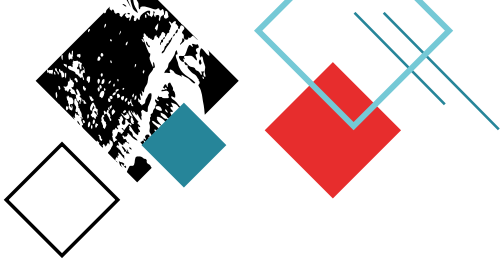


BASEL **IV**

Potential into Practice



Monocle Research Team
2021



In December 2020, the European Banking Authority (EBA) reported that EU banks are facing a €52 billion capital shortfall in terms of complying with the finalised Basel III reforms (colloquially known as Basel IV).¹ The reforms specifically aim to restore credibility to the calculation of risk weighted assets (RWA) and ensure greater comparability of banks' capital ratios, but many banks tend to focus their attention on the financial impact of these reforms, citing increased capital requirements, diminished return on equity and possible adjustments to business models.

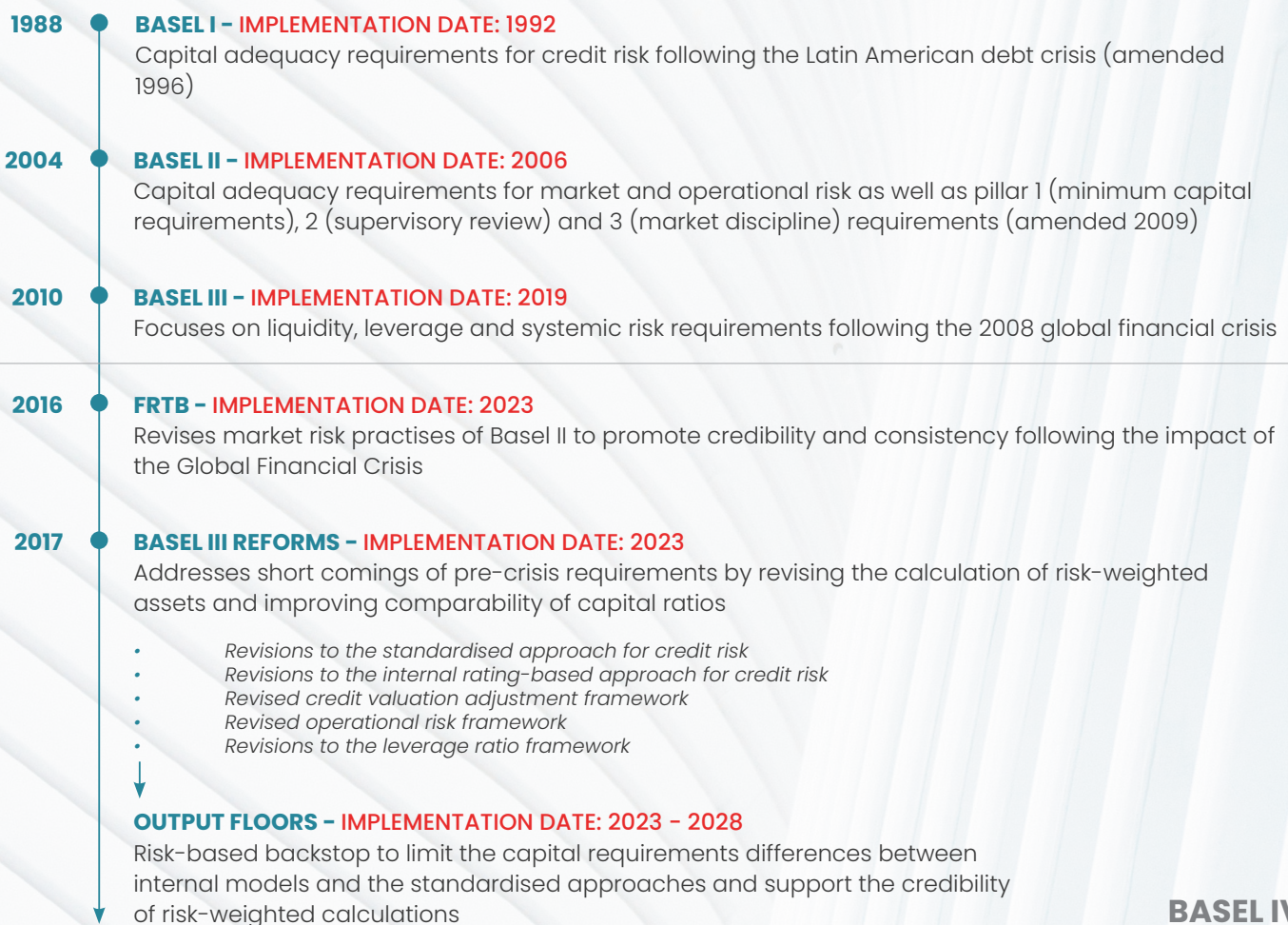
Despite these objections, the execution of these reforms cannot be neglected. Simply put, the effective operationalisation of the Basel III reforms through future-proof capabilities and infrastructure changes cannot be overlooked in order to prevent implementation and

maintenance costs from eroding business and portfolio optimisations.

With this in mind, this paper first unpacks how banks' regulatory capital functions should approach implementing Basel IV across their data landscape, focusing on data models, regulatory calculation engines, and reporting.

Following this, the paper provides key insights on the Basel IV requirements and their implementation challenges and considerations.

1.	SOLUTION DESIGN
2.	CRITICAL BASEL IV STANDARDS & REVISIONS



Basel IV is collective term for the various regulatory revisions and standards released by the BCBS that update the requirements under Basel III.

1. European Banking Authority, "EBA updates its Basel III impact study following the EU Commissions call for advice" (2020), <https://www.eba.europa.eu/eba-updates-its-basel-iii-impact-study-following-eu-commission%E2%80%99s-call-advice>

SOLUTION DESIGN

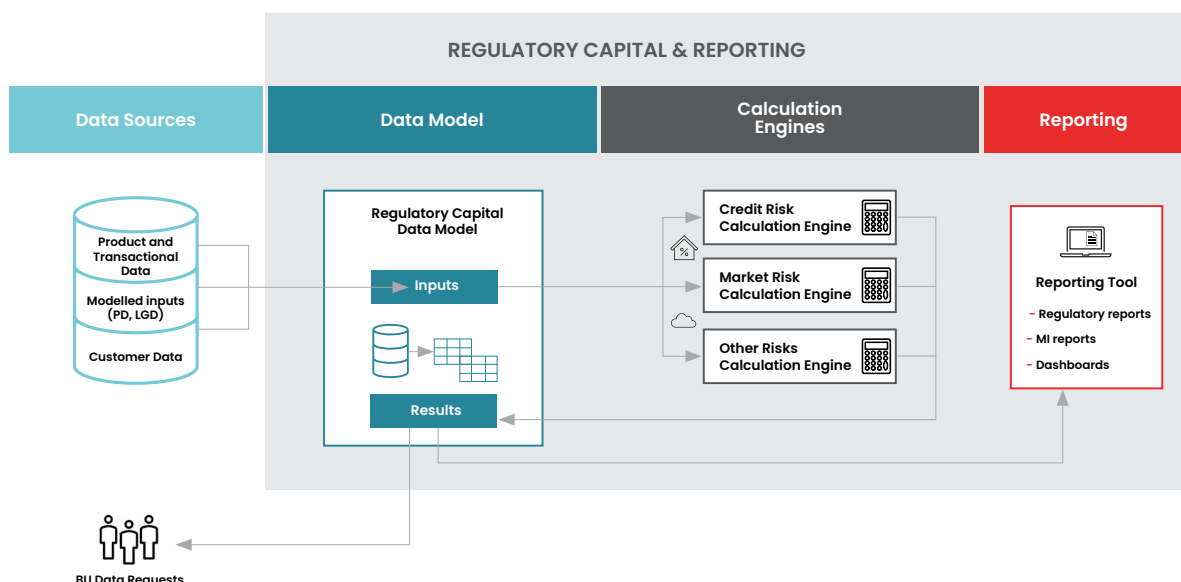
REVAMPING 30 YEARS OF BASEL EMBEDMENT

Many regulatory capital management and reporting solutions would have been designed and built to accommodate the simpler credit, operational and market risk requirements of Basel II in 2004. While banks will no doubt have iteratively improved and optimised their various data and modelling processes these solutions will most likely be inflexible and ill-suited for the more dynamic and granular Basel IV requirements.

As banks continue to implement regulatory capital changes, a tunnel vision approach of building a rigid Basel IV solution that ticks the box of compliance must be avoided. Such an approach often leads to the accumulation of technical debt as iterative updates must be constructed on top of the solution to meet the inevitable developments in the ever-changing Basel framework.

Principally, a regulatory capital solution must prioritise flexibility and scalability that enables a modular design supported by automation and standardisation to efficiently implement continual regulatory revisions. Such a solution becomes a strategic decision-making tool, where ad hoc stress testing and Quantitative Impact Study (QIS) exercises can be performed without the obstacle of excessive time and effort commitments. **Banks now have the opportunity to use their allocated reform budgets to overhaul weak capabilities in their end-to-end regulatory capital function.**

TARGET-STATE REGULATORY CAPITAL FUNCTION



DATA MODELLING

At the heart of a successful Basel IV implementation is meeting the requirement for a robust regulatory capital data model. It is important that the data model correctly captures and standardises the data elements needed for calculation and reporting input, as well as the attributes needed to perform various Basel classifications. It is not uncommon for banks to extract and load their data directly into their calculation engines, however, various sources with fragmented data conventions will lead to increased data preparation efforts and manual interventions to meet engine data needs. The lack of data ownership by the regulatory capital function causes an over reliance on IT for extract-transform-load development.

Banks that continue to ignore best practice of relational database modelling will find the increased number of data points and granularity difficult to incorporate and maintain. It is therefore important as banks update their data models to have a strong balance of knowledge and expertise regarding:

- Basel Reforms Regulation:** Comprehensive and detailed understanding of the regulations, including changes in risk-weights and buckets, updates to model approaches and parameters, classification, and segmentation updates.

ii. Bank Product Idiosyncrasies: A comprehensive internal view of the bank's products, risk metrics and business models, including their products' intrinsic characteristics such as signage conventions, exposure breakdowns and other data elements and conventions that exist on each source system. Without this, banks will struggle to translate and match the general regulatory terms and requirements with their own data elements.

iii. Data Principles: Database and data modelling expertise that prioritise reduced data redundancies, controls for data quality and integrity, and enable scalability for future updates. A standardised data model for regulatory capital should be utilised and enforced, in order to avoid a data model that specifically accommodates a singular downstream process to the detriment of other calculation and reporting processes. The concept of a system and process "agnostic" data model provides a simplified and consistent translation layer between up- and downstream systems without being beholden to any one source, calculation engine, or reporting process's data needs, resulting in more flexible integration capability.

Banks will often have limited expertise on one of these three capabilities, which can result in challenges in complying fully with the Basel reforms, matching the bank's activities to the required changes, or effectively implementing a data model to capture the reforms. These inefficiencies not only result in chronic process disruptions but can compromise the reliability and validity of capital calculations.

CALCULATION ENGINES

The multitude of standards and revisions associated with Basel IV illustrates the point that regulatory requirements

are in a constant state of flux. Banks with an agile computational capability that can match the rate of change efficiently will reap the benefit of reduced RWAs and improved economic profit. Additionally, banks can better fulfil their **Quantitative Impact Study** obligations and perform **ad hoc stress testing** exercises, which became especially important during 2020, when banks were placed under significant pressure to quantify their resilience and risk impacts with the onset of the Covid-19 pandemic.

Previously, banks have sought to build regulatory capital calculation engines in-house for simpler calculations, but the scale of Basel IV regulatory requirements has made the option of purchasing a pre-built, off-the-shelf calculation engine from a vendor a more appealing option. The business case for a vendor offering is typically economy of scale benefits, access to technical IT and regulatory experts and the relief of the burden of model and system maintenance through product support. Today, there are many software vendors providing various levels of calculation and reporting capabilities. Banks need to perform thorough due diligence to make sure that they choose the right solutions for their unique requirements and required functionality, as well as to avoid overspending. Consulting implementation experts are well equipped to assist with these challenges.

Cloud Computing:

Software-as-a-Service (SaaS) offered by many vendors can be a launching pad into cloud computing and the benefits of elastic scalability, integrated automation and measured service capabilities for IT cost transparency. However, the cloud is not always cheaper and should not be considered likely if not adequately supported by the bank's digital enterprise strategy.

Calculation Engine Minimum Capabilities:

- Handle the portfolio and specific product mix (asset classes) of the bank.
- Calculate using more than one regulatory approach/method.
- Flexibility to handle new products and changes in approaches by the bank.
- Optimisation of credit risk mitigant (CRM) allocations
- Perform netting, do minimum checks, apply regulatory defaults, etc.
- Ad hoc stress testing or scenario analysis
- Transparent and auditable

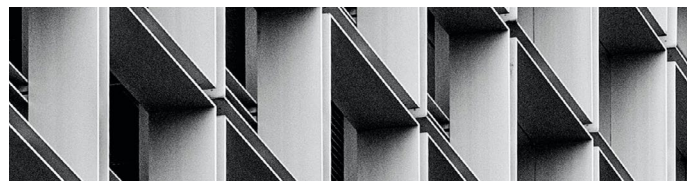
The success of vendor calculation engines is, however, often dependent on the realisation of a well-executed installation. Consideration must be given to, for example, the implementation of a standardised, agnostic data model, which is required to effectively integrate with the bank's data source(s). Banks should therefore be prepared to actively configure, review and implement these products alongside their vendor to ensure they meet the desired objectives. Similarly, each calculator should produce output results as per the standardised data model to ensure consistency and ease of use across downstream reporting and review processes. Banks may find themselves with a mix of in-house and outsourced calculation engines, both requiring effective management and oversight through a comprehensive operating model.

REGULATORY REPORTING

Banks have onerous reporting requirements relating to their relevant regulators but also need to produce extensive internal reporting for analysis and insights, as well as provide specific result datasets to various teams within the bank. These teams include internal modelling teams for model calibration purposes, finance for annual financial reporting, and various business units for capital allocation analytics.

Once again, a standardised data model in which results across the various calculation engines can be fed back is critical to ensure consistency and flexibility throughout the various reporting activities. This will also better enable data lineage mapping and improve the transparency of the process, resulting in better auditability, with reporting usually being the starting point and focus for external auditors.

Additionally, automation of these reporting processes – usually offered in dedicated reporting tools – can reduce manual, repetitive reporting processing, such as data quality checks, aggregation and classification, which are often completed and reconciled on Excel. Automated validations and reconciliations between finance and risk data are of paramount importance and banks will be hindered by the data model if it fails to successfully aggregate and consolidate results correctly, reconcile to financial statements and control for data quality. Any improvement in the transparency of the process results in better auditability with reporting usually the starting point and focus for external auditors.



CRITICAL BASEL IV STANDARDS AND REVISIONS

Basel IV is a collective term for the various regulatory revisions and standards released by the BCBS that update the initial Basel III requirements. The Basel III reforms specifically addresses the significant variation of RWA calculations across banks – which has previously eroded comparability and credibility – with an emphasis on credit risk. Banks that previously relied on internal models for more accurate calculations of their RWAs compared to the standardised approaches (SA) constructed by the BCBS, are likely to be impacted far more by the reforms.

Strategically, it is imperative that banks do not lose sight of their implementation deadlines but should also remain cognisant of the specific operational impacts of these revisions and how their solution capabilities can support effective implementation.

OUTPUT FLOORS

Revised output floors for internal models place a limit on the regulatory capital benefit banks can derive relative to the SA. These output floors will be transitioned in from 2023 at 50% to 2028 at 72.5%. This means that the total risk weighted assets or resulting capital calculated internally cannot be less than the set percentage amount determined using only the SA.

Basel III reforms includes the following revisions and requirements:

- Revised standardised approach for credit risk
- Revised internal rating-based approach for credit risk
- Revised credit valuation adjustment framework
- Revised operational risk framework
- Revised leverage ratio framework
- Output floors

The revised market risk framework (FRTB) has released separately but is grouped together with the Reforms as part of Basel IV.



Banks will now be required to produce results for their internal model approaches together with a comparative SA for each result. In effect, this is a doubling of the process and run-times, increasing operational intensity. In some cases, banks will be required to develop additional calculation engines requiring further data attributes relating to the nature and characteristics of its products that were not previously required for their IRB models.

Some of the biggest data considerations include:

- i. External credit ratings (vendor subscriptions)
- ii. Loan-to-value (LTV) ratios relating to property lending
- iii. Phase and quality classification data for project finance
- iv. Classification data for revolving retail product risk weight buckets
- v. Classification data for off balance sheet credit conversion factors for risk weight buckets

Solution Implications:

Calculation engines must possess the functionality to compute the various regulatory approaches effectively to enable assessment of results.

Additionally, cloud-computing's flexible scalability allows customers to scale up and scale down their processing provisions as required. This allows banks to meet the increase in operational intensity more easily.

The data model should account for extra rating categories (Grade A/B/C), which must be processed by the calculation engine and incorporated into reporting structures.

Solution implications:

SCRA will require updates to the roles and responsibilities in the operating model, as banks decide whether to create this rating system as a part of credit risk or the customer ratings function.

INPUT FLOORS AND RESTRICTED APPROACHES

To address the issue of excessive complexity and variability in banks' IRB capital models, input floors have been introduced for metrics such as probability of default (PD) and loss-given default (LGD). Additionally, the option to use an advanced internally rated based (A-IRB) approach for financial institutions and large corporation credit risk calculations has been removed to reduce RWA variability. This leaves banks with the only option to use the foundational IRB approach with fixed values of LGD and exposure at default (EAD).

Banks should be aware of exposures that move to a SA model, which has stricter collateral thresholds, may no longer qualify as secured, but will be classified as unsecured, resulting in higher risk weightings.

Overall, this will lead to higher capital requirements, which may require banks to reassess their current portfolio composition and the approach used to calculate RWAs for the affected asset classes. Banks should quantify the impact of these reforms to determine whether to deleverage or optimise their exposures.

STANDARDISED APPROACH FOR CREDIT RISK

While not all banks will be impacted by the output floors if they do not make use of IRB models, the BCBS has updated the SA for credit risk, resulting in changes impacting banks' modelling across the board. With credit risk accounting for the majority of banks' risk-taking activities the changes will improve granularity as well as risk weighted sensitivity with a more granular look up table for corporate and residential real estate exposures. Revolving retail exposures will also be classified further by type and LTV ratio segmentation will be facilitated across residential mortgage risk weights.

Additionally, banks will be required to produce a **standardised credit risk assessment (SCRA) approach** for bank counterparties as part of their due diligence process. This will require additional information to be sourced regarding counterparties' regulatory capital requirements and buffers to assess their compliance.



Solution implications:

Operationally, input floors need to be tested and then enforced in the regulatory calculator. Vendor calculators typically provide for these updates with configurable parameters or ad hoc patches.

Configurable parameters offer significant flexibility to gauge the impact of such changes pre-implementation and allow for the creation of configured calculators for forthcoming QIS exercises.

Changes to in-house solutions often require laborious updates to hardcoded variables across the engine's code, increasing the possibility of mistakes.

The BA-CVA, previously the standardised CVA approach, is revised into a reduced and full version. This approach has more granular counterparty type risk weights while the rating buckets have been simplified into two categories. Banks will again have to adjust parameters in their regulatory calculation engine and evaluate how they record their CVA weight mappings. Furthermore, banks employing CVA hedges will have to manage bigger impacts on their calculations, due to the intricacies involved in its consideration of hedges, as well as it being a two-part calculation (reduced and full) that must be combined for the final CVA result.

The new standardised approach (SA-CVA), which is much more complicated than the Basic Approach, is more granular and risk sensitive, requiring pre-modelled inputs not previously needed for CVA. In the past, CVA could have been done within the credit risk process with only credit risk inputs; however, banks now need to consider market volatilities, correlations, and credit spreads given that CVA aligns with the revised market risk framework.

The processing speed of the calculation engine is important to ensure timely and reliable results. Operationally, banks will also need to have a dedicated CVA desk responsible for managing and hedging CVA.

Solution Implications:

Banks will need to be able to provide SA-CVA numbers on demand, in accordance with FRTB SA. They will also need to be able to model CVA and CVA sensitivities on at least a monthly basis.

Embedment of automated reporting will remove the burden of processing, consolidating and reconciling results for monthly reporting.

OPERATIONAL RISK

The BSBC has simplified the operational risk framework by replacing the four current approaches for operational risk with a single SA. Operational risk, which came under the microscope following the Covid-19 pandemic and consequent global lockdowns, under the new approach uses a combination of gross income (business indicator component) and a bank's own internal loss history over 10 years (internal loss multiplier).

While this is a simpler method of calculating operational risk capital, banks will need to put in place a completely new process and will also need to source additional information, such as the historical loss data, which they may not have been actively collecting.

CREDIT VALUATION ADJUSTMENT RISK

Credit Valuation Adjustment (CVA) risk of derivative instruments was a major source of loss for banks during the Global Financial Crisis and was revised in 2020 following the release of the Basel III reforms. However, modelling of this risk is highly complex and the BCBS now considers internally modelled approaches to be inadequate. Therefore, banks must choose between the standardised approach (SA-CVA) and a basic approach (BA-CVA), which aligns to the market risk principles and approaches of the Fundamental Review of the Trading Book.

LEVERAGE RATIO

The reforms introduce a leverage ratio buffer specifically for global systemically important banks (G-SIBs) as a non-risk backstop to the risk-based capital rules of Basel III, to prevent the build-up of unsustainable leverage. The calculation requires comprehensive capital and exposure data, including on-balance sheet exposures, derivative exposures, securities financing transaction exposures and off-balance sheet items. This requires seamless integration of finance and risk data from across the bank.

FUNDAMENTAL REVIEW OF THE TRADING BOOK

FRTB aims to reinvent current market risk practices by limiting regulatory arbitrage through stricter trading and banking designations. Capital requirements are calculated through the new SA using the sum of a sensitivities-based, default risk and residual risk add-on charge, which is comparable to the alternative revised internal mode. This approach contains similar components to the SA with charge components for modellable and non-modellable risk factors calculated on an expected shortfall metric of 97.5% confidence as appose to a VaR metric of 99%.



FRTB calculations will require significant amounts of market risk and transaction data for the IMA's ES calibration, SA's identification of risk factor sensitivities and risk bucket allocations. Banks are required to update their current observations monthly, thereby increasing the amount of data required. Additionally, the calculation of market risk becomes increasingly intensive with multiple stress scenarios needing to be calculated for the SA.

Solution implications:

The introduction of substantial new data points, often requiring granular data, is a significant challenge across the Basel IV standards.

Banks should ensure that their data model conforms to best practice but also aim to embed BCBS 239 – risk data aggregation and risk reporting – with a focus on data quality, data lineage and overall auditability.

HOW MONOCLE CAN ASSIST

Worldwide, banks have increasingly required consulting and advisory services to achieve compliance with the Basel regulatory framework as it grows in complexity and scale. Through our comprehensive understanding of the regulations, as well as data and system management, we assist our clients in operationalising and implementing the required changes at a data and process level.

We design fit-for-purpose, regulatory data models that adhere to best practice data principles, as well as assisting with implementation and integration of vendor provided solutions, such as regulatory calculation engines. We conduct process auditing to vet and confirm data quality, as well as process and code efficiency, to ensure the validity and reliability of regulatory capital results. We design and build reporting solutions and the reporting tasks required. This includes external regulatory reporting, business intelligence visualisations and management information system dashboards, in order for banks to better visualise and analyse their results.

Taking into account our client's specific product offerings, balance sheet composition, regulatory approaches and requirements, we provide regulatory advisory services to simplify and solve for regulatory compliance, allowing our clients to focus on optimising their capital allocations and executing insight driven strategic business decision making.

ABOUT MONOCLE

Monocle is a management consulting firm specialising in banking and insurance. Since 2002, we have assisted industry-leading banks and insurance companies around the world, including institutions in the United Kingdom, Europe, Scandinavia, Asia, South Africa and throughout sub-Saharan Africa.

We design and execute bespoke change projects from start to finish, bridging the divide between business stakeholders' needs and the complex systems, processes and data that sit under the hood. We offer several unique capabilities to our clients, which have been forged over time through the combination of a highly specialised skillset and extensive experience working with the systems, processes and people that are at the heart of the financial services industry.



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