Duke University
The Fuqua School of Business
100 Fuqua Drive
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Joy Tianjiao Tong
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March 29, 2017

David Robinson
Fuqua School of Business
Duke University
100 Fuqua Drive
Durham, NC
USA

Dear Professor Robinson,

I am writing to apply for the NBER Entrepreneurship Research Boot Camp. I am currently a doctoral candidate at Duke University and expect to complete my PhD degree by May 2020. I am very interested in participating in the boot camp, where I can learn greatly from leading researchers and other PhD students in the field of entrepreneurship and innovation, contribute to the discussions as an active participant, and obtain valuable comments for my current projects and future research directions.

I have been working on several projects related to innovation and entrepreneurship. Together with my co-authors, we study patent sales during bankruptcy to understand more about the market for technology. I have an on-going project looking at the use of intangible assets by firms during adverse scenarios such as natural disasters, with a focus on trademark. I also study how corporate social responsibility spur innovation through the innovator channel. I believe that with my strong interest in this field, together with my relevant research experience and knowledge of the literature, I can contribute to the boot camp by engaging in active discussions and I will benefit tremendously from the boot camp.

I am very excited about the opportunity of participating in the NBER Entrepreneurship Research Boot Camp. I received a letter from Professor Thomas Hellmann when I applied for the boot camp last year encouraging me to re-apply this year. Hope my record demonstrates my progress over the past year, and I am enclosing my curriculum vitae and statements of research interests. Professor John Graham from Duke will be writing the letter of recommendation for me. If you require any additional materials or information, I am happy to supply it. Thank you very much for your consideration.

Sincerely,

Joy Tong

Joy Tianjiao Tong

CONTACT INFORMATION

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Durham, NC 27708

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RESEARCH INTERESTS

Corporate Finance, Labor and Finance, Entrepreneurship, Innovation, Law and Economics

EDUCATION

Duke University, The Fuqua School of Business, Durham, North Carolina USA

Ph.D. Candidate in Finance (Expected Graduation Date: May 2020)

Duke University, Durham, North Carolina USA

M.A. in Economics, May, 2014

University of Toronto, Toronto, Ontario Canada

B.S. in Mathematics and Economics, *Highest Honors.*, May, 2012

AWARDS AND FELLOWSHIPS

AFA Doctoral Travel Grant	2018
Fellow Participant, UNC Tax Doctoral Seminar	2016
Graduate Fellowship, Fuqua School of Business, Duke	2014-present
Provost's Scholar, Trinity College, University of Toronto	2013
Faculty of Arts and Science Deans List, University of Toronto	2010-2012
Chancellors Scholarship, Trinity College, University of Toronto	2010-2011

WORKING PAPERS

Selling Innovation in Bankruptcy 2018
(with Song Ma and Wei Wang)

Abstract: We construct a comprehensive dataset of patent sales in Chapter 11 bankruptcies in all US public firms from 1981 to 2012. We document that 40% of firms sell, on average, 18% of their patents during bankruptcy reorganizations. Innovation sales concentrate in the first two quarters after bankruptcy filing. Firms sell more redeployable and liquid patents, as opposed to selling underexploited patents. This pattern is driven by firms that face "fire-sale" pressures and lack access to external financing. Our results are consistent with the view that imminent financing needs in bankruptcy drive innovation sales, and firms proactively avoid market trading frictions in the process.

WORK IN PROGRESS

Does Healthcare Costs Constrain Corporate Investment? 2018

Abstract: Average healthcare cost for US average employers tripled in the past twenty years. Although past literature shows only a partial shifting between benefit and wage, the real effect of healthcare cost increase on firm remain unexplored. Using several identification strategies, this paper shows that within US public firms, the increase in healthcare cost facing by employers decreases both the capital expenditures and R&D expenses of the firm. This effect is exacerbated in firms with higher domestic employment, and relatively lower employee number due to inability to self-insure the health plan.

PRESENTATIONS (* *by co-authors*)	AFA*, Fuqua Finance Brownbag	2018
	CICF*, Economics of Entrepreneurship and Innovation Conference*, EFA*, MFA*, NBER Summer Institute*, NFA*	2017
	Fuqua Finance Brownbag	2016
TEACHING EXPERIENCE	Teaching Assistant, The Fuqua School of Business, Duke:	
	Corporate Finance (MBA Core) for Prof. John Graham	2015-2018
	Venture Capital & Private Equity (MBA Elective) for Prof. David Robinson	2016-2017
	Project Finance (MBA Elective) for Prof. S. Viswanathan	2015
	Teaching Assistant, Department of Economics, Duke:	
	Time Series Analysis (Graduate level)	2013
RESEARCH EXPERIENCE	Research Assistant to Prof. John Graham	2014-present
	Research Assistant to Prof. Campbell Harvey	2013-2016
	Research Assistant to Prof. Alon Brav	2013-2016
SKILLS	Matlab, Stata, Python, R, SAS	

GRADUATE COURSES

Finance

- Empirical Asset Pricing (*Instructor: Lukas Schmid*)
- Empirical Corporate Finance (*Instructor: Alon Brav & John Graham*)
- Theoretical Asset Pricing (*Instructor: Ravi Bansal*)
- Theoretical Corporate Finance (*Instructor: Adriano Rampini, Felipe Varas & Ming Yang*)
- UNC Empirical Corporate Finance PhD Seminar (Audit) (*Instructor: Paige Ouimet*)

Economics Core

- Microeconomics I (*Instructor: Philipp Sadowski*)
  Text:(1) *Microeconomic Theory*, A. Mas-Colell, M. Whinston, and J. Green; (2) *Lecture Notes in Microeconomic Theory*, Ariel Rubinstein
- Microeconomics II: Game Thoery (*Instructor: : Curtis Taylor*)
  Text:(1) *Microeconomic Theory*, A. Mas-Colell, M. Whinston, and J. Green; (2) *Game Theory for Applied Economists*, Robert Gibbons
- Econometrics I (*Instructor: Federico Bugni*)
  Text:(1) *Statistical Inference*, G. Casella and R. Berger; (2) *Econometrics*, F. Hayashi
- Econometrics II (*Instructor: Matthew Masten & Andrew Patton*)
  Text:(1) *Time Series Analysis*, J. Hamilton; (2) *Econometrics*, F. Hayashi

Economics Elective

- Topics In Applied Microecon: Models Of Entry (*Instructor: Allan Collard-Wexler*)
- Topics In Applied Microecon: R&D, Productivity & Technology (*Instructor: Daniel Xu*)
- Topics In Applied Microecon: Demand Estimation (Audit) (*Instructor: James Roberts*)
- Topics In Econometrics: Time Series (*Instructor: Tim Bollerslev*)
- Fuqua Strategy PhD Seminar (*Instructor: Sharon Belenzon*)

Statistics & Mathematics

- Machine Learning I (*Instructor: Sayan Mukherjee*)
  Text: *Elements of Statistical Learning*, Hastie, Tibshirani & Friedman
- Probability & Measure Theory (*Instructor: Robert Wolpert*)

Application for NBER Entrepreneurship Research Boot Camp

Joy Tianjiao Tong, Finance Ph.D. Candidate at Duke

I am writing to express my strong interest in participating in NBER Entrepreneurship Research Boot Camp. I have been working on several projects regarding innovation and entrepreneurship, such as studying patent sales in bankruptcy, investigating the relationship between CSR and innovation, and analyzing the use of trademarks as collateral. This boot camp will offer me a great opportunity to interact with leading researchers in the field and systematically study the literature on entrepreneurship and innovation. This will help me form a more comprehensive understanding of relevant literature and fuel my future research on such topics. Moreover, this boot camp provides me with a chance to communicate with other PhD students whom we share the same research interest.

Below is a short summary of my current research projects on innovation, corporate social responsibility, and employee benefits. The brief summary aims to show that I have accumulated enough preliminary knowledge about topics on entrepreneurship and innovation to participate in this boot camp, and also how I could benefit from this boot camp by pushing further my research agenda on such topics.

My first project studies selling innovation in bankruptcy. As innovation emerges as an asset class that is closely evaluated by the equity market and used in debt financing, it is interesting to know how and to what extend such asset is transacted in bankruptcy restructuring as asset sales are prevalent. To address this question, we examine patent sales during Chapter 11 bankruptcies in all US public firms from 1981 to 2012. We document that the patent sale activity is pervasive; and firms sell more redeployable and liquid patents, as opposed to selling underexploited patents. The results indicate that imminent financing needs in bankruptcy drive innovation sales, and firms proactively avoid market trading frictions in the process.

My second project studies trademark transactions for financing needs. Although patent has been well-studied in the literature, trademark, which is an important and probably a more common type of intellectual property, has not received much attention in the literature. To understand firms' utilization of intangible assets, we look at the setting of natural disaster. Given that physical assets might be severely damaged while intangible assets remain intact, we test whether trademarks and patents are more heavily used as collateral and up for sale in such scenario, thus to find out whether there is a pecking order between tangible and intangible assets when used for financing. I am also interested in how these intangible assets are

deployed and utilized by startup companies for early stage financing, and hope to gain more insights from the boot camp.

My third research project is about understanding the relation between corporate social responsibility (CSR) and innovation activities. My preliminary result suggests that firms engage in CSR activities because it helps to retain human capital and spur innovation. I find that CSR is positively related with firms' innovation activities, both in patent quantity and patent quality. I also find that innovator mobility decreases when firms have higher CSR, and the number of innovators on a patent increases when firms have higher CSR. One explanation is that CSR attracts innovators who are highly educated and care more about social issues. The effect of CSR on innovation is stronger for firms in financial distress. Through participating in this boot camp, I hope to find better identification instruments to capture the causal relationship between higher CSR and innovation output.

My last project studies healthcare cost and firm investment. Although the past literature shows increase in benefit cost will only be partially offset by a reduction in wage, it doesn't explore the effect on firms such as their investment and R&D decisions. Using several identification strategies and a unique dataset on employee health benefit, my paper shows that within US public firms, the increase in healthcare cost decreases both the capital expenditures and R&D expenses of the firm. This effect is exacerbated in firms with higher domestic employment, and relatively lower employee number due to inability to self-insure the health plan. This result suggests that there is not only a partial shifting between healthcare benefit and wage, healthcare cost is also becoming a real burden for US firms. Through participating in this boot camp, I would like to find more ideas to further explore how escalated healthcare costs are channeled differently to reductions in R&D and capital expenditure.

Lastly, besides all my listed research experience on entrepreneurship and innovation topics, I am also interested in studying fintech industry. However, given the obscure nature of the industry and a still growing body of literature, it is hard for me to narrow down a specific research question at current stage. I hope I could get the chance to learn more about this industry in this boot camp.

My strong interest in research topics on entrepreneurship and innovation, coupled with my demonstrated research experience, show that I am ready and motivated to participate in the NBER summer boot camp. This is a valuable opportunity for me to enhance my understanding of entrepreneurship and innovation, and also an opportunity for me to contribute as an active participant.

John R. Graham
D. Richard Mead Jr. Family
Professor of Finance
Director: www.cfosurvey.org

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March 23, 2018

Joy Tong, Duke University, Fuqua School of Business Ph.D. student

Joy Tong is a Ph.D. student at the Fuqua School of Business, Duke University. I am Joy's co-chair. She is in the dissertation stage of our Ph.D. program. I write to recommend Joy to the NBER Entrepreneurship camp.

In the past few years, Joy has turned her attention to entrepreneurship and innovation and is working on several papers.

She has a working paper with Song Ma from Yale and Wei Wang that looks into the case of **selling innovation in bankruptcy**. By examining patent sales during Chapter 11 bankruptcies in all US public firms from 1981 to 2012, they document that 40% of firms sell, on average, 18% of their patents during bankruptcy reorganizations. Firms sell more redeployable and liquid patents, as opposed to selling underexploited patents. The results are consistent with the view that imminent financing needs in bankruptcy drive innovation sales, and firms proactively avoid market trading frictions in the process.

Joy's research on **healthcare cost and firm investment** will likely be her job market paper. She studies how the escalating healthcare cost could be a real burden for US firms. Although past research shows only a partial shifting between benefit and wage, the real effect of healthcare cost increase on the firm itself remains unexplored. Joy documents a negative correlation between firm investment and health expense using a unique dataset on employee health benefit. Then, using several identification strategies, she shows that within US public firms, the increase in healthcare cost decreases both the capital expenditures and R&D spending of the firm. This effect is exacerbated in firms with higher domestic employment, and relatively lower number of employees due to inability to self-insure the health plan.

Joy has done a lot of TA and RA work for me. She is a hard worker and is very reliable. The RA work is related to our quarterly CFO survey. Joy is in charge of taking the first pass through the analysis in a host of Latin American, African, and Asian countries. She has developed the ability to sniff out interesting economic phenomenon in this applied context, and I expect that this will help her conduct interesting empirical work going forward. She has also developed a keen ability to convey nuanced information graphically, in an accessible-to-the-reader format.

This boot camp comes at the perfect time to help solidify Joy's growth over the past few years as a budding researcher and to nurture her creative juices. Joy will benefit enormously if you choose her to attend.

Please let me know if I can provide any more information.

Sincerely,

John R. Graham