NBER Economics of Digitization Tutorial Application

J. Frank Li

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2 Education

Ph.D. Business Economics, University of Michigan, Ross School of Business — 2021 (expected).
M.A. Economics, Duke University — 2014.
B.S. Mathematics (with Honors) and Economics, University of Michigan — 2012.

3 Committee Member

Kyle Handley
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4 Research Interests

Primary: Corporate Finance, Innovation and Entrepreneurship
Secondary: International Economics, Economics of Uncertainty, Firm Dynamics, Natural Language Processing

5 Course Description

Microeconomic Theory (standard first year PhD microeconomic theory sequence in econ department)
Macroeconomic Theory (standard first year PhD macroeconomic theory sequence in econ department)
Econometrics (standard first year PhD econometric theory sequence in econ department)
Microeconometrics (PhD microeconometric method courses)
Econometric Theory (PhD non-parametric econometric theory course)
Industrial Organization (PhD empirical industrial organization course)

International Trade (PhD international trade course, theory and empirics)
International Finance (PhD international finance course, theory and empirics)
Corporate Finance Theory (PhD corporate finance theory, contracts design, agency, adverse selection and asymmetric information, etc.)
Empirical Corporate Finance (PhD empirical corporate finance, reduced form)
Structural Estimation in Corporate Finance (PhD empirical corporate finance, structural estimation)
Business Economics Topics Sequence (6 PhD courses focusing on topics including investment under uncertainty, experimental economics, health economics, organizational economics, IO and antitrust, and development economics)
Information Retrieval (Theory and applications on information retrieval and natural language programming on unstructured data)
Real Analysis (PhD real analysis from math department)
Probability (PhD probability and random processes from math department)

6 Research Papers

Research Interest

My research focuses on using detailed firm level data to shed light on the cause and consequence of developing and adopting disruptive technologies on firm's ownership structures and M&A decisions and performance. I am also interested in measuring the effects of uncertainty (in various topics) on firm investment, hiring, supply chain behavior, etc. My research develops new measures through the use of large scale text data and natural language processing methods, and quantifies the aggregate implications at the macro level.

Research Projects

Disruptive Technologies and Common Ownership. *in progress*

Technological innovation is critical to long-run total factor productivity (TFP) growth, economic growth, and standards of living. According to Schumpeter's (1942) "Creative Destruction" argument, firms play central role in the (disruptive) innovation process. However, since the 2000s, particularly after the financial crisis, low productivity growth seems to become the new normal of U.S. economy along with slowing down innovation, increasing industry concentration and common ownership structure. To investigate this issue, I parse firms' ownership structures and construct a measure of technology disruptiveness at the firm-level that covers a large extended range of firms using textual information from USPTO patents and SEC Edgar corporate reports. Following financial liberalization, I am able to identify and quantify the effects of ownership on firms' incentive to develop and adopt disruptive technologies and its implications on both micro and macro level.

The Effects of Technological Innovation on Mergers and Acquisitions Over the Economic Cycle. *in progress*

Acquiring innovative and/or synergic technologies is one of the main drivers of merger and acquisition activities. In this paper, I examine the effects of disruptive technologies and technological synergies on firms' M&A motives and post-merger performances under economic cycles. My results show that under economic contraction, declining stock market, and tightening credit market, more technologically advanced firms are more likely to participate in M&A activities and seek higher technology synergy levels. Real effects of M&A on firm operating performance can be estimated using failed deals and corrected selection bias from first stage under economic cycles.

Measuring the Effects of Firm Uncertainty on Economic Activity: New Evidence from One Million Documents. (with Kyle Handley) *working paper* `http://bit.ly/HL2018CRUX`

We construct a new time-varying measure of firm-specific uncertainty from analyzing the text of company reports filed with the U.S. Securities and Exchange Commission. We explore the implications of idiosyncratic variation in firm-level uncertainty in the aggregate and with firm-level microdata. We find the new measure is negatively correlated with growth in aggregate investment, GDP, and employment even after controlling for other measures of first moment shocks and aggregate uncertainty. The effect of our firm-level measure on aggregate data is comparable to alternative uncertainty measures such as the VIX. Using firm-level panel data on investment and employment with a rich set of controls, we find our measure of firm-specific uncertainty has reasonably large effects on investment and employment even after controlling for aggregate and industry time-varying shocks. Firm uncertainty shocks (1) reduce investment rates by 0.5% and attenuate the response to positive sales shock by 50% and (2) reduce employment growth rates by 1.4% and responsive to positive sales shocks by 30%. Most of the employment growth reductions operate through diminished gross job creation at new plants and continuing establishments. Moreover, we find firms are less responsive to demand shocks at the firm level and across establishments within a firm, even after controlling for any unobservable firm-year shocks. In subsequent paper, we refine the uncertainty measure by classifying topics on uncertainty using both supervised and unsupervised machine learning techniques, and match the firm-level measure with detailed employee data at worker level.

Uncertainty and Firm Responses. (with Kyle Handley, Fariha Kamal, and Ryan Monarch) *in progress*

The main research agenda is to (i) examine how trade and economic uncertainty affects firm's supply chain decisions; and (ii) determine the aggregate implications of individual firm-level decisions. Leveraging information about trade and economic uncertainty extracted from company SEC filings and linked to the Census data, we propose to investigate how changes in trade policy in recent years have affected firm operations with a particular focus on relationships with foreign suppliers. Questions include, but are not limited to: what changes do importers, expressing uncertainty in company communications with the public with special attention to concerns about trade uncertainty, make to their supply chains? Do they purchase from fewer or more suppliers? How does the average age of their supplier relationships changes, and what does this tell us about the role of reliability in the face of trade policy shocks? Do U.S. importers purchase the same inputs from different countries than before, and if so, what are the effects on price? Do many importers drop out from international trade? We can then use these moments to calibrate a model of supplier search or learning, to understand how such shocks translate into changes in aggregate import flows, overall trade prices, and the extensive margin of trade.

Worker Mobility Restriction and Resource Reallocation within Firms. (with Wenjian Xu) *in progress*

Additional Information

Presentations

China International Conference in Finance, The Econometric Society North American Summer Meeting, Comparative Analysis of Enterprise Data (CAED) Conference 2019
Stanford Institute for Theoretical Economics (SITE) Summer Workshops, 3rd Conference on "Uncertainty and Economic Activity: Measurement, Facts and Fiction", Michigan Ross Brownbag 2018
University of Michigan International Economics Workshop (×2), University of Michigan Business Economics Research Symposium (×2) 2017

Computer Skills

PYTHON, JULIA, MATLAB, STATA, R, SAS, LATEX