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HOW TO REDUCE BONDS SETTLEMENT FAILS AND MITIGATE CSDR FINES AND BUY-INS



The financial services industry has witnessed considerable hype around data science and machine learning in recent years. However, a quick Google search will confirm that there are very few concrete examples of it being put in practice in large institutions and delivering tangible results.

Here at Capco, we strongly believe that data science can add significant value in financial services across multiple functions with high returns on investment. This latest series 'Applied Data Science in Financial Services' aims to highlight the common yet painful problems which Capco has solved using advanced Analytics techniques.

Our second article focuses on a problem that is in the limelight nowadays: bonds settlement fails. On a yearly basis, banks must settle millions of trades. Bond trades failing to settle on the intended date not only causes a major issue for operational teams in terms of workloads of remediation activities, but with the new CSDR regulation expected to come into force in February 2022 (delayed from February 2021 due to the Covid-19 pandemic), this also threatens to impact the bank's bottom lines through automated fines and buy-ins.

We have helped our client mitigate this problem by applying modern data analytics techniques that allowed them to identify quick wins.

Here's our story.

THE PROBLEM: FAILS CONVERTING INTO FINES

Trading activities are at the heart of an investment bank's business. Performing such activities requires settlement: an exchange between a buyer and a seller of a security against cash. The numbers of trades that banks must settle on a yearly basis are very large, typically of the order of millions of transactions. Failing to settle transactions on time can cause major issues such as reputational damage and substantial increases in the workload of remediation activities for operational teams.

An impending consequence is the payment of fines and automated mandatory buy-ins enforced by the new Central Securities Depositors Regulation (CSDR). The first version of this regulation entered into force on 17 September 2014 with the aim of harmonizing the authorization and supervision of central security depositories (CSDs) across the EU and to improve settlement discipline in the securities settlement systems (SSSs) that CSDs operate.

Up until 1 February 2022, bond trades should be settled within two days after the transaction date (commonly referred to as T+2) but if the trade is not settled in that timeframe, the only consequence is reputational damage for the failing party.

However, the new CSDR regulation coming into force on the 1 February 2022 is introducing penalties (starting the next business day after the contractual settlement date) and automated buy-ins (for trades failing to settle in the 7 business days following the contractual settlement date).

This introduces an urgency to ensure that bonds are settled on time, in order to avoid any penalties.

CASE STUDY: BONDS SETTLEMENT FAILS ROOT CAUSE ANALYSIS

Capco was engaged by a tier 1 global bank who sought to make intelligent use of their data to improve their bonds settlement processes in the investment bank. Previously, the client had a daily and high-level view of fails but struggled to consolidate all the data and draw meaningful insights. The goal of this project was to consolidate insights based on a yearly aggregation of root causes, in order to:

1. Make a better use of employee time by improving relevant processes. This was with the aim of accelerating the settlement process, reducing the frequency and amount of time required to fix settlement issues and therefore giving more time to the settlement team to work on other issues/projects
2. Provide ranges of CSDR fines that could potentially have been incurred if the new regulation was already into force and suggest some quick wins to mitigate the problem

The team followed an iterative three-step approach to find the root causes of fails through a combination of descriptive statistics and natural language processing (NLP). The analysis showed the elements potentially causing the greatest CSDR fines and buy-ins, broken down by a multitude of dimensions (e.g. trader book, market, participant, ISINs - unique security identifier).

Step 1: Business Understanding

The team began to build a well-rounded understanding of the trade lifecycle, how systems are interconnected and how data flows from one system to another.

Then they made sure to understand the bank's strategic plans to reduce bonds settlement fails, to ensure the project aligned to the bank's objectives.

This detailed appreciation of future plans and understanding of current processes allowed the team to develop an idea of the ideal 'target state' to work towards.

Step 2: Exploration of Data Sources & Data Lake

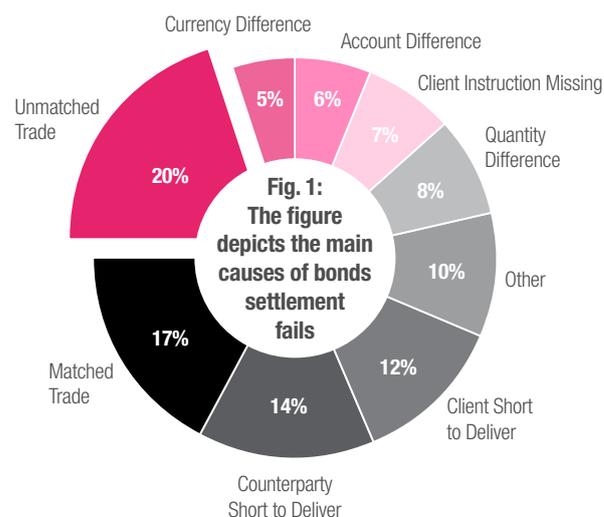
Next, a deep dive into the relevant data sources was performed. Capco typically works with data of different sizes and stored using

different technologies, either on premise or on the cloud. Capco's data scientists can analyze data in CSVs or SQL databases but are also adept at using 'big data' technologies such as Hive, Pig and Spark.

In this case, relevant data was pulled from several diverse sources, mainly from the execution system (where data from several different booking systems data are collected) and from the settlement system. The datasets were then joined to create a single enriched dataset, which enabled a thorough investigation to realize patterns and interrelations within the data.

The team then proceeded to interrogate the data and ask key questions of it, such as:

- Which business areas contribute the most to CSDR fines and buy-ins?
- What are the fail ratios in the different business areas, trader books, etc.?
- Are fails happening mostly due to matched or unmatched reasons?
- What are the main causes behind the fails? (see an example in Fig.1 below)



This step alone was of huge value, as the team could now provide insights to the client as to why bonds settlement fails happened.

Step 3: Analyze Settlement Comments

One of the challenges faced by the client is that important details on root causes were often buried in unstructured comments. It was necessary to tap into this rich source of data and structure it, so that sensible insights could be found.

In order to do this, Capco data scientists started to investigate unigrams (most frequent single words in the comments describing the reason of failure) for the markets and ISINs failing the most. As the analysis progressed, bi-grams, tri-grams and four-grams were also analyzed in order to understand which words were most frequently associated to each other. Word clouds were then drawn to represent the most common issues (see an example in Fig.2 below).

Coupling descriptive statistics with Natural Language Processing (NLP) allowed the client to better understand issues in the current process and their underlying root causes. In that way, the team identified quick wins and communicated these actionable insights to the business.

This analysis also introduced the possibility of developing a model that would look in upstream system to predict fails and their root causes before they happen, so that they could be anticipated or avoided proactively.

Fig. 2: The root causes of bonds settlement fails are depicted.

The bigger a word, the most frequent the word has been found to be the root cause of the fail.



IMPACT TO THE BUSINESS

Now that we had a good understanding of settlement fails and their root causes, we were able to translate our insight into business impact.

We recommended the development of an upstream machine learning model to our client. This would both allow for the prediction of settlement fails before they occur and flag the reasons why they are likely to fail, so that analysts can go into

the system and take preventative action. In contrast to current systems, which only provide a historical view after settlements have failed and therefore necessitating a reactive approach, our model would allow clients to proactively avoid the risk and subsequent penalty altogether.

For our tier 1 clients, this approach could avoid anywhere between USD 2 – 10 million of fines across repo and cash fails.

CLIENT REACTIONS TO THE ROOT CAUSE ANALYSIS

This root cause analysis allowed the client to:

- Identify problems and put remediation plans in place to fix the issues found
- Accurately forecast the CSDR fines and buy-ins that would have been incurred over the period analyzed
- Articulate a clear plan and approach using advanced techniques to avoid punitive fines

The application that was most lauded was the CSDR fines and buy-in calculations. This feature acted as an eye-opener to the business of the impact of the fines that CSDR would have had on the bank if processes were not to be improved, and acted as an impetus for innovative approaches, such as machine learning, to be implemented.

CONCLUSION

Whilst fixing bonds settlement processes might seem like an intimidating process, the quick wins identified by the analysis have allowed the operational teams to implement simple and easy fixes in an efficient manner that would mitigate the bank many potential future problems.

CONTACT

Intrigued by our solution? Get in touch with our Data Science & Machine Learning capability lead, **Riddhi Sen**, on riddhi.sen@capco.com or our R&D Lead, **Jibrán Ahmed** on jibrán.ahmed@capco.com.

ABOUT CAPCO

Capco is a global technology and management consultancy dedicated to the financial services industry. Our professionals combine innovative thinking with unrivalled industry knowledge to offer our clients consulting expertise, complex technology and package integration, transformation delivery, and managed services, to move their organizations forward.

Through our collaborative and efficient approach, we help our clients successfully innovate, increase revenue, manage risk and regulatory change, reduce costs, and enhance controls. We specialize primarily in banking, capital markets, wealth and asset management and insurance. We also have an energy consulting practice in the US. We serve our clients from offices in leading financial centers across the Americas, Europe, and Asia Pacific.

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