

5 - Agile Project Management – Improved Performance Through Scrum Sprints?

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Agile Scrum sprints are characterized by timeboxed progression and output goals for every sprint. In a 2x2 experimental design, we show that in the absence of timeboxed progression and phase-specific output goals participants spend too much time on early compared to later project phases. We refer to this effect as Progression Fallacy. Timeboxed progression mitigates this effect, but only little improves the overall exerted effort. Phase-specific output goals without timeboxed progression have an adverse effect, due to an amplification of the Progression Fallacy. Only the combination of timeboxed progression and phase-specific output goals results in an overall performance uplift.

TC72

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Crowdfunding and Other Fintech Phenomena

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Chair: Hongchang Wang, Mableton, GA, 30126, United States

1 - A Structural Analysis of Bitcoin Cash's Emergency Difficulty Adjustment Algorithm

Vipul Aggarwal, University of Washington, Seattle, WA, 98105, United States, aggarv@uw.edu, Yong Tan

We analyze the equilibrium behaviour of cryptocurrency miners in the wake of a major cryptocurrency fork. Miners are responsible for validating transactions and ensuring smooth functioning of the cryptocurrency platform. Specifically, we are interested in their strategic interactions with the incentives provided by the developers of the newly born minority chain to prioritize its transactions over that of the dominant parent currency. We focus our attention on the Bitcoin (BTC) fork of August 2017 that resulted in the birth of Bitcoin Cash (BCH). BCH's developers introduced emergency difficulty adjustment (EDA) algorithm to incentivize miners to process BCH's transactions over that of BTC's.

2 - Sympathy to the Seemingly Needy: Does Social Influence Alleviate Biases in Medical Crowdfunding?

Yun Young Hur, Georgia Institute of Technology, Atlanta, GA, 30312, United States, Fujie Jin, Xitong Li, Yuan Cheng, Jeffrey Hu

In this study, we conduct a large-scale randomized field experiment with a leading medical crowdfunding platform to examine whether leveraging social influence impacts users' willingness to donate and how the impact differs for cases involving male and female patients. Our results show that social influence alleviates gender bias in donations, particularly for cases lacking other strong signals such as involving patients of young age or with cancer-related conditions. On the other hand, presence of other strong case-level signals makes patient gender a redundant signal and therefore, social influence's impact on willingness to donate is likely similar across patient gender in these cases.

3 - The Value of Alternative Data in Credit Risk Prediction: Evidence from a Large Field Experiment

Tian Lu, Carnegie Mellon University, Pittsburgh, PA, United States, tianlu@andrew.cmu.edu, Yingjie Zhang, Beibei Li

This paper conducts a comprehensive evaluation of the value of alternative data on microloan platforms with a large field experiment. Our machine-learning analyses demonstrate that alternative data can significantly improve the prediction accuracy of borrowers' default behavior and increase platform profits. Moreover, we find that our framework helps financial institutions extend service to more lower-income and less-educated loan applicants from less-developed geographical areas. Our study demonstrates the tremendous potential of leveraging alternative data to alleviate such inequality in the financial service markets, while in the meantime achieving higher platform revenues.

4 - Information Asymmetry and Strategic Early Bidding in Peer-to-Peer Lending

Kai Lu, Assistant Professor of Finance, University of Science and Technology of China, International Institute of Finance, School of Management, Hefei, China, kailu666@ustc.edu.cn, Tat Y. Chan, Zaiyan Wei

We study how investors on peer-to-peer lending platforms utilize their information advantage to bid strategically. Better-informed investors face a tradeoff between the probability of successful funding and the expected return when deciding the timing of bidding. Using a unique dataset from Prosper.com, we document the phenomenon of early bidding (or "squatting") behaviors. We show that "good" loans attract more early bids than "bad" loans. Most importantly, "good" loans with a low ex-ante probability of funding success attract more early bids from better-informed investors. Those early bids would benefit not only the borrowers but also uninformed investors.

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1 - Prospective Dynamic Fraud Control for Optimal Profitability in E-commerce

Anand Oka, Microsoft, Redmond, WA, United States, John Beaver, Yung-Wen Liu

Many merchants conduct their businesses through e-commerce. One major challenge in tackling e-commerce fraud results from dynamic fraud patterns, which can degrade the detection power of risk models and can lead to them failing to detect fraud that has emerging unrecognized patterns. The problem is further exacerbated by the conventional decision frameworks that ignore the follow-up decisions made by other associated parties (e.g., payment-instrument issuing banks and manual review agents). Microsoft developed a new fraud management system (FMS) that effectively tackles these two challenges. It keeps features used by the machine learning (ML) risk models up to date by using real-time archiving, dynamic risk tables, and graph theory. The FMS uses customized long-term and short-term sequential ML models to detect both historical and emerging fraud patterns. It also makes rapid real-time optimal decisions using a dynamic programming approach to optimize the long-term profit by taking into account the aforementioned multi-party decisions. After implementing these innovations over a two-year period (2016 to 2018), Microsoft reduced its fraud loss by 0.52%, thus generating \$75 million in additional savings, reduced the incorrect fraud rejection rate by 1.38%, and improved its bank authorization rate by 7.7%. The result was many millions of dollars in additional revenue. These innovations simultaneously prevent fraud and increase bank acceptance. In April 2019, Microsoft launched Microsoft Dynamics 365 Fraud Protection, a cloud-based service available for all e-commerce merchants.

2 - Bus Routing Optimization Helps Boston Public Schools Design Better Policies

Arthur J. Delarue, MIT, Cambridge, MA, 02139, United States, Sebastien Martin

Spreading start times allows school districts to reduce transportation costs by reusing buses between schools. However, assigning each school a time involves both estimating the impact on transportation costs and reconciling additional competing objectives. These challenges force many school districts to make myopic decisions, leading to an expensive and inequitable status quo. For instance, most American teenagers start school before 8:00 AM, despite evidence of significant associated health issues. We propose an algorithm to jointly solve the school bus routing and bell time selection problems. Our application in Boston led to \$5 million in yearly savings (maintaining service quality despite a 50-bus fleet reduction) and to the unanimous approval of the first school start time reform in 30 years.

3 - Vattenfall Gets Hundreds of Millions in Gains Through the Application of Operations Research for Offshore Wind Farm Design

David Pisinger, Technical University of Denmark and Vattenfall, Lyngby, Denmark, Martina Fischetti, Jesper Runge Kristoffersen, Thomas Hjort, Michele Monaci

Vattenfall Gets Hundreds of Millions in Gains Through the Application of Operations Research for Offshore Wind Farm Design Martina Fischetti, Jesper Runge Kristoffersen, Thomas Hjort, Michele Monaci, David Pisinger Wind energy is a fast-evolving field that has attracted a lot of attention and investments over the past decades. The development into a more mature and competitive market makes reduction of costs and maximisation of power production imperative already in the design phase of new wind farms. Vattenfall is one of the largest producers of electricity and heat in Northern Europe, having the ambition to enable a fossil free living within one generation. To reach this goal Vattenfall developed OR methods to identify the optimal location of wind turbines in a given site, and the corresponding routing for offshore electrical cables. In this way Vattenfall is able to maximize the power output and reduce building costs. The tools developed in our project are now fully deployed in the company and used to design all Vattenfall's offshore wind farms. They allowed for savings the order of 150M€ for the complete pipeline of sites under construction (so far).