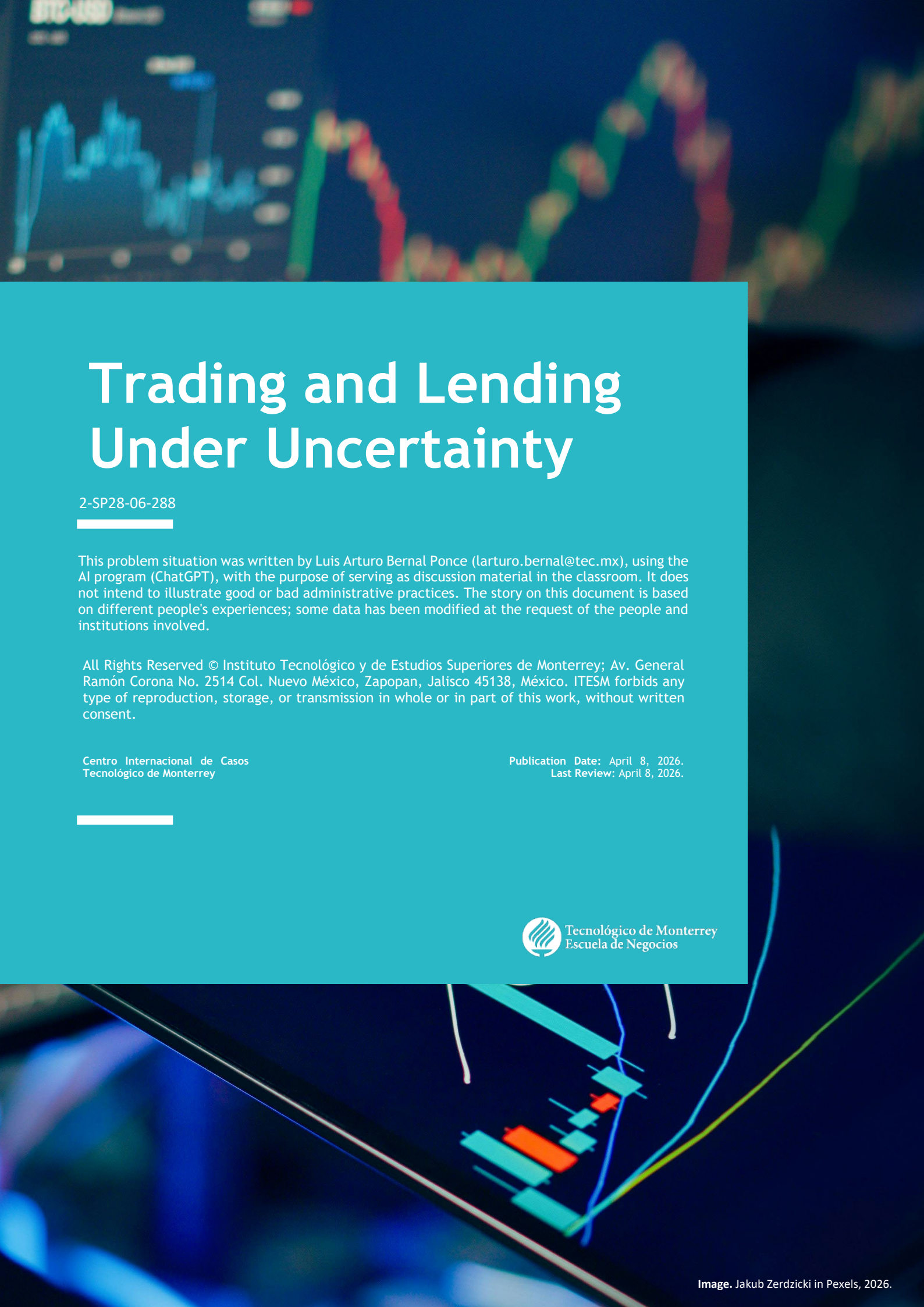




Trading and Lending Under Uncertainty

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This problem situation was written by Luis Arturo Bernal Ponce (larturo.bernal@tec.mx), using the AI program (ChatGPT), with the purpose of serving as discussion material in the classroom. It does not intend to illustrate good or bad administrative practices. The story on this document is based on different people's experiences; some data has been modified at the request of the people and institutions involved.

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The Company

Cap Adv is a financial consulting firm based in Vancouver, Canada, specializing in quantitative analysis and financial modeling for asset managers and financial institutions. The firm supports clients in improving both investment performance and risk management through data-driven decision-making.

Recently, Cap Adv was hired by Arxz Investment Partners, an asset management and lending firm that provides equity investment services and corporate financing solutions to institutional and high-net-worth clients across North America and Latin America.

Despite maintaining a diversified investment approach and a disciplined long-term strategy, Arxz Investment Partners has faced increasing pressure from clients due to inconsistent performance relative to benchmark indices in the asset management segment. At the same time, the firm has expanded its corporate lending operations, particularly toward small and medium-sized enterprises (SMEs), introducing additional challenges in credit risk assessment.

As stated by Arxz Investment Partners's Chief Financial Officer during a recent internal meeting:

"We have been in the market for decades, relying on solid fundamentals and long-term strategies. However, the competitive landscape is changing. We need to evaluate whether more systematic techniques can improve our results without compromising our risk standards".

Arxz Investment Partners's executive team has identified the need to strengthen both its investment strategy and its credit evaluation process, recognizing that both areas directly impact on the firm's overall profitability and risk exposure.

The Investment Challenge

Arxz Investment Partners's portfolio managers have traditionally relied on fundamental analysis and long-term investment principles. However, recent industry developments have intensified the need to incorporate more systematic approaches.

Algorithmic and electronic trading play a significant role in modern financial markets, reflecting the increasing use of automated and data-driven trading systems (Bank for International Settlements, 2023). Consequently, asset managers face greater pressure to adopt more systematic and responsive strategies. In this context, some members of the investment team have proposed incorporating rule-based trading strategies, leveraging existing programming tools that allow the systematic implementation and evaluation of trading rules using historical data. These strategies aim to exploit short-term trends in asset prices by generating buy and sell signals based on observable patterns in historical data.

Momentum strategies are based on the idea that assets exhibiting upward price trends may continue performing well in the short term, while assets showing downward trends may continue underperforming. In academic literature, momentum is often considered a market anomaly, as it reflects predictable patterns in asset returns that are not fully explained by traditional models of market efficiency. This approach is widely studied in empirical finance and is often considered a practical way to capture short-term market dynamics.



While such approaches are widely used in practice, there is no consensus within the firm regarding their effectiveness. Some managers believe that these strategies may improve timing, as programmatic implementation allows for the consistent and immediate execution of predefined rules, reducing delays and discretionary biases in decision-making. By leveraging programming tools, these strategies can systematically process large volumes of data and react more efficiently to market signals. However, other managers argue that they may lead to excessive trading, increased volatility, and performance that does not consistently exceed passive strategies.

To address this debate, Arxz Investment Partners has requested Cap Adv to conduct a structured evaluation of a momentum-based trading strategy, given its intuitive foundation and empirical support suggesting that assets with recent positive performance may continue to perform well in the short term, using historical market data. The objective is to determine whether such a strategy can generate superior risk-adjusted returns compared to a buy-and-hold approach, which consists of purchasing assets and maintaining the position over time without actively adjusting it in response to short-term market movements, and whether it should be incorporated into the firm's investment process.

The Credit Risk Challenge

In parallel, Arxz Investment Partners has expanded its lending activities to SMEs, seeking to diversify its revenue sources beyond asset management. However, this expansion has exposed weaknesses in the firm's current credit evaluation framework.

At present, credit decisions are primarily based on traditional financial statement analysis, using key ratios related to profitability, liquidity, leverage, and operational efficiency. Despite this approach, recent outcomes have shown inconsistencies: some firms with strong financial indicators have experienced financial distress, while others with weaker profiles have remained stable.

At the same time, financial technology firms are transforming credit risk assessment processes. For example, companies such as *Kueski* in Mexico use machine learning and alternative data to evaluate credit applications more efficiently, enabling faster and more flexible lending decisions (Kueski, n.d.; World Bank, 2022). These developments highlight the limitations of relying exclusively on traditional financial indicators.

Arxz Investment Partners has provided Cap Adv with historical data on past loan applicants, including financial ratios such as working capital to total assets, retained earnings to total assets, earnings before interest and taxes to total assets, and sales to total assets, along with an indicator of whether the firm defaulted within a defined time horizon.

One important characteristic of the dataset is the relatively low proportion of default events, which complicates the evaluation of predictive performance and requires careful interpretation of results.

Cap Adv has been tasked with developing a structured analytical approach to estimate the likelihood of default and support more consistent credit approval decisions, balancing the trade-off between portfolio growth and risk control.

The Analytical Objective

The analysis must include two complementary components. On the investment side, it requires the appropriate processing and transformation of historical market data, as well as the construction and evaluation of a rule-based trading strategy founded on momentum indicators to assess its performance. On the credit side, it involves the analysis of corporate financial information to estimate the likelihood of default for potential borrowers and to support consistent credit approval decisions based on the identified risk levels. In both cases, the results must be presented in a clear and interpretable manner to support effective decision-making.

Arxx Investment Partners's executive team expects a clear recommendation within three weeks. They seek to determine whether a rule-based trading strategy improves portfolio performance relative to a passive investment approach, based on metrics such as return, volatility, and drawdown. At the same time, they require an assessment of how effectively financial indicators can be used to identify high-risk borrowers, supported by model evaluation metrics and classification results. Based on this analysis, the firm aims to establish criteria to support credit approval decisions and to evaluate whether the proposed approaches contribute to improving performance while maintaining adequate risk control.

SEE Datasets [Market Data](#) and [Corporate Credits](#)

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