
SUMMARY

Harnessing data is a critical element in complying with the Fundamental Review of the Trading Book (FRTB) regulation. Banks are obliged to grasp incremental data requirements against their existing data calculation models and calculators.

Banks will need to identify whether their risk factors can be modelled or not, also known as “Non-modellable Risk Factors” (NMRFs).

If a risk factor does not have 24 “real” price observations annually and no less than 1-month between each observation it’s then classified as “non-modellable”. “Real” prices include executed trades and committed quotes.

With markets that have little transparency, the process of collecting “real” price data becomes challenging. Sourcing quality market data with “real and observable” prices will, ultimately, play a pivotal role in the difficulty of non-modelled risk.

The authors analyze the approach that firms should undergo when sourcing data that is attributable to FRTB’s NMRFs.

INTRODUCTION

The Great Recession highlighted many financial, economic, and regulatory vulnerabilities worldwide. At the forefront was the shortcomings of the Basel Committee on Banking Supervision’s (BCBS) Basel II market risk framework, initially published in 2004. Basel II had three main pillars aimed to alleviate anxieties of regulatory competitiveness and provide guidelines for capital requirements across banks:

1. Minimum Capital requirements;
2. Supervisory review; and
3. Market Discipline

The first pillar of Basel II emphasized the concept of risk-based capital requirements. Critics of this pillar often reference its ability to exacerbate business-cycle fluctuations, and in turn the bank’s vulnerability to economic downturns and loan losses.¹ Next was Basel II.5, it focused deeper on credit risk exposure and reducing the market risk framework’s cyclicalities by setting higher capital requirements. Although more stringent, Basel II.5 proved ineffective and, likewise, not without its shortcomings. In response, the BCBS released a new framework in January 2016 – the Fundamental Review of the Trading Book (FRTB). FRTB imposed rigorous capital requirements, defined a firm boundary between the trading book, implemented an alternative method of measuring market risk (using Expected Shortfall [ES] as the main exposure measure) instead of VaR, and

¹ Kashyap, A.K., & Stein, J. C. (2004). Cyclical implications of the Basel II capital standards. *Economic Perspectives – Federal Reserve Bank of Chicago*, 28(1), 18-33.

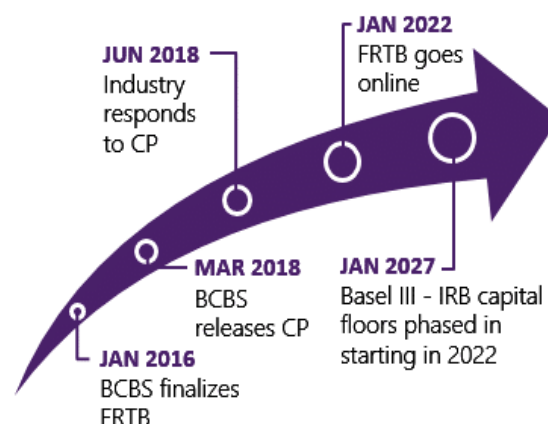
ensuring desk approvals for internal models with the expectation of **sourcing quality market data**. Loosely defined, FRTB is the next generation of market risk regulatory capital rules for large, international financial institutions.

On March 22, 2018, BCBS penned a consultation paper (CP) outlining revisions to the minimum capital requirements for market risk, and most importantly, an extension to the implementation timeline and reporting date to January 2022. The extension allowed banks an opportunity to synchronize their work for an alignment with the new FRTB and Basel III standards (FIGURE 1). Aware of the impending developments, on June 20, 2018, the “Industry” – represented by the Internal Swaps and Derivatives Association (ISDA), the Global Financial Markets Association (GFMA), and the Institute of International Finance (IIF) provided feedback on the CP. In their response, their feedback re-iterated the vulnerabilities to the proposed risk exposure modelling and how it would impede on market-making activities and the operational fluidity of the global capital markets.² The negative effects of this could be increasing trading costs when entering or exiting positions, longer times for buyers and sellers to be matched, and a reduction in overall market liquidity.

MARKET RISK CASE STUDY

Although regulation comes into effect in 2022, financial institutions have been active

FIGURE 1. FRTB AND BASEL III PROGRESSION

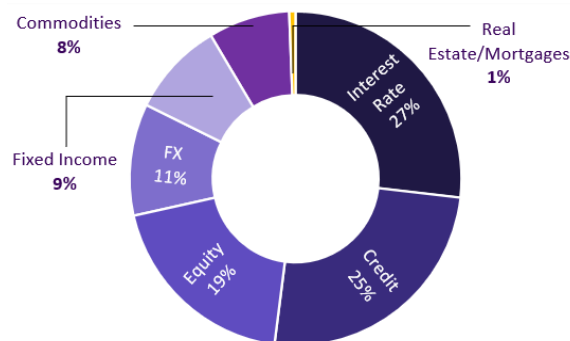


Source: Bank for International Settlements (BIS), International Swaps and Derivatives Association (ISDA), International Capital Market Association (ICMA).

in reducing the amount of market risk exposure carried out in their trading books. However, banks remain unclear on various aspects of the FRTB such as interpreting the requirements and how it will be executed in different jurisdictions. Until the implementation deadline, the widely used measure for market risk continues to be Value-at-Risk (VaR), to be replaced by ES - in order to better reflect "tail risk" (addressing large deviations away from average values) and capital adequacy. The preference of ES relative to VaR is because of VaR's inability to increase as portfolios are diversified. To get a sense of the risk types that contribute most to a financial institutions' market risk exposure we looked at the top 5 North American banks (by market capitalization): JPMorgan Chase & Co., Bank of America, Wells Fargo, Citi, and Royal Bank of Canada, together they make up US\$1.25 trillion. They measured VaR is at the 99 percent

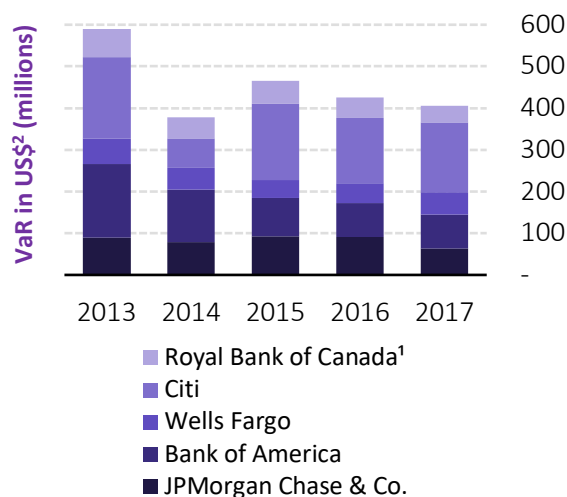
² BCBS Consultation Paper – Revisions to the Minimum Capital Requirements for Market Risk. ISDA, GFMA, and IIF to BCBS. June 2018.

FIGURE 2. MAJOR MARKET RISK TYPES



Source: Bank's annual reports³

FIGURE 3. ANNUAL AVERAGE MARKET RISK



¹ Fiscal year for Royal Bank ends October 31.

² Currency is in USD as at August 13, 2018.

Source: Bank's annual reports³

confidence level for price movements over a one day holding period. Once aggregated, we find they are mostly exposed to interest rate risk and credit risk on an average annual basis of 27% and 25%, respectively (FIGURE 2). Across the last five years, overall market risk exposure has been falling – with the total

average annual market risk VaR across the top 5 banks being reduced by 31% from US\$590 million in 2013 to US\$405 million in 2017 (FIGURE 3). Many financial institutions have voiced concerns regarding higher capital requirements in conjunction with increased compliance costs leading to a reduction in profitability. These higher requirements essentially place a higher burden on accurate and effective risk modelling despite ongoing challenges to the procurement of quality data sets, especially regarding illiquid assets and non-modellable risk factors (NMRFs.).

MODELLING APPROACHES

A bank must acquire desk approvals for dealing with risk exposures, namely: for both credit spread and default risk. For the ones that fall short of this hurdle, the desk will be deemed ineligible for internal modelling. The Internal Model Approach (IMA) is the best-case scenario for a firm for having lower capital charges.

To illustrate the benefit on the IMA versus the SA, the Industry conducted an impact study using a sample of 33 banks with quality data. The findings demonstrated FRTB capital for trading desks under the IMA is 3.21 times larger than the capital based on current IMA rules.⁴ To have trading desks govern the process, they are first required to be: (1) nominated by the bank and (2) satisfy back-testing, P&L attribution tests, and capitalization levels.

³ Royal Bank of Canada, Citi, Wells Fargo, Bank of America, and JPMorgan Chase & Co. Annual Report, 2013-17.

⁴ BCBS Consultation Paper.

A rigorous process of stress testing is essential to standardize ES by applying a dataset with a sample size of 10 years (at minimum). Depending on the class of risk factor, market liquidity is integrated into the application by certifying a liquidity horizon range between 10-250 days. Under this approach, although preferably ideal, securing market data on assets with varying liquidities is a challenge to ensuring regulatory model approvals.

The Standardized Approach is the easier fallback method for determining capital charges if the bank fails on implementing a sufficient internal model. The SA capital requirement stems from the summation of three components; (1) risk charges under the sensitivities-based method, (2) the default risk charge, and (3) the residual risk add-on. Under this method, the financial institution must provide a regular disclosure report, for all trading desks.

NON-MODELLABLE RISK FACTORS

Non-modellable risk factors (NMRFs) could result in overcapitalization, poor capital alignment with the underlying risks, and will undermine the viability of the IMA. Classified as a capital add-on under the ES model, the BCBS addresses the dilemma of risk modelling for instruments lacking sufficient price observations. For a risk factor to be considered as “modellable”, the BCBS states that there must be “continuously” available “real” prices for a representative set of transactions. The criteria to establish whether a price is “real” it must be a price that is: (1) an institutional

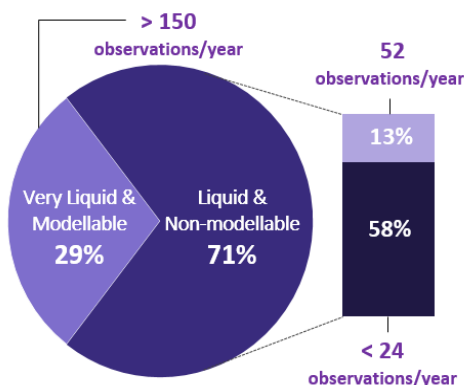
conducted transaction or (2) a transaction between other arm’s-length parties or (3) obtained from a committed quote. To be considered “continuously” available “real” prices, the risk factor must satisfy two rules. First, the minimum price observation rule – where 24 price observations per year measured over the period to calculate ES must be obtained. Second, the one-month gap rule – a maximum period of one month must be between two consecutive price observations. The criteria is required to be assessed on a monthly frequency.

The inability to model poses a critical threat to banks as most of their market risk exposure stems from risks with limited available data due to their illiquidity. NMRFs remain as the key contributor to the IMA capital charge. The ISDA, GFMA, and IIF conducted an analysis using approximately 20,000 risk factors that have a minimum of one price observation per period. They discovered that 71% of them are non-modellable (FIGURE 4).⁵

Seasonality, new issuances, and associations to exotic instruments also contribute towards the inability of banks to obtain “real” prices using their personal transaction data. Timing of when trading activities occur have an impact on the eligibility of risk factors. For example, liquid products that are traded at the beginning and end of every month would fail the one-month requirement. A June 2018 study conducted by Morgan Stanley looked at a representative sample of U.S corporate bonds and discovered in their findings that only 43% of the assets meet the

⁵ BCBS Consultation Paper.

FIGURE 4. RISK FACTOR EVENTS AND LIQUIDITY



Source: ISDA, GFMA, IIF.

one-month gap rule.⁶ By extending the allowable time-gap between months to 90 days, they found that 60% of the same representative sample would satisfy a 3-in-90 day test. Implying that trading activities of liquid products could follow cyclical patterns - result in failing the one-month gap rule. Understanding NMRFs is still a process that is evolving as developments between the regulator and the industry continue to grow. The anticipation is that a large amount of risk factors are to be non-modellingable. The ISDA and the Association for Financial Markets in Europe (AFME) identified the most relevant and common risk factors as⁷:

- Non-G10 rates
- G10 FX Volatilities > 3 Years
- Non-G10 FX Volatilities
- Interest rate (IR) volatilities other than EUR and USD
- IR out-of-the-money (OTM) volatility for all currencies

- Most non-US credit risk factors
- Single name equity risk factors other than spot for develop markets (i.e. implied volatility, repo, rates and dividends)

FRTB IMPACT

The FRTB requires banks to source reliable data to comply with standards. For banks that wish to use the IMA, they must pass the NMRF test which places a strain to source data and organize and map these risk factors. A June 2017 report by the ISDA, GFMA, and IIF highlighted that 36% of the IMA capital charge will be attributed to NMRFs.⁸ When adopting the IMA, there is immense value in measuring capital charges by favorable risk weightings. If left unattended, the consequence are cliff effects between the SA and IMA - mainly due to bank's losing approvals as a cause of insufficient market data and robust testing. Many firms are still in the early stages of developing and executing a forward thinking FRTB strategy and are looking for ways to address the key challenges while supporting the business. Improving a firm's FRTB pricing observations strategy is an important concern for firms implementing the new regulation, with roadblock issues such as:

- Where to procure Intra-day pricing data with the possibility of real-time analysis requirements, and
- How to benefit from having computer performance (technology) to handle 16x more (re)valuation per trade

⁶ "Revisions to the Minimum Capital Requirements for Market Risk". Morgan Stanley to BCBS. June 20, 2018.

⁷ "Industry Response to EBA RTA Discussion Paper on Market Risk & Counterparty Credit Risk Framework." ISDA and AFME to BCBS. March 2018.

⁸ ISDA, GFMA, IIF. *FRTB QIS 7 Refresh – Spotlight (June 2017)*.

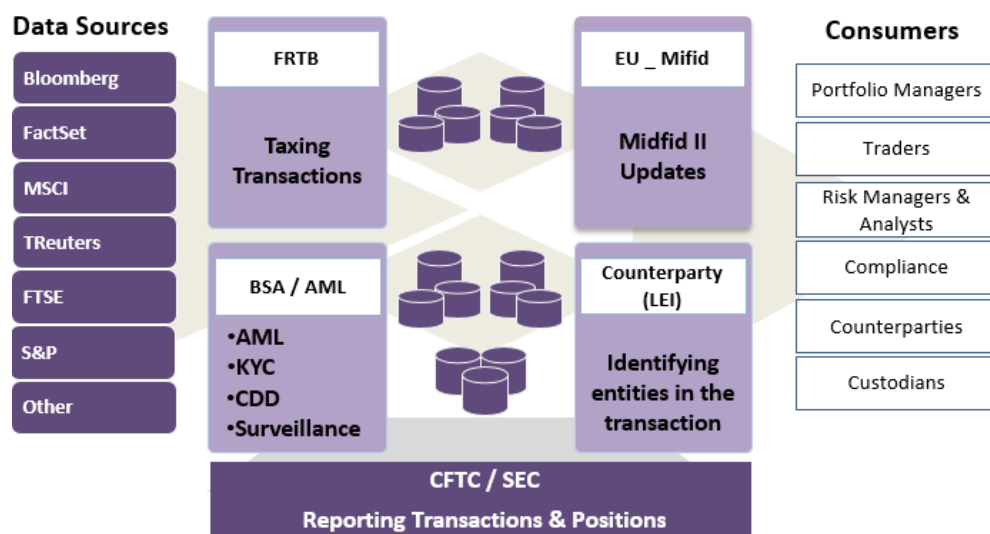
To handle the various compliance issues ahead, a firm's best course of action is to leverage technology to create a proven, repeatable, transparent strategy in providing end-user benefits. The initial and most crucial challenge is the identification of relevant vendor sources and their location (FIGURE 5). Once the data is sourced, infrastructure and process management becomes an onerous task to generate reporting at variable frequencies while fostering an analytics capacity. By creating a platform with a centralized connector to the

data vendors, the firm can then effectively position themselves to structure a streamlined process with technology scalable for data applications (FIGURE 5). This particular set-up will enable the organization to leverage their return-on-investment with respect to technology expenditures. The desired outcome will provide simultaneous solutions against multiple compliance issues, allowing economies of scale in their risk management practices and business operations.

FIGURE 5. CENTRALIZED DATA FRAMEWORK

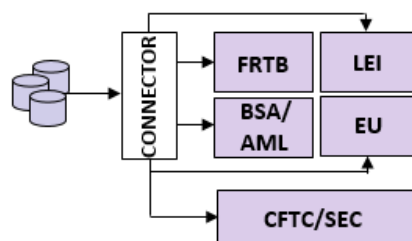
CHALLENGE

- i. Identifying Vendor Sources & Alternatives
- ii. Identifying data location
- iii. Building the connectors to the data
- iv. Reporting at the desired frequency
- v. Designing an analytic engine to identify relationships



GOAL

- i. Build a repeatable and transparent process with technology scalable for data requirements
- ii. Leverage ROI on technology spend for one solution to service multiple compliance issues



GET AHEAD OF THE FRTB WITH MARKET DATA COMPANY

Market Data Company (MDC) is a leader in market data contract compliance, operations, technology, and advisory services.

Our proven record of expertise is exemplified across four key areas:

- Risk operations;
- Consumption;
- Governance; and
- Data quality

We support implementing the FRTB from an industry regulatory perspective. We do this by leveraging our seasoned know-how in the procurement of market data to meet the necessary historical pricing requirements.

MDC has extensive experience guiding organizations navigate through optimization programs and associated organizational transformations. We have supported a significant number of buy- and sell-side firms through the development of models and implementation of road maps. Our unique range of experience and skills has positioned ourselves to effectively diagnose, design, and implement change successfully.

MDC's Framework helps investment firms ensure that commitments to compliance and data optimization are clearly articulated and aligned to other strategic objectives. Our teams have the depth and breadth of skills spanning across data, risk management, and IT change.

ABOUT THE AUTHORS

Robert Benedetto

Head of Strategy for MDC, a boutique consulting firm specializing in Market and Reference data servicing the Financial Services Industry. Prior to this, he led Data and Risk Management consulting practices for various consulting companies delivering solutions for buy-side and sell-side firms. In both positions his delivery role centres on Business Strategy and Risk Management for firms throughout Canada, the US and Europe. He can be reached at 1 416-315-7177 or 1 905-464-3696.

Edmond Farah

As a Senior Consultant for MDC, he brings a wide range of experience in both the private and public sector such as small business scale-up, business valuations, economic and policy analysis, and teaching. Edmond holds a Master of Arts in Applied Economics from York University and the Schulich School of Business and a Bachelor of Arts (Honours) in International Economics and Finance from Ryerson University. He is currently working towards obtaining the Chartered Financial Analyst (CFA) designation.