved over time due to stress testing requirements (basically, what is working and what is not) can be helpful to internal auditors examining operational risk models in any context.

[13] Ibid.

[14] Basel Committee on Banking Supervision: *Basel III: Finalising post-crisis reforms* (Basel, Switzerland: Bank for International Settlements, 2017). https://www.bis.org/bcbs/publ/d424.pdf.

by a set of regulatory-determined marginal coefficients; and 3) the Internal Loss Multiplier (ILM), which is a scaling factor based on a bank's average historical losses and the BIC.

The BI contains three components:

1. Interest, Leases, and Dividends (ILDC).
2. Services (SC).
3. Financial (FC).

The BI is defined as:

$$BI = ILDC + SC + FC$$

In the formula below, a bar above a term indicates that it is calculated as the average over three years: t, t-1 and t-2.

$$\text{ILDC} = Min\left[\overline{Abs(Interest\ Income\ -\ Interest\ Expense)}; 2.25\% * \overline{Interest\ Earning\ Assets}\right] + \overline{Dividend\ Income}$$

$$\text{SC} = Max\left[\overline{Other\ Operating\ Income}; \overline{Other\ Operating\ Expense}\right] + Max\left[\overline{Fee\ Income}; \overline{Fee\ Expense}\right]$$

$$FC = \overline{Abs(Net\ P\&L\ Trading\ Book)} + \overline{Abs(Net\ P\&L\ Banking\ Book)}$$

To calculate the BIC, the BI is multiplied by marginal coefficients (α_i). The marginal coefficients increase with the size of the BI, as shown in the **Figure 5** example:[15]

Figure 5: BI Ranges and Marginal Coefficients

Bucket	BI Range (in €bn)	BI Marginal Coefficients (αi)
1	≤ 1	12%
2	1 < BI ≤ 30	15%
3	> 30	18%

Source: Basel Committee on Banking Supervision: *Basel III: Finalising post-crisis reforms* (Basel, Switzerland: Bank for International Settlements, 2017). https://www.bis.org/bcbs/publ/d424.pdf.

For banks in the first bucket (i.e., with a BI less than or equal to €1bn) the BIC is equal to BI x 12%. The marginal increase in the BIC resulting from a one unit increase in the BI is 12% in bucket 1, 15% in bucket 2, and 18% in bucket 3. For example, given a BI = €35bn, the BIC = (1 x 12%) + (30-1) x 15% + (35-30) x 18% = €5.37bn. According to Basel III:

[15] Ibid.

A bank's internal operational risk loss experience affects the calculation of operational risk capital through the Internal Loss Multiplier (ILM). The ILM is defined as:

$$ILM = Ln\left(\exp(1) - 1 + \left(\frac{LC}{BIC}\right)^{0.8}\right)$$

where the Loss Component (LC) is equal to 15 times average annual operational risk losses incurred over the previous 10 years. The ILM is equal to one where the loss and business indicator components are equal. Where the LC is greater than the BIC, the ILM is greater than one. That is, a bank with losses that are high relative to its BIC is required to hold higher capital due to the incorporation of internal losses into the calculation methodology. Conversely, where the LC is lower than the BIC, the ILM is less than one. That is, a bank with losses that are low relative to its BIC is required to hold lower capital due to the incorporation of internal losses into the calculation methodology…[16]

Finally the minimum Operational Risk Capital (ORC) is calculated by multiplying the BIC and the ILM:

$$ORC = BIC * ILM$$

Supervisors have advocated for regression-based models to establish the relationship between losses due to occurrence of operational risks and macroeconomic variables. However, many banks have had difficulty finding datasets relevant to their portfolios and operations that are robust enough to demonstrate such a relationship.[17] Risk losses such as reputational impacts due to data breaches are difficult to quantify, and many operational risks are new areas that have not been evaluated for loss data in prior time periods.

Many banks did not track losses due to operational risk occurrences prior to the 2008 crisis, which also contributes to a lack of long-term data for extreme loss scenarios. As a result, many banks have had to turn to external datasets, which can be difficult to integrate into internal loss data. Internal auditors should be aware of the requirements Basel has set for loss datasets to assure the board that the organization is properly accounting for potential losses due to operational risk occurrences from a regulatory perspective. (See Appendix E. Internal Audit Engagement Considerations in the Capital Planning Process, for more information.)

Internal auditors should obtain evidence that their bank is using the approaches approved by relevant regulatory bodies for measuring credit, market, and operational risks and that they maintain capital in compliance with regulatory guidelines. This may be found in capital policy

[16] Ibid.

[17] Mihov, Atanas and Curti, Filippo and Abdymomunov, Azamat, U.S. Banking Sector Operational Losses and the Macroeconomic Environment (July 5, 2017). Available at SSRN: https://ssrn.com/abstract=2738485 or http://dx.doi.org/10.2139/ssrn.2738485.

documents, model documentation, asset and liability committee (ALCO) minutes, and results of regulatory examinations.

Risk Weighted Assets

The concept of RWA is simple, but calculating it for a financial institution of any size is a challenge.

Banks are required to hold capital in proportion to the risk level associated with the assets on their balance sheets. However, there are many specifications regarding how to classify assets (Tier 1 and Tier 2) and regulatory adjustments to be made based on numerous factors. Further, depending on the bank's status in terms of phase-in periods, these criteria may vary (See Appendix D. Basel III Implementation – Global Progress, for more information on global adoption of Basel II and III standards). To add to the complications, starting balances for both on- and off-balance sheet exposures and applicable risk weights form the foundation for estimates of post-stress testing capital ratios. Any deficiencies or inaccuracies in these starting balances will only compound throughout the capital planning process.

Here is a simplified example of the RWA concept:

> Cash and high-quality investment grade sovereign bonds are deemed to exhibit little if any credit risk. Therefore, banks could assign them no risk score and reserve no capital. Conversely, a subprime mortgage that is 90 days past due on its payments may require a capital reserve of 50 percent or more of its anticipated cash flows.

To calculate RWA, banks must perform this evaluation process for the entire asset side of the balance sheet and sum up the capital required based on the assigned risk weightings. That sum is the minimum required capital level for that bank.

The internal audit activity should complete a thorough review of the RWA measurement methodology with a specific focus on the assets that are considered for measurement. Internal auditors should have a good understanding of the RWA measurements and the factors required to measure RWA before beginning the review. Internal auditors may find studying these items useful in guiding their review: the applicable regulatory guidance, footnotes, and disclosures in the financial statements; balance sheet breakdown reports; and ALCO minutes.

Economic Capital

Though regulatory capital requirements are the focus of this practice guide, banks must still calculate how much capital they need to allocate internally to their business lines and products to execute their strategy and obtain their desired yields from their activities while remaining solvent. To do this, banks use internal capital models and the concept of Economic Capital (eCap), which is the amount of risk capital that a bank estimates it needs to remain solvent at a given confidence level and time horizon.

In a practical sense, banks use eCap to identify deals that may appear to generate large profits but have more than a commensurate capital charge. It also draws attention to businesses that offer high risk-adjusted returns despite low gross returns. This information assists the bank in making decisions regarding how to manage their portfolios with their need for profitability in balance with requirements for regulatory capital.

Disclosure Requirements

Since the recent financial crisis, disclosure requirements have been scrutinized and standardized by financial services supervisors. The objective of the Basel III capital disclosure requirements is to improve transparency on banks' capital positions, particularly in the quality of the capital held against the risks a bank incurs.

According to the Basel standards, the requirements include:

- A common template banks must use to report the breakdown of their regulatory capital.
- A three-step reconciliation requirement to ensure a full reconciliation of all regulatory capital elements back to the institution's balance sheet.
- A common template banks must use to provide a description of the main features of regulatory capital instruments used.
- Rules requiring banks to provide the full terms and conditions of regulatory capital instruments on their websites including those benefiting from the transitional arrangements.
- A common template banks must use during the transition period.[18]

Audit Considerations

In the case of public banks, the internal audit activity should review the financial statement disclosures/ footnotes as constructed by the external auditors for completeness and accuracy before the financial statements are approved by senior executives and issued to the public.

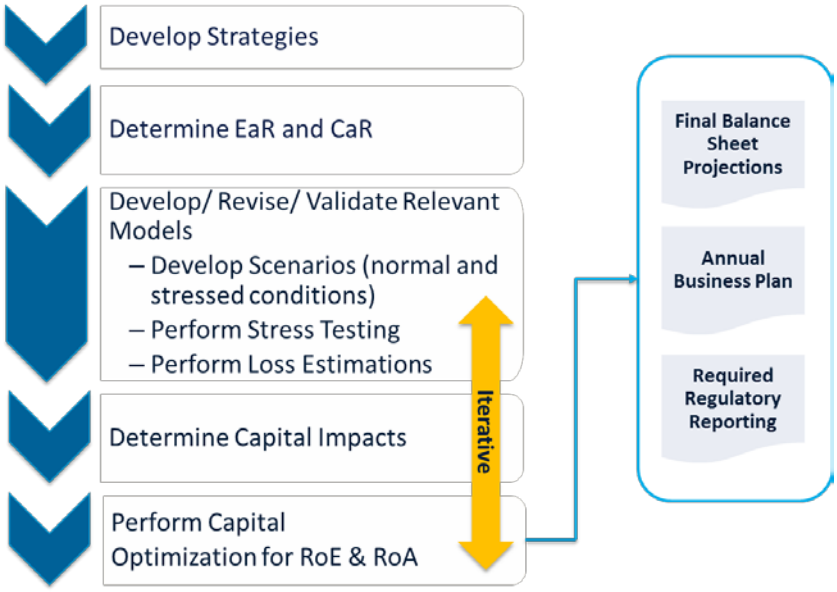
Basel III also provides timing requirements regarding the release of disclosures and lists the key capital ratios and elements that must be reported by banks with the issuance of each set of financial statements. These disclosures must be included in their entirety in the bank's financial statements or the financial statement package must include direct links to the full disclosures on the bank's website.

[18] Basel Committee on Banking Supervision. *Consultative Document: Definition of capital disclosure requirements* (Basel, Switzerland, Bank for International Settlements, 2011). https://www.bis.org/publ/bcbs212.pdf.

Capital Planning Process

Per Standard 1220.A1 – Due Professional Care, internal audit must exercise due professional care by considering the adequacy and effectiveness of governance, risk management, and control processes, among others. Capital planning is key to the safety and soundness of the financial institution, and an institution's board is ultimately responsible for strategy decisions including capital adequacy. "The firm's capital planning should be consistent with the strategy and risk appetite set by the board and with the firm's risk levels, including how risks at the firm may emerge and evolve under stress. The board must annually review and approve the firm's capital plan."[19] This is shown in Figure 6.

Figure 6: Capital Planning Process and Resulting Reports



Capital Planning Governance

As is true regarding any area of organizational risk, performing a preliminary risk assessment requires understanding risk management roles and responsibilities throughout the organization. The IIA's Three Lines of Defense model is helpful for identifying those roles and responsibilities.[20]

The nature and types of the second line of defense depends on many factors including organizational maturity. In general, the first line of defense should propose the risk appetite, targets, and limits, but the control functions (e.g., the bank's risk management function) should

[19] United States Code of Federal Regulations, 12 CFR 225.8(e)(1)(iii)

[20] The Institute of Internal Auditors. The IIA's Position Paper: *The Three Lines of Defense in Effective Risk Management and Control* (Altamonte Springs: The Institute of Internal Auditors, 2013), 2-6.

collaborate and ensure that those proposals are appropriate; that is, consistent with the bank's risk profile. The Asset/Liability Committee (ALCO) should review the capital plan, monitor conformance to the bank's stated risk appetite, and oversee decision-making related to managing assets and liabilities. This oversight includes evaluating and reacting to changing market conditions and ensuring the adequacy of liquidity and capital resources. The board should review and approve the bank's strategy, policies, and risk management practices at least annually and must review and ratify any policy changes.[21] Ultimately, the board is also responsible for ensuring that senior management effectively manages capital risks, as outlined in Appendix F. Sample Capital Adequacy Risks and Controls.

Audit Considerations

In addition to knowing the key components of the risk appetite and capital planning process, internal auditors should understand the relationship among strategy, risk appetite, and the capital planning process.

They should be able to evaluate whether the institution is operating as if the three elements are an integrated unit or if there are organizational silos or other impediments interfering with managing capital risk in an integrated fashion. Any concerns should be reported to the board.

A bank's capital strategies and, as a result, their capital planning processes start with the organization's stated risk appetite. The IIA defines risk appetite as the level of risk that an organization is willing to accept.[22] The Risk Appetite Framework forms the basis of capital policies and governs the strategies and processes the organization uses to meet its objectives. The Risk Appetite Framework is defined by Basel as "the overall approach, including policies, processes, controls and systems, through which risk appetite is established, communicated, and monitored."[23] This definition includes the interaction between capital preservation and funding costs as well as interactions between credit, market, operational, and systemic risks.

Effective management of relevant risks requires establishing a unified platform to facilitate a common understanding of different risks across an organization. The Risk Appetite Framework enables senior management and the board to articulate an overview of the organization's risk position and define acceptable limits.

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[21] Board of Governors of the Federal Reserve System. SR 15-18 attachment: *Federal Reserve Supervisory Assessment of Capital Planning and Positions for LISCC Firms and Large and Complex Firms*. Washington, D.C.: FRS, 2015. https://www.federalreserve.gov/supervisionreg/srletters/sr1518_PW.pdf

[22] The Institute of Internal Auditors, *International Professional Practices Framework* (Florida: The Institute of Internal Auditors, 2017), 243.

[23] Basel Committee on Banking Supervision. *Consultative Document, Guidelines, Corporate governance principles for banks* (Basel, Switzerland: Bank for International Settlements, 2014). https://www.bis.org/publ/bcbs294.pdf.

When considering capital adequacy risk, a bank considers its risk appetite given its target capital position. Risk appetite establishes the aggregate level of risk the bank is willing to accept or avoid to achieve its business objectives and strategies.

The board should approve the Risk Appetite Framework annually at a minimum. Further, banks should have a protocol that triggers the board to review the Risk Appetite Framework off schedule if there is a significant organizational shift, either planned or unplanned.

Banks should define various risk-related parameters to comply with the Risk Appetite Framework. These parameters should be included in the **Risk Appetite Statement** and/or the capital policy. **Risk capacity** expresses the maximum level of risk the bank can assume given its current level of resources, constraints, and its obligations. Risk limits are the allocation of aggregate risk appetite limits to business lines, legal entities, specific risk categories, and other granular levels. **Risk tolerance** may be used to indicate how much variance in risk exposure the institution will accept around trades, etc., given the parameters set for risk capacity and their associated risk limits.

In a Risk Appetite Statement, these limits extend to all business units and product levels. The bank can use the results of stress testing (discussed below) to validate the appropriateness of limits set by the Risk Appetite Framework. Banks should be able to articulate consistency between capital targets, stress tolerances, and potential crisis/failure thresholds. The capital adequacy policy should define the escalation protocols to be taken for situations where the limits have been reached.

Effective communication of the Risk Appetite Framework across the organization enables management at all levels (the first line of defense) to align strategy and decision-making with the predefined risk appetite, and risk management and other relevant departments (the second line of defense) to monitor and control the established limits. Management should consider both qualitative and quantitative measures expressed regarding the bank's strategies, capital, liquidity, reputation, risk profile, etc.

Audit Considerations

BCBS outlines the key fundamental elements of a sound capital assessment. Internal auditors should be aware of these fundamental elements and ensure their integration into their audit plans:

- Policies and procedures designed to ensure that the bank identifies, measures, and reports all material risks.
- A process that relates capital to the level of risk.
- A process that states capital adequacy goals with respect to risk, taking into account the bank's strategic focus and business plan.
- A process of internal controls, reviews, and audit to ensure the integrity of the overall management process.

Source: Basel Committee on Banking Supervision. *International Convergence of Capital Measurement and Capital Standards,* (Basel, Switzerland: Bank of International Settlements, 2006). https://www.bis.org/publ/bcbs128.pdf.

Once a bank has established its Risk Appetite Statement, which may change from year to year, and articulated its capital policy throughout the organization, it has a solid base with which to design its strategies. Capital planning is the underpinning that allows the bank to allocate capital to strategies, business lines, and products it plans to pursue in the upcoming year. Internal auditors should confirm the bank involves a solid cross-section of departments — both first line and second line of defense — in proposing plans and challenging the assumptions constructed in the strategic plan that will feed into the capital planning process.

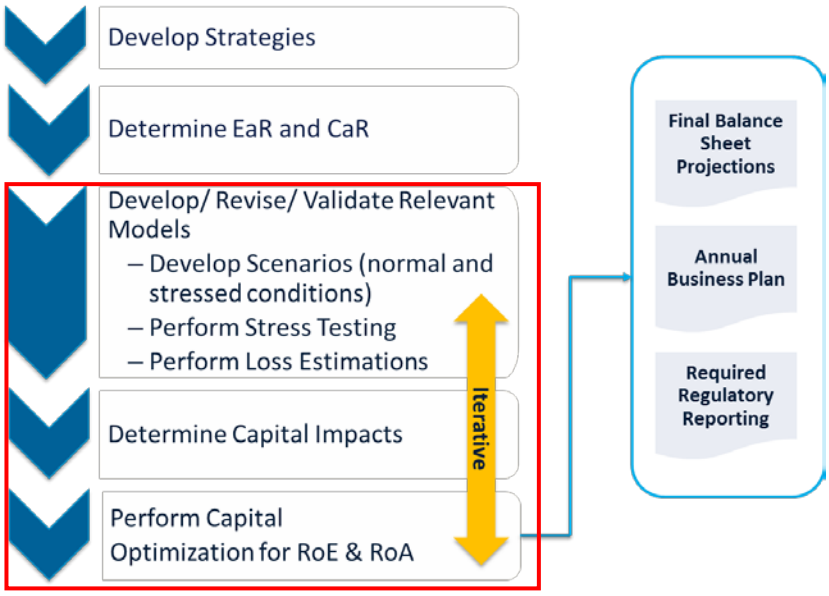
Stress Testing

Stress testing involves evaluating a bank's consolidated risk exposure and financial position under severe, yet plausible, scenarios and is central to the iterative process of strategy selection. Stress testing enables management to forecast how financial results and capital positions would vary under different macroeconomic and idiosyncratic scenarios, as shown in Figure 7.

Audit Considerations

Internal auditors should carefully examine the scenario development process to ensure that all parties are involved at the appropriate stage and that data from all relevant parties is considered appropriately.

Figure 7: Capital Planning Process and Resulting Reports



For example:

- The impact of different market and economic stressors on the financial results and metrics of different business units.

- The impact of various capital actions (e.g., dividend payouts, share repurchases, debt and capital restructuring) on financial results and capital position/ratios.

Stress testing is a critical component of the capital planning process because it alerts management to potentially adverse, unexpected outcomes of various risks and helps management determine the amount of capital that might be needed to absorb losses if large shocks were to occur. Stress testing supplements other risk management techniques and plays a particularly important role in:

Audit Considerations

Supervisors will expect the institution to estimate losses, revenue, expenses, and capital that take into account the macroeconomic drivers relevant to them. Key variables should be clearly documented.

- Testing the bank's risk appetite and risk tolerance.
- Providing forward-looking assessments of risk.
- Overcoming limitations of models and historical data.
- Informing capital and liquidity planning procedures.
- Interacting with other important elements of the risk management framework, such as the recovery and resolution plan.
- Developing risk mitigation or contingency plans in stressed conditions.

A robust scenario-based forecasting process should enable efficient coordination across the organization and be flexible enough to accommodate ad hoc requests from regulators and management. The organization should also establish and maintain a repeatable, dependable, and well-controlled environment. The strategies and procedures employed by the organization will be subject to internal review via the capital planning process. All of this work is consolidated and compared with the organization's capital adequacy policy and its requirement that risks are captured in the strategic plan and risk exposures are kept at levels consistent with thresholds established in the Risk Appetite Framework.

The advantage of a scenario-based forecasting process is that these tools are forward-looking. While EaR, CaR, and some models used to calculate capital for credit, market, or operational risk are based on historical data, stress tests are based on the judgment of the bank's experts and project losses into the future given a significant shock. In the process of stress testing, banks should develop specific scenarios that focus on the idiosyncratic risks unique to its risk profile and operations.

The scenario design process should be linked directly to the institution's strategic risk assessment process. It follows then that nonfinancial and/or nonquantifiable risks should be incorporated into the stress testing analysis. Supervisors will expect banks to be able to articulate how nonfinancial risks are incorporated into stress testing and, ultimately, into the decisions made during the capital planning process.

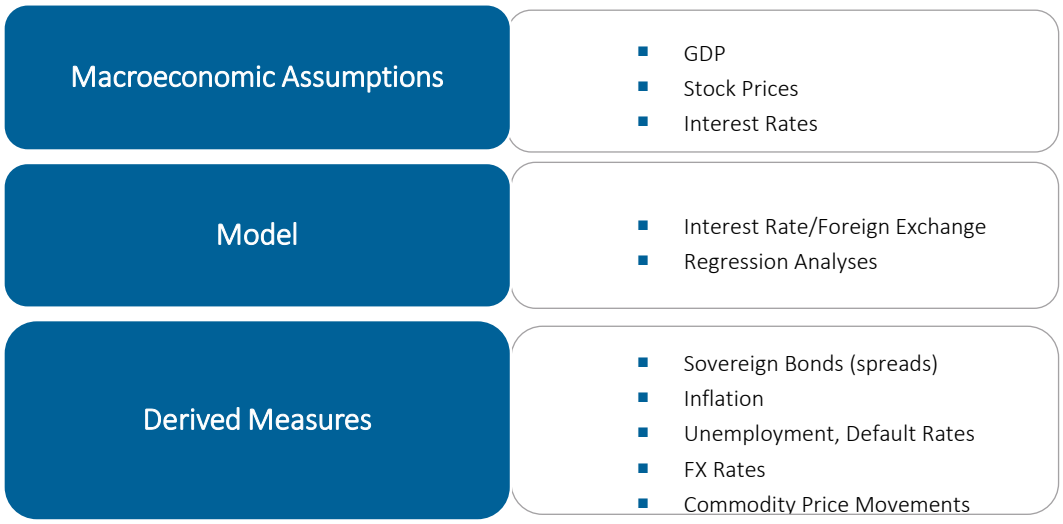
Further, multiple stressful conditions may happen simultaneously or in rapid succession. This phenomena can exacerbate the negative cumulative effects of stressed conditions, including positive or negative correlations and additional effects that may follow.

A key set of risk parameters applies to banks: they are holistic in nature, can be applied to multiple geographies, and cover most if not all risk areas:

- Gross domestic product (GDP).
- Stock prices.
- Interest rates.
- Default rates.
- Spreads of credit default swaps (CDS).
- Unemployment rates.
- Inflation rates.
- Commodity prices.
- FX rates.
- Bond prices.

These primary parameters can be used to derive secondary parameters with the help of models and regressions that evaluate relationships among variables. Secondary parameters could include Interest Rate/Foreign Exchange Rate models and regressions of the GDP versus PD, as shown in Figure 8.

Figure 8: Secondary Risk Parameter Scenario



Scenario: Recession

Here is an example of stress testing models in a recession scenario:

- There is a recession in the United States caused by increasing levels of consumer debt and leveraged buying in the stock market.
- Demand for consumer goods decreases as households become over-leveraged and start falling behind on payments.
- Imports decrease.
- U.S. GDP declines.
- Unemployment rates increase.
- Loan defaults increase negatively impacting availability of credit.
- The recession spills over into Europe.
- In Europe, increasing sovereign debt becomes critical and several banks fail.
- Interest rates rise.
- Credit is restricted globally.

The first step in designing a stress test is to distribute the primary parameter sets to each business line of the bank, down to the trading desk level. Within the business lines and trading desks, the stressed values are determined. Secondly, the aggregation of expected losses is done at the top line group level.

According to the Federal Reserve Bank's Letter SR 15-18:

> The firm's stress testing practices should capture the potential increase in losses or decrease in pre-provision net revenue (PPNR) that could result from the firm's risks, exposures, and activities under stressful scenarios.... Projections of losses and PPNR should be done at a level of granularity that allows for the appropriate differentiation of risk drivers, while balancing practical constraints such as data limitations.

Final Reporting

The final steps in the capital planning process begin when the iterative modeling processes are complete to the satisfaction of senior management. When senior management has settled on a strategy for the year, all the information produced during the capital planning process should be consolidated to produce final versions of balance sheet projections, the business plan, and required regulatory reports.

Audit Considerations

Internal audit should, at a minimum, validate the accuracy of final regulatory reports against the results of the audits they have been conducting in conjunction with the capital planning process.

When finalizing the balance sheet projections, management should have clarity on the relationships among revenues, expenses, and on- and off-balance sheet exposures under stressed conditions. Any changes planned in the institution's

asset mix and the resulting RWA changes must be consistent with the PPNR and loss estimates. This information should be tied back to the bank's strategic risk assessment and more granular risk assessments undertaken by management. Scenarios that generate increased losses, reduced revenues, and drive significant changes to the balance sheet and RWAs over the planning time horizon should be noted in detail.

Once this analysis is complete, the final business plan can be constructed with capital allocations stated for the selected strategies, business lines, products, etc., and regulatory reports can be generated.

Leverage Ratio

The leverage ratio is a regulatory measure that attempts to guarantee the bank's solidity and financial strength in terms of indebtedness. Leverage ratio guidelines were introduced in 2014 to address the buildup of excessive on- and off-balance sheet leverage by banks, which was considered a root cause of the 2008 financial crisis.[24] The guidelines constrain the disproportional growth of banks' balance sheets. To avoid an excessive leverage ratio, supervisors require banks to operate within the regulatory ratio limits of total balance sheet to Tier 1 capital. Banks must measure the size of their balance sheets (inclusive of on- and off- balance sheet items) and compare them against the Tier 1 capital they hold.

The Basel III leverage ratio is defined as the capital measure (numerator) divided by the exposure measure (denominator), with this ratio expressed as a percentage. The minimum ratio required is 3 percent with a numerator (capital measure) as Tier 1 capital of the Risk-based Capital (RBC) framework, and the denominator (exposure measure) as the accounting value of the on-balance sheet exposures, derivative exposures, securities financing transactions, and off-balance sheet items.[25]

Supervisors have provided guidance to banks on the factors that must be used to convert off-balance sheet exposures based on their respective riskiness. Every month, banks are required to calculate their leverage ratio, which is currently set at a minimum of 3 percent, and report it to their local regulator. Organizations should establish a target for their leverage ratio and monitor it monthly.

According to the Basel Monitoring Report issued in 2017, overall, the global leverage ratio grew between 2001 and 2016. In Europe, leverage ratios started from a base of 2.7 percent and

[24] Basel Committee on Banking Supervision. *Basel III: Finalising post-crisis reforms* (Basel, Switzerland: Bank for International Settlements, 2017). https://www.bis.org/bcbs/publ/d424.pdf

[25] Basel Committee on Banking Supervision. *Basel III leverage ratio framework and disclosure requirement*. (Basel, Switzerland: Bank for International Settlements, 2014). https://www.bis.org/publ/bcbs270.pdf.

increased to 5 percent at end of December 2016. In the Americas and the rest of the world, ratios increased from slightly above 4 percent in 2011 to more than 6 percent as of December 2016.[26]

The Basel III reform introduced a leverage ratio buffer for globally systemic important banks (G-SIBs). The leverage ratio buffer for each G-SIB will be set at 50 percent of its risk-based capital buffer. For example, a bank with a 2 percent risk-based buffer will have a 1 percent leverage ratio buffer and so will be expected to maintain a leverage ratio of at least 4 percent.[27]

Internal audit should consider independently monitoring their institution's leverage ratio on a regular basis. This can be a key indicator that something has gone wrong with the execution of the strategies developed from the capital planning process. At a minimum, monitoring the leverage ratio can provide internal audit with an indication of the institution's performance against their capital plan.

Auditing Capital Adequacy and Stress Testing

Standard 2200 – Engagement Planning

Internal audit must determine in planning an engagement if the organization has a unified and cohesive governance structure in place, including policies, processes, and tools to consistently manage the environment and control the risks related to capital planning. Identifying the components of this governance structure will facilitate the effective planning of the audit.

For more information, see The IIA Practice Guide "Engagement Planning: Establishing Objectives and Scope."

Engagement planning generally includes these steps:

1. Understand the context and purpose of the engagement.
2. Gather information to understand the area or process under review.
3. Conduct a preliminary risk assessment of the area or process under review.
4. Form engagement objectives.
5. Establish engagement scope.
6. Allocate resources.
7. Document the plan.

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[26] Basel Committee on Banking Supervision. *Basel III Monitoring Report* (Basel, Switzerland: Bank for International Settlements, 2017). https://www.bis.org/bcbs/publ/d416.pdf.

[27] Ibid.

The remaining sections of this guide will help internal auditors through the process of planning and executing an internal audit of the capital planning process.

Standard 2201 – Planning Considerations

Understand the context and purpose of the engagement.

While audit coverage of the organization's capital planning process can be done using different approaches, the importance of sound capital management to the safety and soundness of the bank means that the internal audit plan should provide assurance to senior management and the board that the process is operating properly and within regulatory guidelines over a reasonable period of time. This period could be between one and three years, depending on the size, business model, and risk of the institution.

It is important that internal auditors document the information gathered while developing the plan. This process is not always a sequential number of steps. Rather, it is an ongoing process that must be updated throughout the engagement planning as new information is obtained through the review of prior assessments (e.g., risk assessments, reports by assurance and consulting service providers), understanding and mapping process flows and controls, or interviewing relevant stakeholders.

Gather information to understand the area or process under review.

The **chief audit executive** (CAE), or internal auditors assigned by the CAE, should be involved in various meetings throughout the bank regarding capital risks, capital risk management, and strategic planning, always conscious of the information that pertains to capital planning, which may lead to the business line, product, or a specific model's inclusion in the internal audit engagement scope for the capital planning process. This information will also help internal auditors identify where risk information is retained in the organization.

Once internal auditors have identified the departments, functions, and roles in the organization that are relevant to managing capital adequacy risk, they should gather relevant documentation to support the preliminary risk assessment and plan the audit engagement. The following elements can help the risks to the bank in achieving its capital adequacy objectives as stated in the capital adequacy strategy:

- Charters, policies, and other mandate information for the governance entities responsible for establishing the capital adequacy strategy.
- Any documents or personnel that can assist in understanding the minimum capital required, which will drive the capital adequacy strategy.
- Documentation of all phases of the capital planning process including how Tier 1 and Tier 2 capital is classified and accuracy of resulting RWA calculations.
- Results of modeling for credit, market, and operational risks.
- Documentation of the process for designing and running normal and stress scenarios.

- Reports containing the results of stress testing.

There are other sources of information internal audit could be evaluating year-round as potential early warning indicators that the bank's capital processes are not performing within defined limits:

1. Material changes in the Capital Ratio or Leverage Ratio.
2. Reports and examinations by supervisors and other internal and external assurance providers for any observations identified.
3. Significant losses in product lines or business lines that were not indicated in the current capital plan.

Unfavorable results may indicate internal audit should revise its risk assessment of the area and, possibly, the engagement objectives and scope.

Conduct a preliminary risk assessment of the area or process under review.

As internal auditors conduct their engagement-level risk assessments, they should review past workpapers and consider the last time an end-to-end engagement was completed, as well as the last time any targeted engagement was completed. In planning individual engagements that involve capital adequacy, internal auditors should consider information from the organizationwide risk assessment related to capital adequacy, if one exists.

An effective way to perform and document an engagement level risk assessment is to create a risk matrix listing the relevant risks and then expand the matrix to include measures of significance. A risk matrix may be created using a spreadsheet or similar document, with or without an audit software program. The format of the matrix may vary but typically includes a row for each risk and a column for each risk measure, such as impact and likelihood.

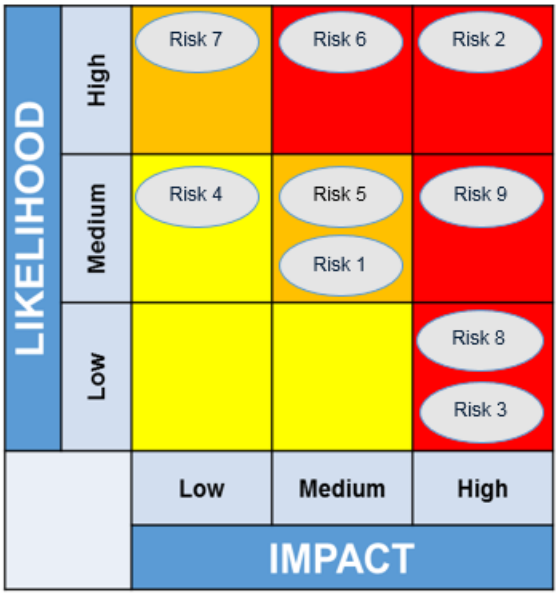
For more information on model risk management, see The IIA Practice Guide "Auditing Model Risk Management."

Assessing impact can be complicated because it involves both quantitative and qualitative factors. Internal auditors should account for not only the financial, operational, and regulatory impact of capital adequacy risks, but also the nonfinancial impacts, such as damage to the organization's reputation or relationships with customers or vendors. For example, an error in a data stream for an upstream model may have material impacts on downstream models depending on how the outputs from the upstream model are used. Some risks may seem insignificant on their own but should be considered in the context of the bank's capital strategy.

Factors to consider when assessing likelihood include past risk occurrences, risk impact data from proxy sources, and the complexity and number of people involved in the process.

The risk ratings from the risk matrix can then be represented on a basic graph, such as a heat map. By plotting each risk's impact along one axis and its likelihood along the other axis, internal auditors clearly depict the risk's overall significance, or priority. Typically, the combined significance of impact and likelihood is indicated using a color system: red denotes the highest priorities, orange denotes risks that are significant enough to warrant consideration, and yellow denotes risks that are not significant as shown in Figure 9. The heat map should be included in the engagement workpapers because it supports internal auditors' decisions about risk significance.

Figure 9: Heat Map



One limitation of heat maps is that impact and likelihood appear to be equally important. While such equivalence might be true at times, impact usually takes priority over likelihood. For example, in most cases, a risk rated high impact and low likelihood (H, L) should be prioritized over a risk considered low impact, even if the likelihood of its occurrence is high (L, H).

An additional limitation of heat maps is that only two measures can be considered at a time (in this case, impact and likelihood). It may be desirable or necessary to also consider such measures as velocity, vulnerability, volatility, interdependency, and/or correlation when determining the significance of risk.

After internal auditors have identified and prioritized capital planning related risks, they should determine which controls, if any, are in place to mitigate those risks. Like the heat map, the risk and control matrix should be included in the engagement workpapers. The information from the matrix is then incorporated into the preliminary risk assessment used to establish the engagement objectives and scope. (See The IIA Practice Guide "Engagement Planning: Establishing Objectives and Scope," which provides detailed information about building upon the risk assessment to develop the engagement objectives and scope.) In addition, the risk heat map and risk and control matrix will lend support to the engagement results and conclusions, in conformance with Standard 2330 – Documenting Information.

Standard 2210 – Engagement Objectives

Form engagement objectives.

The overall objective of a capital adequacy audit is typically to provide independent assurance over the governance, policies, processes, and key controls that support the implementation, execution, and oversight of an organization's capital adequacy risk management framework. The process of forming engagement objectives for capital planning should be closely related to the current year or cycle's business objectives and strategies, significant risks identified in the preliminary risk assessment, and the regulatory requirements the bank must meet in terms of their capital position.

Objectives of Assurance Engagements

- Reflect risks to the business objectives of the area or process that were assessed as significant during the preliminary risk assessment (Standard 2210.A1).
- Consider the probability of significant errors, fraud, noncompliance, and other exposures (Standard 2210.A2).
- Identify appropriate evaluation criteria (Standard 2210.A3).

Internal audit should include criteria it will use to evaluate the capital adequacy risk management framework in its engagement objectives. These criteria are needed to determine whether capital adequacy related objectives and goals have been accomplished. According to Standard 2210.A3, there are three types of criteria internal audit may want to use to construct the evaluation criteria for engagements:

- Internal (e.g., policies and procedures of the organization).
- External (e.g., laws and regulations imposed by statutory bodies).
- Leading practices (e.g., industry and professional guidance).

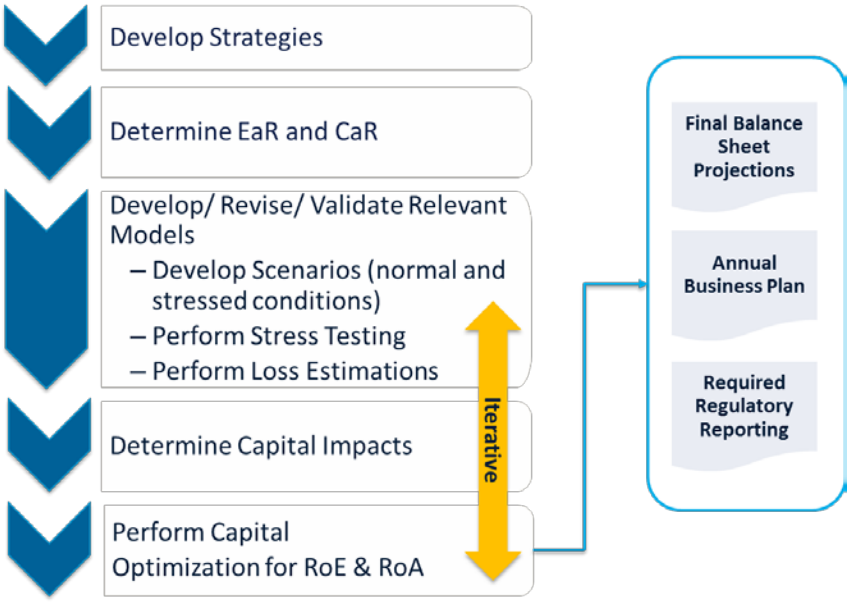
In the end, the assessment should determine whether the end-to-end process is functioning in accordance with the expectations of supervisors and the board and as described in approved policies and procedures.

Standard 2220 – Engagement Scope

Establish engagement scope.

The CAE, or internal auditors assigned by the CAE, should be involved in various meetings throughout the bank regarding capital risks, capital risk management, and strategic planning, which may lead to the business line, product, or a specific model's inclusion in the internal audit engagement scope for the capital planning process. At a high level, audits of the capital planning process may be structured as an end-to-end assessment, as shown in **Figure 10** below, culminating in the issuance of an opinion.

Figure 10: Capital Planning Process and Resulting Reports



Alternately, internal auditors may choose to break the overall assessment of capital adequacy down into separate engagements and may choose to thoroughly assess only specific segments of the capital risk management process each year of a multi-year audit cycle. However, if internal audit is going to break the audit up, it must be careful to follow the results of its risk assessments and conform to Standard 2010 – Planning, which states, "The chief audit executive must establish a risk-based plan to determine the priorities of the internal audit activity, consistent with the organization's goals."

For example, in year one, internal auditors may choose to review the governance process surrounding the Risk Appetite Framework and strategic planning to assure that board oversight is appropriate and that reporting is complete and timely. In year two, internal auditors could focus on operational risk and stress testing. In year three, the audit engagement could focus on credit and market risk. Regulatory reporting would be examined in each of the three years.

Additionally, internal auditors may target engagements to specific business lines, regions, or product lines. A targeted approach could include stand-alone assessments of capital planning, the Risk Appetite Framework, stress testing, and the leverage ratio. In the stand-alone assessments, internal auditors may test and report on different phases of the capital planning process that consume the majority of the time and resources.

Standard 2230 – Engagement Resource Allocation

Allocate resources.

To accurately and completely examine the capital planning process, internal auditors should take care to ensure they are independent and that the appropriate technical skill sets are employed. The most common way internal auditors or second line personnel may have their independence impaired is if they are involved with the development, implementation, or validation of any relevant models. If this situation occurs, the auditors or second line personnel who performed the validation work should not be part of the audit team.

In conformance with Standard 2230, the CAE should assess the skills of internal audit team members periodically to ensure that the internal audit activity has the appropriate skills to evaluate the capital adequacy of the organization. If the CAE wishes to issue an opinion on the capital adequacy risk management process including the more technical areas such as specific statistical financial models, a suggestion is to evaluate the possibility of relying on the work of other internal and external assurance and consulting service providers (i.e., the second line of defense or third-party service providers). Some special skill sets required to examine and validate models might include:

- Creation of sample data sets to run through the models to determine if the results reported by management are consistent with results seen given the independent data assets.
- Examining the technical change control process used to create and revise the models.
- Examining the source code to ensure values are not hard coded into the models for fields that should update automatically or that contain data linked from another source that would cause erroneous results.
- Examine the model validation process including documentation, validation methods, and competency of personnel (either internal or external) performing the validations.
- Examine data feeds for stability and error rates.

However, as noted in Standard 2050 – Coordination and Reliance, the CAE should carefully consider the competency, objectivity, and due professional care of the other providers, as well as clearly understanding the scope, objectives, and results of their work, because the CAE retains the responsibility for ensuring adequate support exists for the conclusions and opinions reached by the internal audit activity.

Standard 2330 – Documenting Information

Document the plan.

During planning, internal auditors document information in engagement workpapers. This information becomes part of the engagement work program that must be established to achieve the engagement objectives, as required by Standard 2240 – Engagement Work Program.

The process of establishing the engagement objectives and scope may produce any or all of the following workpapers:

- Process maps.
- Model inventories.
- Summary of interviews and brainstorming sessions.
- Preliminary risk assessment (e.g., risk and control matrix and heat map).
- Rationale for decisions regarding which risks to include in the engagement.
- Criteria that will be used to evaluate the area or process under review (required for assurance engagements, according to Standard 2210.A3).

For more details on how to plan and scope an audit, see The IIA Practice Guide "Engagement Planning: Establishing Objectives and Scope."

Standard 2240 – Engagement Work Program

When constructing their engagement work programs, internal auditors should be careful to establish realistic timelines for testing. Elements of the capital planning process, such as determining Earnings at Risk (EaR) and Capital at Risk (CaR), risk modeling for normal conditions, stress testing, and aggregating the impacts to capital are often done in parallel. And the process is iterative so these models keep running and the inputs and outputs change rapidly.

Internal auditors may not always have access to the most up-to-date data while executing their capital planning internal audit engagement. They also may not have timely access to the personnel needed to validate controls present in the capital planning process. Managing these risks to the audit procedures must be proactive and the right skill sets must be present in the internal audit group or a plan for relying on the work of others should be in place before the process begins.

Refer to Appendix E. Internal Audit Engagement Considerations for the Capital Planning Process, for additional information.

Standard 2400 – Communicating Results

At the conclusion of the internal audit engagement, internal auditors should be able to deliver a report (an opinion if required by regulation) on the effectiveness and efficiency of the governance, risk management, and controls involved in the capital planning process. The report also should include conclusions (or opinions as necessary) on the effectiveness of the bank's model risk management program, the stress scenarios applied to the models (if not provided/required by the regulator), and the accuracy of the stress tests and scenarios in relation to the economic environment faced by the bank.

Given capital planning is a vital process related to the safety and soundness of the bank, internal audit departments should not only follow their standard reporting procedures for all capital planning audits, but also ensure a copy is given directly to the board or its delegates.

Appendix A. Related IIA Standards and Guidance

Please refer to the *Standards* for the complete pronouncement. To assist with the implementation of the *Standards*, The IIA recommends that internal auditors refer to each standard's respective Implementation Guide.

Related IIA Standards
Standard 1220 – Due Professional Care
Standard 2010 – Planning
Standard 2050 – Coordination and Reliance
Standard 2200 – Engagement Planning
Standard 2201 – Planning Considerations
Standard 2210 – Engagement Objectives
Standard 2220 – Engagement Scope
Standard 2240 – Engagement Work Program
Standard 2330 – Documenting Information
Standard 2400 – Communicating Results

Related IIA Guidance
Practice Guide "Auditing Liquidity Risk: An Overview," 2018.
Practice Guide "Engagement Planning: Establishing Objectives and Scope," 2017.
Practice Guide "Auditing Model Risk Model Risk Management," 2018.
IIA Position Paper: The Three Lines of Defense in Effective Risk Management and Control, 2013.

Appendix B. Glossary

Terms identified with an asterisk (*) are taken from the "Glossary" of The IIA's *International Professional Practices Framework® (IPPF®), 2017 edition.*

Capital – According to Basel III, consists of the sum of Tier 1 capital (going-concern capital) and Tier 2 Capital (gone-concern capital). For each category there is a single set of criteria that instruments are required to meet. Those requirements are described in Basel documentation.

Capital Adequacy – Enough capital to run an institution's business while still absorbing the risk and volatility of its credit, market, and operational threats.

Chief Audit Executive* – Describes the role of a person in a senior position responsible for effectively managing the internal audit activity in accordance with the internal audit charter and the mandatory elements of the International Professional Practices Framework. The chief audit executive or others reporting to the chief audit executive will have appropriate professional certifications and qualifications. The specific job title and/or responsibilities of the chief audit executive may vary across organizations.

Dodd-Frank Act – U.S. Dodd-Frank Wall Street Reform and Consumer Protection Act. Financial reform legislation passed by the Obama administration as a response to the financial crisis of 2008.

Leverage Ratio – According to Basel III, the capital measure (the numerator) divided by the exposure measure (the denominator), with this ratio expressed as a percentage: Leverage ratio = Capital measure / Exposure measure.

Liquidity – The ability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. [28]

Risk Appetite* – The level of risk that an organization is willing to accept.

Risk Appetite Statement – The written articulation of the aggregate level and types of risk that a bank will accept, or avoid, in order to achieve its business objectives. It includes quantitative measures expressed relative to earnings, capital, risk measures, liquidity, and other relevant measures as appropriate. It should also include qualitative statements to address reputation and conduct risks as well as money laundering and unethical practices. [29]

[28] Basel Committee on Banking Supervision. *Principles for Sound Liquidity Risk Management and Supervision*. (Basel, Switzerland: Bank for International Settlements, 2008). https://www.bis.org/publ/bcbs144.pdf.

[29] Financial Stability Board, "Principles for An Effective Risk Appetite Framework," November 2013, http://www.fsb.org/wp-content/uploads/r_131118.pdf.

Risk Appetite Framework – The overall approach including policies, processes, limits, controls, and systems through which risk appetite is established, communicated, and monitored. It includes a risk appetite statement, risk limits, and an outline of the roles and responsibilities of those overseeing the implementation and monitoring of the risk appetite framework. The risk appetite framework should consider material risks to the bank, as well as to its reputation vis-à-vis policyholders, depositors, investors, and customers. The risk appetite framework aligns with the institution's strategy.[30]

Risk-based Capital (RBC) – The amount of capital that supervisors deem necessary for an institution to maintain its overall business operations.

Risk Capacity – Maximum acceptable risk exposure before breaching capital and liquidity needs.

Risk Tolerance – The acceptable variation in outcomes related to specific performance measures linked to objectives the entity seeks to achieve.[31]

[30] Ibid.

[31] Beasley, Mark S., Bonnie V. Hancock, and Bruce C. Branson for Committee of Sponsoring Organizations of the Treadway Commission. Strengthening Enterprise Risk Management for Strategic Advantage, 2009.

Appendix C. Definitions of Capital

Tier 1 and Tier 2 Capital

The Basel standard requires banks to maintain minimum capital levels to cover losses in proportion to risky assets held on their balance sheets. This capital is bifurcated into Tier 1 and Tier 2 capital. Tier 1 capital is considered the highest quality or "core" capital as introduced in Basel II. Tier 1 capital can absorb losses without requiring the bank to cease trading activities. Under Basel III, only common equity is considered core capital.

Tier 1 capital is also known as going-concern capital, which means that the business is viable and operating although suffering losses of some significance. Tier 1 capital consists of Common Equity Tier 1 (CET1) and Additional Tier 1 capital. CET1 capital includes high quality liquid capital, such as:

- Common shares issued by the bank.
- Retained earnings.
- Accumulated other comprehensive income.
- Other disclosed reserves.[32]

Basel III lays out specific criteria for an instrument to be included in CET1. Further, the instrument must meet all of those criteria to merit inclusion. Additional Tier 1 capital consists of "Instruments issued by the bank that meet the criteria for inclusion in Additional Tier 1 capital (and are not included in Common Equity Tier 1)."[33] For example, perpetual bonds may be included as Additional Tier 1 capital. Basel III sets out minimum requirements for Additional Tier 1 capital. Instruments must meet or exceed these requirements for inclusion. Some types of instruments that would not qualify for inclusion in Additional Tier 1 capital are:

- Subordinated debt.
- Unsecured debt.
- Instruments with a maturity date.
- Instruments with a credit-sensitive dividend feature.
- Special purpose vehicles/off-balance sheet liabilities (that are not issued out of an operating entity or the holding company in the consolidated group).[34]

However, these instruments may qualify for inclusion in Tier 2 capital.

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[32] Basel Committee on Banking Supervision. *Basel III: A global regulatory framework for more resilient banks and banking systems*. (Basel, Switzerland: Bank for International Settlements, 2011). https://www.bis.org/publ/bcbs189.pdf

[33] Ibid.

[34] Ibid.

Regulatory adjustments are deducted in the calculation of CET1. These adjustments account for balance sheet items that are intangible assets, hedging an exposure, or are accruals for expenses that have not yet been incurred. These adjustments also help the bank avoid situations where they may be double counting certain capital amounts. Some of the items deducted from Tier 1 or Tier 2 capital will receive different risk weightings and may be deducted at different rates.[35] Per Basel III, regulatory adjustments will be calculated for some items. Once CET1 has been calculated and adjusted, the bank can move on to the calculations for Tier 2 capital.

Tier 2 capital (CET2) is also known as "gone-concern capital," which means the business is no longer viable. This type of capital represents the less liquid, lower quality assets that would be consumed in a fatal situation for the bank. The addition is that general loan loss reserves are eligible for inclusion in Tier 2 but are limited to a maximum of 1.25 percentage points of credit risk weighted assets calculated under the standardized approach.[36] Loan loss reserves cannot be included in Tier 1 capital in any form.

The capital requirements are as follows:

1. Tier 1 equity capital must be at least 4.5 percent of RWA at all times.
2. Total Tier 1 capital (Tier 1 equity capital plus Additional Tier 1 capital) must be at 6 percent of RWA at all times.
3. Total capital (total Tier 1 plus Tier 2) must be at least 8 percent of RWA at all times.[37]

[35] Basel Committee on Banking Supervision. *Basel III: A global regulatory framework for more resilient banks and banking systems*. (Basel, Switzerland: Bank for International Settlements, 2011). https://www.bis.org/publ/bcbs189.pdf.

[36] Ibid.

[37] Basel Committee on Banking Supervision. *Basel III phase-in arrangements.* (Basel, Switzerland: Bank for International Settlements, 2013). https://www.bis.org/bcbs/basel3/basel3_phase_in_arrangements.pdf.

The Basel III revised regulatory capital requirements are phasing in over nine years as shown in Figure C.1.[38]

Figure C.1: Phase-in Arrangements

Annex 4 Phase-in Arrangements (shading indicates transition periods – all dates are as of 1 January.)

	2011	2012	2013	2014	2015	2016	2017	2018	As of 1 January 2019
Leverage Ratio	Supervisory monitoring		Parallel Run 1 Jan 2013 – 1 Jan 2017 Disclosure starts 1 Jan 2015					Migra-tion to Pillar 1	
Minimum Common Equity Capital Ratio			3.5%	4.0%	4.5%	4.5%	4.5%	4.5%	4.5%
Capital Conservation Buffer						0.625%	1.25%	1.875%	2.50%
Minimum common equity plus capital conservation buffer			3.5%	4.0%	4.5%	5.125%	5.75%	6.375%	7.0%
Phase-in of deductions from CET1 (including amounts exceeding the limit for DTAs, MSRs, and financials)				20%	40%	60%	80%	100%	100%
Minimum Tier 1 Capital			4.5%	5.5%	6.0%	6.0%	6.0%	6.0%	6.0%
Minimum Total Capital			8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
Minimum Total Capital plus conservation buffer			8.0%	8.0%	8.0%	8.625%	9.25%	9.875%	10.5%
Capital instruments that no longer qualify as non-core Tier 1 capital or Tier 2 capital			Phased out over 10 year horizon beginning 2013						

Source: Basel Committee on Banking Supervision. *Basel III: A global regulatory framework for more resilient banks and banking systems*. (Basel, Switzerland: Bank for International Settlements, 2011) https://www.bis.org/publ/bcbs189.pdf.

Total Loss-Absorbing Capacity (TLAC) Standard for Global Systemically Important Banks

In November 2015, the Financial Stability Board (FSB) issued the final Total Loss-Absorbing Capacity (TLAC) standard for global systemically important banks (G-SIBs). The TLAC standard ensures that G-SIBs will have:

> sufficient loss-absorbing and recapitalization capacity available in resolution for authorities to implement an orderly resolution that minimizes impacts on financial

[38] Basel Committee on Banking Supervision. *Basel III: A global regulatory framework for more resilient banks and banking systems*. (Basel, Switzerland: Bank for International Settlements, 2011) https://www.bis.org/publ/bcbs189.pdf.

stability, maintains the continuity of critical functions, and avoids exposing public funds to loss.

G-SIBs will be required to meet the TLAC requirement alongside the minimum regulatory requirements set out in the Basel III framework. Specifically, they will be required to meet a Minimum TLAC requirement of at least 16% of the resolution group's risk weighted assets (TLAC RWA Minimum) as from 1 January 2019 and at least 18% as from 1 January 2022. Minimum TLAC must also be at least 6% of the Basel III leverage ratio denominator (TLAC Leverage Ratio Exposure [LRE] Minimum) as from 1 January 2019, and at least 6.75% as from 1 January 2022.

G-SIBs headquartered in emerging market economies will be required to meet the 16% RWA and 6% LRE Minimum TLAC requirement no later than 1 January 2025, and the 18% RWA and 6.75% LRE Minimum TLAC requirement no later than 1 January 2028. This conformance period will be accelerated if, in the next five years, corporate debt markets in these economies reach 55% of the emerging market economy's GDP. The FSB will monitor implementation of the TLAC standard and will undertake a review of the technical implementation by the end of 2019.[39]

The findings of the impact assessment studies conducted by experts at the FSB, Basel Committee on Banking Supervision, and Bank for International Settlements (BIS) are published alongside the final TLAC standard in the form of the following reports:

- Overview report summarising the findings of the TLAC impact assessment studies.
- Quantitative Impact Study report conducted by the BCBS.
- Economic Impact Assessment report conducted by a group of experts chaired by the BIS.
- Historical Losses and Recapitalisation Needs findings report.

The impact assessment studies found that the micro- and macroeconomic costs of TLAC are relatively contained. The estimated costs for G-SIBs of meeting the minimum TLAC requirement are found to translate into increases in lending rates for the average borrower that range from 2.2 to 3.2 basis points, while the median long-run annual output costs are estimated at 2 to 2.8 basis points of GDP. The benefits of TLAC arise from the reduced likelihood and cost of crises and exceed these costs, with even the most conservative assumptions yielding estimated benefits of between 15 and 20 basis points of annual GDP.[40]

[39] "FSB issues final Total Loss-Absorbing Capacity standard for global systemically important banks." 2015. http://www.fsb.org/2015/11/tlac-press-release/. Accessed March 8, 2018.

[40] Ibid.

Appendix D. Basel III Implementation – Global Progress

The degree to which banks are required to comply with the Basel III capital standards vary by country and region, as some jurisdictions impose requirements that are stricter than the Basel III minima (known as super-equivalence) or fast-track implementation ahead of the global schedule.

For example, by 2019, Switzerland's universal full-service banks must have a capital charge of 19 percent of total RWA while most European countries will have minimum total capital (plus conservation buffer) of 10.5 percent of RWA.

Per BCBS, Basel III capital ratios will be phased in as follows:

- Regulatory adjustments (i.e., stricter sets of deductions that apply under Basel III) are fully phased in as of 1 January 2018.
- An additional 2.5% capital conservation buffer above the regulatory minimum capital ratios, which must be met with CET1 capital, will be phased in by 1 January 2019.
- The additional loss absorbency requirement for global systemically important banking institutions (G-SIBs), which ranges from 1.0% to 2.5%, will be fully phased in by 1 January 2019. It will be applied as an extension of the capital conservation buffer and must be met with CET1.[41]

In the Bank for International Settlements' September 2017 Basel III Monitoring Report, data were provided for a total of 200 banks, including 105 Group 1 banks and 95 Group 2 banks. Group 1 banks are those that have Tier 1 capital of more than €3 billion and are internationally active. All other banks are considered Group 2 banks. All banks in the sample meet Basel III minimum and target CET1 capital requirements as agreed up to end-2015.

[41] Basel Committee on Banking Supervision. *Basel III: Finalising post-crisis reforms*. (Basel, Switzerland: Bank for International Settlements, 2017). https://www.bis.org/bcbs/publ/d424.pdf.

Appendix E. Internal Audit Engagement Considerations for the Capital Planning Process

Given the internal audit activity's role in providing independent assurance that the bank is managing risk in a way that is consistent with regulatory requirements and the achievement of their objectives, Tables E.1 and E.2 comprise a framework for conducting an internal audit of the capital planning process. The internal auditor may need to tailor or create test steps for unique areas of an organization's policies and procedures. The internal auditor may also need to refer to audit programs for related areas (i.e., model risk management, liquidity risk management, credit/market/operational risk management) to design a fully developed capital planning audit, especially if the audit is broken down into segments as mentioned in this guide.

Table E.1: Capital Planning Governance and Oversight

Risk Assessment

- Gather documentation including:
  - Charters, policies, and other mandate information for the governance entities responsible for establishing the capital adequacy strategy.
  - Any documents or personnel that can assist them in understanding the minimum capital required, which will drive the capital strategy.
  - Documentation of all phases of the capital planning process, including how Tier 1 and Tier 2 capital is classified and accuracy of resulting RWA calculations.
  - Results of modeling for credit, market, and operational risks.
  - Documentation of the process for designing and running normal and stress scenarios.
  - Reports containing the results of stress testing.
- Gain an understanding of the key risks identified as related to the bank's objectives.
- Rate risks in accordance with the organization's established risk assessment methodology.

Risk Appetite Framework

- Review the institution's Risk Appetite Framework for completeness and adequacy.
- Ensure it contains the necessary components:
  - Risk capacity: The maximum level of risk the bank can assume given its current level of resources, constraints, and its obligations.
  - Risk limits: The allocation of aggregate risk appetite limits to business lines, legal entities, specific risk categories, and other relevant granular levels.
  - Risk tolerance: Indicates how much variance the institution will accept around trades, etc., given the parameters set for risk capacity and their associated risk limits.

Communication

- Review plans and processes to communicate the risk appetite to all employees.
- Ensure the plan covers the entire organization and is executed regularly.
- Use surveys, interviews, or other methods to ascertain both employee participation in communication programs and their level of understanding regarding the institution's risk appetite.

Policies and Procedures

- Compare content of the Risk Appetite Framework and its associated statement(s) to the institution's capital adequacy policy and regulatory requirements to ensure all required limits and triggers are included.
- Verify that the policies and procedures are current and updated timely for any procedural changes.
- Confirm that any updates requested by the board during the annual review were properly made.
- Ensure the policies and procedures cover the entire capital planning process in detail. Specific areas of importance include:
  - Relationship to strategies and risk appetite.
  - Governance overview.
  - Controls.
  - Risk limits and tolerances with their associated triggers and escalation protocols (walk through the process from the identification of a breach through resolution).
  - Data considerations.
  - Regulatory requirements.
  - Ensure all pertinent regulations have been incorporated into the policies and procedures (e.g., SR 11-07/OCC 2011-12, SR 15-18, Basel II, Basel III).

Board Reporting

- Review capital planning-related reports for the board. Ensure the reports contain all pertinent information the board requires to make informed decisions regarding the institution's capital strategy.
- Best practices indicate the following information should be delivered to the board at least annually:
  - Analysis of the macroeconomic environment.
  - Capital levels related to budgets and forecasts.
  - Financial performance for business lines and the overall institution.
  - Updates on issues important to stakeholders including regulatory changes and market events.
- Reports from senior management regarding status of any deficiencies or findings related to the execution of the capital strategy or capital planning process.
- Obtain evidence that the board is performing an annual review of the capital planning process.

Table E.2: Capital Planning Process

Scenario Development and Stress Testing

- Conduct walk-throughs of the processes the bank uses to ensure capital adequacy during both normal and stressful conditions.
- Ascertain whether periodic stress tests are conducted and whether the results are shared as defined in the capital adequacy policy.
- Validate that a contingency funding plan is in place consistent with the loss scenarios identified in the stress testing exercise.
- Obtain enough evidence to ensure that the data produced during the capital planning process not only followed the correct policies and procedures and have the appropriate approvals but that the numbers are reasonable.

Risk Limits and Escalation Protocols

- Review the controls in place to monitor indicators approaching the defined limits and how the functions monitoring capital are addressing identified issues.
- Review the actions taken by management in cases where thresholds appear to have been breached.
- Design tests to determine whether the Risk Appetite Framework aligns with the capital adequacy policy.
- Challenge the suitability of the risk appetite and the thresholds established for adequacy and the controls the entity has established.

Risk Weighted Assets

- Review the organization's risk weighted assets and the quality and quantity of the organization's Tier 1 and Tier 2 capital in detail.
- Review the capital allocated for each risk to validate compliance with the capital adequacy policy.
- Validate the data used by the organization in the capital calculation.
- Bring any red flags or gaps in the risk weighted asset measurement or capital allocation to the attention of management for discussion.
- Review the allocation of capital for various business units and the utilization and returns of capital as part of the assessment.
- Identify and raise issues related to the classification of capital instruments and gaps in risk weighted assets measurement or compliance to capital adequacy norms established by Basel or local regulators as necessary.

Models

- Examine datasets ensuring that the organization has met the general criteria on loss data identification, collection, and treatment for operational risk as laid out in Basel III: Finalising post-crisis reforms, December 2017, p. 130 – 133.
- Follow your organization's model risk management audit programs as appropriate to audit individual models.
- At a minimum:
  - Validate the institution's inventory of models used in the capital planning process.
  - Execute some level of model validation including back testing, confirmation of assumptions, and resulting estimates and forecasts.

Further Engagement Considerations from Regulatory Sources

Internal auditors may also find helpful information to assist them in planning their audits from various regulatory publications, as in the two examples provided here:

According to Capital Planning at Large Bank Holding Companies: Supervisory Expectations and Range of Current Practices, published by the U.S. Federal Reserve in 2013,[42] seven principles underlie an effective capital adequacy process:

1. Risk identification and management.
2. Loss estimation.
3. Capital resource estimation.
4. Capital adequacy assessment.
5. Capital policy and planning.
6. Internal controls.
7. Board/senior management oversight.

According to "A sound capital planning process: fundamental elements," published by BCBS in January 2014, the Basel committee provided four fundamental components of a sound capital planning process:

1. Internal control and governance.
2. Capital policy and risk capture.
3. Forward-looking view.
4. Management framework for preserving capital.

Two additional resources are available from BCBS regarding capital adequacy and stress testing. First, "Principles for sound stress testing practices and supervision," introduced 21 principles: 15 for banks and six for supervisors.[43] Second, after the development and evolution of new techniques, computational capabilities, and expertise, a new consultative document with nine consolidated principles "at a sufficiently high level to avoid impeding innovation in this rapidly evolving area" was published.[44]

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[42] https://www.federalreserve.gov/bankinforeg/bcreg20130819a1.pdf.

[43] Basel Committee on Banking Supervision. *Principles for sound stress testing practices and supervision*. (Basel Switzerland: Bank for International Settlements, 2009). www.bis.org/publ/bcbs155.pdf.

[44] Basel Committee on Banking Supervision. *Consultative Document: Stress testing principles*. (Basel, Switzerland, Bank for International Settlements, 2017). https://www.bis.org/bcbs/publ/d428.pdf.

Appendix F. Sample Capital Adequacy Risks and Controls

This table lists some of the main risk areas and controls that internal auditors should consider when performing a capital planning process risk assessment. The list is neither exhaustive nor meant to be used as an engagement work program or checklist.

In practice these risk areas should be broken down into their appropriate balance sheet accounts, product lines, or similar categories used by the particular organization and analyzed for relevant risks. The controls are broadly represented in categories of elements, such as strategies, documents, models, data flows, reports, and analyses that could be utilized to mitigate risks that may occur in the listed risk areas.

Risk	Controls
Bank fails to meet minimum capital requirements established by Basel Committee on Banking Supervision and local regulators.	■ Tier 1 and Tier 2 capital. ■ Capital adequacy ratio. ■ Capital adequacy strategy and responsible parties. ■ Capital conservation buffer. ■ Risk weighted assets. ■ Capital adequacy policy is in place.
Organization fails to properly identify and calculate significance of capital adequacy risk.	■ Risk Appetite Framework is in place. ■ Risk Appetite Framework aligns with capital policy. ■ Parameters set in Risk Appetite Framework reflect relevant risks and are within regulatory guidelines. ■ Risk Appetite Framework is communicated and understood across the bank as appropriate. ■ Risk appetite is defined and understood. ■ Risk capacity is defined and understood. ■ Risk limits are defined and understood. ■ Risk Appetite Statement is in place. ■ Capital adequacy policy articulates capital targets, stress tolerances, potential crisis/failure thresholds. ■ Early warning indicators are in place to alert management when risk limits may be breached. ■ Controls ensure monitoring of limits to identify and address issues.
Bank has not properly prepared for credit needs; not enough capital allocated (scenarios could include: losses due to deterioration of asset quality, losses due to movements in underlying market factors, operational losses due to external events, etc.).	■ Risks of assets are weighted and capital is allocated as percentage of risk weighted assets. ■ Risk weighted asset measurement methodology and capital calculation data are valid. ■ Assets are in compliance with adequacy policy.

Risk	Controls
Organization cannot survive period of financial or economic stress.	■ Periodic stress tests are conducted. ■ Results of periodic stress tests are shared according to capital adequacy policy assumptions, models, and inputs to the Internal Capital Adequacy Assessment Process (ICAAP) are appropriate. ■ ICAAP strategies and procedures are repeatable and dependable.
Bank fails to meet leverage ratio guidelines or fails to be solid in terms of indebtedness.	■ Manuals explain ratio sufficiently and are updated regularly. ■ Roles, responsibilities, and data provided by each are clearly defined. ■ Controls are consistent. ■ Calculation of ratio and data used are valid. ■ Oversight and the control environment are satisfactory. ■ Leverage ratio calculation and reporting are in compliance with regulations. ■ Leverage ratio was published and reported to regulator.

Appendix G. References and Additional Reading

References

Basel Committee on Banking Supervision. *Basel III: a global regulatory framework for more resilient banks and banking systems*. (Basel, Switzerland: Bank for International Settlements, 2011). https://www.bis.org/publ/bcbs189.pdf.

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