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FROM THEORY
TO ACTION

FUNDAMENTAL REVIEW

OF THE TRADING BOOK (FRTB)

In January 2016, the Basel Committee on Banking Supervision (BCBS) published final rules for the market risk framework for capital requirements. The BCBS proposed the end of 2019 as a compliance deadline for banks with a significant presence in capital markets.¹

The new rules – known as Fundamental Review of the Trading Book or FRTB – are designed to address Basel 2.5 issues such as the under-capitalization of the trading book, capital arbitrage between banking and trading books, and internal risk transfers. Through the FRTB rules, BCBS is seeking, for example, to establish a more objective boundary between the trading book and the banking book, and to eliminate capital arbitrage between the regulatory banking and trading books.²

FRTB encompasses a revised internal model approach characterized by a shift from Value-at-Risk (VAR) to the Expected Shortfall (ES) measure of risk, for a better reflection of “tail risk” and capital adequacy during periods of significant financial market stress.³

CHALLENGES TO FRTB IMPLEMENTATION

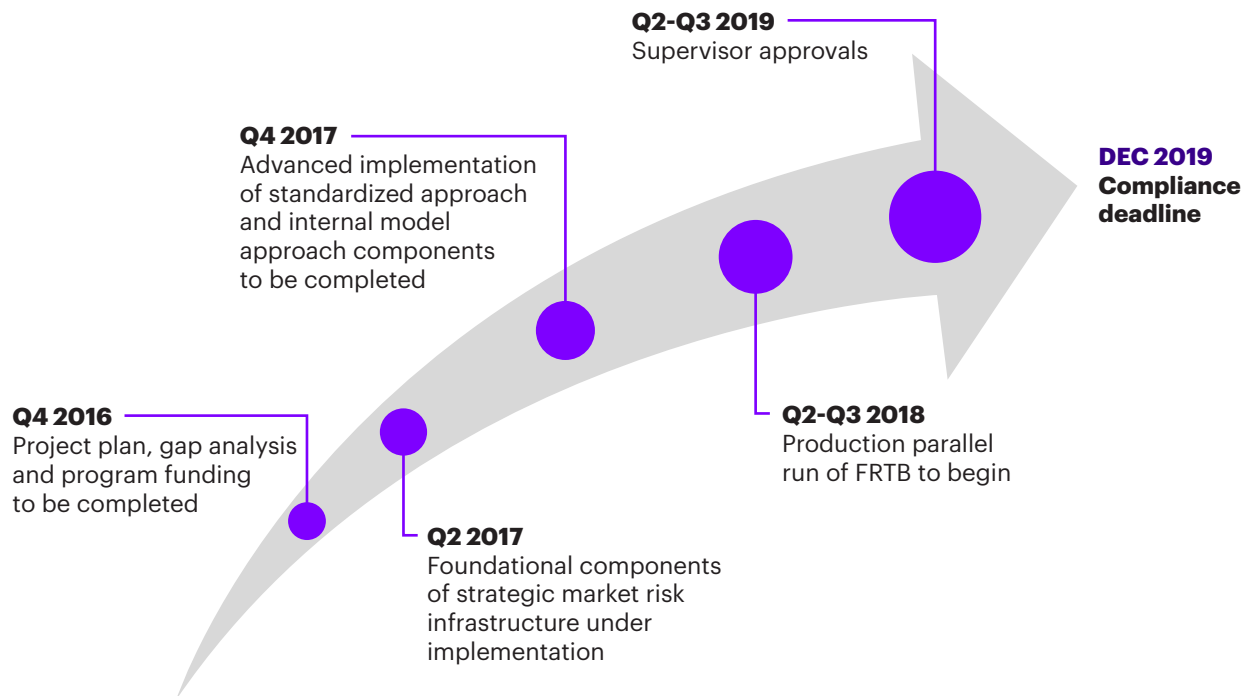
Accenture believes that adoption of the FRTB rules presents banks with major challenges in areas related to business operations and infrastructure provisioning. According to our analysis and estimates we expect:

- Significant increases (as much as 40 percent) in market risk capital requirements;
- Higher costs for rules implementation programs – ranging from \$100 million to \$250 million for large banks;
- Large increases in Business as Usual (BAU) costs due to desk level requirements; and

- Additional investment in technology infrastructure for risk calculation.

FRTB rules require banks to strengthen their existing market risk infrastructure and overall technology capabilities, with additional computational capacity to support calculations as required under new capital requirements. Banks should also plan for additional complexity in operations and processes due to changed desk structures and should undertake the standardization of data sources to support these changes.

Figure 1. Expected FRTB Timeline



Note: Industry participants are in discussion with national supervisors and the BCBS around the compliance timeline for FRTB. This may lead to the compliance deadline moving beyond December 2019.

Source: Minimum capital requirements for market risk, BCBS, January 2016 and Accenture estimates.

The BCBS recommended deadline of December 31, 2019 may not seem imminent, but the journey to compliance is not easy. Banks should begin to address their FRTB implementation strategy immediately and plan for implementation issues going forward.

New rules affect these key areas:

P&L (profit and loss) attribution test

P&L attribution test helps evaluate the efficiency of the internal models and their ability to capture all the relevant risks impacting the portfolio. This is a new requirement and each trading desk must independently pass this test. If a desk experiences breaches four or more times, then it will be put on standardized approach methodology.⁴

Risk factor eligibility (modelable vs non-modelable)

Each of the risk factors which banks model will need to undergo an eligibility check, meaning that the banks will need to obtain real prices for them.⁵ With this measure, we believe that BCBS aims to strengthen the internal models to include only those risk factors which would have consistent interpretation by the banks. This will also eliminate any ad-hoc risk factor inclusion to help reduce the capital impact.

Data requirements and risk measures at desk level

FRTB rules are explicit in proposing the reporting structure of market risk to management and regulators would be checking this at the trading desk level.⁶ As we see it, banks would also need to obtain the data and run their risk calculations at a trading desk level and to adjust their data sourcing and calculation strategies accordingly.

For banks, major areas of focus include strengthening existing market risk infrastructure and technology capabilities; positioning additional computational capacity to support FRTB calculations; and planning for additional complexity in operations and processes due to changes in their desk structures (although we believe that some banks may seek to incorporate this into ongoing Volcker Rule implementation activities) and the standardization of data sources.

As shown in Figure 2, a majority of FRTB rules have a direct or indirect impact on banks' data management strategies. Solving for data challenges would be a top priority as banks mobilize their resources in their efforts to comply.

Figure 2. FRTB Impact Analysis Framework

	1. TRADING BOOK BOUNDARY AND RISK POLICY		2. STANDARDIZED APPROACH		3. INTERNAL MODEL APPROACH	
1, 2, 3. FUNCTIONAL REQUIREMENTS	1.1 Trade and Bank Book Boundaries	1.4 Covered Instruments	2.1 Sensitivity Based Method (SBM)	2.4 Delta, Vega and Curvature Calculation	3.1 Risk Factor Analysis	3.4 Default Risk Charge (DRC) – IMA
	1.2 Trading Desk Identification	1.5 Risk Management Policies	2.2 Establish Risk Classes	2.5 Default Risk Charge (DRC) - SA	3.2 Expected Shortfall Calculation	3.5 Non-Modelable: Capital Add-Ons (SES)
	1.3 Internal Risk Transfers	1.6 Reporting Requirements	2.3 Securitization	2.6 Residual Risk Add-On	3.3 Trading Desk Eligibility	3.6 Multi Liquidity Horizons
			2.7 SA Capital Calculation Methodology		3.7 Calibration to Stress Period	3.8 IMA Capital Calculation Methodology
4. SUPERVISORY APPROVALS	4.1 Trading Book Boundary	4.3 Instrument Redesignation	4.4 Residual Risk Add-On Approval	4.6 SBM Calculator	4.8 IMA Risk Factors	4.10 P&L Attribution
	4.2 Exception for Covered Instruments		4.5 Internal Risk Transfers Controls	4.7 Model Validation	4.9 Backtesting	4.11 Changes to IMA Model
5. DATA & TECHNOLOGY	5.1 Asset Classification	5.3 Instrument Master	5.3 Risk Sensitivities Data Sourcing	5.5 Capital Aggregation	5.6 Risk Factor Pricing Data	5.8 Full Revaluation
	5.2 Security Reference Data		5.4 Data Taxonomy		5.7 Stress Calculations	5.9 P&L Attribution and Backtesting

 High Impact Activities

Source: Accenture Analysis

DATA ISSUES FOR BANKS

We see three data issues as fundamental to an effective implementation of the FRTB framework

1 RISK SENSITIVITIES SOURCING

The rules for standardized approach (SA) and internal models approach (IMA) advocate both: the use of risk sensitivities and consistency in their calculation which, for the first time, should be the same as those used for the pricing models or instrument prices in the P&L statement that management receives.⁷ Unlike previous standardized

models, the SA under FRTB rules makes use of risk sensitivities to capture both linear and nonlinear risk in the trading desk.

Banks are also required to calculate risk charges using SA, identifying Delta, Vega and Curvature sensitivities across all risk classes.

The rules specify the maturity buckets for each risk class and sensitivity combination to arrive at a final sensitivity value per bucket, using netting rules. This should lead to a comprehensive calculation of risk using SA, adding to the complexity of computation. Figure 3 below shows the number of buckets for each sensitivity and risk class combination under a sensitivities-based method for SA.

Under the revised rules, a bank would need to compute at least 79 different calculation inputs for each sensitivity class for risk computation under SA. The new prescribed risk factors and liquidity computation may lead to as many as 12,000 calculations per trade, compared to the current 250 to 500 calculations per trade under earlier Basel 2.5 regulations.

The SA has introduced the concept of curvature risk to capture nonlinear risk which is not captured by the delta of the instruments with optionality. Curvature risk is not a second order approximation, but rather a full revaluation needed for every instrument affected. This means, we believe, that banks would need to update infrastructure, data availability, and IT capacity to run the revaluation for all products with optionality.

The new rules also specify that the sensitivities should be calculated on the prices of instruments or on pricing models which are used for P&L reporting or market risk management within the bank. This calls for consistency between the calculations used for computing sensitivities and the valuation models used by the front office for trading purposes.

Figure 3. Number of Buckets for Sensitivities Calculation

		RISK CLASSES						
		GIRR	CSR – Non-Securitization	CSR – Securitization (CTP)	CSR – Securitization (Non-CTP)	Equity	Commodity	FX
SENSITIVITY	Delta	Individual currency	16	16	25	11	11	Individual currency
	Vega	Individual currency	16	16	25	11	11	Individual currency
	Curvature	Individual currency	16	16	25	11	11	Individual currency

LEGEND:

CSR: Credit Spread Risk **CTP:** Correlation Trading Portfolio **GIRR:** General Interest Rate Risk

Source: Minimum capital requirements for market risk. Basel Committee on Banking Supervision, January 2016.

2 MARKET DATA SOURCING

Banks need to source pricing information for risk factors to be eligible for inclusion in IMA calculation. These market prices need to be “real” and “observable” based upon market transactions.⁸ If pricing is not available for a risk factor then the bank would need to add a Non-Modelable Risk Factor charge to the capital calculation thereby increasing the capital requirement.

The rules specify conditions which need to be fulfilled for risk factors to be considered modelable.⁹ Due to these restrictions, and the limited availability of pricing information, we anticipate that market data would be a high hurdle for banks.

Market data is also needed for computation of risk sensitivities for a SA-based capital calculation, meaning that the data used for computation of sensitivities is consistent with front office use of pricing information, as required by the regulations.

Costs for a pooled market data utility can run up to \$15 million for initial setup, with additional costs for routine maintenance and global sourcing of data.¹⁰

We see implementation challenges for banks in these main areas to source market data for risk factors:

Risk factor pricing

Banks should look at issues such as risk factor analysis, which entails obtaining risk factors for inclusion in the internal models to identify if each risk factor is modelable or non-modelable. Banks

should also manage the liquidity horizon, which is differentiated by which risk factor is necessary for the computation of the expected shortfall. Other areas of concern in risk factor pricing include the new level of segmentation of the different instruments and the assignment of different weights (for example, for creditworthiness of the issuer, or for currency) as prescribed in the rules.

P&L attribution

Issues in P&L attribution include integration of data and time series to secure the adequacy of the input data for the computation of the measures of risk and P&L, and changes in the workflow and the definitions of new processes of analysis for each trading desk.

Market data quality issues

A key concern here is the non-availability of market data for risk factors. Grouping these within the non-modelable risk factor category may increase the capital requirements for these risk factors in case of error.

Banks are considering a number of solutions to deal with these challenges, including the pooling of data to overcome the lack of market data. This approach, however, presents risks of its own, such as the potential for abuse of the framework if uncommitted quotes are provided; this could lead to regulatory sanctions on the entire initiative. There are also concerns about collusion between financial institutions, which could lead to manipulation of market data. Strong governance and controls would be needed to prevent any misuse or manipulation of the market data utility.

3 RISK CALCULATOR DATA GAPS

Understanding the incremental data requirements versus the existing data calculation models and calculators is crucial, as FRTB has introduced changes to the way risk charge is calculated under both SA and IMA.

Some broad data gaps affect risk calculators across risk factors and asset classes. These relate to the mismatch of maturities of existing risk factors and the maturity classifications prescribed by FRTB regulations. Another gap is related to the mapping of internal ratings to FRTB rules, especially for US institutions, as regulations prohibit the use of external ratings.

The data gaps for calculating capital charge using SA touch on the following broad themes:

Maturity mismatch

The FRTB rules framework defines the risk factors and vertices in a way designed to calculate sensitivities. These risk factors and vertices have maturities which may differ from the existing risk computation systems within banks.

Data sourcing gaps

The existing risk infrastructure at banks does not source and/or obtain all the data required for calculation of capital charge under SA, as specified in the FRTB rules. Data sourcing challenges exist in the decomposition of equity baskets and/or indices, in underlying products decomposition, in sourcing equity rating data for default risk charge computation, and in managing internal ratings for both credit and equity issuers.

Assumptions

Due to existing data challenges in banks' risk process models, many assumptions have to be made by the risk management teams, which may lead to inaccurate calculations for capital charge under SA. Specifically, banks may need to make assumptions in doing linear extrapolation of their calculation of risk sensitivities, where underlying data is not available to them.

Data taxonomy

Because of differences in front office and risk management systems, there is a challenge in classifying the different products, as per the FRTB rules, to maintain consistency in calculation and a uniform interpretation of the asset classes across the bank. Mapping instruments to the relevant asset classes can therefore become a major challenge for the banks.

Banks opting for IMA face challenges of their own, including:

Data sourcing

The revised IMA approval process proposed under FRTB rules puts the burden on banks to obtain the data for market risk calculations, as well as for developing a robust testing mechanism to obtain approval for use of internal models.

Data sourcing for IMA models present challenges such as managing complex risk factor mappings containing different asset classes; having a clear process of non-modelable risk factors for identification and implementation, and mapping liquidity horizons for different asset classes. The IMA framework also specifies that the risk factors should be supported by an external, verifiable price, rather than the internal prices many banks use for risk calculation.

Assumptions

FRTB rules detail the process for P&L attribution for the internal models, which requires full revaluation methods rather than the approximation methods banks currently use. To use full revaluation methods, banks would need to use data for full sets of positions; they would need to create systemic assumptions to fill in the missing data. This may not sit well with regulators, who may insist on the SA calculation in the absence of hard data to back the internal models.

Data taxonomy

As is the case with SA, a consistent data taxonomy is essential for all risk computation within the bank. The IMA approach calls for addressing products booked outside the normal data ecosystem, which may present bespoke data challenges.

Rules interpretation

There are data issues related to the interpretation of the rules for Risk Theoretical P&L for satisfying the P&L attribution using the IMA approach. This means that additional guidance is needed from the supervisors to avoid delays related to incorrect implementation of the P&L implementation models in the banks.

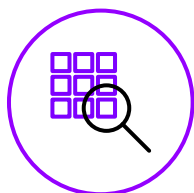
REMEDIATION EFFORTS TO ADDRESS DATA CHALLENGES

In our view, for an effective implementation of an FRTB program, banks should have a sound data sourcing, calculation and management strategy. Addressing the data challenges can provide the foundation to be flexible and agile in their FRTB compliance efforts.

Banks should be well served if they form the data strategy of the organization around FRTB rules by considering the key recommendations, issues and analysis dimensions that follow.

ANALYSIS DIMENSION

BENEFITS



1. IDENTIFY A CONSISTENT SET OF SENSITIVITIES

Methodology

Take a systematic approach to bucketing sensitivities or risk exposure for individual risk classes.

Make sure calculation methodologies are consistent across different areas of the bank. The ideal scenario would be that the sensitivities are calculated only once by a golden source calculator and then utilized by different teams of the bank as needed.

Taxonomy

Maintain the same sensitivities definition across the front office and risk management teams by having a common taxonomy for both.

Establish standard data taxonomies for attributes across risk classes and sensitivities and use throughout the organization.

Consistent treatment of data across the bank.

Front office and risk management teams have the same calculations and sensitivity data.



2. DEFINE A CENTRALIZED ARCHITECTURE FOR SOURCING RISK DATA

Data Sourcing

Set up a central repository for all risk sensitivities within the bank. This repository would receive data from different golden sources for risk sensitivities and it should be stored and organized by risk class, bucket, tenor and risk factor respectively.

- Finalize the list of sensitivities to be sourced in the repository for each bucket across risk classes.
- Identify golden sources of sensitivities calculation across risk classes.
- Create data sourcing standards for sensitivity data sourcing.

- Define feed formats for obtaining data for each sensitivity. A favored practice is to establish a unified feed format which can be used for sourcing data from multiple sources. This should lead to consistent data processing for storing in the repository.

- Establish data feed service level agreements (SLAs) and frequency with source systems for obtaining the data. Favored practice is to obtain the data feed daily with a pre-defined cutoff time for global operations.

Data Quality

Create data quality standards for managing high quality risk sensitivities data for internal and external audit approvals.

Golden source of risk data across the bank.

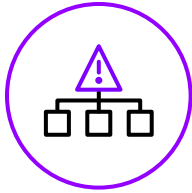
Ease of data quality management.

Availability of data across the organization as per SLA needed.

Support approval process and supervisory auditing.

ANALYSIS DIMENSION

BENEFITS



3. MANAGE IMA RISK FACTORS AND LIQUIDITY HORIZONS

Taxonomy

Individuate criteria and indicators for distinguishing between modelable and non-modelable risk factors.

Exploit monitoring of the time series and the quality of the contribution.

Data Sourcing

Participate in data pooling initiatives within the industry or subscribe to third-party vendors for obtaining real prices. However, note that this approach has its own risk as there is a possibility of price manipulation

by an industry consortium to skirt the regulatory requirement and this may be rejected by the supervisors.

Identify data providers and establish vendor relationships to obtain real pricing information.

Data Quality

Develop activities for the control of data for each desk instead of the legal entity as a whole.

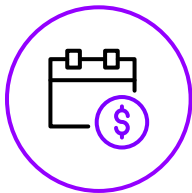
Aggregation

Structure computations to easily manage the inclusion/exclusion of the desk considered eligible/ineligible for the internal model.

Support to individual desk approval for IMA.

Flexibility in switching to SA approach in case of rejection by supervisors.

Reduced capital charges due to IMA.



4. PLAN FOR P&L ATTRIBUTION

Taxonomy

Define the factors governing the portfolio which is to be considered for P&L attribution and communication protocols to different departments involved, such as Finance, for integrating the desks which are eligible for the internal model.

Governance

Revise the report system for Risk Management based on the outcome of the backtesting.

Approval for use of IMA to compute capital charges.

Successful P&L attribution tests.



5. MANAGE SA RISK SENSITIVITIES

Governance

Document the existing data which is useful for sensitivity management from the front office systems.

Data Quality

Periodically update the dataset to confirm the existing risk factors and identify any new risk factors impacting the models.

Consistent calculation of risk sensitivities across the front office applications.

Identification of sensitivity gaps which can be corrected.

Up to date SA calculators.



6. IMPROVE MARKET DATA PROCESS FOR DATA QUALITY MANAGEMENT

Infrastructure

Integrate the IT processes which warn/alert users of data issues in the repository. This should help with the ability to proactively take action and resolve issues on a timely basis, with direct communication with the Risk Technology function.

Data Quality

Signal to both users and affected functions the data issues and eventual delays to improve management of the activities.

Data quality management.

Efficient communication for reporting.



7. SEEK TECHNOLOGY SYNERGIES WITH OTHER REGULATORY INITIATIVES

ANALYSIS DIMENSION

Infrastructure

Identify synergies with other strategic regulatory initiatives such as BCBS 239 and the Uncleared Margin Regulation (UMR). Leverage the existing infrastructure for supporting FRTB, or, if they are in the middle of implementation, make sure that the technology solutions for different regulatory programs are supporting the FRTB requirements as well.

UMR regulations proposed by BCBS in their final rules published in December 2013 and adopted by regulators in the US propose the use of “Greeks” which are similar to the sensitivities proposed under the SA framework for FRTB. Additionally the calculation mechanism is similar to the one shared by FRTB. The comparison of frameworks is given below:

- As can be seen below UMR rules have a strong parallel with FRTB regulations with the only difference being that UMR applies to uncleared derivatives while FRTB regulations apply to the entire market portfolio of the bank.

- This then becomes a question of scalability and flexibility of the bank’s UMR calculator. A bank would be well served if it can leverage the UMR work and extend it to the SA calculator for FRTB.

BCBS 239 regulations propose the use of automated risk reporting and data traceability from source, as well as the use of risk data within the bank. Within a bank, an FRTB program can leverage the standards established as part of BCBS 239 as follows:

- Sourcing data directly from golden sources without any data transformation and manipulation.
- Maintaining strong data lineage documentation for traceability and supervisory approvals.
- Using a BCBS 239 infrastructure for risk reporting to generate market risk reporting under FRTB.

BENEFITS

Identification of strategic tools within the bank.

Avoiding duplicative work.

Cost savings due to sharing of processes and infrastructure across multiple programs.

Permits compliance across all regulatory regimes.

FRTB Rules	UMR Rules (ISDA, 2016)
Calculate Delta, Vega and Curvature for each risk class	Calculate portfolio “Greeks” for each of the risk factors, which can be done using internal models, vendor supplied models or counterparty provided “Greeks.” $IM_x = \text{DeltaMargin}_x + \text{VegaMargin}_x + \text{CurvatureMargin}_x$
The total market risk charge is an aggregate of the risk charge for Delta, Vega and Curvature across risk classes	Aggregate the margins for each asset class calculated using the above formula. $SIMM = SIMM_{RatesFX} + SIMM_{Credit} + SIMM_{Equity} + SIMM_{Commodity}$

Source: Accenture analysis of the International Swaps and Derivatives Association (ISDA) Standard Initial Margin Model (SIMM) version 3.15

CONCLUSION

STEPS TO TRANSFORMATION OF MARKET RISK PROCESSES

We believe that most banks have elements in place to begin an effective transformation of their market risk processes in response to FRTB. We strongly encourage them to link these elements together to create a comprehensive approach to market risk management.

These steps include:

1. Defining internal understanding of FRTB rules and requirements

This includes performing a detailed impact analysis of the FRTB rules on capital requirements and the processes involved. The bank should form assessment workstreams, identify categories and dimensions of impact, and understand the current capabilities for people, process and technology within the bank.

2. Developing a target state operating model

The bank should finalize the target state technology and business operation capabilities, and identify strategic platforms and solutions to be leveraged in a target state environment. In addition, the bank should also define the organizational structure for compliance and participate in industry forums to identify the current level of industry practice.

3. Documenting gap analysis and create an implementation strategy

This entails identifying gaps (using the current state assessment and target state definition) as well as areas where remediation work is required for compliance. In this step, the bank also finalizes funding requirements and makes provisions, identifies gaps in resources and skills, and details the technology changes required to reach the target state.

4. Creating an implementation roadmap

Once the first three steps have been taken, the bank can create a detailed roadmap and direct different workstreams aimed at reaching the desired target state.

As we have seen, challenges related to FRTB implementation are significant. While banks still have enough time to meet the 2019 deadline, they have no time to lose in organizing and planning what amounts to a comprehensive reordering of their market risk processes. The needed talent is in short supply and banks that move quickly to develop and execute a plan would have an advantage over competitors who are slower to respond to this major regulatory initiative.

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It is a price at which the institution has conducted a transaction;
It is a verifiable price for an actual transaction between other arms-length parties; or
The price is obtained from a committed quote;
If the price is obtained from a third-party vendor (with some conditions to accepting the vendor data).
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