March 29, 2019

Dear NBER Entrepreneurship Research Boot Camp Committee,

I am writing to apply for the 2019 NBER Entrepreneurship Research Boot Camp. I am a Finance Ph.D. student at the University of Michigan Ross School of Business. I expect to complete my degree in May of 2022.

My research interest is to understand the effect of information technology progress on corporate dynamic. Specifically, I am interested to estimate how a benign spiral between data accumulation and productivity boost together affect market concentration and firm innovation decision. I plan to build a structural estimation linking productivity recovered from supply function, a data proxy, and market concentration at industry level or market share at firm level to get formal estimation. While I wish to work on this project in the summer, there is no guanrantee that such methods would work out. I need more exposure to literature linking innovation, firm productivity and market structure. Thus I am looking forward to further exposure to these topics in the summer Entrepreneurship camp.

Attached you will find my curriculum vitae and research statement. Letters in support of my application will be sent separately. You should expect letters from Prof. Toni Whited. Please contact me if you need any further information. Thank you for your consideration.

Sincerely,

Yuan Shi
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YUAN SHI

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EDUCATION

University of Michigan, Ross School of Business *August 2017 - Present*
PhD in Finance
Tsinghua University, School of Economics and Management *July 2012 - June 2016*
Bachelor of Economics and Finance

PROJECTS

Does Algorithmic Trading Affect Corporate Decision Through an Information Channel?
The booming algorithmic trading in corporate securities has been suggested to affect the price informativeness through different channels and over the different horizon. The real question, whether it has real implication on the corporate decision, is unclear. Using market order history as proxy for algorithmic trading behavior, I found that firms targeted more by algorithmic trading have stock market price better predicting future earnings for up to 5 years (price of capital market is more informative) and have firm investment following more tightly with stock market price (manager learn from capital market).

RESEARCH EXPERIENCE

Research assistant to Professor Toni Whited (University of Michigan) *2017 - 2018*
Replicated and analyzed empirical result for *the interest sensitivity of corporate cash* and *Testing trade-off theory of capital structure using costly rebalancings*
Research assistant to Professor Carola Frydman (Northwestern University) *2016 - 2017*
Research project: *Effects of the introduction of securities ratings in the early twentieth century*
Cleaned and compiled historical data including Poors institution holding of securities, Moodys rating of security, NYSE security trading record and bid-ask quotation
Conducted data analysis and discussed empirical methodology, including proposing identification strategy of ex-ante information asymmetry, modeling information shock based on ex-ante firm financial status and ex-post rating result, identifying control groups, and creating a proper measurement of treatment results like market liquidity

CLASS LIST

Please see attached transcript.

Statement of Purpose

Yuan Shi

March 29, 2019

I am interested in the question of how information technology progress affect corporate dynamic. Specifically, I am interested in its effect through 2 channels: (1) productivity channel (current project and major motivation for the summer camp) and (2) financing channel (past project and minor motivation).

1 Productivity channel

The 21st century has witnessed a rise of superstar firms with higher productivity, profitability, and innovation. Together with the increase in market concentration is the shift of firm investment to intangible asset investment, and a shift of superstar companies to technology and data intensive industries. I would like to interpret these phenomena as a result from an increase in big data activity. Farboodi, Mihet, Philippon, and Veldkamp (2019) have proposed a benign spiral between data and economic activity that we typicalaly observe in large, data and technologic intensive companies: (1) data is a result of economic activity and (2) larger data base increase productivity and thus facilitate economic activity. These features give rise to a high fixed cost, diminishing marginal cost production function, which naturally leads to increase in market power. Multiple interesting questions could arise from this simple notion of data-productivity feedback loop: (1) Could I quantify the average and marginal effect of data on productivities and productivity on data? (2) What is the optimal investment in data technology that firms should adopt to boost this data-productivity feedback loop? (3) How is the answer to (1) and (2) affected by market structure and how will the answer to (1) and (2) in turn affect the market structure? These questions both are intellectually interesting and have rich policy implication.

Based on my current knowledge, however, the empirical estimating of such stories can be complicated. Neither data not firm productivity is immediate observable. Productivity might be recoverd from quantity and cost(from supply function), and data might be proxied by web visit count. A structural estimation linking recovered productivity, data proxy, and market concentration at industry level or market share at firm level might be helpful. I plan to work on these methods this summer, but there is no guanrantee that such methods would work out. I need more exposure to literature linking innovation, firm productivity and market structure. Thus I am looking forward to gain further exposure to these topics in the summer Entrepreneurship camp.

2 Financing channel

The financial market serves as a platform of information aggregation and exchange: by arbitrage trading, market participants reveal public and private information about firm's growth potential, helping both investors and firm managers to make a better decision based on richer information. Thus informationally more efficient market should see more efficient investment decision both at investors' end and firms' end. The 21st century has witnessed a fast rise in information processing capacity. Specifically, algorithmic-based trading (AT) strategies (the trading strategies that use automatic computer algorithms to make trading decisions, submit and manage orders), have been suggested to enhance price discovery by better separating permanent price changes from temporary demand shock, acquiring information from low-attention earnings announcements and reducing cost of liquidity supply through auto-quote. AT has, on the other hand, been criticized to reduce information holder's rent in trading and thus lowering investor's incentive to acquire new firm information. Empirical results supporting such argument have shown reduced information pre-earnings announcement up to one month.

While previous researches focus on the secondary market reaction to such effects, I am more interested in the real effect of algorithmic tradings, i.e. how such changes in market information quality affect resource allocation and firm behavior. There are 2 potential channels in generating a real effect. The first channel is the financing channel: by bridging the information gap between investors and firms, we should expect lower financial cost with increased algorithmic trading. The second channel is feedback channel: by more efficiently aggregating private information from market participants, we should expect firm managers able to learn more accurate private information from the market and thus optimally behaving managers have their investment decisions following more the stock market price. As a first approach to this question, I empirically tested these predictions. Using market order history as proxy for algorithmic trading behavior, I found that firms targeted more by algorithmic trading have stock market price better predicting future earnings for up to 5 years (price of capital market is more informative) and have firm investment following more tightly with stock market price (manager learn from capital market).

Although my first approach has suggested a data correlation pattern that is consistent with the theory of AT improving a firm's security price informativeness at secondary market and affecting firm investment decisions, such study is imperfect in the sense that it only suggests correlation, not causation, because algorithmic based investor's focusing on firm is endogenously correlated with firm characteristics. Also the exact channel of information transmission is unclear here. A specifically interesting story I want to look at is that the market price convey information about profitability in product market and thus affect firm innovation. To further the study on this topic, either a cleaner empirical setting or a more developed model with a testable correlation is necessary.

Towards this end, I would appreciate it if I could attend the NBER Entrepreneurship boot camp. Its extensive cover of frontier topics in firm innovation would help me better approach the question that I am interested, and also give me inspiration of the research agenda under my broad research interests topic of technologic progress and firm dynamics.

THE UNIVERSITY OF MICHIGAN – ANN ARBOR

Unofficial Transcript - Not an Official Transcript

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Uniqname: SHYUAN

Date: Mar 17, 2019

Citizen: Non-Resident Alien
Visa: F1

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Ann Arbor, MI 48105
United States

Fall 2017		**Rackham**	**Grade**	**Hours**	**MSH**	**CTP**	**MHP**
ECON	600	Math-Economists	A	2.00	2.00	2.00	8.00
ECON	601	Microecon Theory I	A+	1.50	1.50	1.50	6.45
ECON	603	Microecon Theory III	A+	1.50	1.50	1.50	6.45
ECON	671	Econometric Anlys I	A-	3.00	3.00	3.00	11.10
FIN	855	Inv Dec Symmet	B+	3.00	3.00	3.00	9.90
Term Total		**GPA: 3.809**		**11.00**	**11.00**	**11.00**	**41.90**
Cumulative Total		**GPA: 3.809**			**11.00**	**11.00**	**41.90**

Winter 2018		**Rackham**	**Grade**	**Hours**	**MSH**	**CTP**	**MHP**
ECON	602	Microecon Theory II	A	1.50	1.50	1.50	6.00
ECON	604	Microecon Theory IV	A+	1.50	1.50	1.50	6.45
ECON	672	Econometric Anl II	B+	3.00	3.00	3.00	9.90
FIN	873	Structural Estimat	A-	1.50	1.50	1.50	5.55
FIN	885	Res Top in Finance	S	1.50	0.00	1.50	0.00
Term Total		**GPA: 3.720**		**9.00**	**7.50**	**9.00**	**27.90**
Cumulative Total		**GPA: 3.772**			**18.50**	**20.00**	**69.80**

Fall 2018		**Rackham**	**Grade**	**Hours**	**MSH**	**CTP**	**MHP**
ECON	605	Macroecon Theory I	A+	3.00	3.00	3.00	12.90
ECON	675	Appl Microeconometrc	A	3.00	3.00	3.00	12.00
FIN	865	Asymmetric Info	A+	1.50	1.50	1.50	6.45
FIN	871	Corporate Finance	A-	1.50	1.50	1.50	5.55
Term Total		**GPA: 4.000**		**9.00**	**9.00**	**9.00**	**36.90**
Cumulative Total		**GPA: 3.880**			**27.50**	**29.00**	**106.70**

Winter 2019		**Rackham**	**Grade**	**Hours**	**MSH**	**CTP**	**MHP**
Elections as of: 03/17/2019							
BA	830	Teach'g Fundamentals	S	0.50	0.00	0.50	0.00
ECON	632	Ind Org & Pub Pol		3.00	0.00	0.00	0.00
FIN	872	Continuous-Time Pln	A	1.50	1.50	1.50	6.00
FIN	875	Emprcl Methdlgy Fin		1.50	0.00	0.00	0.00
FIN	885	Res Top in Finance	S	1.50	0.00	1.50	0.00
Term Total		**GPA: 4.000**		**8.00**	**1.50**	**3.50**	**6.00**
Cumulative Total		**GPA: 3.886**			**29.00**	**32.50**	**112.70**

Academic Statistics for Rackham		**MSH**	**CTP**	**MHP**
Total to Date	**GPA: 3.886**	**29.00**	**32.50**	**112.70**

Program Action History: **Business Administration Doc**
04/10/2017 Matriculation
Business Administration PhD / Finance

Academic Previous Experience

Tsinghua University Tsinghua Yuan
Beijing 11 100084 China
Bachelor of Economics 07/01/2016

End of Unofficial Transcript