Application - NBER Entrepreneurship Research Bootcamp 2020

Assa Cohen

March 25, 2020

Personal Details
Name: Assa Cohen. **Affiliation**: Ph.D. student, University of Pennsylvania.
Email: assac@sas.upenn.edu, **phone**: (267)886-0316.
Address: 803 S. Hutchinson St, Phildelphia, PA. 19147
Academic Advisor (recommendation letter writer): Prof. Guillermo Ordonez .

Cover Letter

I am a student of macroeconomics interested in the interaction between macroeconomic factors and technological innovation. I believe there is great potential in attaining new knowledge about technological change and incorporating it into macroeconomic analyses. My current research, which I explain in more detail in my essay, studies how business-cycle fluctuations shape future growth through their impact on R&D composition. In the future, I plan to research the role that technology plays in the formation of other macroeconomic phenomena.

Through my research I have become familiar with the literature on endogenous technological change. I have also written a few referee reports on the subject for *The International Economic Review*, and *The Journal of Economic Theory*. Furthermore, as a part of my research, I requested and was granted access to administrative data about firm-level R&D.

My secondary field of interest is finance. I am curious about the impact of financial markets on the macroeconomy, and the role that information plays in determining the behavior of these markets. My interest in finance led me to become a research assistant for Dr. Benjamin Lester at the Federal Reserve Bank of Philadelphia. Dr. Lester and I are exploring a unique database on OTC financial markets called Regulatory TRACE. We hope this endeavor will lead to a joint research project.

Given that I want to continue researching technological innovation, the NBER Entrepreneurship Bootcamp offers an extraordinary opportunity to learn from leading scholars in the field. Moreover,

I am eager to exchange ideas with other students who share a passion for studying entrepreneurship and technology. Through my rigorous course work at the University of Pennsylvania, I developed solid foundations in both economic theory and empirics. I believe that my training, along with my research on endogenous growth, has prepared me well for the Bootcamp.

ASSA COHEN

803 Hutchinson, Philadelphia, PA 19147
(+1)267-886-0316, assac@sas.upenn.edu

FIELDS OF INTEREST

- Macroeconomics, Finance, Technological Innovation.

EDUCATION

- Ph.D. Candidate, Economics, University of Pennsylvania, PA, 2016 - Present.
  Advisor: Prof. Guillermo Ordonez.
- M.A., Economics, Tel Aviv University, Israel, 2016.
  Advisor: Prof. Itzhak Gilboa.
- M.A., Philosophy, Tel Aviv University, Israel, 2016.
  Advisor: Prof. Ruth Weintraub.
- B.A. The Adi Lautman Honors Program, Tel Aviv University, 2012.

RESEARCH EXPERIENCE AND OTHER EMPLOYMENT

- Research Assistant for Dr. Benjamin Lester, Federal Reserve Bank of Philadelphia, 2019 - Present.
- Research Assistant for Prof. Guillermo Ordonez, 2019.
- Economist, National Economic Council, Prime Minister's Office, Israel, 2015-2016
- Research Assistant for Prof. Itzhak Gilboa, 2014-2015

WORKING PAPERS

- "Demand Flucutations and R&D Composition".

PROFESSIONAL ACTIVITIES

Referee service:

- *International Economic Review*.
- *Journal of Economic Thoery*.

TEACHING

- Teaching Assistant at the University of Pennsylvania, 2017-2019:
  Money, Credit and Banking (Prof. Harold Cole), Economics of Family (Prof. Jeremy Greenwood), Statistics 103 (Prof. Frank Ditragllia).
- Teaching Assistant at Tel Aviv University, 2014-2015:
  Microeconomics 1 (Prof. Itzhak Gilboa), Microeconomics 2 (Prof. Ariel Rubinstein).

SKILLS

- Languages: Hebrew (native), English (fluent), Chinese (conversent).
- Computer languages: MATLAB, R, JULIA.

Gradute School Course Work, University of Pennsylvania

Please press the name of the course to see its syllabus.

Foundation Courses

1. Microeconomic Theory 1.
2. Microeconomic Theory 2 (Game Theory).
3. Macroeconomic Theory 1.
4. Macroeconomic Theory 2.
5. Econometrics 1 - Foundations.
6. Econometrics - Methods.

Elective Courses

1. Economic Growth.
2. Macroeconomics and Financial Markets.
3. Macroeconomics and Financial Frictions.
4. Topics in Labor, Health, and Family Economics.
5. International Macroeconomics.
6. Corporate Finance.
7. Econometrics 3 - Advanced Methods.
8. Decision Theory

Audited

1. Introduction to Macroeconomics with Household Heterogenity.
2. Computational Methods for Economics.
3. Search Theory and its Applications.
4. Topics in Econometrics.

Essay

Technology is a powerful force that shapes the fundamentals of our economy. Yet, there is still much we do not know about the process of technological innovation and its interaction with other economic factors. My current research, which I explain in detail below, harnesses insights about R&D composition to study the impact of business cycles on long-term growth. In the future, I want to utilize knowledge about the process of technological development to address other key questions in macroeconomics.

The NBER Entrepreneurship Bootcamp would be an extraordinary opportunity to learn cutting-edge methods for modeling and measuring innovation. I would benefit much from participating in critical discussions of these methods and the reasoning that underlies them. I am certain that many of those methods would assist me in tackling challenges in my current and future research.

I am eager to learn more about the role of entrepreneurs in generating technological change. As a part of my general agenda, I want to research how different macroeconomic conditions shape technology by fostering or inhibiting entrepreneurship. The Bootcamp will expose me to the frontier of research on the topic. I am also looking forward to learning about research that integrates my two fields of interest - innovation and finance. I am sure that I will greatly enjoy lectures in the Bootcamp that discuss venture capital and the funding of entrepreneurship. I hope that they will inspire me to develop research ideas about these topics.

One of the greatest benefits of attending the Bootcamp is meeting other Ph.D. students who share my passion for research on technological innovation. I would be delighted to become a part of a community of young researchers who work in the field. Beyond the joy of exchanging ideas, I am eager to use the 5-day Bootcamp to initiate new connections. I hope that these connections will set the ground for good long-term professional relationships and research collaborations.

Lastly, it would be a true privilege to learn about innovation from the scholars who lead the research in the field. I would be honored to study from researchers like Prof. Nicholas Bloom, whos work shaped my views on technological change.

My current project studies the impact of business-cycle fluctuations on technological development and growth while emphasizing their effect on *research composition*. It documents that private basic research expenditure in the US is counter-cyclical, while applied research is cyclical. The research aims to explain *why* this pattern emerges, and what can it teach us about the impact of short-term economic fluctuation on technology and long-term growth.

The research will test the hypothesis that the pattern reflects changes in firms' R&D activity in response to temporary demand shocks. Weak demand lowers the returns from launching new products through development and applied research. In response, firms shift their R&D effort towards building capacity to innovate in the future by accumulating knowledge (basic research). Analogously, positive demand shocks lead firms to focus on short-run R&D.

Further, the research argues that the knowledge that is accumulated during downturns generates rapid innovation in their aftermath. That rapid innovation compensates for the slower rate of technological progress during the recession itself (analogous claims for booms). The claim stands in stark contrast with the literature that argues that recessions create a persistent adverse effect on growth by diminishing the creation of new knowledge [1]. It outperforms this literature in explaining the behavior of TFP growth, which typically bounces up after recessions and declines after booms.

The theory is embedded in a novel endogenous growth model in which R&D productivity depends on the gap between the firm's knowledge and the level of technology in practice. A greater gap implies more opportunities to innovate. [2]. Downturns augment the gap by inducing firms to accumulate knowledge rather than creating new technologies; booms contract it by depleting the pool of potential inventions.

The research will be conducted using administrative firm-level data provided by the US Census [3]. I intend to use cross-sector variance to test whether temporary demand shocks cause firms to reallocate funds from applied to basic research. The data will also be used to calibrate the endogenous growth model. The calibration will allow testing the success of the model in explaining sector-level TFP dynamics as resulting from changes in R&D composition.

[1] See for instnace:
Barlevy, G (2004). 'The Cost of Business Cycles Under Endogenous Growth', *AER* 94(4), pp: 964-990
Comin, D., and Gerlter, M. (2006). "Medium-term Business Cycles, *AER* 96(3), pp. 523-551.

[2] The idea is inspired by: Nelson, R. R., and Phelps, Edmund S. (1966). "Investment in Humans, Technological Diffusion, and Economic Growth", *AER, (Papers and Proceedings)* (56), pp: 69-75.

[3] A request to get access to BRDIS/SIRD, LBD, QFR, and additional databases was approved by the US Census and the IRS. I am currently waiting to attain a Special Sworn Status

Penn
Arts & Sciences

Department of Economics
3718 Locust Walk
Philadelphia, PA 19104-6297
Tel. 215.898.1875
Fax 215.573.2057

Guillermo Ordonez
Associate Professor of Economics
email: ordonez@econ.upenn.edu
http://www.sas.upenn.edu/~ordonez/

March 25, 2020

It is a pleasure to recommend *Assa Cohen* for the NBER Entrepreneurship Boot Camp. Assa is a fourth-year student in the PhD in Economics at the University of Pennsylvania. I have known him since his second year, when he was a student in my advanced second-year PhD class on the Macroeconomics of Financial Markets, in which he was the top student.

In my class, and as part of the assignments, I ask students to write a term paper on a subject related to financial economics and macroeconomics. Assa wrote a technically challenging and very interesting paper on the predatory behavior of banking and its on the instability of the financial sector in fragile aggregate states. It became apparent at that point Assa's ability to exploit an interesting subject and to tackle challenging questions in a serious and formal way.

Since that moment I have worked with Assa very closely, becoming his advisor after reading his third-year paper (a requirement for students at UPenn), where he studies endogenous technological change, combining business cycles and long-term growth. This paper became the backbone of his research and the platform for his dissertation proposal, here submitted as part of this application (more on it below). Based on how impressed I was about Assa's work in his second year, I hired him as my RA during his third year, helping me in the construction and analysis of datasets and in the generalization of a model for joint work I have with Facundo Piguillem on "Retirement and Shadow Banking", in which we study the role of retirement needs in boosting shadow banking activities.

Assa's main paper studies the impact of business-cycles on R&D composition. It documents that private basic research expenditure in the US is counter-cyclical, suggesting that demand shocks may potentially affect firms' R&D strategy and the ensuing growth experience. Weak demands during a downturn lower the return from launching new products. Firms respond by shifting their R&D effort from creating new goods (development and applied research) to building capacity to innovate in the future (basic research). Similarly, booms dictate a strategy that prioritizes short-term over long-term R&D. His paper further argues that those changes in R&D composition may play a key role in shaping the dynamics of technology and growth. The knowledge accumulated during downturns boosts innovation in their aftermath. Similarly, booms deplete the pool of potential inventions and render future innovation harder.

These ideas are embedded into a novel endogenous growth model that distinguishes R&D to creating knowledge and applying it. The qualitative predictions of the model are consistent with the behavior of TFP, which typically bounces-back after recessions, but grows at a slower rate following booms. The US Census

and IRS has granted Assa access to administrative firm-level about their R&D activities, which will be used to calibrate the model and test its implications quantitatively.

Assa has not, however, abandoned his interests on financial issues. He is now working with Benjamin Lester at the Federal Reserve Bank of Philadelphia. They are exploring an exclusive database of financial OTC markets called Regulatory TRACE. Regulatory TRACE discloses the identity of the dealer in transactions. It allows connecting features of the dealer, such as the regulations which are imposed on it, its portfolio, its liabilities, etc., to its actions in OTC markets.

Finally, I have invited Assa to participate in a very intensive reading group that I run and in which students present new papers and advances on research to each other. This group is composed by just five students across all cohorts at the UPenn Economics Program and I invite just those who I consider have the strongest potential for the job market and the best future academic prospects. Past students in this group have had a great placement and as such it is a very good signal about Assa's potential.

From a more candid perspective, Assa always participate in our Department macro seminars, making very smart questions and comments (not common at this stage of formation). He interacts very well with classmates and faculty alike, offering intelligent feedback. He's a pleasure to have around and discuss research. I would rank him as one of the top three students I have interacted with, both at Penn and previously at Yale.

In conclusion, let me reiterate my enthusiasm for Assa as a student with interests in macroeconomics, growth and financial markets, with a focus on endogenous technological improvements both in the long and in the short run. He has shown a wide set of skills, in particular in constructing new models and taking them to the data. He is tenacious in pursuing his ideas and he has the drive to conclude projects. For all these reasons I enthusiastically recommend Assa for participation at the NBER Boot Camp.

Please do not hesitate to contact me for further information.

Best,



Guillermo Ordonez
Associate Professor of Economics
University of Pennsylvania