Cover Letter for the NBER Innovation Research Bootcamp,

My name is Martin Aragoneses, currently a Business Economics PhD student at Harvard University. I would like to attend the innovation bootcamp in the NBER SI to become familiar with both the innovation research frontier and researchers engaged in pushing it forward. I would like to formally become a part of the NBER innovation research community in the years to come, and I think attending this bootcamp would be an excellent starting point.

Although it has not been my primary focus, I do have some prior knowledge on innovation-based firm dynamics and growth through mostly theoretical coursework (see below). Despite my extensive theoretical training, I have found myself lacking in the state of the art of empirical work around innovation. I would like to fill in my knowledge gap this summer to start strongly on the next stage of my career as an assistant professor.

My research to date has focused on the investment of firms over the life cycle. I am interested in further understanding the early stages of the firm life cycle, when the firm is young and technology is still very plastic: technological choices and the innovation investments firms make early on may be crucial for their impacts on the firm itself and the aggregate economy later on. I am interested particularly in the interplay between financing and the availability of skilled labor and their combined use for innovative purposes when firms are young. In ongoing work, I am starting to find that large changes in the economy's labor structure (e.g. the decline in the labor share and the rise of skilled labor demand) and intangible investment (spending in R&D and managerial inputs) seen at the aggregate can be traced back to changes happening among startups and young firms, not old, established firms. I suspect this is related to the improvements in venture capital and private equity that have helped recent cohorts of young firms to adopt different technologies and start more innovation intensive.Thus, it is my top priority to familiarize myself with the innovation sub-literatures that could be helpful to understand what is going on–I am particularly intrigued by the work of Nanda and Rhodes-Kropf (2016) and Guzman and Stern (2020).

My **contact letter writer** is my advisor Xavier Gabaix (xavier@gabaix.com). If needed further references, you may contact the rest of my dissertation committee which includes Ludwig Straub, Gabe Chodorow-Reich, Marc Melitz, and Josh Lerner.

Thank you very much for your consideration,

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Education

Harvard University.
Ph.D. Business Economics, 2024 (expected)

Universitat Pompeu Fabra, Graduate School of Economics, Barcelona.
M.Sc. Economics, 2015, Ranked 1st out of 74.
Thesis: "A Theory of Fiscal Policy Rules with Commodity Price Risk" (honors)

Universidad Complutense, Madrid.
B.Sc. Economics, 2014
University of California, Berkeley, senior year scholarship *awarded to 8 university-wide*
London School of Economics, Computational Tools, Real Analysis*, 1st class honors*

Fields

Primary Field: Macroeconomics
Secondary Fields: Innovation and Entrepreneurship, International Economics, Finance.

References

Ludwig Straub ludwigstraub@g.harvard.edu	Xavier Gabaix xavier@gabaix.com	Gabriel Chodorow-Reich gabecr@gmail.com

Teaching Experience

Harvard EC 2419 *Heterogeneous-Agent Macroeconomics,* TA for Ludwig Straub (2021, 2022)

Harvard EC 2410 *Firm Dynamics, Innovation, & Growth,* TA for Philippe Aghion (2019, 2020)

Harvard EC 2010C *Macroeconomic Theory I: Economic Growth*, TA for Robert Barro (2018)

Undergrad economics educational channel: https://www.youtube.com/user/UnderstandEconomics

Employment

Harvard Economics Department, Research Assistant for Emmanuel Farhi (2017-2018)

MIT Economics Department, NBER RA for Amy Finkelstein (2015-2017)

UC Berkeley Economics Department, RA for Edward Miguel (2014)

Metaeconomics, analyst for team of economic consultants for Government of Angola (2012-2015)

Fellowships & Awards

US Census Bureau, Department of Commerce, Special Sworn Status with restricted data access
Census Project #2590: *Drivers & Consequences of the Changing Distribution of Firms*
with Gabriel Chodorow-Reich, Michael Blank, Omeed Maghzian, and Harris Eppsteiner

La Caixa Graduate Fellowship for graduate studies. *Ranked 1st in 55 in Social Sciences category*

Spain's National Economics Olympiad, Co-Champion. *Awarded undergraduate scholarship*

Job Market Paper **The Firm Life Cycle Origins of the Aggregate Investment Puzzle**

The decline in US investment after the 1980s is puzzling because profits increased and interest rates fell, which should have stimulated investment. I find the decline in the startup rate of new businesses is behind this missing investment boom puzzle. Confidential micro data from the US Census shows a striking divergence between micro and macro trends: investment *increased* by 10% for the average firm despite a 14.5% decline in aggregate investment. Changes in the firm age distribution masked this investment boom from aggregate data. Fewer births aged firms and depressed aggregate investment because older firms invest less intensely despite being more profitable. In a calibrated firm dynamics model, firm aging due to falling entry explains 80% of the investment trend decline from 11.5% to 9% of GDP between 1980 and 2010. Given historical changes in startup rates, the life cycle model rationalizes the boom and bust in aggregate investment and its puzzling relation with profits and interest rates since the 1950s. Consistent with the model, cross-country data shows rising investment and falling profits amidst a resurgence in startup activity since 2010.

Papers in Progress. **Startups, Intangibles, and the Labor Share**

I investigate the firm life cycle origins of the increasing importance of intangible capital investment and the labor share decline since the 1980s using confidential US Census micro data. I find firm aging explains part of these trends: as they grow with age, older firms spend more in advertising or innovation and lower their labor shares. However, the changing composition of startups has been an even more important driver of these trends. Relative to startups in the past, recent cohorts of firms are significantly more likely to invest in intangible capital and survive at higher rates. Younger firms seem to have used intangibles to lower their labor shares rather than substitute for physical capital. These patterns are consistent with a model where information and communication technologies that started to become available after 1980 have increasingly been adopted by firms at the startup stage.

US Startup Creation and Immigration Policy

Immigrants are only 15% of the US population but disproportionately run highly successful startups. Immigration policies aimed at restricting foreign labor supply may end up reducing labor demand by lowering firm creation. Real time survey evidence around a 2020 student visa policy announcement shows increasing immigration barriers can indeed lower startup creation among highly educated immigrants. Financial constraints amplify the negative effects of immigration policy shocks on startup creation. A model where immigrants face policy and financial hurdles predicts liberalizing immigration can have positive aggregate effects by increasing firm entry and improving talent allocation. Thus, immigration liberalization policies could help advanced economies facing declining startup rates since the 1980s due to slowing population growth.

The Firm Age Anatomy of the US Economy in the Post-War Era

The full age distribution of US firms is unknown since the Census does not track firms' date of incorporation: age can only be known after 1977. I digitized historical data on the US firm age distribution right after WWII, documenting that the 2010s firm age distribution is remarkably similar to the one in the 1950s. This suggests that the decline in entry after 1977 may have been bringing the economy back to a post-WWII steady state. However, I show that firms today exit systematically at higher rates and experience faster growth throughout their life than those around 1950, suggesting US firms today are better selected. Finally, I compare the US to other OECD countries, showing that the recent resurgence in startup activity in Census data since the Great Recession—ending four decades of decline since 1980—may be having more pronounced aggregate consequences in the US.

Are Conglomerate Firms Automatic (De)Stabilizers?

Multi-unit firms trade-off insurance and selection to allocate capital and employment, redistributing across workers of different regions, sectors, and skills. I study the "progressivity" of a conglomerate redistribution channel using US Census data to assess whether multi-unit firms effectively subsidize (or tax) low-income workers at the expense (or benefit) of top earners during in recessions or booms.

Academic Service	Student organizer, Harvard macro lunch seminars and reading group, 2019-2020
	Referee for *Quarterly Journal of Economics*
Languages	English, Spanish (native), French (basic), Chinese (Hanyu Shuiping Kaoshi level 3).
Software skills	Advanced: Python, Matlab, Stata, Unix. Basic: R, SAS.
Personal Information	2023 Boston Marathon, fundraised *$15,000 for Samaritans suicide prevention/survivors support:* https://www.givengain.com/ap/martin-aragoneses-raising-funds-for-samaritans-inc
	See Crimson article: https://www.thecrimson.com/article/2020/7/15/ice-policy-economics-study/
	Trained as classical concert pianist (1997-2007) at the Professional Conservatory of Segovia, Spain
	Harvard Club Tennis and Harvard Cycling Club
	Born: Segovia, Spain.

Coursework. As requested, here is a list of courses I have taken:

a. PhD level courses.

- Harvard (Farhi, Laibson, Barro, Rogoff)
- MIT (Werning, Beraja, Caballero, Angeletos)
- Universitat Pompeu Fabra (Galí,Ventura, Xavier Sala-i-Martin)
- UC Berkeley (Romer, Obstfeld, Gorodnichenko, Pouzo)
- Empirical applied macroeconomics (Gabe Chodorow-Reich),
- Macro-Finance (Gabaix),
- Macro-Industrial Organization: Firm Dynamics (Aghion, Akcigit),
- International Trade (Melitz, Antras),
- Computational Macro (Fernandez-Villaverde, Moll),
- Finance (Campbell)
- Industrial Organization (Pakes, Lee)

b. I have also MBA level courses

- Tom Nicholas' The Coming of Managerial Capitalism
- Bill Kerr's Managing the Future of Work

c. In addition, I have been the TA for two courses

- Philippe Aghion's firm dynamics and economic growth
- Ludwig Straub's heterogeneous agent macroeconomics

My background is mostly theoretical, and I would like to gain more exposure to the methods and the applied results in the empirical literature on innovation during the Summer Institute Bootcamp.

Research statement. My research studies the drivers and consequences of historical changes in startup activity. My work tries to understand several macroeconomic trends through the lens of theories of the firm life cycle coupled with confidential data from the US Census Bureau–with which I intend to study R&D spending, patenting, and employment of innovators by young, high-growth firms. In my **current Job Market Paper**, "The Firm Life Cycle Origins of the Aggregate Investment Puzzle", I discovered a striking disconnect between the micro and the macroeconomy. At the micro-level, US firms seem to invest more intensely than ever before, just as one hears from the optimistic narrative in Silicon Valley and the business world. However, this has not translated into a boom in aggregate investment-to-GDP at the macro-level. Why? Because the steady decline in startup creation has turned the average firm older, and since older firms invest less intensely in the data, this shift in the age distribution of firms has overpowered the micro investment boom. I find changes in startup activity explain not only the majority of the puzzling decline in investment after 1980 but also the investment boom since 1950. After WWII, startup activity boomed and so did investment as firms became younger. My findings suggest long-run changes in startup activity matter for macroeconomics because they shift the firm age distribution, but in order to detect these effects, models where heterogeneity varies over the firm life cycle–such as the one I develop and calibrate in the paper–are necessary.

I am currently working on my other dissertation chapters setting the stage for my **future research** on startups, the labor share, and intangible investment. I am using US Census Bureau micro data to measure different forms of innovation-related investment, such as R&D spending and patenting activity and employment of innovators by young, high-growth firms. I am currently finding that although there are *fewer* startups being born today, recent cohorts of younger firms, such as Uber, likely start better selected, more technologically advanced, and survive at higher rates than firms in older cohorts. Relative to startups in the past, recent cohorts of entrants invest more intensely across the board, but particularly in intangible capital–which I measured through spending and worker allocation into innovation and advertising. Younger firms seem to have used intangibles to save on labor rather than substitute for physical capital as it has been the case for platform-firms like Uber. This changing composition of startups has been an important force behind the aggregate shift towards intangible capital and away from labor. My findings are consistent with large changes since the 1980 affecting the US economy through their adoption by firms *at the startup stage*. Finance fueled technology choices and innovation investments firms make early on may be crucial for their aggregate impacts later on. I suspect Europe has not experienced a strong decline in the labor share as the US because young European firms have not had the funding to adopt the innovation intensive technologies of US startups.

Why the bootcamp: Despite my training, I have found myself lacking in the state of the art of empirical work around innovation, especially relating to corporate finance, and I think filling in this gap would be very helpful. I am particularly intrigued by work in the innovation literature related to Nanda and Rhodes-Kropf (2016) and Guzman and Stern (2020) and further understanding the changing nature of startups and young firms at a time when their technology is still very plastic. More broadly, I am interested in learning as much as I can about the findings and tools of the innovation literature with the hope of generating spillovers in my research, which I am deeply passionate about!

References

Ramana Nanda and Matthew Rhodes-Kropf. 2016. Financing Entrepreneurial Experimentation. Innovation Policy and the Economy 2016 16:, 1-23

Guzman, Jorge, and Scott Stern. 2020. "The State of American Entrepreneurship: New Estimates of the Quantity and Quality of Entrepreneurship for 32 US States, 1988–2014." *American Economic Journal: Economic Policy*, 12 (4): 212-43.

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February 1, 2024

Re: Martin Aragoneses for the NBER Innovation Research Boot Camp 2024

Dear fellow economists:

I'm delighted to extremely warmly recommend **Martin Aragoneses** to the NBER Innovation Research Boot Camp.

Martin is graduating this year from Harvard's economic department. He'd be fantastic for the bootcamp. He's extremely dynamic, creates lots of positive externalities, and is very fascinated by innovation, entrepreneurship, in particular on their macroeconomic dimensions.

Martin's job market paper is "The Firm Life Cycle Origins of the Aggregate Investment Puzzle". I think that it is very interesting, and that Martin's paper gives a very important perspective on this big issue, the vagaries and secular decline in the investment rate, via changes in the birth rate of new firms. He studies their growth dynamics too. Because of this, **the paper has a very good shot at being published in a top 5 economics journal.**

I cautiously hope he'll get a great job, e.g. at INSEAD, or perhaps the Fed Board.

Martin will be a great player in the entrepreneurship literature, and still would be benefit a lot from the bootcamp.

Do not hesitate to contact me if you'd like to know more about Martin.

Thank you,



Xavier Gabaix