Dear Admission Committee for the NBER Entrepreneurship Boot Camp,

I am Scarlet (Sijia) Chen, a third year PhD in the Department of Economics at Stanford University. I am writing to apply for the 2019 NBER Entrepreneurship Boot Camp. I am attaching the following material in order:

- Curriculum Vitae
- List of all current and completed PhD courses
- Two-page essay

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My recommendation letter writer is Prof. Nick Bloom at the Department of Economics at Stanford University. His email is nbloom@stanford.edu. The recommendation letter will be submitted separately from this package.

Please let me know if any additional information is needed. Thanks so much for your help!

Best regards,
Scarlet Chen

Scarlet (Sijia) Chen

Education

2016-present Ph.D. candidate in Economics, Stanford University
2011-2015 B.Sc. in Economics and Finance, First Class Honors, Hong Kong University of Science and Technology
2014 Visiting Undergraduate Student, Harvard University

Research Experience

2014-2016 Research Assistant for Prof. Melissa Dell
2017-present Research Assistant for Prof. Nick Bloom

Teaching Experience

Winter 2018 Teaching Assistant for *Econ 102C Advanced Topics in Econometrics*

Fellowship and Scholarship

2015-2016 LEAP Pre-Doctoral Fellowship, Harvard University
2012-2015 Scholarship Scheme for Continuing Undergraduate Students, HKUST
2015 HKSAR Government Scholarship Fund – Reaching Out Award
2015 Academic Excellence Award, HKUST

Presentation

May 2019 (scheduled) Comparative Analysis of Enterprise Data Conference, Ross School of Business, University of Michigan

Conference and Event

June 2018 Participant, Macro Financial Modeling Summer Sessions for Young Scholars
Oct 2018 Organizer, Empirics and Methods in Economics Conference

Publication

"Brexit and Uncertainty: Insights from the Decision Maker Panel", *Fiscal Studies*, 39(4):555-580, 2018 (with Nick Bloom, Phil Bunn, Paul Mizen, Pawel Smietanka, Greg Thwaites and Garry Young).

Research in Progress

A House for a Bride: Marriage and Homeownership in China
(Joint with Adam (Jiwei) Zhang)

If homeownership and marriage are complements, rising house prices can lead to delay in marriage by delaying house purchase. In this paper we study this relationship in the context of China, which experienced a dramatic housing boom in the past two decades. First we show empirical evidence that single males with `marriage house' are more likely to get married than those without. Then we build a model of household choice problem with housing demand to quantify the effect. In the model ownership increases marriage probability and marriage is more desirable with marriage house. When house price increases, agents buy houses later, and thus get married later. The model matches key patterns of ownership and marriage over the life cycle and explains the rise in marriage age in China for the past two decades.

The Impact of Brexit on UK Firms
(Joint with Nicholas Bloom, Philip Bunn, Paul Mizen, Pawel Smietanka and Gregory Thwaite)

The UK's decision to leave the EU in the 2016 referendum created substantial uncertainty for UK businesses. We created a novel firm survey, the Decision Maker Panel, to study the impact of Brexit on UK firms. We found that Brexit is an important source of uncertainty and businesses that are more exposed to the EU through exports, use of migrant labour and regulation are most likely to be affected. Using a difference-in-difference design, we found that Brexit lowered employment growth by about 0.8% and investment by about 5%. We use these data to estimate that Brexit lowered aggregate investment growth by 3-4pp over the year following the referendum, relative to what would otherwise have been the case.

List of completed and current courses

Econ 202 Microeconomics I by Prof. Paul Milgrom and Prof. Ilya Segal
Econ 203 Microeconomics II by Prof. Douglas Bernheim
Econ 204 Microeconomics III by Prof. Matthew Jackson
Econ 210 Macroeconomics I by Prof. Martin Schneider and Prof. Monika Piazzesi
Econ 211 Macroeconomics II by Prof. Adrien Auclert and Prof. Pete Klenow
Econ 212 Macroeconomics III by Prof. Gregory Jarosch and Prof. Pablo Kurlat
Econ 270 Intermediate Econometrics I by Prof. Joseph Romano and Prof. Han Hong
Econ 271 Intermediate Econometrics II by Prof. Han Hong and Prof. Thomas MaCurdy
Econ 272 Intermediate Econometrics III by Prof. Guido Imbens

Econ 246 Labor Economics I by Prof. Luigi Pistaferri
Econ 247 Labor Economics II by Prof. Nick Bloom
Econ 248 Labor Economics III by Prof. Isaac Sorkin

Econ 233 Advanced Macroeconomics I by Prof. Chad Jones and Prof. Pete Klenow
Econ 237 Financial Economics II by Prof. Martin Schneider and Prof. Chris Tonetti

Econ 241 Public Economics I by Prof. Raj Chetty and Prof. Douglas Bernheim
Econ 292 Quantitative Methods for Empirical Research by Prof. Guido Imbens
Econ 226 US Economic History by Prof. Gavin Wright

Econ 300 Third Year Seminar
Finance 633 Advanced Empirical Corporate Finance by Prof. Amit Seru

Since the outset of my PhD, I have been involved in research related to firms and entrepreneurship. Despite being the best source of data on private firms in the US, the census data is lacking on variables on customers and products – for example, the number of products by each firm, the number of products ordered per order or per customer, the average number of customer per year, etc. Thus, in summer 2017, Prof. Pete Klenow, Prof. Nick Bloom, a former graduate student at Stanford Megha Patnaik and I started a project in which we designed a novel firm survey precisely to fill in this gap. I was responsible for drafting and testing survey questions, through which I familiarized myself with most major firm surveys such as the Annual Survey of Manufactures, the Business Research & Development and Innovation Survey, the Management and Organizational Practices Survey, etc. After finalizing the survey questions, I cold-called manufacturing firms in the Bay Area to schedule firm visits in which Prof. Bloom and Prof. Klenow together with Megha and I would visit the firm, understand their business condition, and test the survey on the firm. Through talking to the entrepreneurs, I got to understand the difficulty of small businesses, such as financing, short of skilled labor, marketing, etc., which planted seeds for my future research in this field.

The second project I worked on related to firms is on the impact of Brexit on UK firms. Unlike other information shocks, Brexit is special in a sense that it brings a prolonged period of uncertainty: the deadline for leaving is only in March 2019 while the referendum took place in June 2016, and the exact terms of the leave was (and still remain) unclear. To understand the effect of uncertainty on firms, the Bank of England, University of Nottingham, and Stanford University started a large scale firm survey, the Decision Maker Panel, which surveys financial directors of public and private firms in the UK at monthly frequency to gather information on firms' expectation of and uncertainty in future employment, investment, sales, and prices, etc. The survey is large (6,200 firms covering 15% of private sector employment in UK) and it matches with aggregate figures (e.g. growth rate of investment and employment) very well. We learnt that Brexit is one of the top 3 sources of uncertainty for 40% firms in UK, and the more exposed the firm is to EU through import/export, use of migrant labor, and regulation, the higher the uncertainty the firm experiences. Using a diff-in-diff framework, also found that the uncertainty induced by Brexit has reduced employment and investment growth by 0.8% and 5% respectively.

The third and most recent project I worked on related to firms is on the effect of disruptive technology. One of the biggest long run concern for many firms is the impact of disruptive technology on their business (either as a compliment or substitute) but there lacks good measure of firms' exposure to such factors. In this project, we (Prof. Nick Bloom, Prof. Tarek Alexander Hassan, Prof. Josh Lerner, Prof. Ahmed Tahoun, Aakash Kalyani) combine text data from earnings calls and news articles to bridge the gap. For the 10 disruptive technologies defined by MIT technology review, we define bigrams, such as `driverless cars' and `driverless trucks', and use the number of mentions of such key words in earnings calls as a measure of firm's vulnerability to such technology. Then we scrape Access World News each of the technology, and define exposure as the frequency of mentions in each day's news. We plan to investigate the effect of exposure to disruptive technology on firm's stock return and volatility, short run and long run performance, employment and investment growth, and research and development activities.

There are several research projects I plan to work on using the Census datasets on firms. First, I am interested in the effect of online advertising on firm entry. The availability of online advertising significantly lowered the entry cost of small business in the following sense: 1) google or facebook ads allow users (i.e. firms) to target very specific audience. For example, a firm can use facebook ads to target only minority women aged between 20 and 25. By contrast, traditional advertisement does a poor job targeting, e.g. TV ads and billboards. 2) online ads allow businesses to pay a very small amount of money to access a small amount of audience. For example, one can tell facebook to spend only $1 on advertising its business, whereas with traditional advertisement, the minimum amount of audience is on the magnitude of thousands (e.g. a magazine). 3) the availability of online ads made purely online business possible. For example, one could start a drop-shipping business at home, with no fixed cost such as renting an office or buying equipment. The above three features significantly lowered the fixed cost of setting up a business, and should have increased business entry and competition and lowered prices of similar products in traditional businesses. I plan to merge the Nielson Ad Intel dataset at industry by year level with the Annual Survey of Entrepreneurs and the Longitudinal Business Database and examine whether higher share of online advertisement expenditure is associated with higher rate of entry, higher share of small businesses, and lower concentration. This project is important as it helps to understand potentially the largest factor in shaping the atlas of entrepreneurship in the US in recent decade.

The second project I plan to work on concerns the effect of regulation on demographics of entrepreneurs and its implications on business dynamism. Since the 1980s, there has been an increasing amount of regulations on all aspects of businesses: labor regulations increased the cost of hiring and firing; regulations on licensing increased the fixed cost of opening up a business as it has to require several licenses on different aspects before starting its operation, etc. Although big firms can outsource issues concerning legal, accounting, tax, finance, IT, etc. to professional service businesses, it is very hard for small firms to do so as their scale of operation does not justify using the service provided by those professional service firms. As a result, small business owners have to have a minimum level of knowledge for law, taxation, accounting, finance, IT, etc. However, it requires a basic level of general education for someone to understand the basics of law, taxation, accounting, etc. As a result, if regulation indeed has been increasing, it could have made it harder for people with lower level of education to become entrepreneurs. In order to test this hypothesis, I will merge state by year by industry level regulation with the Annual Survey of Entrepreneurs which provides detailed information on owner characteristics and examine whether rising regulation is associated with a more educated population of entrepreneurs. If this is true, this is another place where the `American Dream' is withering: it used to be that, for someone who is not very highly educated and thus cannot seek a successful career path in a corporate, they can always start their own business and still end up high on the income ladder. Now even the ladder of entrepreneurship requires a degree for entrance, closing the last door of mobility for the large lower-educated mass in the US.

The above projects are interesting both theoretically and for its policy implications on innovation and inequality. The boot camp is a perfect chance for me to extend my knowledge in the field of entrepreneurship and facilitate my current and future research on it. I also believe that with my experience with the Census data and firm survey data such as the Decision Maker Panel I can bring unique value to the summer camp and benefits other participants in it.

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March 17th 2019

Dear NBER Entrepreneurship Committee

Hi all – I very strongly support Scarlet Chen for the NBER Entrepreneurship boot camp. She is a truly fantastic student. As you know I am writing for two students this year – Melanie and Scarlet – and I would rank them both extremely highly (probably the strongest students I have had for a while). Scarlet is (like Melanie) very hard working, sharp and focused on applied micro entrepreneurship research. She will do extremely well on the market so will be a great ambassador for the program, and I think we benefit hugely given her entrepreneurship focus. Indeed, just today I contacted Stripe.com about getting her access to start-up data. She is also working with me on two other projects so I know her well and am highly impressed by her.

I have known Scarlet Chen since Jan 2017 when she took my second year labor economics class as a first year phd student, and she has worked with me as RA and coauthor on several projects ever since.

She started working with me (as a co-author) on a project on the impact of Brexit uncertainty on firms from fall 2017, a project joint with Phil Bunn, Paul Mizen, Pawel Smietanka, and Gregory Thwaites. Although the project started several months before she joined, she quickly got up to speed with the large and sophisticated dataset, and conducted several pieces of empirical analysis independently, including initiating using a diff-in-diff strategy to evaluate the impact of Brexit uncertainty on firm's input (employment and capital expenditure) pooling the company accounts data as pre-period and the survey data as post-period data that turned out to be a key piece of result in the project. She also linked the proprietary data with public data (firms' stock return and volatility) and verified that the measure of uncertainty and future sales in the proprietary data line up well with that of stock market performance. She also independently drafted the first version of the paper herself, including replicating all the results conducted by other team members, organizing them in a logical way, and actually write up the paper. She also made suggestions on the structure of the presentation which turned out to be the same as what I would do, suggesting a good understanding of the project. She also was able to talk to journalist from Stanford Business Review about the project independently.

Her second year paper 'A House for a Bride: Homeownership and Marriage in China' (joint with Adam Zhang) measures the impact of rising house prices on age at marriage in China, which experienced a dramatic housing boom in the past two decades. In China, it is often expected that the males' family purchase a `marriage house' – a house where the newlywed can move into – before the marriage. As a result, if house price increases, then agents have buy house later, and get married later. They first show empirical evidence supporting the 'house-for-bride' story: single males whose family owns marriage house

are 1.7 times more likely to get married than those who do not, and house prices and marriage age are strongly positively correlated in the cross section, controlling for county and year fixed effects. Then she build a model of household choice problem with housing demand to quantify the effect. In the model, marriage is desirable and marriage probability depends on ownership status. As a result, when house price increases, agents delay house purchase, and marriage happens later. After calibration the model matches key patterns of marriage and house purchase over the life cycle, and can explain around 1/3 of the rise in age at marriage in China in the past two decades.

In her future research she plans to work on macro-labor and entrepreneurship/firm dynamics. On the firm side, she is interested in the effect of rising regulations (including occupation licensing) on firm's entry and exit and surviving firms' characteristics; she also plans to look at the relationship between entrepreneur demographics (age, sex, race, education, etc.) on firms' performance (revenue, volatility, survival). On the macro-labor side, she has a project on matching between worker personalities and firm characteristics, in which she found that as workers progress in the career ladder, the distance between their own personality and the job's traits actually increases, and that the aggregate distance has declined from 1980s to 1990s but has increased ever since.

Last summer she participated in the Macro Finance Modeling summer camp organized by the Becker Friedman Institute of the University of Chicago. I believe she will greatly benefit from participating in the entrepreneurship summer camp as she has several ongoing projects related to firm dynamics and is also starting several projects on entrepreneurship. She will also no doubt place extremely well so will be a credit to the program going forwards.

Again, I very strongly recommend Scarlet who is a fantastic student!

Yours Sincerely,



Nicholas Bloom

Professor of Economics and Courtesy Professor at Stanford GSB

Co-Director of the NBER Productivity, Entrepreneurship and Innovation Program