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points from their loyalty program as an incentive in promotions (reward points coupons) instead of immediate discounts (price discount coupons), firms seek to optimize the gross profit from the promotion by reducing costs and strengthening repeat purchase behavior. We compared both coupons in a field experiment with a retailer, finding: (i) Both boost short-term sales significantly. (ii) Compared to immediate discount coupons, future-credit coupons cut redemption revenues by 50%, despite higher average transaction spends, due to fewer redemptions. Despite cost benefits, they yield less profit than immediate discounts. (iii) Redemption of future-credit coupons fails to increase total spend or repeat purchases post-promotion in comparison to the redemption of an immediate discount coupon. Retailers' hopes for loyalty points over immediate discounts in promotions don't pan out.

3 - Bespoke Direct Marketing Optimization
Philipp Pithan, Arnd Huchzermeier

Firm growth and profitability are typically achieved through new customer acquisition and loyal customer retention, often relying on non-discriminatory mass marketing. Given the rise of customer databases and firms' natural desire to build lasting customer relationships, retailers increasingly employ direct marketing measures. Yet the associated marketing campaigns tend to be wasteful and myopic, leaving a vast potential untapped. Bespoke Direct Marketing Optimization (BDMO) comprises (i) campaign selection, (ii) campaign sequencing, and (iii) the targeting of (sub)segments for (re)activation while considering multiple objectives. We propose an optimization model that solves these decisions simultaneously while adhering to multiple business constraints, incorporating actual customer buying behavior, and accounting for the multi-period customer migration, which, despite its major implications, is often ignored by other DMO models. We also describe a heuristic that can be applied to larger problem instances. We dramatically reduce the complexity and runtime of the optimization problems while still obtaining nearly optimal results. Using a real-world planning problem, we perform a numerical study for testing and benchmarking. There is a limit to the performance effects of increasing the budget for direct marketing models; any improvement beyond that limit is possible only with models and/or measures that are more bespoke.

4 - The Analytical Edge in Circular Economy: Predictive Analytics for Reusable Packaging Success
Alexander Niclas Popovic, Arnd Huchzermeier

Driven by environmental pollution concerns and legislative pressure, an increasing number of Industry 5.0 initiatives and impact startups have recently emerged, focusing on establishing circular economy business models. One emerging industry is combating plastic waste through innovative reusable packaging systems.

In this study, we examine the case of the German startup Vytal, which offers a deposit-free reusable packaging system for take-out food, utilizing serialized containers. We develop a forecasting framework to estimate the distribution of net demand, consisting of container issues and returns. Accurate net demand forecasts are critical for optimizing asset utilization and inventory management of reusables. We propose a forecasting framework based on a pool of distributed lag models for estimating container issues and returns. Each model exploits the relationship between container issues and returns to make accurate predictions, and we combine them into an "optimal" model using an adaptive Markov Chain Monte Carlo algorithm. Furthermore, we examine several extensions of our basic model and analyze the benefits of including additional covariates, as well as leveraging cross-location forecasts into our model.

We use a unique dataset from Vytal to demonstrate that our proposed forecasting framework outperforms existing models and algorithms from both the literature and our case company in terms of forecast accuracy and computational inference efficiency.

■ TA-51
Tuesday, 8:30-10:00 - Room: M5 (building: 101)

Corporate finance risk management

Stream: Risk management in finance
Invited session
Chair: *Aleš Kresta*

1 - Two-stage DEA model to evaluate corporate efficiency in sustainability
Kristina Sutiene, Clara Vaz, Raminta Vaitiekuniene

The relationship between environmental, social, and corporate governance (ESG) and corporate financial performance (CFP) has been widely explored and continues to be an active area of research. Two main directions could be revealed. Investor-centric studies seek to directly link ESG to CFP using benchmarks and adopting a portfolio accordingly, while corporate-focused research explores different elements of performance like innovation and operational efficiency to understand the impact of ESG initiatives on CFP. These studies commonly employ correlation analysis, mediating factors, or regression analysis to disclose those patterns. Notably, some studies employ Data Envelopment Analysis (DEA) to assess corporate efficiency by minimizing their resources and maximizing ESG. We contribute to this field by using a benefit-of-the-doubt (BoD) model based on the DEA, which is used to calculate a composite indicator of ESG for manufacturing corporates. Then, in the second stage of this model the panel regression is used to identify elements of CFP and their significance for the ESG outcome. The results of corporate ESG efficiency is discussed in a view of corporate operating country, region and development level. The research has received funding from the Research Council of Lithuania (LMTLT), agreement No. S-PD-22-23.

2 - Exploring aspects of risk and sustainability in portfolio composition and Assets and Liabilities Management (ALM) for a Brazilian fintech
Fernando Luiz Pereira de Oliveira, Carolina Vieira, André Robine, Gustavo Souza

This work presents a case study focusing on the importance of Assets and Liabilities Management (ALM) in a complex economic scenario, of a Brazilian fintech company with a significant cash flow of 27 billion BRL per year. Applying methods from modern portfolio theory, multivariate analysis and data mining, we identify the classifying variables that affect credit risk and liquidity for this company and demonstrate how through a data-oriented risk profile one can optimize profitability with strategies that nonetheless comply with United Nations' Sustainable Development Goals (SDGs). Specifically, we approach the adequacy of the company's ALM strategy to SDG 8 (Decent Work and Economic Growth), which is of particular importance in the Brazilian context and Latin America in general.

3 - Reputation risk mitigation in investment strategies
Alexandra Moura, Carlos Oliveira

We consider an investment model in which a firm decides to invest in the market, taking into account its future revenue and the possible occurrence of adverse events that may impact its reputation. The firm can buy an insurance contract at the investment time to mitigate reputation risk. The firm decides when to enter the market and the insurance strategy that maximizes its value. We consider three types of insurance contracts and different premium principles. We provide analytical conditions for the optimum and study several numerical examples. Results show that the firm's optimal strategy depends on the risk size, the firm's risk aversion, and the insurance premium.