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Deriving Greater Enterprise-wide Risk Insight from Stronger Data Quality Management

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Executive Summary

» The 2007-2008 financial crisis has resulted in a greater focus on risk management from both a quantitative and qualitative perspective. This paper addresses the main issues associated with data quality in banking, demonstrating that data silos continue to be the main cause of data quality issues. The regulatory wave triggered by the financial crisis has not ignored the data-quality issue and this paper outlines the key regulatory concerns, mainly around Basel II and III. Finally, this paper outlines best practices banks can leverage to improve data accuracy, quality, and access across the organization. As a conclusion, the paper embraces the adoption of a centralized risk data repository, commonly known as a risk datamart, as the main tool banks can use to improve data quality and holistic risk governance.

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Main Challenges Associated with Data Quality in Banks

Low-quality data in financial institutions can be attributed to many factors, including:

- Singularities in the nature or size of the portfolio
- The application of a high level of expert judgment of qualitative factors in the determination of counterparties internal ratings for credit approval
- The accumulation of historical data over a period of time whereby the data has usually been collected for daily operational purposes, rather than for the calculation of economic and regulatory capital

However, the main cause of low-quality data can be attributed to the organization of risk data in watertight silos. Such a situation instigates data duplication and inconsistent values. Risk data becomes disaggregated in multiple silos according to different dimensions, such as different books, different functions within the organization, or different risk types. A 2010 report by the Senior Supervisors Group (SSG), which evaluates the progress within financial institutions in developing enterprise-wide data aggregation capabilities, confirms that the issue of data aggregation remains a key challenge.[1]

Did Basel II Facilitate a Silo-based Approach?

Since 2005, banks have been implementing Basel II requirements which some practitioners believe have promoted a silo-based approach to risk data. For the first time, the regulation enforced the tripartite organization of risk types into three silos of expertise – credit risk, market risk, and operational risk. This evolved from Basel I which addressed only credit risk and included market risk only at a later stage, leaving operational risk unaddressed.

This silo-based approach produced the unintended consequence of multiple data sources and systems across risk types, which has resulted in lower levels of quality and consistency. Since the financial crisis, new regulatory frameworks such as Basel III and Solvency II, are moving away from these silos and promoting greater integration among risk types across the organization. For example, Solvency II promotes an integrated approach from two perspectives:

- The taxonomy of Pillar I risks is wider and more articulated, therefore the same data enters into the calculation of more than one sub-risk
- The data quality assessment requirements prohibit the data duplication. Data cannot be assessed twice in two different silos and then enter the Solvency Capital Requirement calculations, as this would violate the auditing requirements.

Basel II required such a huge implementation effort that risk managers focused exclusively on its implementation, leaving little time or focus for best practices such as risk data aggregation and integration. The lack of agreement between business lines and IT departments made it difficult to gather the necessary consensus and budgets for IT risk investments. Furthermore, the short-term focus in budget allocations for risk infrastructure projects delayed projects aimed at creating a centralized and organic data infrastructure. Moreover, weak data governance at the firm level has produced inconsistent approaches, whereby risk data management is managed and developed independently and in an uncoordinated manner across risk silos. Finally, the integration of new entities into a banking group (from mergers or acquisitions) might have been conducted by adding a patch between the existing risk infrastructures instead of seeking integration between them.

Fragmented Risk Data Infrastructures Slow Down Risk Governance

The fragmented organization of risk data into separate silos slows down risk management innovation and hinders the capability to respond to new regulatory requirements. Within each risk silo, risk managers can develop their own data taxonomy which renders problematic data aggregation downstream or across different business lines. This hinders innovation and makes it difficult to execute activities that are based on an aggregated view of risk data.

Multiple silos reduce the organization's ability to quickly and effectively respond to new regulatory requirements. Furthermore, to create and deliver accurate internal business reports for the Board and other stakeholders, the bank needs to have a "single source of truth" from which the risk, governance, and compliance teams can produce reliable reporting.

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[1] Senior Supervisors Group: Observations on Developments in Risk Appetite Frameworks and IT Infrastructure - December 2010, pages 12-14.

What are the Current Regulatory Requirements on Data Quality?

Data quality requirements have evolved over time. Supervisors reactions to the financial crisis involved an increase of regulatory requirements for data quality. Solvency II has introduced strict and detailed data quality requirements for EU-based insurers. In the MiFID area, the Committee of European Securities Regulators (CESR) published three consultation papers which contain the same data quality assessment measures as Solvency II.[2] The UK FSA was already very attentive before the crisis to the issues of data quality, and it promoted a data quality assessment based on the criteria of completeness, accuracy, and appropriateness.[3] This is consistent with its latest requirements on the standardized approach for operational risk.[4]

Data Quality Requirements in Basel II

Basel II provided general guidelines on how to assess data quality. It required "the data used as inputs into the model to be accurate, complete, and appropriate."[5], and banks wanting to adopt an IRB approach to Basel II had to be confident, not only in the model, but also that the data is fit for the intended purpose.

Most of the issues with data quality concern the internal model validation process for the Pillar I risks (market, credit, operational):

- The process must be robust enough to check all of the relevant steps: data collection (customers, products, contracts), parameters estimation, update/override, RWA computation.
- The risk management IT system must be integrated with the day-to-day business processes. For example, in the area of credit risk, the customer's probability of default (PD) estimation has to be effectively used in the credit origination and in the pricing process to the borrower.
- All the data used as components for the RWA computation (for example PD, LGD, EAD and M parameters and their inputs) must be stored. The bank must be able to rerun the process to reproduce the entire RWA workflow to reproduce the same output.
- Data quality properties, with explicit constraints referenced to accuracy, completeness and profiling.

Data Aggregation is Implicitly Required by Basel III

Basel III implicitly requires banks to knock down the silo-based configuration because higher quality capital is required, better capital/risk ratios are required, and new risk charges (IRC, Stressed VaR, etc.) have been added. Under these new conditions every cent counts, hence financial institutions are more focused on enhancing data quality.

Basel III compels banks to move towards the execution of comprehensive stress testing across risk types. This poses a clear challenge to risk data aggregation, as it compels the bank to accurately control the different sources of risks embedded in a single product or transaction. Furthermore, Basel III introduces requirements for counterparty credit risk and market risk that can be fulfilled only by enabling global counterparty definitions, which in turn can be accomplished by integrating the data silos feeding daily risk calculations and data reporting. To this extent, market and credit risk factors must be managed in an integrated fashion.

Finally, the increased volume of liquidity risk reports that banks have to submit reinforces the need for a stronger risk data infrastructure across the enterprise.

A Note on Dodd Frank

In June 2012, The US Department of Treasury, the Federal Reserve System and The Federal Deposit Insurance Corporation issued Notices of Proposed Rulemaking (NPRs) that will revise the agencies' current capital rules. They are proposing to revise the risk-based and leverage capital requirements consistent with agreements reached by the Basel III Framework. While the final rules are still being devised, it is envisaged that US-based banks will need to follow the same data considerations implicitly implied under Basel III, as outlined above.

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[2] Technical advice to the European Commission on investor protection and intermediaries (Ref. CESR/10-417), equity markets (Ref. CESR/10-394) and transaction reporting (Ref. CESR/10-292).

[3] Financial Services Authority: Industry Feedback: Large corporate rating probability of default models, December 2004, Section 3 on Data Completeness, Accuracy and Appropriateness.

[4] Financial Services Authority: Enhancing frameworks in the standardised approach to operational risk –Guidance note" - January 2011, page 10. The FSA introduced the scorecard approach to data quality in Basel II. With CP 189 it proposed to identify quantifiable targets to cover the completeness and accuracy criteria. Such targets (both firm specific and regulatory defined) shall be evaluated through a self-assessment data accuracy scorecard (DAS).

[5] Annex VII, Part 4, Paragraph 31 of the Capital Requirements Directive (CRD).

Best Practices for the Governance of Data Quality

A number of best practices can be identified in the area of data quality for financial institutions. This section focuses on two key themes: a centralized approach to risk data and the integration of risk and finance data.

1. A Centralized Approach to Data Quality Management

To develop a clean and efficient approach to risk data management, risk calculation engines should receive input (and eventually hypotheses and parameters) from and store results into a centralized risk data repository. This repository defines a common taxonomy of risk data across all of its users (IT, risk, finance, reporting). This centralized approach to data quality is widely recognized as a best practice by the industry; however it is sometimes overlooked in favor of short-term patchwork solutions.

Banks could consider instituting a process of Data Quality Assessment, which involves the application of the criteria of completeness, accuracy, and appropriateness. Two mechanisms are used to test these criteria: the execution of data quality checks and the application of data reconciliation (particularly with the General Ledger).

The reconciliation process is particularly important for the accomplishment of accuracy, and it involves identifying differences in the data and explaining the consequences of these differences.

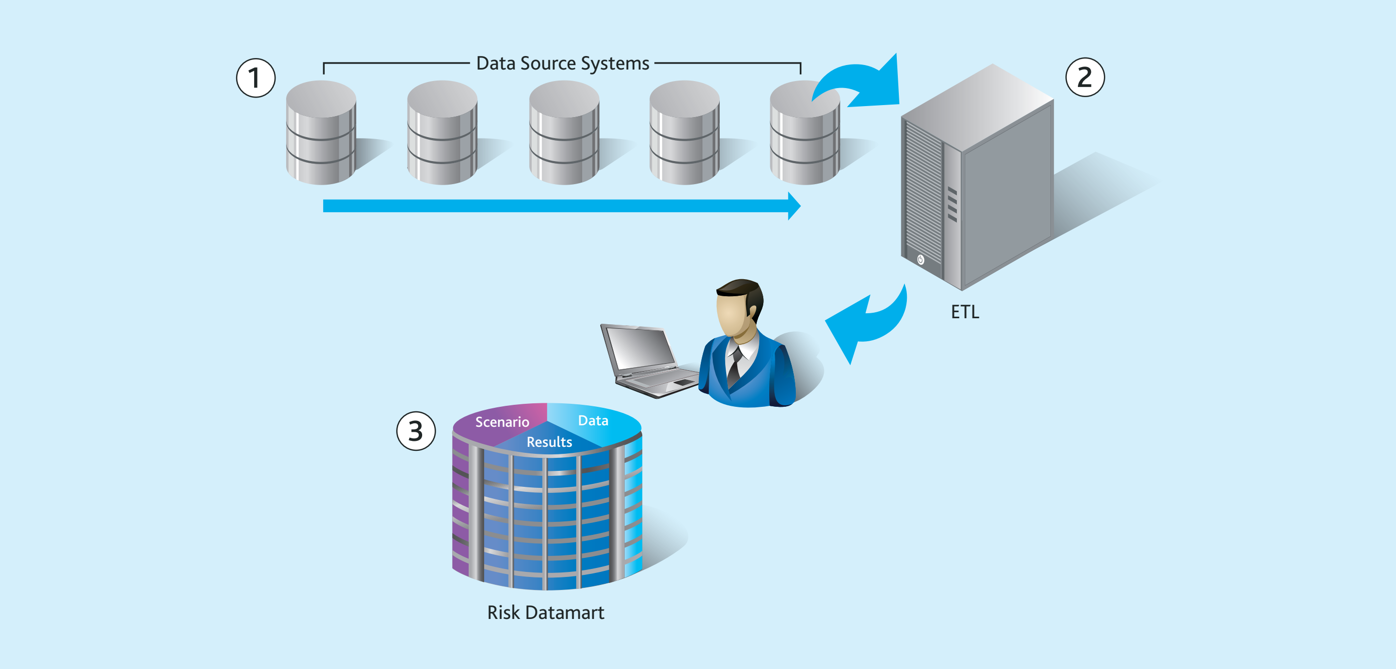
In the banking sector the reconciliation process involves the aggregation of data at the transactional level, accounting data, and off-balance sheet data. More importantly, the reconciliation process includes periodic reconciliation between risk and financial data (where VaR calculations are compared to P&L on a daily basis).

Given the centralized risk data repository, there are a number of potential locations for the DQA process. These include:

1. Within the data source systems feeding the centralized risk repository

2. Within the IT infrastructure that moves data from the source to the centralized risk repository

3. Inside the centralized risk repository itself



Performing DQA In the Data Source Systems Feeding the Centralized Risk Repository

In the first case, the owner of each external data source system can easily manage the data quality checks and the associated data correction rules. However, this pattern presents three disadvantages. First, in case of conflict between data owners, the users of the data (responsible for the data quality) will not have the power to fix the data appropriately because this activity depends on other actions. Second, owners of external data systems are often positioned within the IT department, therefore the business user will not have access to the DQA process. Third, data quality checks will be developed, leading to duplication and inconsistency.

Performing DQA within the IT Infrastructure that Moves Data from the Source to the Centralized Risk Repository

The second pattern involves executing the DQA within the IT infrastructure that transfers data from the legacy sources to the centralized risk repository (usually ETL tools). This pattern is most appropriate when we move data between systems that are accessed exclusively by IT applications. However, when the business user needs to access risk data, this pattern presents some drawbacks. First, the data checks are managed in tools that are too technical to be made available to the business user. Second, and most importantly, data quality checks performed will filter out low-quality data. This practice is not recommended because reviewing low-quality data enables the user to understand which data has low quality and also what to do with it (for example, using it in the risk calculations, correcting it temporarily and so forth).

Performing DQA Inside the Centralized Risk Repository

The third pattern involves executing the DQA in the centralized repository, after all of the risk data has been loaded. This pattern enables users to have direct access to the DQA. Moreover, as mentioned above, it is beneficial to import all the data, even the low-quality data, in order to enable the user to assess the quality and take appropriate actions. These activities would be impossible in the two previous patterns. The main disadvantage with this approach is that users who want to apply permanent corrections to low-quality data would have to act on the source systems directly, which are normally not accessible. Hence, the possibility to temporarily correct data in the centralized risk repository while the IT department applies the correct fixes in the upstream legacy systems seems a good compromise to enable the risk manager to control the data quality and meet regulatory compliance expectations.

From this analysis of a centralized approach to risk data, we can recommend two best practices. First, banks should look at adopting approaches that enable the user to access the DQA, not only in terms of results but also in terms of control of the involved data quality checks. Second, banks should give the business user the possibility to access low-quality data, in order to analyze the results of the DQA and perform “what-if-analysis” with it.

2. Integration Between Risk and Finance

Basel III brings new regulatory focus on the integration of risk and finance data. This is particularly evident when performing comprehensive stress testing across risk types and calculating the new liquidity risk ratios, which require interaction with Treasury teams.

Historically, risk management and finance teams within banks have worked with different data. The departments that traditionally report to the CRO (credit risk, market risk, operational risk, enterprise risk, and reporting) often work with data that is organized in silos according to the taxonomy promoted by Basel II. Any risk integration activity needs to manage data coming from different, often overlapping, sources which makes auditing, tracking, and documentation a challenge.

We can see the same issues, often to a higher degree, occurring in the departments traditionally reporting to the CFO (for example, accounting/controlling, treasury, financial and regulatory reporting, capital management, strategic planning and budgeting), with the result that strong reconciliation processes are needed between source systems, GL, and risk repositories.

The integration between risk and finance would benefit several activities:

- Stress testing liquidity and profit and loss
- Measuring performance based on economic profit (risk and performance management)
- Economic capital modeling
- Integrated use of risk data in financial reporting to regulators and shareholders
- Alignment of capital and balance sheets structure to risk appetite
- Alignment of risk appetite against strategy

Conclusions

This paper has identified the partitioned configuration of risk data within banks as the key cause of low-quality data. This has been driven by regulations (primarily Basel II) which has enforced the tripartite organization of risk types into three silos of expertise – credit risk, market risk, and operational risk.

This silo-based approach has produced the unintended consequence of multiple data sources and systems across risk types which has resulted in lower levels of quality and consistency. Additionally, multiple silos reduce the organization's ability to quickly and effectively respond to new regulatory requirements and hinders risk management innovation and makes it difficult to execute activities that are based on an aggregated view of risk data.

Data aggregation is implicitly required under Basel III because the higher quality capital requirements and new risk charges are challenging financial organizations to make every cent count. Stronger processes and more accurate enterprise-wide data will help organizations meet this challenge.

This paper promoted the use of data centralization, through risk and finance datamarts, as a way to facilitate increased data quality across the organization. This datamart can define a common taxonomy of risk data across all of its users facilitating a "single source of truth".

Furthermore, banks should look at integrating their risk and finance data to strengthen stress testing across risk types and to improve internal and external reporting.

Further Reading

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