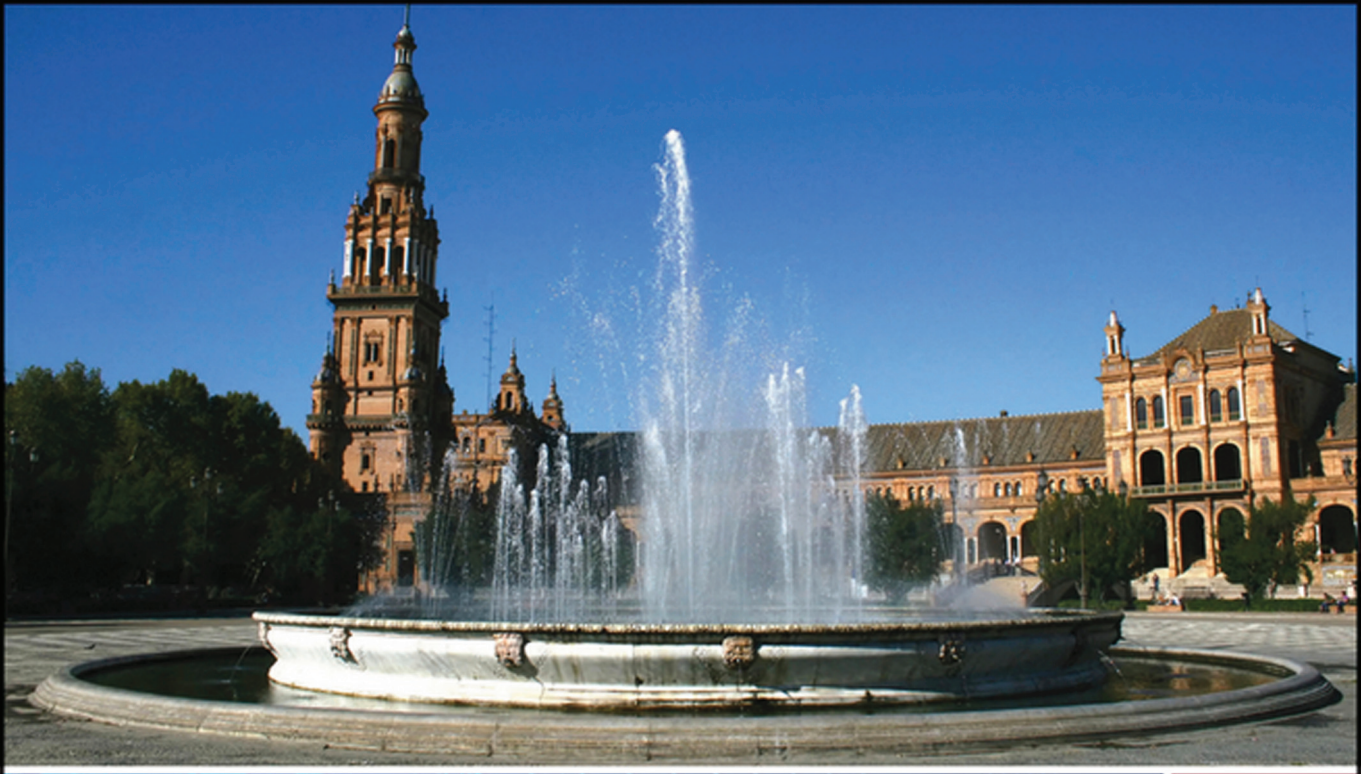
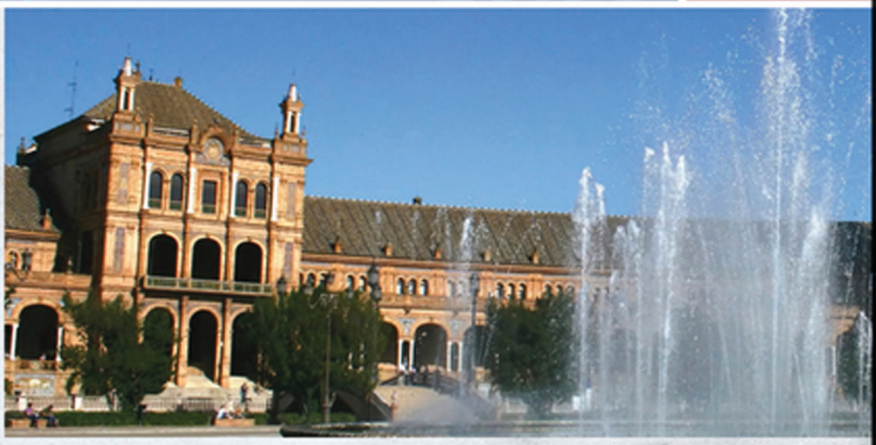


TREASURY MARKETS and OPERATIONS



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The Hong Kong Institute of Bankers

Treasury Markets and Operations

Treasury Markets and Operations

The Hong Kong Institute of Bankers

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Preface

Treasury Markets and Operations (TMO) and *Bank Asset and Liability Management* (ALM) are the two modules within the Hong Kong Institute of Bankers' (HKIB) curriculum of Treasury Management. As part of the Associate of the Hong Kong Institute of Bankers (AHKIB) Qualifications structure, the syllabuses are tailor made for learning and development of a banking career in Hong Kong and Mainland China. Therefore, the two modules—TMO and ALM—are closely related with one focusing on treasury market knowledge and tools for strategic execution and the other on how the overall composition of assets and liabilities should be formulated and managed to support the bank business model.

Why is the role of bank treasury important? Bank treasury needs to have the capability to understand the complexity of market conditions and the usage of treasury market products to implement the ALM strategy set by the asset and liability management committee (ALCO) and bank management. It is also closely involved in the control of a number of key risks including market risk, interest rate risk and liquidity risk, which are among the eight inherent risks under constant vigilance at banks and financial institutions.

This book *Treasury Markets and Operations* aims to equip bank treasury professionals with the necessary knowledge and tools to understand the complexity of changing market conditions and to apply their learning to manage risks and take advantage of emerging opportunities. The launch of this book on treasury markets and operations is very timely given recent developments in 2013–14, including:

- Increased market volatility in both the currency and money market, such as the further liberalization of the CNY foreign exchange rate mechanisms, the Bank of Japan policy on the JPY exchange rate, and the tapering of the third iteration of the Federal Reserve program of quantitative easing and the effect on the interest rate cycle.

- The beginning of the rollout of Basel III, which will take effect through 2013–2019 and will have significant effects on the future of bank business models in particular the size of balance sheets through the leverage ratio, the decision on the holdings of high quality liquid assets against the composition of bank liabilities, the complexity of internal transfer pricing on both liquidity and capital costs, and the complexity of collateral management for ver the counter (OTC) derivatives contracts.

In his 2013–14 Budget Speech, the Financial Secretary of Hong Kong mentioned the importance of financial services as one of the four pillar industries for the territory.

There are several areas that the industry will depend upon to develop a strong bank treasury sector:

a. Strengthening RMB-denominated financial products in promoting Hong Kong as an offshore RMB business centre;
b. Enhancing services for multinational enterprises to manage their global or regional treasury functions in Hong Kong; and
c. Increasing the depth of the bond market with the growing adoption of bonds (post-2015) as eligible high quality liquid assets for bank liquidity risk management.

The Hong Kong economy has been resilient against international financial crisis and has earned the highest AAA sovereign credit rating from Standard & Poor's since 2010, thanks in part to the strong standard of governance and a well-regulated and capitalized banking sector. Due to the cross border nature and the growing size of financial intermediation activities vis-à-vis the size of our economy, the banking sector must remain vigilant against future financial shocks. A strong bank treasury operations are critical to the timely and sound execution, especially during times of crisis.

Strong treasury management operations are key to the safe and successful operation of a bank or financial institution.

This book is divided into three parts and nine chapters that delve deeply into the subject matter. Every effort has been made to ensure that policies and regulations discussed are up to date and current as of early 2014. Students are advised to keep themselves up-to-date on evolving TMO issues available through the web sites of the Institute, the Hong Kong Monetary Authority (HKMA), and the Bank for International Settlements (BIS).

The first part of this book starts with a background discussion of bank treasury management. Chapter 1 considers treasury management in financial institutions and the issues the bank treasury has to deal with. Chapter 2 looks at the foreign exchange market, a significant part of bank treasury operations given that Hong Kong was ranked in the 2013 BIS survey as the world's fifth largest centre for foreign exchange trading. Chapter 3 looks at the money and capital markets with a particular focus on how these markets operate in Hong Kong. Chapter 4 then looks in depth at the bond market—and an appendix provides a more detailed discussion of the quantitative aspects of bond valuation. The discussion then moves on to derivative products in Chapter 5.

The second part of this book starts with Chapter 6, with a discussion of the various operations associated with the treasury. Because much of what the treasury does involves considerations of risk, that is exactly what Chapter 7 starts to consider with a discussion of the various types of risk, in particular market risk and how to assess their potential impact. Chapter 8 then moves on to a discussion of RMB payment and settlement systems as part of the development of Hong Kong as an offshore RMB centre, which are critical to managing treasury operational risks.

The final chapter in this book brings the discussion to a practical conclusion by considering a series of case studies to illustrate how weaknesses in treasury control can result in significant financial loss to financial institutions.

This book includes detailed explanations, summaries, tables, and charts to help industry professionals develop a sound theoretical framework for their work in the field. Both students and working professionals can benefit from this detailed work, produced in collaboration with some of Hong Kong's most prominent professionals. Aimed at banking practitioners and designed as an essential tool to achieve learning outcomes, this book includes recommendations for additional readings. This textbook should be used in conjunction with related regulatory documents published by the BIS, HKMA and other institutions, some of which are referenced in the text. A list of further readings at the end of each chapter will help readers expand their knowledge of each subject while supplementary readings can help readers dig deeper into specific areas. Essential readings will occasionally be highlighted and these are important for students preparing for the examinations leading to the Associate of the Hong Kong Institute of Bankers designation (AHKIB).

The information resources in the collection of Hong Kong Monetary Authority publications provided essential references in developing much of the book. The preparation of this work would not have been possible without the support and assistance of a number of subject expert advisors. We would like to extend our sincere thanks to Mr. Peter Wong Wai Man for his valuable insight and review on the syllabus and content of this book. Mr. Wong is also the Executive Board Member of the Treasury Markets Association. There are many others whose generous advice, support and encouragement have contributed to the development of the book. The Hong Kong Institute of Bankers and future banking professionals are indebted to all of them.

The Hong Kong Institute of Bankers

PART 1

1

TREASURY MANAGEMENT

CHAPTER 1

1

Treasury Management of Financial Institutions

Learning objectives

After studying this chapter, you should be able to:

1. Understand the role the treasury plays in financial institutions including those of the front office, middle office, and back office.
2. Discuss treasury issues such as management of the balance sheet, liquidity risk, settlement and pre-settlement credit risk, interest rate risk, and foreign exchange exposure.
3. Understand the implications of the Basel III accords on asset and liability management.
4. Describe the controls and measures in treasury management to protect against overexposure, errors, and fraud, manage conflicts of interest, and other issues.

Introduction

Among companies in general, the corporate treasury department makes sure there is sufficient cash at all times to meet the operational needs of the business. Treasury also takes charge of cash forecasting, working capital management, cash management, investment management, treasury risk management, and fund-raising.

Treasury in financial institutions functions the same way—with one important addition. In institutions where investment banking is a key activity, treasury also participates in the foreign exchange, loans and deposits, debt securities, commodity products, and their derivative instruments on behalf of the bank and the bank's clients.

As such, it is important for banking professional, not only to master the intricacies of managing the treasury function, but also to gain a deep knowledge of how financial markets work. The banking professional needs to know the products that are traded there, and the controls and code of ethics that are designed to help protect the organisation against fraud, errors, over-exposure, conflicts of interest, and other risks.

In this chapter, we discuss the general facets of treasury management in financial institutions to establish a broad framework for the succeeding chapters, which deal in more detail with the financial markets, risk considerations and controls, and model codes of conduct and best market practices.

Issues in Treasury Operations

Some people might think that treasury operations exist only to generate profits for the bank, but they would be wrong. In fact, treasury operations are integral to the proper functioning of a financial institution, including the areas of balance sheet management, liquidity risk management, management of settlement and pre-settlement credit risk, management of interest-rate risk, and management of foreign exchange exposure. Banking professionals in Hong Kong should, at the bare minimum, be intimately familiar with these processes.

In banks and financial institutions, treasury departments are typically split into front, middle, and back offices with different functions. These functions will be explored in greater detail later in the book.

There is an important relationship between the management of capital and the management of risk, a relationship that has to be fine-tuned. On the one hand, treasuries at banks and financial institutions are expected to manage capital to ensure there is always enough liquidity to "fund increases in assets or meet obligations as they fall due without incurring unacceptable losses," notes the Hong Kong Monetary Authority (HKMA) in its Supervisory Policy Manual.[1]

[1]"Supervisory Policy Manual: Liquidity Risk Management (LM-1)." Hong Kong Monetary Authority, V.1A, 1 April 2011. Web. 7 Mar 2014.

Managing this relationship has long required treasuries to walk a fine line but the job has become more complicated in the past decade as a result of changing regulations and new liquidity requirements. Relatively recent changes in the way institutions fund their liquidity include increases in the use of wholesale and capital market sources that are more sensitive to credit and price risks, more frequent use of off-balance sheet activities and advances in electronic technologies like internet banking and smart cards that allow for faster withdrawal of funds. It is up to the treasury to balance out all these changes and ensure there is enough liquidity at all times.

At the same time, the treasury has to keep risks within boundaries that are acceptable both to regulators and their institutions. There are multiple types of risk such as liquidity risk, liability risk, exchange rate risk, credit risk, regulatory risk, and so on.

Managing liquidity risk is central to the treasury's operations. This requires the treasury to stay on top of the institution's liquidity position at any given time, balance that against the liquidity needs of the institution, track off-balance sheet activities—such as trading in derivatives or options—to make sure the institution is not caught off guard by a sudden need to cover a position, and correlate the liquidity risk with other types of risk. A sudden and unaccounted-for change in interest rates could, for example, drain away some liquidity from the institution and cause a chain reaction with potentially serious consequences.

All these activities are spread throughout the treasury. Often unseen from the outside, treasury operations have grown in size and complexity over the past few years. The treasury is now involved in most operations of the bank in one way or another, as we explore in this section.

Balance Sheet Management

The term "balance sheet management" refers to the process of determining the size and composition of the bank's assets and liabilities to achieve (or exceed) capital adequacy requirements and other desired financial ratios. It is a complicated process that involves balancing the often-conflicting goals of making a profit, staying liquid, and reducing risk.

As a key member of the Asset-Liability Management Committee (ALCO), treasury contributes to balance sheet management through its fund-raising and proprietary trading activities.

Treasury's success or failure to raise loan capital, for example, has a direct impact on the bank's liquidity position on the balance sheet.

Treasury also plays a role in creating new instruments for trading on the external markets, which may include the bank's securitized assets. Securitization involves packaging and pooling assets on the balance sheet such as mortgages, car loans, and credit card loans into financial instruments, effectively taking them off the balance sheet and thus reducing capital requirements.[2]

[2] The role of the treasury and its instruments are discussed in greater detail in "Asset and Liability Management", another book in this series.

Basel III

Over the last few decades, there has been a visible process of consolidation among financial institutions. Fewer banks meant stronger banks, so the theory went, but it also meant a greater concentration of risk among fewer institutions. As a result, starting in the 1990s, the Basel Committee on Banking Supervision[3] (BCBS) of the Bank for International Settlements (BIS) started paying greater attention to issues associated with balance sheet management and the regulatory recommendations put forth in the Basel Accords, which many regulators use as the basis for domestic regulatory structures.[4]

Basel II, the second iteration of the accords, first introduced capital adequacy requirements in the mid-1990s to create an international standard for capital convergence and risk management. Basel II was finally approved in 2004. Capital requirements are the minimum amount of capital that a bank must maintain in relation to each of its activities—and different activities have different capital adequacy ratios. It became the job of the treasury to ensure these requirements are constantly met. These capital adequacy requirements created stronger banks but at a cost, particular in terms of opportunities. Taking capital out of operations and locking it away as an umbrella for a rainy days means banks have less capital to lend or invest. Since lending and investment are the lifeblood of banks, less capital in these activities invariably means less profit.

The third iteration of the accords, known as Basel III, started being introduced in phases starting in Jan. 1 2013. These are a series of capital and liquidity rules for banks to, in the words of the BCBS, "strengthen the regulation, supervision and risk management of the banking sector." In broad strokes, Basel III has three broad goals. The first is to improve the ability of the banking sector to absorb the shocks of financial and economic stress, a lesson hard learned in the aftermath of the Global Financial Crisis. The second is to continue to improve risk management and governance. The third is to strengthen transparency and disclosures of banks. To accomplish these three goals, the reforms target bank regulation to raise the strength of individual banks, as opposed to the banking sector in general, while also creating systems to tackle system-wide risks that can build up and be amplified by weak economic cycles.

The Basel III capital accords were introduced in 2010 and updated in mid-2011. The liquidity rules were introduced in 2013. Known as the Liquidity Coverage Ratio (LCR), these liquidity rules were endorsed by the Group of Central Bank Governors and Heads of

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[3] The Basel Committee on Banking Supervision (BCBS) is an international standard-setting body that promotes sound standards of banking supervision globally. Its members come from Argentina, Australia, Belgium, Brazil, Canada, China, France, Germany, Hong Kong, India, Indonesia, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, Russia, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

[4] Horcher, Karen A. "Essentials of Managing Treasury". New Jersey: John Wiley & Sons, 2005. Print. Pg 197.

Supervision (GHOS) in January 2013. A key revision introduced by the LCR is an amendment to the definition of high-quality liquid assets and net cash outflows. When the LCR is fully implemented, sometime around 2019, the minimum LCR requirement should be around 100%, up from 60% upon its introduction in 2015. The phase in of the various Basel III requirements started in 2013. (See Table 1.1.)

The HKIB book *Operational Risk Management* offers more in-depth discussions of the Basel accords. For our purposes, it is sufficient to point out that Basel II linked capital requirements with risk management and did so by basing banking regulations on three pillars[5]:

- **Pillar 1:** Minimum capital requirements;
- **Pillar 2:** Supervisory review and processes;
- **Pillar 3:** Market discipline.

As it turned out, however, the capital adequacy requirements introduced in Basel II proved to be insufficient to avert the crisis of 2008. So, the BCBS revisited the issue in Basel III, the third iteration of the accords (without counting Basel 2.5). Basel III is being implemented in stages in different markets. Basel III is designed to further enhance the resilience of banks and banking systems and address weaknesses observed in the recent Global Financial Crisis. G20 leaders endorsed Basel III in 2010. Details of the reforms are included in Table 1.2. Hong Kong plans to implement this latest version of the Basel accords in phases over several years starting in 2013. Implementation should be completed by January 2019.

While Basel II put much of its focus on risk management (including introducing entire sections on operational risk management that were previously overlooked), Basel III is basically divided into two areas:

- Additional regulatory capital;
- Asset and liability management that addresses leverage and liquidity risks.

In terms of regulatory capital, Basel III sets a series of new minimums and limits that banks should be intimately familiar with and maintain. (See Table 1.2). It is the second area, the focus on asset and liability management, that is most relevant to our discussion here.

Following the adoption of Basel III, banks will have to adopt two new ratios for liquidity standards.

The first is the Liquidity Coverage Ratio (LCR) and the second is a Net Stable Funding Ratio (NSFR).

The LCR was first published in December 2010 and was revised over the next couple of years to fine-tune the definitions of high-quality liquid assets (HQLA) and net cash outflows. By 2019, when the LCR is fully implemented, it will have a 100% threshold as a

[5] Horcher, Karen A. "Essentials of Managing Treasury". New Jersey: John Wiley & Sons, 2005. Print. Pg 200.

TABLE 1.1 Basel III phase in arrangements

Basel III phase-in arrangements

(All dates are as of 1 January)

Basel Committee on Banking Supervision
BANK FOR INTERNATIONAL SETTLEMENTS

	Phases	2013	2014	2015	2016	2017	2018	2019
Capital	Leverage Ratio		Parallel run 1 Jan 2013 – 1 Jan 2017 Disclosure starts 1 Jan 2015				Migration to Pillar 1	
	Minimum Common Equity Capital Ratio	3.5%	4.0%	4.5%				4.5%
	Capital Conservation Buffer				0.625%	1.25%	1.875%	2.5%
	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*		20%	40%	60%	80%	100%	100%
	Minimum Tier 1 Capital	4.5%	5.5%	6.0%				6.0%
	Minimum Total Capital		8.0%					8.0%
	Minimum Total Capital plus conservation buffer		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					
Liquidity	Liquidity coverage ratio – minimum requirement			60%	70%	80%	90%	100%
	Net stable funding ratio						Introduce minimum standard	

* Including amounts exceeding the limit for deferred tax assets (DTAs), mortgage servicing rights (MSRs) and financials.

– – transition periods

Source: BCBS

TABLE 1.2 Basel III reforms

Basel Committee on Banking Supervision reforms - Basel III

Strengthens microprudential regulation and supervision, and adds a macroprudential overlay that includes capital buffers.

Capital

Pillar 1

	Capital	Risk coverage	Containing leverage	Pillar 2: Risk management and supervision	Pillar 3: Market discipline
All Banks	**Quality and level of capital** Greater focus on common equity. The minimum will be raised to 4.5% of risk-weighted assets, after deductions. **Capital loss absorption at the point of non-viability** Contractual terms of capital instruments will include a clause that allows – at the discretion of the relevant authority – write-off or conversion to common shares if the bank is judged to be non-viable. This principle increases the contribution of the private sector to resolving future banking crises and thereby reduces moral hazard. **Capital conservation buffer** Comprising common equity of 2.5% of risk-weighted assets, bringing the total common equity standard to 7%. Constraint on a bank's discretionary distributions will be imposed when banks fall into the buffer range. **Countercyclical buffer** Imposed within a range of 0-2.5% comprising common equity, when authorities judge credit growth is resulting in an unacceptable build up of systematic risk.	**Securitisations** Strengthens the capital treatment for certain complex securitisations. Requires banks to conduct more rigorous credit analyses of externally rated securitisation exposures. **Trading book** Significantly higher capital for trading and derivatives activities, as well as complex securitisations held in the trading book. Introduction of a stressed value-at-risk framework to help mitigate procyclicality. A capital charge for incremental risk that estimates the default and migration risks of unsecuritised credit products and takes liquidity into account. **Counterparty credit risk** Substantial strengthening of the counterparty credit risk framework. Includes: more stringent requirements for measuring exposure; capital incentives for banks to use central counterparties for derivatives; and higher capital for inter-financial sector exposures. **Bank exposures to central counterparties (CCPs)** The Committee has proposed that trade exposures to a qualifying CCP will receive a 2% risk weight and default fund exposures to a qualifying CCP will be capitalised according to a risk-based method that consistently and simply estimates risk arising from such default fund.	**Leverage ratio** A non-risk-based leverage ratio that includes off-balance sheet exposures will serve as a backstop to the risk-based capital requirement. Also helps contain system wide build up of leverage.	**Supplemental Pillar 2 requirements.** Address firm-wide governance and risk management; capturing the risk of off-balance sheet exposures and securitisation activities; managing risk concentrations; providing incentives for banks to better manage risk and returns over the long term; sound compensation practices; valuation practices; stress testing; accounting standards for financial instruments; corporate governance; and supervisory colleges.	**Revised Pillar 3 disclosures requirements** The requirements introduced relate to securitisation exposures and sponsorship of off-balance sheet vehicles. Enhanced disclosures on the detail of the components of regulatory capital and their reconciliation to the reported accounts will be required, including a comprehensive explanation of how a bank calculates its regulatory capital ratios.
SIFIs	In addition to meeting the Basel III requirements, global systemically important financial institutions (SIFIs) must have higher loss absorbency capacity to reflect the greater risks that they pose to the financial system. The Committee has developed a methodology that includes both quantitative indicators and qualitative elements to identify global systemically important banks (SIBs). The additional loss absorbency requirements are to be met with a progressive Common Equity Tier 1 (CET1) capital requirement ranging from 1% to 2.5%, depending on a bank's systemic importance. For banks facing the highest SIB surcharge, an additional loss absorbency of 1% could be applied as a disincentive to increase materially their global systemic importance in the future. A consultative document was published in cooperation with the Financial Stability Board, which is coordinating the overall set of measures to reduce the moral hazard posed by global SIFIs.				

Liquidity

Global liquidity standard and supervisory monitoring

Liquidity coverage ratio
The liquidity coverage ratio (LCR) will require banks to have sufficient high-quality liquid assets to withstand a 30-day stressed funding scenario that is specified by supervisors.

Net stable funding ratio
The net stable funding ratio (NSFR) is a longer-term structural ratio designed to address liquidity mismatches. It covers the entire balance sheet and provides incentives for banks to use stable sources of funding.

Principles for Sound Liquidity Risk Management and Supervision
The Committee's 2008 guidance *Principles for Sound Liquidity Risk Management and Supervision* takes account of lessons learned during the crisis and is based on a fundamental review of sound practices for managing liquidity risk in banking organisations.

Supervisory monitoring
The liquidity framework includes a common set of monitoring metrics to assist supervisors in identifying and analysing liquidity risk trends at both the bank and system-wide level.

Source: BCBS

minimum requirement in normal times. The LCR will be first introduced with a threshold of 60% in 2015.[6]

The NSFR acts as a supplement to the LCR and has a one year time horizon. The goal of the NSFR is to provide a "sustainable maturity structure of assets and liabilities".[7] At the time of writing, the NSFR was still undergoing a period of review, but the BCBS intended to adopt any necessary revisions and introduce it fully by January 2018.

Both ratios are significant for treasury operations because it is up to this particular function of a bank to ensure the ratios are met on a daily basis. A short examination of the LCR makes it clear that its impact on treasury operations is significant.

[6] "Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools". Bank for International Settlements. January 2013. Web: www.bis.org/publ/bcbs238.htm. 17 April 2013.

[7] "Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools". Bank for International Settlements. January 2013. Pg. 1–8.

The LCR is based on the stock of HQLA to cover net cash outflows over a 30-day period under a prescribed stress scenario. HQLA are assets that can be "easily and immediately converted into cash at little or no loss of value," meaning that they are typically low risk, easy to valuate, have little correlation with risky assets, and are listed on recognized exchanges, have low volatility, and are typically shelters in times of systemic crisis.

Significantly, the BCBS notes that these assets should be "under the control of the function charged with managing liquidity of the bank," meaning the treasurer and the treasury function. What's more, LCR assets should be kept in a separate pool and used solely as contingent funds. In other words, it is up to the treasury function to ensure LCR is met at all times and that the funds are appropriately managed.

Much like the LCR, the NSFR also requires access to a minimum amount of stable funding. This amount is linked to the liquidity profile of the assets of the bank as well as any needs for liquidity that the bank may face from its off-balance sheet commitments over a one-year period. The idea behind the NSFR is to limit reliance on short-term wholesale funding during times of too much liquidity and encourage better liquidity risk management.[8]

Liquidity Risk Management

The bank's ALCO also oversees liquidity risk management, which is concerned with the risk of having insufficient funds available to meet a sudden large-scale demand for funds from depositors or sudden draw downs from clients. As noted, liquidity is a factor in balance sheet management—the drive to maximize the value of assets must be balanced with the need to keep enough cash and cash equivalents on hand to service expected (and unexpected) demands on the liabilities side. Proprietary trading gains from treasury operations help enhance the bank's profitability, but these must be strictly separated from the bank book. This underscores the need for internal controls and monitoring to ensure that fraud and errors do not occur in treasury operations.

It is difficult to overestimate the importance of appropriately managing liquidity so as to ensure the bank is always in a position to meet its obligations while, whenever possible, deriving a benefit from its liquid reserves. Risks associated with liquidity are major and can be life threatening to an organization if not managed properly.[9]

Asset Quality Classification

A key aspect of managing liquidity risk is knowing what an organization does with its reserves. While it makes sense to invest as much as possible so as to generate a return, it is also important that the bank or financial institution have regular and rapid access to its liquid reserves. Asset quality classification is an important activity.

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[8] "Basel III: A global regulatory framework for more resilient banks and banking systems". Bank For International Settlements. June 2011. Pg. 9.

[9] Horcher, Karen A. "Essentials of Managing Treasury". New Jersey: John Wiley & Sons, 2005. Print. Pg. 197.

It is up to the treasurer to consider the safety of the principal should the bank move to invest its liquid reserves. Author Steven Bragg notes: "It would not do to invest company funds in a risky investment in order to earn extraordinarily high returns if there is a chance that any portion of the principal will be lost."[10] Just as important, however, are considerations of maturity and marketability. Even the safest investment on the planet may pose a liquidity risk if it is not liquid, regardless of how much return it might generate.

For treasury managers, this means that the best investments are not only safe but also easily accessible through a strong liquid secondary market that guarantees immediate resale should the need arise.

When viewed through this lens, the yield that a particular investment might generate is the last consideration. After all, the goal of liquid reserves is not so much to generate profit but to guarantee the continuity of the operations of the bank or financial institution: "Within the boundaries of appropriate levels of risk, maturity, and marketability, the treasurer can then pick the investment with the highest yield. Since these criteria tend to limit one to very low-risk investments, the yield is also likely to be very low," notes Bragg.

Nevertheless, within these boundaries of low risk levels, short maturity, and high marketability there are a number of investment options such as bonds (preferably near their maturity dates), commercial paper, or treasury issuances.

Off-Balance Sheet Activities

Off-balance sheet (OBS) activities are assets or debt financing activities that are not included in a bank's balance sheet. An example may be asset management or brokerage services involving securities that belong to the client but are held by the bank in trust. Often, these assets are reported as "off-balance sheet."

Banks tend to have large sums in their off-balance sheet accounts. When a bank takes a deposit of, for example, HK$10 million, it has a corresponding liability. If the client then moves that money into a fund or buys a stock, the bank may hold the investment and have some fiduciary duties but it no longer has a liability. If the client then chooses to sell the investment, the liability would reappear.

Each of these transactions has an impact on the liquidity of a bank and its treasury operations and, since the Global Financial Crisis, a number of OBS operations have come under greater regulatory scrutiny. Collateralized debt obligations, subprime-mortgage securities (in the United States), and credit default swaps all have been used to move debt out of bank balance sheets. Often, the sale of these products is recorded as proceeds but the liability is rarely recorded on the company's balance sheet. Another example is securitized loans. A loan is generally kept in a bank's books as an asset but when loans are securitized and sold off as investments the debt, for which the bank is liable in case of a default, is moved off the books.

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[10] Bragg, Steven M. "Treasury Management: The Practitioner's Guide". New Jersey: John Wiley & Sons, 2010. Pg. 165.

Under Hong Kong accounting standards banks are expected to disclose contingent liabilities and commitments associated with OBS items related to a number of areas, such as direct credit substitutes like bank acceptance guarantees and standby letters of credit, some transaction-related liabilities like performance bonds, and short-term self-liquidating trade-related contingent liabilities that arise from the movement of goods and others.[11]

Counterparty Exposures and Capital Requirements

Counterparty risk considerations are also key to effective liquidity management. Banks typically consider counterparty risk as part of their credit risk management strategies. After all, one definition of credit risk is "the probability of loss as a result of the failure or unwillingness of a counterparty or borrower to fulfill a financial obligation."[12]

Ratings and reviews can help choose appropriate counterparties and minimize risk. Banks often set up counterparty limits and alter those limits depending on their short or long-term liquidity needs and the nature of the transaction in which the counterparty may be involved.

Something similar happens with capital requirements that banks must meet at all times. It is up to the treasury function to ensure short and long-term requirements are constantly met or they may put the bank in a precarious position. As Basel III is introduced, these capital requirements will shift and, most likely, grow larger. It will be up to the treasury to make the necessary action to ensure the bank stays within its regulatory comfort zone.

Management of Settlement/ Pre-Settlement Credit Risk

Settlement credit risk refers to the risk of a counterparty failing to settle a transaction as expected through a transfer system, which can happen if one party defaults on its clearing obligations to one or more counterparties. Pre-settlement credit risk is the risk of a party failing to meet the terms of a contract before that contract's settlement date, thus terminating the contract and causing the bank to replace it with another one, incurring replacement costs in the process.

Settlement and pre-settlement credit risk is an issue in treasury operations, including in areas such as proprietary trading. Treasury should make sure it knows the identity of the counterparties it deals with. According to *The Model Code: The International Code of Conduct and Practice for the Financial Markets*, which is issued by ACI—The Financial Markets Association, "it is good practice for the Compliance, Legal and Credit functions within a firm to have full knowledge of the end principal's identity, prior to the execution

[11] Hong Kong Institute of Certified Public Accountants. "Hong Kong Accounting Standard 30". 2005. Available online at http://app1.hkicpa.org.hk/professionaltechnical/accounting/exposuredraft/HKAS30cl.pdf.
[12] Karen A. Horcher; "Essentials of Managing Treasury"; John Wiley & Sons; New Jersey; 2005; p 153.

of a transaction, in order that credit, 'Know Your Customer,' anti-money laundering and potential fraud issues can be addressed."[13]

Treasury should determine there is sufficient credit limit available for the counterparty before entering into any contract, in cases where the bank is dealing over the counter (OTC) and not through an exchange.

Treasury should be careful in dealing with overly complicated and large transactions, which could place a greater strain on the counterparties and thus heighten settlement risk. It should be extra vigilant during times of economic and financial crisis, which intensifies the risk of liquidity problems and even bankruptcy among counterparties. Finally, it should make sure to use payment systems that are based on internationally accepted standards and practices, and which have a track record for safety and efficiency.

Management of Interest-Rate Risk

Interest-rate risk is defined as the potential impact on the net asset value of a bank's balance sheet and earnings from a change in interest rates. Fixed-rate assets will fall in value when rates go up, for example, while funding costs will increase. Interest-rate risk typically arises when there is a maturity date mismatch between assets and liabilities.

Even more important is the shape of the yield curve and the changes to the shape. For example, a book with a combination of short-term and long-term asset- or liability maturity structures is at risk from a yield curve inversion. The bank will need to change the structure of the book to take into account its views on the yield curve.

We will discuss this topic in more detail in Chapter 3 but, for the moment, it is important to understand that treasury is a key player in managing interest-rate risk through the trading book or banking book. Based on the bank's interest-rate scenarios and views on the yield curve and the likely impact on the balance sheet and earnings, treasury can devise trading strategies that can be put into effect at the appropriate time, involving financial instruments such as interest rate swaps. Provided these strategies are well designed and executed, they should help the bank mitigate the negative effects of interest rate changes and the yield curve, and maximise their positive impact.

Management of Foreign Exchange Exposure

Few banks deal only in a single currency. Most have assets and liabilities in their home currencies, U.S. dollar, euro, yen, renminbi, and other currencies accrued in the normal course

[13] The Financial Markets Association; *The Model Code: The International Code of Conduct and Practice for the Financial Markets*; January 2013, pg 17.

of lending, raising capital, issuing letters of credit, and other activities. This mix exposes the bank to foreign exchange risk, particularly if a currency experiences a steep fall in value. The bank's assets denominated in that currency then lose value against its home currency, although its liabilities in that devalued currency will also shrink.

Treasury operations have a role to play in managing foreign exchange exposure in response to the currency position of the bank and the currency movements, as well as the determination of whether the foreign exchange risk should be hedged. There are a number of foreign exchange exposures, such as economic exposure, accounting exposure, and transaction exposures. One may decide to hedge economic and transaction exposures, which reduce the future volatility of cash flows that are subject to foreign exchange rate movement, but not accounting exposures, which result only in unrealized gain and loss arisen from period-to-period balance sheet re-measurement.

Treasury Controls and Measures

The Nick Leeson case outlined in Chapter 9 shows how dangerous out-of-control treasury operations can be to a financial institution. How can a bank make sure it does not suffer the same tragic fate as Barings Bank?

The answer lies in well-designed and implemented oversight and management systems within and outside the treasury function. These include internal controls, trading limits, monitoring and control of the dealing operation, audit and compliance issues, management of conflicts of interest, and internalisation of the best-practice recommendations of *The Model Code*.

Managing the treasury is a very practical, pragmatic, and hands on exercise but one that leaves plenty of room for more theoretical considerations that extend beyond spreadsheet rows, columns and balances. Ethical issues linked to treasury management are of increasing consideration for regulators, in not small measure because treasury decisions and trading actions can influence the size of the unsquared open position with risk consequences for a financial institution.

Hong Kong's Treasury Markets Association (TMA) has developed a comprehensive *Code of Conduct and Practice*. The Global Financial Crisis of 2008 "highlighted the dangers of unchecked financial innovation and insufficiently regulated market behaviour," notes the TMA. "At the same time, however, it is perhaps neither adequate nor desirable for regulations to be the sole curb moderating the actions of market participants."

The TMA was established in 2006 to promote professionalism and competitiveness within Hong Kong's treasury markets and develop codes and standards for the industry. Populated by active market participants, the TMA is not a regulator but it does set standards for the industry to follow. The code of conduct published in 2011 and updated in 2014 covers a range of financial products including foreign exchange, money market instruments, debt securities, over-the-counter (OTC) derivatives, repurchase agreements (repo), commodities and credit derivatives, and structured products.

The Code covers a wide range of ethical considerations including the need for confidentiality within and without the institution, the importance of legal and regulatory compliance, requirements for training for staff, how to handle conflicts of interest, the role of diligence in dealing with clients and executing mandates, and the importance of honesty and fairness. These broad considerations come into play when dealing with the myriad issues that treasuries confront every day such as money laundering, fraud, criminal activities, segregation of duties, personal data, and complaints.[14]

Internal Controls

One lesson from the collapse of Barings is the importance of internal controls. Leeson was able to falsely claim huge profits and hide his true losses because there was no segregation of duties at Barings Securities (Singapore). He was in effect judge, jury, prosecutor, and defence attorney all in one.

The essence of internal controls is to make sure that persons initiating and completing transactions do not control or account for the results of that deal. For example, trading should always be separated from confirmations. This will help ensure that someone who is making unauthorised trades will not be able to hide confirmations from the counterparty that would alert supervisors of the fraud. Similarly, a senior treasury officer should approve all trades, but another official outside of treasury, such as a specialist in the accounting department, should reconcile the total transactions.

Part of a good internal control system is a clear definition of responsibilities and authorisations within the treasury function. The content of which must be comprehensive and regularly updated. The bank's list of authorised dealers and authorised signatures should also be periodically updated and distributed to all concerned. There should be a written notification whenever a responsible person is dropped or added to the list.

It is also important to fully document all transactions and assign custody of records to persons other than those directly involved in trading and confirmation. Securities are commonly stored by a third-party custodian, but if they are kept on site, those responsible for them must not be assigned the accounting task.

There should be procedures in place to regulate the documentation and recording of transactions, including taping of telephone conversations and recording electronic text messages. Who can access these records and for how long they should be kept should also be made clear. The length of time for keeping records varies, depending on the product. For example, if the transaction is related to a 10-year interest rate swap, the records must be maintained over 10 years. The same logic applies to taped phone records. However, the financial institution should comply with the legal requirements related to these issues in the country where it operates.

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[14] Code of Conduct and Practice, Treasury Markets Association. Hong Kong, April 2011. Accessed at https://www.tma.org.hk/PubFile/tmacode.pdf.

The segregation of duties and other control measures are meant not only to discourage fraud. They can also help avert honest errors because there are different sets of eyes that look at the same transaction. Despite the automatic systems in place in modern trading, the front office can still commit inadvertent mistakes. The typical treasury structure of front office, middle office, and back office is useful in this regard, as long as those units are properly segregated and fully informed about various responsibilities and authorisations.

Trading Limits

There are various types of trading limits. The most common limits are:

- Position limit or open position limit;
- Stop loss limits; and
- Value-at-Risk (VaR) limits.

The limits should be measurable in order to clearly segregate trading positions taken by individual traders, business units, and the entire financial institution that make them. In addition, these limits should be also clearly defined and communicable, thereby allowing strict monitoring and enforcement by an independent third party on all trading activities.

The objective is to make sure that the bank is not exposed to specific market risks at levels that exceed what the board and senior management have authorized. In setting those limits, the bank should be guided by value-at-risk (VaR), which is a methodology that computes the probabilistic bounds of market losses over a given period of time expressed in terms of a specified degree of certainty, known as the confidence interval. VaR limit is also a compulsory requirement as stipulated in the Basel II agreement to measure overall market risk, if the financial institution is using internal models.

Basel III introduces further checks on trading activities to limit exposures. A key requirement is for banks to reduce trading capital to a significant portion of Tier 1 capital, for which banks have to have enough capital reserves in place to cover adequacy requirements. At the same time, Basel III increases requirements for supervisory focus on proprietary trading activities—these requirements have already pushed banks to reorganize their operations to separate banking and trading.

Markets and the instruments that trade on them constantly change and evolve, as do the experience, expertise, and track record of the bank's individual traders and the bank's own tolerance for market risk. There must be a system to deal with exceptions that breach trading limits. This typically involves case-by-case decisions by senior treasury managers who may act on their own or elevate the case to ALCO, the chief executive, or the board.