TO: Prospective Economics PhD Students
FROM: Alvin Christian
DATE: July 31, 2020
RE: Applying to Economics PhD Programs Memo

Introduction

In this memo, I describe the application process for economics PhD programs in the U.S. I include information on components of the application, including research experience, letters of recommendation, math requirements, the GRE, and the statement of purpose. I also provide strategies on choosing schools. This information is based on my own research, conversations with current graduate students and professors, and from my experience during the 2019-20 application cycle.

Application Components

Begin working on your application in late summer/early fall because most applications are due in December and January. The typical application consists of the following:

- Three letters of recommendation
- Transcripts (unofficial are ok for most schools)
- GRE ($27 per school)
- Statement of purpose
- Writing sample[1]
- Application fee (∼$100 per school)

This process requires a lot of organization, so I provide an excel spreadsheet to help you stay organized (you'll want to write down all these usernames and passwords somewhere). I recommend setting aside $2-3k and increasing your credit limit because between taking and studying for the GRE, application fees, and buying avocado toast and iced coffee, costs will add up. I spent over $2,000 applying to grad school!

Research Experience

I recommend having at least 1-2 years of research experience when applying to show you are serious about research and know what you are getting yourself into. If you are an undergraduate, RA for professors who are doing work you find interesting (all you have to do is ask!) If you can't find any RA opportunities, do a thesis, independent study/research, or graduate coursework to signal interest. If you're out of school, do a Pre-Doc. I have written short guides on getting and succeeding at Pre-Docs, which you can find on my website.

Letters of Recommendation

This is probably the most important part of your application, but also the one you have the least control over. Economics is a highly hierarchical and clubby discipline, so getting

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[1]Submit a thesis, research paper, or research proposal that shows you can communicate concisely and clearly. I used a two-page research proposal as my writing sample.

letters from professors the admissions committee will know and respect is important. If you're an undergraduate, take the initiative and reach out to professors for RA opportunities, independent study opportunities, and attend office hours. Building strong relationships with you letter writers is important—they need to bat for you! As a rule of thumb, letters from economists and other quant-heavy fields (e.g., Public Policy, Finance, Education, etc.) are more valuable because economists are reading, citing, and collaborating with those researchers. Letters from tenured and senior professors will hold more weight than those from fresh-out-of-grad school APs. Be strategic with your letters, and make sure each uniquely contributes to your narrative as an applicant.

Reach out to potential letter writers in late summer or early fall and give them a list of every program you are applying to with a tentative timeline. Provide them with a resume/CV and a draft of your statement of purpose as soon as you can (incomplete is ok). This will help them write more specific and personalized letters. I also advise you to suggest specific things you'd like your letter writers to highlight. If you've been coding in Stata or running fancy analyses, ask someone to mention that. If you had a bad freshman year because you were working full-time, ask the other to mention it. Don't be shy or meek about this—it will make the lives of your recommenders easier and result in a better letter. Finally, don't hesitate to politely nudge professors closer to deadlines to submit letters; academics are busy and this can slip between the cracks.

Math Courses
Here are math requirements to be competitive for top graduate programs:

- **Necessary**
    - Single Variable and Multivariable Calculus (Calc I-III)
    - Linear Algebra
    - Real Analysis

- **Highly Recommended**
    - Differential Equations
    - Probability Theory
    - Mathematical Statistics

- **Showing-off**
    - Topology
    - Stochastic Processes
    - Complex Analysis
    - Measure Theory

You need good grades in these courses ($\geq$ A-), though an odd B is ok (no one is perfect!)[2] You must ace Real Analysis—this is typically the first course where undergraduates write

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[2]I'm unsure if where you take these courses matters, but it can't hurt to take some of the important ones (Real Analysis) at more selective schools.

rigorous mathematical proofs, and therefore is an important signal. Good grades in econometrics courses and graduate economics courses (e.g., microeconomic theory) are also positive signals because they show you are capable of doing graduate coursework.[3] A rule of thumb: more math is better.

GRE

If you want to attend a top graduate school, you need a near perfect GRE quantitative score (graduate schools do not care about the writing or verbal component, at least for domestic applicants). An example: the average quant GRE score for newly matriculated students at Duke for the 2019-20 cohort was 169 (verbal was only 158). Some programs use the GRE as a filter (i.e., you need a score above a cutoff to have your application looked at, but beyond that it won't help or hurt you). Aim to score above the 90th percentile (≥ 167).

Luckily, the GRE is the most game-able part of the application. Here are some tips to help you do well:

- Acing the GRE requires putting in time. There are only so many ways to ask about the area of a triangle, so do as many practice problems as possible.

- Purchase Magoosh; the lessons are great, the diagnostic materials will show you what you need to study, and the online format will get you accustomed to the actual exam.

- Practice timing yourself.

- Do the GRE while in college or right after college because your mind will be in school/test mode (scores are valid up to five years). If you're taking it after being out of school for a number of years, find a study buddy to keep you accountable.

- Don't be discouraged if you don't do well your first time. This test doesn't reflect your potential as a graduate student or a researcher. **If you're dissatisfied with your score and able, spend the money and retake it. You're spending so much applying to grad school, so give it your best shot!** Joshua Goodman and colleagues (2020) show that students who retake the SAT substantially increase their scores. I'm sure the same is true for the GRE, so don't let a bad score hold you back.

Statement of Purpose

The statement of purpose tells the admissions committee why you—beyond what's listed in your transcripts and resume—want to go to grad school, what you're interested in studying, and why you will succeed in grad school and become a successful academic researcher. The goal isn't to regurgitate your resume/CV, but to communicate a clear narrative. You also want to demonstrate your capacity to conduct academic research by highlighting relevant experiences, showcasing your knowledge about the field and literature, and by asking interesting research questions.

Professors Matthew Gentzkow and Jessie Shapiro have a section on applying to PhD programs in their RA manual that has useful information on the SOP. They suggest

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[3]I have, however, also been told that a bad grade in graduate coursework can be a negative signal, so be strategic about this.

devoting over half of your SOP to outlining your research agenda for grad school and beyond. They recommend spending the other half discussing your independent research and your past record and accomplishments, including RA work. According to them, only a minimal amount of space ($<10\%$) should be devoted to your personal narrative. I've seen several successful SOPs follow this formula—I followed it myself, and found it provided a useful structure. I should caution, however, that this advice is tailored to applicants from their RA lab, so you may not want to follow this advice exactly.

Here are some general tips for writing a strong SOP:

- Brevity is key—showcase your ability to write directly, clearly, and efficiently. Reviewers will read many SOPs, so don't be wordy and waste their time. Avoid repeating things that are on your resume unless absolutely necessary. Aim to write ∼1,000 words, though this can vary from program to program.

- Tailor your SOP to each program. You do not have to completely restructure your SOP each time; however, at the very least swap out a few sentences or have a personalized paragraph explaining why you want to attend this program in particular.[4]

- Read recent papers from your intended field and from professors at prospective programs.[5] Get a general idea of what has been done, what people are doing, and what you want to do. Use this to discuss interesting research ideas and write statements like such:
  - *I'm interested in studying X because. . . Professors A and B have explored this problem using [method/data]. . . I'd like to build off their work to study X using [method/data].*
  - *I'm interested in studying X. We know A, B, and C, but we don't know much about D. I'd like to study how X relates to D using [method/data].*

- Be specific but not too specific. If you're interested in studying a niche topic that only one person in school A works on, writing about that topic might alienate you at schools B, C, and D (and maybe A if that person isn't on the admissions committee or is leaving). No one expects you to know exactly what you want to study before you enter grad school—just show you have the potential to ask interesting questions and do good research.

- Play to your strengths. If you have a lot of field-work experience, highlight it. If you want to study a certain topic (e.g., education) and have real-world experience (e.g., teaching), bring it up.

- Explicitly state why you want to study economics (e.g., drawn by rigorous methods) and what you want to get out of grad school (e.g., want to be a professor). However,

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[4]I recommend talking to current grad students. Some programs encourage interdisciplinary research, are policy-focused, or have other interesting quirks. It's helpful to know these when crafting your SOP. On the other hand, Gentzkow and Shapiro advise their RAs against tailoring the SOP, citing low upside benefits and large downside risks. Do what you feel is right for you.

[5]Look at what these professors are currently working on and avoid referencing topics they are no longer interested in.

don't overemphasize this point because everyone will be writing about the same generic things.

- I would avoid saying you want a job outside academia because the purpose of a PhD program is to prepare you to do academic research.
- Have multiple people (professors, colleagues, and friends) read your SOP and provide feedback.

Choosing Programs

As I said earlier, economics is a highly hierarchical discipline, so you'll likely be applying to many of the highest ranked schools.[6] To find programs, I recommend looking at papers you like and looking at the schools those authors teach at and attended. Scour the websites of current and former job market candidates to get a feel for what type of research is supported at different schools and where such students place in the job market—pay attention to the median student in your desired field, not the outliers. Consider non-academic preferences; for example, you may want to live in a certain geographic location. This shouldn't be discounted because this will be 5-6 years of your life. Don't apply to programs you wouldn't like or want to attend—applications are expensive!

How Many Programs Should I Apply To?

I recommend applying to 20-30 programs (only if you're willing to attend that many programs). Economics PhD programs are notoriously competitive, and even if you have all the components of a successful application (strong letters of recommendation, good grades in math, a high GRE score, and a lot of research experience), you're still not guaranteed a spot anywhere. For example, in 2018 the University of Michigan had over 700 applications and only 22 matriculated students, implying a lower bound acceptance rate of 3.1%. Duke had a 10.4% acceptance rate in 2020. Harvard claims they get over 600 applicants a year and accept 40-44, implying that their acceptance rate is no more than 7.3%. Bottom line: be prepared to be rejected. A lot.

Professor Scott Cunningham compares applying to grad school to picking stocks. Just like you wouldn't invest all your savings in one company or sector, you shouldn't apply to just top 10 schools. He recommends treating your applications like an index fund—you diversify your applications across the entire distribution of schools and only apply to schools above your reservation school. In normal speak, find the lowest ranked school you'd attend, and apply to as many schools above it as you can, keeping in mind the probability of acceptance decreases as you move up school ranking. This is expensive but is the dominant strategy for getting an acceptance—don't hate the playa, hate the game.

For a stylized example, take a look at the figure below. I model acceptances as binomial outcomes and assume errors are independent and identically distributed. I then plot the probability that you get into at least one school based on a constant acceptance rate across each school (2%, 5%, and 10%).

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[6]Many people turn to USNews and IDEAS/RePEc for rankings.

Probability of At Least One Acceptance By Schools' Acceptance Rate
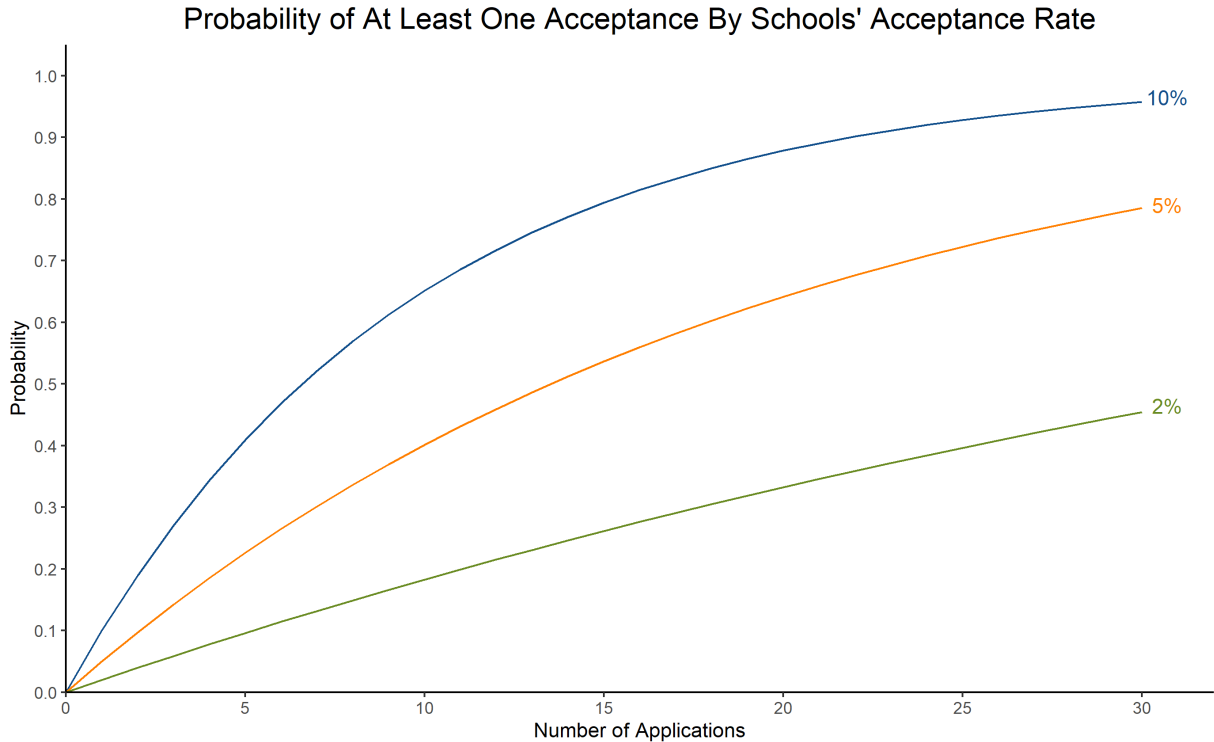
Your chance of getting into at least one school is monotonically increasing along the number of applications you send out. Note, however, that you never have a 100% chance of an acceptance, not even if you apply to 20 schools with a 10% chance of getting into each school (it's 88%). Take a look at what happens if you apply to just 5 schools—at a 2% acceptance rate you only have a 10% chance of getting into at least one school, and at a 5% acceptance rate this only goes up to 23%. These programs are competitive, so it isn't unheard of for someone to apply to dozens of programs and receive just one or no acceptance. When I applied in the 2019-20 cycle, I applied to 19 programs and only got 2 acceptances. Apply to as many as you can and remember—you just need one!

Deciding Between Programs
If you are lucky, you'll get more than one acceptance and can decide between programs. The standard advice is to simply choose the highest ranked school. However, if you're choosing between similarly ranked schools, then things get murky. Here's some advice I was given from current professors:

- Look at recent job placements to get an idea of where you will be 5-6 years down the road. Focus on the median student, not the outliers.

- Don't choose a school or location you won't like because six years is a very long time.

- Talk to current and former grad students to get a feel for what the culture is like. Ask about qualifying exams and dropouts—is the program trying to thin the herd or groom people for success?

- Don't decide based on one or two professors because academics—especially the ones you will want to work with—are highly mobile and can move to different schools. You're choosing the program, not the professor.

- There are not large differences in the quality of professors across top institutions, so consider the quality of your peers—there are positive externalities to being around people smarter than you.

- Judge the quality of programs by the mid-career researchers currently publishing in top journals. When you're on the market, you want well-established and active people batting for you.

Conclusion

I hope you found this information useful. When it comes down to it, getting into a top program boils down to four things: 1) showcasing valuable research experience, 2) getting strong letters of recommendation that speak to your research capabilities, 3) demonstrating academic excellence (i.e., doing well in math courses and the GRE), and 4) crafting a compelling SOP. If you have these things, you've done all you can to get into a top grad program, and the rest is up to chance.

While these tips are generalizable, I want to emphasize that they are based off my specific experience where I had very specific goals (i.e., attend a top program so I had a good reason to not get married). It's likely that your goals, experiences, and interests differ, so feel free to adapt these tips as you see fit. For example, you may care less about rankings, want to pursue heterodox economics, or have binding geographic preferences. I encourage you to reach out to professors and colleagues that know you well, and work with them to develop a realistic application plan for you.

After you are done applying, I suggest taking time off for yourself. You have done your best, and things are now out of your hands. Be kind to yourself and avoid checking certain websites to see when decisions are coming; it will do nothing but make you anxious. I suggest you escape the frigid January/February weather and do some traveling to celebrate the end of the application cycle—you deserve it.

Miscellaneous

- Apply to the NSF GRFP. This fellowship is intended to identify successful early-career researchers and provides generous financial support. Applying shows that you are serious about research, and if you get it, it can pull you off the wait list at some programs. It is due in October, so it forces you to think carefully about what you want to study early. Although I didn't get it, applying led to a better SOP and gave me a good writing sample.

- Negotiate your stipend by leveraging other offers. You may not get a higher stipend, but you can win extra perks, like travel funds or housing priority. There are no downsides here.