



Rising Scholars Conference
Finance Student Research Presentations

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Melissa Crumling is a 4th year Finance PhD student at Drexel University. Originally from Cape Town, South Africa, she earned her bachelor's from Kutztown University in 2019 and received her Master's in Finance from Villanova University in 2020. Her research interests include Corporate Finance, specifically Venture Capital and Entrepreneurial Finance.

Abstract:

Breaking Network Barriers in the Era of Data-Driven Venture Capitalists

A large concern in the venture capital industry is the geographic concentration of venture capitalists and their investments in the United States (Lerner and Nanda, 2020). The National Venture Capital Association statistics suggest that three metropolitan areas - the San Francisco Bay Area, Greater New York, and Greater Boston - account for about two-thirds of the venture capital deployed by firms each year. While innovation hubs create increasing returns to scale in entrepreneurial and innovative activity, the geographic concentration of venture capital can diminish innovative activities in many other parts of the country. More generally, Glaeser and Hausman (2020) have documented in the United States the growing hubs of innovative activity in places far removed from the areas with the greatest economic need, a phenomenon that the growth of venture capital has accelerated.

The geographic concentration of VC activity is largely due to the socially connected nature of the VC industry. VCs typically rely on their networks to identify potential investments (Sorenson and Stuart, 2001), which can be limiting to their geographic location and specialized industry (Hochberg, Ljungqvist, and Lu, 2007). However, in recent years, the use of statistical methods such as machine learning and artificial intelligence (otherwise known as data-driven technologies) has significantly advanced the investment decision process of the financial services industry, including venture capitalists (VCs). VCs are increasingly adopting data-driven approaches to automate the pre-investment screening process, specifically sourcing, screening, and evaluating startups. The percentage of global funding rounds involving data-driven VCs has increased from 7% in 2000 to nearly 20% in 2020 (Bonelli 2023).

The use of data technologies differs greatly from the traditional VC investment strategy. VCs who adopt data technologies use web crawlers and commercial databases to find all possible startups and, once identified, seek to collect as much information as possible to create a comprehensive company profile (Retterath, 2020). The screening and evaluating process is thus based on a much wider set of potential investments than the traditional VC. Using data

technologies to source startups may therefore have important long-term consequences on the current geographic concentration of VC investments.

Using data from Crunchbase, I develop a sample of US-based VC investments from 2000 to 2022. Following Bonelli (2023), I identify when VCs hire data scientist to implement data technologies and classify a VC firm as data-driven from the date of its first data-related employee. The rationale is that VCs using data technologies rely on human capital and expertise to implement the data infrastructure. Prior research has used job postings to infer technology adoption (e.g. Alekseeva, Gine, Samila, and Taska, 2021 and Goldfarb, Taska and Teodoridis, 2021).

As a first step, and without claiming causality, I find that after VCs adopt data technologies, they are more likely to invest in firms further away, in a different state, in earlier stages and enter new (but established) markets. These results show that the characteristics of VC's final investments may change after adopting data technologies.

In addition, I find that VCs are more likely to invest in unestablished markets after adopting data technologies. In future tests, I hope to look at how data driven investment decisions may increase entrepreneurial activity in underrepresented areas in the US and identify how this may have real economic consequences for innovation outside regular VC hubs.

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Umang is a PhD candidate in finance at the University of Iowa. His research interests include financial intermediation, market microstructure, asset pricing, and household finance. Before graduate school, Umang worked at the Fixed Income and Foreign Exchange Markets division of J.P. Morgan.

Abstract:

Unemployment Insurance Fraud in the Debit Card Market

Authors: Umang Khetan, University of Iowa; Jetson Leder-Luis, Boston University & NBER; Jialan Wang, University of Illinois at Urbana-Champaign & NBER; Yunrong Zhou, Purdue University

We study fraud in the unemployment insurance (UI) system using a dataset of 35 million debit card transactions. We apply machine learning techniques to group cards into clusters corresponding to varying levels of suspicious or potentially fraudulent activity. We then conduct an analysis based on the staggered adoption of state-level identity verification systems between 2020 and 2021 to assess the effectiveness of technological solutions for reducing fraud. Our findings suggest that identity verification reduced payouts to suspicious cards by 40% relative to non-suspicious cards, which were largely unaffected by these technologies. Our results indicate that identity screening of new and continuing UI applicants may be an effective mechanism for mitigating fraud in the UI system.

Background

Unemployment insurance (UI) is one of the largest financial support programs in the United States, serving millions of individuals who lose their jobs each year and boosting the aggregate economy during crises. The onset of the COVID-19 pandemic and sharp economic contraction led to a large expansion in unemployment insurance, with state and federal governments disbursing over \$800 billion between 2020-2021. However, the rapid UI expansion prioritizing speed over security was also susceptible to fraud, with frequent news reports claiming diversion of funds away from the intended recipients. In this paper, we examine the effectiveness of anti-fraud screening measures in reducing the misallocation of unemployment benefits.

Methodology and preliminary results

Measurement is a natural challenge when studying fraud, as those who commit fraud try to conceal it. We identify indicators of potentially fraudulent activity by analyzing the income and spending patterns in a data set of tens of millions of debit card transactions. We deploy an unsupervised machine learning algorithm on the transactions in our database and group these cards into clusters representing varying levels of suspicious behavior.

In response to growing concerns about fraud, 29 states adopted identity verification technologies using third-party vendors between March 2020 and September 2021. The staggered adoption of these policies provides quasi-experimental variation that we use to identify their effects on disbursement of UI to potentially fraudulent recipients. Using a

difference-in-differences identification strategy, we find that identity verification led to a 40% reduction in UI disbursed to suspicious cards, with minimal negative impact on most other UI recipients. These results suggest that the identity verification technologies implemented during the pandemic were likely to be relatively efficient and cost-effective measures to reduce fraud.

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I am a fifth-year Finance Ph.D. Candidate at the Fisher College of Business, The Ohio State University. My main research interests are corporate finance, financial intermediation, and international finance. My current research projects focus on the risks firms may face stemming from the kinds of goods they produce and their production processes. In particular, my job market paper seeks to understand the impact of supply network fragility on firms' corporate policies.

Before joining The Ohio State University as a Ph.D. student, I was a Senior Quantitative Analyst in the Quantitative Supervision & Research group at the Federal Reserve Bank of Richmond, where I contributed to the stress-testing program. I hold a B.A. in Economics and a B.S. in Mathematics from the University of Maryland and an M.A. in Economics from the University of Texas at Austin.

Abstract:

Supply Network Fragility, Inventory Investment and Corporate Liquidity

This study investigates the impact of supply network fragility on firm-level corporate policies, employing a rich dataset from over 11,000 foreign suppliers to U.S. manufacturing companies from 2007 to 2021. I focus on two primary mechanisms contributing to supply network fragility: the level of input specialization and the scarcity of suppliers providing those specialized inputs. Theoretically and empirically, I demonstrate that companies with fragile supply networks maintain lower cash reserves, higher book leverage, and more input inventories than otherwise similar firms. Moreover, the evolution of corporate policies around supply network shocks and exogenous variation in supply network fragility due to technological breakthroughs that increase reliance on advanced electronics suggest a causal interpretation of the results. I propose that corporate liquidity is less advantageous for firms with fragile supply networks because such firms are less likely to have access to spot markets for inputs after disruptions. These findings suggest that supply network risk has important firm-level implications beyond the direct transmission of shocks from suppliers to customer firms.

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Ruoxi Tian is a Finance Ph.D. candidate at Carlson School of Management, University of Minnesota. His primary research interests lie in empirical corporate finance, with a particular focus on ESG (Environmental, Social, and Governance) and CSR (Corporate Social Responsibility). Additionally, he likes to explore the applications of textual analysis and machine learning in finance. Ruoxi received his B.A. in Business English and Finance from Guangdong University of Foreign Studies in China and an M.A. in Economics from Duke University.

Abstract:

Public Preference and Corporate Investment in DEI

Authors: Jonathan M. Karpoff, University of Washington; Ruoxi Tian, University of Minnesota; Tracy Yue Wang, University of Minnesota; Keer Yang, University of California at Davis

How do corporations internalize non-pecuniary social preferences in their internally shared preferences (namely, corporate culture)? We explore this research question in the context of Diversity, Equity, and inclusion (DEI) using the murder of George Floyd as a shock to public preference for DEI. We fine-tune a state-of-the-art machine learning model to capture specific corporate DEI investments from proxy statements. We find that firms not only significantly increase DEI investments on average after George Floyd's murder, surpassing historical trends, but such corporate responses are also heterogeneous, even after controlling for confounding factors such as COVID pandemic and diversity-related regulations. Firms with greater public exposure ex ante invest more in DEI after George Floyd's murder. They tend to be larger and attract more attention from both mainstream and social media. We further unpack the influence of public attention into forces from different stakeholder groups. Our findings indicate that firms with more DEI investments have higher institutional ownership, less powerful CEOs and more operations in communities leaning towards the Democratic party. Furthermore, the George Floyd event is associated with an increase in the value of firms' investment in DEI activities. Firms with more DEI investments ex ante experience greater share value gains around the time of the George Floyd's murder compared to those with fewer or no DEI investments, and they respond to such changes by increasing their DEI investments the most. We develop a conceptual framework to explain our findings. Our study suggests that public preferences on social issues affect corporate preferences on those issues through firms' stakeholders, and investors' preferences are an important channel. Our work also contributes to the understanding of DEI activities in U.S. corporations. One policy implication is that increasing public awareness could be an alternative intervention to quotas and other one-size-fit-all policies to overcome inequality and discrimination. However, heightened public attention to DEI due to a prominent social event could further polarize corporate DEI efforts.