RBC Capital Markets

Evolution of Bank Regulatory Landscape and Impact on Capital Markets Dealer Activities

October 2016

RBC Capital Markets

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Table of Contents

Evolving Bank Regulatory Landscape

Section I

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Evolving Bank Regulatory Landscape

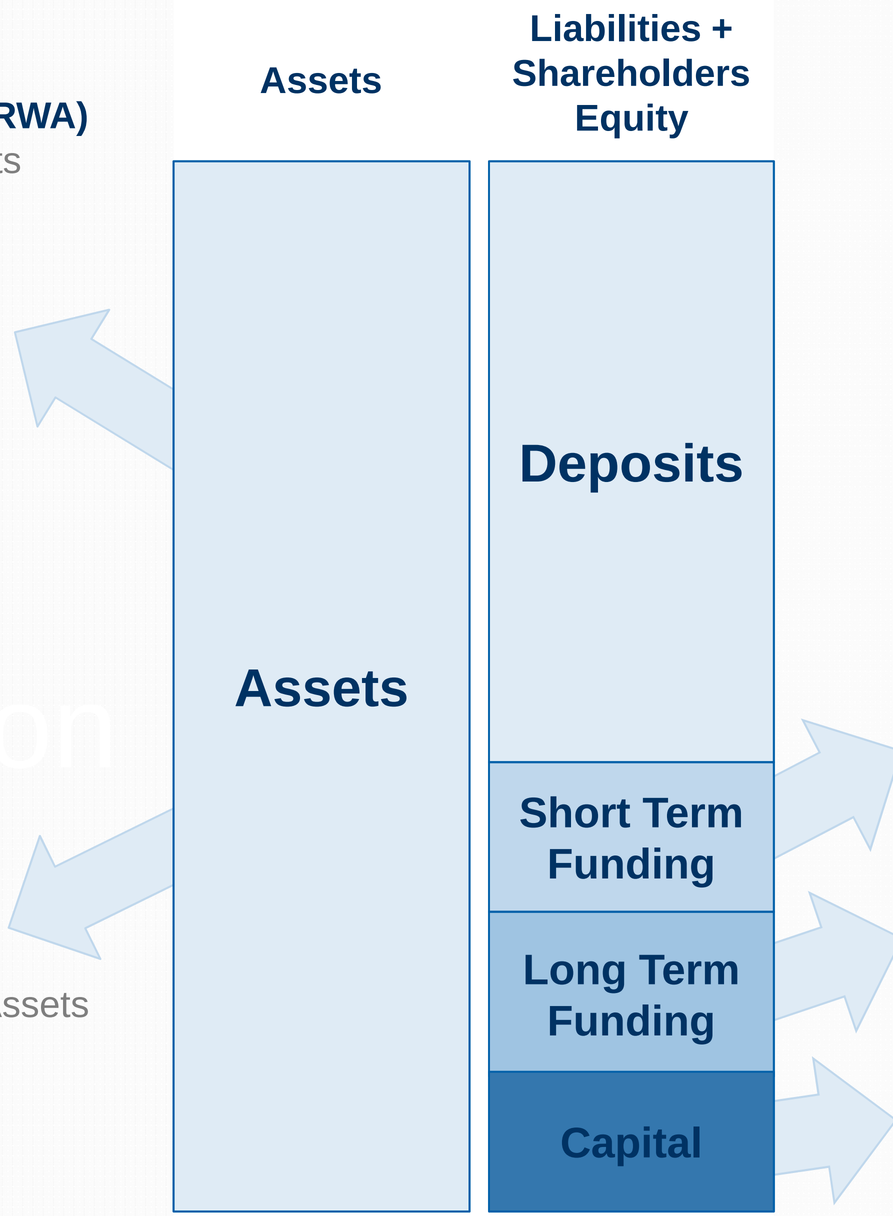
Balance Sheet & Regulation at a Glance

Risk Weighted Assets (RWA)

Risk Based View of Assets

- Credit Risk
- Market Risk
- Operational Risk

➢ Standardized RWA
➢ Advanced RWA



Leverage Exposure

Non-Risk Based View of Assets

- On Balance Sheet
- Derivative Exposure
- Securities Financing
- Off Balance Sheet

LCR: Liquidity Coverage Ratio

NSFR: Net Stable Funding Ratio

TLAC: Total Loss Absorbing Capital

- Bail-in eligible debt (resolution)

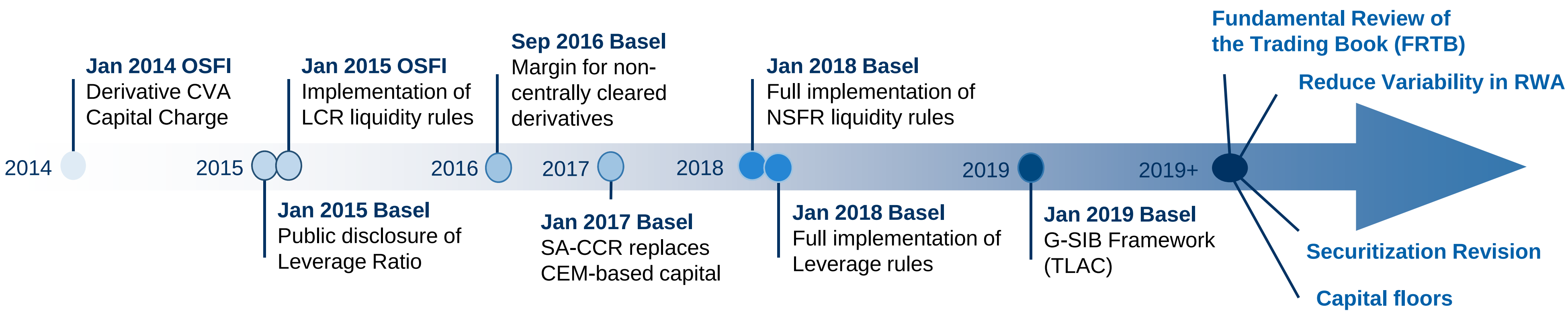
Stronger Capital Ratios

- Higher Quality Capital
- Higher minimum ratios
- G-SIB / D-SIB Surcharges
- NVCC provisions (recovery)
- Stress Testing (CCAR)

Evolving Bank Regulatory Landscape

Regulatory Timelines

Timelines



Bank Regulation – Summary

Bank Capital Requirements

Risk Weighted Assets(RWA) -- Leverage Exposure -- Stress Testing

RWA: Bank assets weighted by credit, market and operational risks
Leverage Ratio: Non-Risk based measure of capital adequacy taking into account on-and-off balance sheet exposures.
Stress Tests: Exercise to ensure there exists sufficient capital to continue operations through times of financial stress.

Global Liquidity Standards

Liquidity Coverage Ratio(LCR) -- Net Stable Funding Ratio(NSFR)

LCR: Promotes the short-term resilience of the liquidity risk profile of banks. Ensures an adequate stock of high-quality liquid assets that can be converted easily and immediately into cash to meet liquidity needs for a 30 calendar day stress scenario.
NSFR: Requires banks to maintain a stable funding profile in relation to the composition of their assets and off-balance sheet activities.

Provisions / Reform

Total Loss Absorbing Capacity(TLAC) -- Market Structure Reform

TLAC: Amount of regulatory capital and “bail-in” eligible debt that comprise the loss absorbing capacity of banks.
Margin on Uncleared Swaps: Minimum standards for margin requirements for non-centrally cleared derivatives

Further Revisions to Bank Capital Requirements

Section II

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Regulatory Capital – Further Revisions

Since the publication of the Basel III papers, the BCBS has continued to work on additional reforms. Major areas of focus for capital have been:

- **The Fundamental Review of the Trading book (FRTB) :** Revision to the market risk framework
  - A revised trading book and banking book boundary.
  - Incorporation of the risk of market or instrument illiquidity.
  - Movement from “VaR” to “Expected Shortfall” to better capture “tail risk”
  - Introduction of capital against “non-modellable” risk factors.
  - Desk-level internal model eligibility criteria
- **Reducing the Variability of modeled RWA across banks.**
  - Remove the option to use the “Internal Ratings Based” approach for certain exposures.
  - Adopt exposure-level, model-parameter floors to ensure minimum level of conservatism.
- **Revising standardized approaches for RWA to make them more risk sensitive and a credible fall-back to model based approaches.**
  - Replace “Current Exposure Method” (CEM) for credit with “Standardized Approach Counterparty Credit Risk” (SA-CCR)
  - Enhance the market risk standardized approach with more sensitivity based estimates (FRTB-SA)
- **Consideration of a capital floor, based on standardized approaches.**

Impact to Dealer Inventories and Market Liquidity

Section III

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Impact to Dealer Inventories

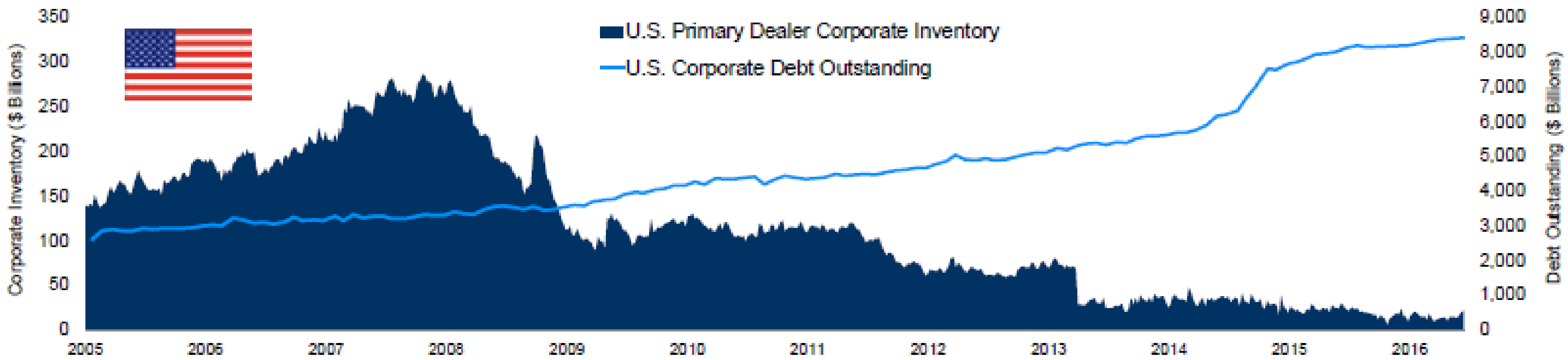
Liquidity Risks, Dealer Inventories & Trading Volumes

> **"Market liquidity in fixed-income markets is evolving in response to structural and cyclical changes to the financial system. Market perceptions that liquidity in many markets, particularly in fixed-income markets, has become more variable have led to questions about its potential resilience during times of stress."**

Bank of Canada, Financial System Review
June 2016

In Canada:
- **Corporate new issue markets continue to remain healthy supported by increased investor participation**
- **Market-wide liquidity in the GoC bond market has deteriorated slightly since 2013.**
- **Weaker secondary market dynamics have begun to impact liquidity**
- **Reduced trading and dealer inventory has increased the risk of congestion in a one-sided market**

Globally:
- **In response to weaker economic outlooks, monetary policy changes & regulation changes, dealers are reacting by reducing bond inventories. This is contributing to lower trading activity at a time when bonds outstanding are at historically high levels**



Source: MarketAxess, Federal Reserve Bank of New York, SIFMA
Source: RBC Capital Markets, IIROC MTRS Trade data

How will NSFR, FRTB and other regulations further impact market liquidity?

Change in Regulation ultimately leads to change in behavior

- Pressure to continually assess and rebalance business mix based on binding constraints
- Banks require an intimate knowledge of existing and future regulations to "right price" transactions
- Higher infrastructure costs to support regulation, influencing overall returns
- Shift in market-making from a "principal" to an "agency" based model.
- Possible exit of certain markets to reduce RWA or Leveraged assets

Regulation	Expected Market Impact
Risk Weighted Assets	FRTB and potential capital floors will further increase capital costs of warehousing "illiquid" and "complex" transactions. Expect Emerging Market, Structured & Securitized products to be most impacted.
Leverage	Banks have been forced to re-balance their business mix to meet new leverage targets. Dealer balance sheets have dramatically reduced. Treasury and repo holdings have been most impacted.
Liquidity	Funding is being pushed further out on all types of assets. Proposed NSFR requirements on short term repo is raising concerns over repo liquidity. Margin requirements for non-centrally cleared derivatives will require initial margin that will further add to costs of doing derivatives.
Resolution	TLAC requirements will force bank to hold more "bail-in" eligible debt that could increase funding costs for banks. Capital treatment of TLAC holdings could make market making in this paper very difficult and could possibly decrease liquidity and increase funding costs.

Pricing Examples

Section IV

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Quantitative Pricing Example

Summary of Implied Costs *($100mm exposure)*	Sovereign	Corporate					Financial
	AAA	**AA**	**A**	**BBB**	**BB**	**B-**	**A**
Risk Weight (%)	0%	20%	50%	100%	100%	150%	50%
Implied RWA ($mm)	0.0	20.0	50.0	100.0	100.0	150.0	50.0
Implied Leverage ($mm)	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Tier1 Capital							
Tier1 Capital (@12.0%)($mm)	0.0	2.4	6.0	12.0	12.0	18.0	6.0
Capital Cost (%)	10%	10%	10%	10%	10%	10%	10%
Tier1 Capital Cost (bps)	0.0	24.0	60.0	120.0	120.0	180.0	60.0
Leverage Ratio							
Leverage Capital (@4%)($mm)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Add'l Capital above T1 ($mm)	4.0	1.6	0.0	0.0	0.0	0.0	0.0
Add'l Capital Cost (bps)	40.0	16.0	0.0	0.0	0.0	0.0	0.0
Liquidity Ratios							
HQLA Category	L1	L2A	L2B	L2B	L3	L3	L3
Haircut (%)	0%	15%	50%	50%	100%	100%	100%
Cost of 1yr Debt (%)	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%
Liquidity Ratio Debt Cost (bps)	0.0	15.0	50.0	50.0	100.0	100.0	100.0

Total Regulatory Cost (bps)	Sovereign	Corporate					Financial
Before (bps)	**0.0**	**24.0**	**60.0**	**120.0**	**120.0**	**180.0**	**60.0**
After (bps)	**40.0**	**55.0**	**110.0**	**170.0**	**220.0**	**280.0**	**160.0**
Binding Constraint	*Leverage*	*Leverage*	*RWA*	*RWA*	*RWA*	*RWA*	*RWA*

All figures and assumptions above are for demonstration purposes only.

Appendix

Section V

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Global Liquidity Standards

Liquidity Rules – LCR, NSFR, NCCF

LCR (Liquidity Coverage Ratio)

High Quality Liquid Assets > 100%
Net 30d cash outflow

Stock of High Quality Liquid Assets

Level 1 Assets (Eligible Unencumbered)
- cash
- central bank reserves
- sovereigns, supras and PSEs under certain conditions

Level 2 Assets (Eligible Unencumbered)

Level 2A: (40% limit with 15% haircut)
- Sovereigns/SSAs/PSEs attracting 20% RW
- Corporates rated at least AA-
- FI obligations not permitted

Level 2B: (15% limit with 50% haircut)
- Corporates rated A+ to BBB-
- Certain unencumbered equities
- Certain RMBS rated AA or higher (25% haircut)

Net 30d cash outflow

- No roll of short term secured financing trades except for those with L1 or L2 assets
- Prescribed run off of deposits
- Loss of funding on ABS, covered bonds and other structured financing transactions
- Prescribed draw downs on committed credit and liquidity lines
- Liquidity needs based on a 3-notch downgrade on derivative transactions (eg collateral calls)
- Look back buffer (largest absolute net 30d collateral flows realised during the preceding 24 months)

NSFR (Net Stable Funding Ratio)

Available Stable Funding > 100%
Required Stable Funding

Available Amount of Stable Funding

Available Stable Funding
- 100% secured and unsecured borrowings with effective residual maturities of one year or more
- 95% of stable non-maturity demand deposits provided by retail and small business customers
- 50% funding <1yr provided by non-FI corporate customer
- 50% other funding 6m to 1yr from central banks and financial institutions

Required Amount of Stable Funding

Required Stable Funding
- Securities (5% L1, 15% L2A, 50% L2B, 100% FI)
- Loans to FIs (50% 6m to1yr, 100% >1yr)
- Residential Mortgages (65%)
- Derivatives (100% net DRA & 20% of net DRL)
- 85% of assets posted as IM for derivative contracts to CCP
- Off-balance sheet (5% undrawn portion of irrevocable and conditionally revocable credit and liquidity facilities to any client)
- 10% of unencumbered loans to FI's <6m (secured by L1 Assets) (15% if other)

NCCF (Net Cumulative Cash Flow)

Measures gaps between cash inflows and outflows up to a 12 month time horizon

- NCCF is an OSFI regulation which is separate from Basel III
- Requires banks to ensure they have sufficient asset liquidity to offset its net cash outflows for up to 20 weeks instead of 6 weeks
- It must be met in each funding currency
- Banks used to arrange rolling 9 week funding with money market funds. They cannot do this at 20 weeks. This is forcing banks to fund much more extensively at one, two and three years instead of in the short term money markets
- Ultimately, the NCCF and NSFR increase bank funding costs. It seems likely that some costs will be passed on though this will depend on global implementation