

Handbook for Graduate School In Economics

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Introduction

This handbook will inform you about graduate school in economics, walking you through how to prepare while in college, how to choose a graduate school, what field of study is right for you, and how the applications process works. Graduate study and graduate degrees are becoming increasingly important in today's world. More and more, many of the really good jobs in economics are limited to those who have pursued graduate study. However, the good news is that graduate study comes in many forms, as you will see in the next sections.

The decision to apply to graduate school should begin with careful thought because of the personal and time commitment required. Seek information on opportunities, salaries, and projected jobs for economists in conjunction with your evaluation of graduate programs. Graduate school is for people who love research, scholarship, and teaching. It should provide you with professional skills and in-depth knowledge of your chosen field of study. You need to assess yourself and evaluate the types of degree programs and their expectations before directing your energies to the application process.

Assess Yourself

1. Are you excited about the discipline you're choosing? The demands and intensity of graduate school are high—if you love the discipline you choose, you will be better able to handle the stress. This is a big decision: you may be spending 5 or more years studying this discipline. You want to make sure that you really enjoy it.
2. When will you graduate? It is important to realize that nearly all (99%) of graduate programs only allow people to start the program in the fall semester. This means you must apply the fall of the year BEFORE you want to attend graduate school.
3. Is attending graduate school a delayed career decision? Don't go to graduate school just because you don't know what kind of job you want. You will be wasting your time and money, as well as the graduate schools time and money if you're academically burned out or not really committed to graduate school.
4. Can you afford it? Most graduate programs provide some financial support (see Paying for Graduate School). Keep this in mind when applying. Look at the support the department provides, the number of fellowships or assistantships, the cost of living in the area, etc.
5. What should you expect in graduate school? Graduate school should prepare you for a future career through specialized courses and training. It will require more focused and sustained work and a more intense relationship with faculty and other students than did your undergraduate education.
6. What are the personal skills/qualities necessary to be successful in graduate school? Everyone is different, and everyone can succeed in the right graduate school program. In general, you need to be intelligent, to be able to comprehend challenging concepts, to be creative, and to be a self-starter. In addition, you need discipline, persistence, and focus. In graduate school, more of the work and learning will be your responsibility.
7. Living in another part of the country. Graduate school is a great opportunity to see some of the US and live in another region of the country. However, there are also a number of excellent graduate programs in many different fields in Illinois, Iowa, Michigan, Minnesota, and Wisconsin. Do some research and find out what programs you might like.

If you think graduate school might be for you, keep reading...in all cases, you might want to pick up a US News and World Report edition that ranks and discusses the programs that you're interested in.

Types of Graduate Schools and Degrees

Economics majors go to graduate school in many different fields and seek many different degrees. Some of the main fields are listed below.

1. PhD in Economics
2. MA or a MS in Economics/Econometrics
3. PhD or MA in Public Policy
4. JD Law Degree
5. MBA, MA, or PhD in Human Resources, Industrial Relations, Finance, Management

What Are Economists Paid Anyway?

Depending on the field you go into and the career you pursue, starting salaries vary widely. Economics professors start at salaries between \$40,000 and \$90,000 at most institutions. Median annual wage and salary earnings of economists were \$72,780 in May 2004. The middle 50 percent earned between \$53,650 and \$96,240. The lowest 10 percent earned less than \$41,040, and the highest 10 percent earned more than \$129,170. The Federal Government recognizes education and experience in certifying applicants for entry-level positions. The starting salary for economists having a bachelor's degree was about \$24,667 a year in 2005; however, those with superior academic records could begin at \$30,567. Those having a master's degree could qualify for positions at an annual salary of \$37,390. Those with a Ph.D. could begin at \$45,239, while some individuals with experience and an advanced degree could start at \$54,221. The average annual salary for economists employed by the Federal Government was \$89,441 a year in 2005. Data provided by the Bureau of Labor Statistics Occupational Outlook Handbook (OOH) (<http://www.bls.gov/oco/home.htm>). The Occupational Outlook Handbook is an excellent source of information about careers in any field; the discussion on what economists and research analysts actually do is very good.

PhD in Economics

The most difficult of the graduate degrees is the PhD, which stands for Doctor of Philosophy. Getting a PhD normally takes 5 years or longer; the very quickest one can earn a PhD is in 4 years. Usually you spend two years taking a full load of courses (3 or 4 a semester). In your first year, you will take a full year of microeconomic theory, a full year of macroeconomic theory, a full year of econometrics, and usually some additional mathematics or statistics courses. After your first year, you must pass exams (prelims) in these fields to be allowed to continue in the program. Every program has slightly different exam formats, but all limit the number of times you can take these exams. During your second year, you can choose the fields of economics in which you want to specialize. The fields might include international economics, public economics, industrial organization, monetary economics, environmental economics, labor economics, developmental economics, health economics, etc. You can also choose to specialize in advanced microeconomics, macroeconomics, or econometrics. In your third, fourth, and fifth years, you spend your time working on a dissertation—original research in economics on a topic of your choice. Job opportunities for people with a PhD include professor of economics, professional economist for business, media, or government, economic analyst, or economic consultant. Economists with PhD's also work for a large number of international agencies such as the World Bank, the Inter-American Development Bank, the International Monetary Fund, and other political, economic, or humanitarian organizations.

Masters in Economics

Many people choose to pursue a MA (Masters of Arts) or a MS (Masters of Science) in economics. These programs take 1 to 2 years, depending on the school and curriculum. You can also pursue a MA or MS part time, unlike a PhD. The course work is similar to that in the PhD program—you take courses in microeconomics, macroeconomics, econometrics, and a specialty field. In some programs you have to write a thesis, and in others you take an exam to earn your degree. Students entering Economics PhD or MA programs are frequently required to take the GRE (Graduate Record Examination—more later) in order to apply to grad school.

More and more, the “good” jobs—those that are interesting and challenging and that pay well—require some education beyond a BA or BS. This means to be competitive, you might want to consider a Masters degree. This degree can prepare you for a wide variety of jobs in business, consulting, and government. People who specialize in econometrics and forecasting are particularly employable as economic analysts, research analysts, and economic consultants. While people with MA or MS degrees work mostly in business and government, others decide to go on and pursue a PhD in economics.

The Master’s in Economics is an applied degree. Master’s programs are typically geared to provide skills to business professionals and researchers. While PhD programs normally concentrate on theoretical issues, Master’s programs focus on the practical application of economic theory. Master’s programs are often designed to meet particular needs of regional commerce. The curriculum may begin with a relatively simple introduction to economics or a more advanced treatment that requires a good knowledge of economics and some mathematics training. All programs cover a range of subjects in micro and macro beyond intermediate undergraduate training. These programs commonly place a heavy emphasis on statistical analysis and econometrics.

It is also important to note that a Master’s degree is not normally a prerequisite for entering a PhD program. In fact, if you plan to earn a PhD you may end up wasting valuable time pursuing a MA. This varies with institutions, so be sure to ask the graduate coordinator. Also, it is important to know if the school also offers a PhD program. Schools that offer two graduate tracks (PhD and Master’s) can neglect the Master’s students.

Important Questions

What is the job-placement history of your recent graduates?

Are the PhD and MA programs separate tracks?

What are the requirements? Mathematics requirements? GPA requirements?

What comprehensive exams are required?

Is there a thesis requirement (track)?

While all the schools listed in the PhD rankings at the end of this booklet have Masters Programs, there are also many other schools that specialize in Masters Degrees. In fact, if you’re specifically interested in a MA or MS, you might have a better experience at a school that offers only Masters degrees (more faculty time and more resources devoted to you, rather than to the PhD students). Many schools offer specialized programs, and you should be able to find one that emphasizes topics you’re interested in. A number of universities in our area have active MA or MS programs. They include UW Milwaukee, Marquette University, St. Cloud State University in Minnesota, Western Michigan, Northern Illinois, and

Western Illinois. Schools with a Masters program that have a particular specialty usually discuss it on their website. For example, St. Cloud State is one of the few schools in the country to offer a specialty in the economics of nonprofit organizations. UW Milwaukee specializes in labor economics. Marquette specializes in a MS in Applied Economics (econometrics). The masters program at Suffolk University in Boston specializes in government consulting and tax analysis or international business consulting (Masters in Economic Policy—MSEP—and a Masters in International Economics—MSIE). Tufts University in Boston has an excellent international economics masters program.

Other programs you might want to check out include University of Texas-Dallas, University of Central Florida, Indiana University, the MA in Economic Policy from the University of Maryland in Baltimore County, the MS in Resource and Applied Economics from the University of Nevada Reno, and the MA in Public Affairs from UW Madison's LaFollette School.

The application process is similar to that described for PhD programs. It is best to take at least a year of calculus (though this is not required by all programs). You will usually need to take the GRE, get 2 or 3 letters of recommendation from professors, and have your transcripts sent to the schools you're applying to. To apply successfully to the best MA and MS programs, you should follow the same advice and timeline as given below in the section Time-Line for PhD programs.

Recently, a UWO alumnus decided in October of his senior year that he wanted to go to graduate school, but only had Math MBA 1. He applied to a number of MA programs and was accepted to the UW Milwaukee economics graduate program with a teaching assistantship that will pay his tuition and a living stipend. He plans to apply to PhD programs after completing his MA.

Public Policy/ Public Affairs

In addition, as an economics major you can go on to earn a PhD or MA in Public Policy, Public Affairs, or a Masters in Public Administration (MPA). For the latter two, search for information on the web. Public Policy is a field that combines economics, political science, and sociology, and is therefore not as math intensive as pure economics programs. You still do research on real world problems, but in this case your training is broader and often best suited for pursuing jobs in government. In fact, the former US Secretary of the Treasury, Paul O'Neil, had a MA in Public Policy from the University of Indiana. The University of Wisconsin Madison has a very good program in public policy. See the [Time-Line](#) section for application details and schedule.

Specialties in Public Policy or Public Affairs include public-policy analysis, public management and administration, public finance and budgeting, city management or urban policy, criminal justice policy and management, health policy and management, environmental policy and management, nonprofit management, information and technology management, and social policy. See this website for more details: <http://www.uiowa.edu/~ournews/rankings02/publicaffairs.pdf>

Top programs in Public Policy/ Public Affairs

1. Harvard University
2. Syracuse University
3. Indiana University Bloomington
4. Princeton University
5. University of California Berkeley
6. University of Georgia
7. Carnegie Mellon University
8. University of Michigan
9. University of Chicago
10. University of Southern California
- 11. University of Wisconsin Madison**
12. University of Texas – Austin
13. American University
14. Columbia University
15. SUNY Albany
16. University of Kansas
17. University of Minnesota Twin-Cities
18. University of North Carolina Chapel Hill
19. Duke University
20. George Washington University
21. New York University
22. University of Maryland College Park
23. University of Pittsburgh
24. Arizona State University
25. Florida State University
26. University of California Los Angeles
27. University of Washington
28. Virginia Tech
29. Georgetown University
30. Johns Hopkins University
31. Georgia State University

Law School

Many economics majors go on to attend Law School, and earn a JD (Juris Doctorate). Law School generally takes 3 years to complete, with two full years of specified course work and one year of specialized course work. The applications process is a little different from that of graduate school, in that law school applicants take the LSAT (Law School Admission Test—check www.lsat.com) exam instead of the GRE (Graduate Record Examination). However, much of the rest of the process is similar. Economics majors have traditionally been very successful at getting into Law School

The Law School application process is increasingly competitive. Law Schools are interested in your LSAT score, your GPA, your letters of recommendation, and more that other graduate programs, your personal statement. At the same time, all law schools have people to help you out: the Assistant Dean of Admissions. The assistant dean of admissions will organize a campus tour for you, answer any and all questions, and help you get the feel of an individual law school. We had the assistant deans from Madison and Marquette visit us last year, and they provided lots of helpful information. If you're interested in law school, keep your eye out for upcoming events.

For the application process, the time-line is similar to that for economics PhD programs, though you should do some research on law schools in particular. See the US News and World Report more complete listings for law schools.

More than other graduate programs, the rankings of the specialties of a particular law school may be very different from their overall ranking. For example, Marquette has one of the nation's top Sports Law programs. Other law specialties include clinical training, dispute resolution, environmental law, healthcare law, intellectual property law, international law, trial advocacy, and tax law. Some fields like anti-trust are highly related to economics. In addition, graduating from a middle or lower ranked law school does not mean you will not make lots of money or will not be successful. Michigan's former (3 term) governor, John Engler, graduated from Cooley Law School in Lansing Michigan. Cooley is a tier-4 school, with an open admissions policy.

Top Law Schools

1. Yale University
2. Stanford University
3. Harvard University
4. Columbia University
5. New York University
6. University of Chicago
7. UC Berkeley
8. University of Michigan
9. University of Pennsylvania
10. University of Virginia
11. Northwestern University
12. Duke University
13. Cornell University
14. Georgetown University
15. University of Texas Austin
16. UCLA
17. Vanderbilt University
18. University of Iowa
19. University of Minnesota

Business and MBA Programs

Of course, economics majors also get their MBA (Masters of Business Administration) or MA's or PhD's in finance, human resources, industrial relations, management or other fields of business specialization. Business specialties also include accounting, general management, management information systems, international business, entrepreneurship, marketing, product/operations management, quantitative analysis, and nonprofit organizations. For these programs, it is not necessary to have an undergraduate degree in Business, and the graduate programs view economics as a very good major. Most MBA programs require you to take the GMAT (Graduate Management Admission Test) exam. Otherwise the application process is similar to that for other programs.

The MBA is a very popular degree in the business world. The average MBA student is a working professional. Often times urban schools offer classes at times that are convenient to those working full-time jobs. The MBA degree is a composite degree that requires the study of several disciplines relevant to business. The most common disciplines are Finance, Accounting, Management, and Marketing. Students are normally required to complete core courses in economics and statistics before picking a main field of concentration. Many MBA programs do not offer much rigor beyond the current undergraduate business curriculum; however, Sewanee students have likely had minimal exposure to these courses. The general rule on MBA school quality is the higher the ranking the more rigorous the program. Some schools offer special "Executive MBA" programs that operate on weekends and some evenings separate from a full-time program. Many schools also offer MBA programs tailored to the needs of specific industries, such as scientists, engineers, doctors, etc. A new species of MBA with a specialty in International Business is growing in popularity. This MBA requires extensive language training and living abroad. Normally, business schools only accept students with several years of work experience. It is normally a waste of time to apply to MBA programs directly after receiving your bachelor's degree. The Graduate Management Admissions Test (GMAT) is normally required for entry into an MBA program.

Increasingly, there are more and more options for business school, including programs that specialize in night/weekend/part time programs and even entirely on-line programs. However, many of the best business schools require you to have 2 or 3 years (minimum) experience working in the business world before they will consider admitting you. Again, depending on the area of specialty, the top programs differ considerably from the general rankings. Make sure to do some serious research before applying.

Top Business Schools

1. Stanford University
2. Harvard University
3. University of Pennsylvania
4. MIT
5. Northwestern University
6. Duke University
7. University of Chicago
8. Columbia University
9. Dartmouth University
10. UC Berkeley
11. University of Michigan
12. University of Virginia
13. NYU
14. Yale University
15. UCLA

16. Cornell University
17. University of North Carolina
18. Carnegie Mellon
19. University of Texas Austin
20. USC
21. Indiana University
22. Emory University (Atlanta)
23. University of Rochester
24. Georgetown University
25. Michigan State University
26. Ohio State University
27. University of Minnesota
28. Purdue University
29. Brigham Young
30. Vanderbilt University

Important questions to ask an MBA program:

- What work experience do you require?
- What is the prerequisite coursework?
- Do you have full-time and part-time programs?
- What about on-line programs?
- Is there available funding?
- Do you have internship programs? Are they required?
- Do you help place your students in internships?
- What is your job-placement history?
- Are the professors full-time or adjunct?
- Is there a language requirement?

There are no right or wrong answers to these – it depends on what kind of program you want.

For MBA rankings

<http://www.mba-programs.info/business-school-rankings.htm>

Also, do some reading on valuing an MBA degree -- *The Wall Street Journal* publishes an article every year that lists the top MBA programs and the “top-value” MBA programs. The latter examines what it costs to get the MBA compared to increased earnings after the MBA.

Industrial Relations

Industrial Relations (IR) is a particularly hot new field—you study the business management aspects of economics and areas related to labor economics and human resource economics. You can earn a PhD in IR, and go on to work at a university or business, or you can earn a MA or MS in IR. People with Masters degrees frequently go to work in business. People in this field often get hired by corporations to manage labor issues. Specialties include labor economics, collective bargaining and public policy, gender, race, and ethnicity in the labor force, occupational safety and health, unions, public sector bargaining, and many other issues relating to labor economics. This field can be fairly quantitative, but not all specialties rely on good statistical skills.

One advantage of this field is that you can get into a program without previous work experience. Professor Johnson's brother has a MA in IR from Cornell University—he went straight to graduate school after getting an undergraduate degree in psychology and economics from the University of Illinois. He was hired after his first year of study (out of two full years) by Allied Signal (now Honeywell) and now makes more than Professor Johnson.

Michigan State University also has a very good program in IR, with extensive ties to the auto industry and heavy manufacturing in Michigan and throughout the Midwest. The Iowa State University IR Program's web site is quite helpful:

<http://www.econ.iastate.edu/industrialrelations/irpos.htm>.

The University of Minnesota also has an excellent program in Industrial Relations in the Carlson School of Business. Unfortunately, I could not find a cumulative ranking of IR programs. But, hit the web and you'll learn lots about this field.

Also, check out the program at UW Milwaukee. They have a very well respected program in Human Resources and Industrial Relations. Professor Johnson has a friend who teaches in this program – ask her and she'll set up an informational meeting or get any questions answered.

<http://www.uwm.edu/Dept/MHRLR/index.html>

What You Need to Get into Graduate School

1. **Test Scores:** GRE, LSAT, GMAT, whatever is requested by the programs to which you plan to apply. The better your scores, the better your chances. For economics, you need to take the GRE, which is made up of three parts: the verbal, the quantitative, and the analytical. Graduate programs in economics are most interested in your score on the quantitative and analytical portions of the exam. Ideally, verbal GRE scores should be above 550, quantitative scores over 700, and analytical scores over 700 (a 4.5 or higher on the new scale). This is ideal – lots of students get in with quantitative scores of 670 or lower verbal scores. What sorts of scores you need depends on where you want to apply. You should plan to take this exam during the summer before you would apply to graduate school and/or as late as October of the year you would apply to graduate school. Sometimes people take the exam 2 or 3 times, in an effort to get the highest score possible. This can get expensive; I'd recommend buying one of those GRE prep books for \$25 and studying instead.
2. **GPA:** Most schools require GPA's over 3.0, and better schools require GPA's of 3.3 to 3.5 and higher. Generally higher GPA's payoff. For those of you who had rough freshmen or sophomore years, many graduate programs consider most strongly your GPA for your last 90 credits.
3. **Math Background:** Economics programs (both PhD and MA) strongly prefer students to have a solid math background. This includes a full year of calculus (Calc I and Calc II) and a semester of Linear Algebra and Mathematical Statistics at a minimum. Law School, Public Policy, and Business Schools do not have as rigorous math requirements. Economics programs would rather you took Calculus II and III and got a C than have you not take the math and have a higher GPA.
4. **Letters of Recommendation:** Schools require either 2 or 3 letters of recommendation from faculty members. It is worthwhile getting to know a couple of your professors, so that you feel comfortable asking them for a reference letter. When you ask your professor for a letter, make sure to provide him/her with your transcript, a resume, and a list of schools with complete addresses. Your statement of purpose might also be helpful. In addition some schools will have forms for recommendations that need to be attached to the letter. You should always give those to your professors well in advance of the deadline. Letters are required to be in official university envelopes, so you don't have to worry about supplying us with envelopes or stamps.
5. **Statement of Purpose:** All schools will also ask you for a statement of purpose, an essay usually 1 to 2 pages in length that explains your reasons for wanting to pursue graduate study and your career goals. In many cases, this is the only sample of writing that the graduate school will see, so you want it to be good. Take some time and really work on it. There's lots of good advice on how to write statements on the web. Feel free to ask your professors for comments or suggestions. Economists aren't known for being creative writers (check out the titles on your textbooks, for example). Statements of purpose should be professional, addressing why you want to go to graduate school, what you've done to prepare for graduate school, and what you might want to study in graduate school (and even with whom). You can also mention what you want to do with your degree—be a professor, be a government economist, be president of the United States, etc. You don't have to know what you want to study, but claiming you do helps with your statement.

What Will Help You Be A Better Candidate

1. **More Math Classes:** Be a math major. But since that's not for all of us, Calculus III, Introduction to Linear Math, Introduction to Abstract Math, Linear Numerical Analysis, Differential Equations, Elementary Number Theory, Probability and Statistics, and Advanced Calculus will all make you a better candidate for graduate school in economics. The three underlined courses are most highly recommended (especially Linear Math and Calculus III). The very best economics programs have a bias for people who are mathematics and economics double majors. See the suggested course schedules below.
2. **Research:** Participating in research with faculty members will also help set you apart from other applicants. Juniors at UWO can apply for summer research stipends (\$2500) for collaborative work with faculty. These grants have an application deadline in early February of the year you'd get the funding. To be eligible, you must register for at least 6 credits the next fall semester (so some seniors will also qualify, if you're planning to graduate in December). Economics has had at least one student get a grant each year since 2003. There is a similar grant that can be done during the school year. You can also take Econometric Methods II as an Independent Study to continue to work on your Econometrics project from EC 473.

There are many opportunities to present your research at UWO, at UW System Conferences, and at economics conferences such as the Wisconsin Economics Association Meetings or the Midwest Economics Association Meetings. In 2003, UWO had an economics major present his paper at the Midwest Economics Association Meetings in St. Louis. Every spring UW Oshkosh hosts a Celebration of Scholarship, which is also a great place to present research. Another good place to present is the Wisconsin Economics Association meetings in October –in 2006 we had two students present their econometrics projects there. Talk to Professors Johnson or McGee if you want more information.

See below for how to get the most out of research.

3. **Outside Programs and Work Shops:** Some universities sponsor special seminars or workshops for undergraduate students. One famous workshop takes place at the end of January at the University of Arizona. If accepted, the University program pays you to go to Arizona to participate in economics experiments and study game theory and experimental economics for a weekend with other undergraduates from around the country. This is a great way to meet other economics majors who want to go to graduate school and see what graduate school might be like. UWO had a student accepted to this program in 2003 (he is now at Syracuse University pursuing a PhD in economics.)
4. **Internships:** Internships doing research or consulting are also ways to improve your chances to get into good graduate schools. Talk to your professors about opportunities.
5. **Participate:** Participation in the Economics Student Club, ODE, or tutoring in the department are other ways to get more experience with economics. You may also be able to arrange to assist with research with particular professors.

What the University of Minnesota Graduate Director Had to Say...

Prepared for the Midwest Economics Association Conference

March 2007

(notes taken by UWO Economics Alumni Beau Buchmann)

Each year at Minnesota, they receive 250 to 300 applications for the PhD program. Of these, 200 meet the minimum qualifications. From this they narrow it down to 80, and make offers to 40, anticipating that 20 may accept.

GRE

- If you score in the 760's, don't apply to top 10 programs
- If you score in the 750's
 - Retake is a plus
 - Schools only look at the top/maximum score you earn
 - No mention of analytical score
 - Little concern about GRE English score, unless unusually bad

Letters

- People who know you
- Ability to comment on your thinking and writing in their courses

Math

- The more, the better
- University of Minnesota requires real analysis (many graduate students take this their first year)

Entry

- Don't wait more than a year or two
- Only wait if experience will help you during graduate school
- Getting a masters in mathematics or statistics before entering grad school will not help

During

- TA/RA helps
- Teach your own courses when given the opportunity; helps on job market

Suggested Course Schedule 1—Math & Economics Double Major

You should double check all this info with the math department and see your advisor about substitutions and changes, or just to devise a program that is really the best for you. Economics graduate programs want students with a solid math background. One good way to demonstrate this with a mathematics major or minor. The “Emphasis in Statistics” is probably the best selection. This schedule will allow you to complete a math major. While you can mix and match mathematics electives and choose a different emphasis, the ones here have been suggested as ones best suited for people considering graduate school in economics. This major is a good choice for people who took a lot of math already as a freshman or sophomore, especially if you’ve already done Calc I (Math 171) and Calc II (Math 172).

Fall Junior Year

| | |
|-----------------|--|
| EC 329 or EC331 | Intermediate Microeconomics OR Intermediate Macroeconomics |
| EC 473 | Econometrics* |
| Math 301 | Intro to Probability and Statistics (prerequisite Math 171 and 172) |
| Math 256 | Introduction to Linear Mathematics (requires Math 171 as a prerequisite) |

Spring Junior Year

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|---------------------------------------|--|
| EC 329 or EC331 | Intermediate Macroeconomics OR Intermediate Microeconomics |
| Math 302 | Intermediate Statistical Methods (Spring Only) |
| Math 200 | Minitab Statistical Computing (1 credit) |
| Math 273 | Calculus III |
| Economics Requirements & Electives | Recommended: EC 305 Money and Banking EC 403 Public Sector EC 420 International Trade EC 433 Managerial |

Fall Senior Year

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| Math 222 | Introduction to Abstract Math (Fall Only) |
| Math 401 | Mathematical Statistics I (Fall only) |
| Math 304 | Nonparametric Methods |
| Economics Electives & Requirements | |

Spring Senior Year

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| Math 402 | Mathematical Statistics II (Spring only) |
| Math 403 | Issues in Statistical Analysis (Spring only) |
| Math 385 | Applied Regression |
| Economics Electives & Requirements | |

* It is particularly important to take Econometrics fall of your junior year if you’re interested in applying for a UWO Collaborative Faculty-Student Research Grant. This grant pays \$2000 to support your research either during the summer or during your senior year. The deadline for applying for the grant is in early February, and it is much easier to put together a proposal if you’ve already done some research. Econometrics also counts as a statistics elective.

Suggested Course Schedule 2—Economics Major, Math Minor

Suppose you are only interested in a Mathematics Minor, then this is a good schedule for you. Seniors who only recently thought about applying to graduate school could probably work this into a one-year plan, assuming that they have taken Calculus I (Math 171) and Calculus II (Math 172) already. **DON'T PANIC.** People not “good” at math or who don’t like mathematics by itself can suffer through this sequence relatively painlessly. This schedule works even better for those of you who have taken Calculus I and II before your junior year.

Fall Junior Year

| | |
|---------------------------------------|--|
| EC 329 or EC331 EC 473 Math 171 | Intermediate Microeconomics OR Intermediate Macroeconomics Econometrics (see above comment on Econometrics) Calculus I (if you’ve already taken Calc I or got an A or A/B in Math MBA I, sign up for Calc II; the latter requires Math Department OK) |
|---------------------------------------|--|

Spring Junior Year

| | |
|---|--|
| EC 329 or EC331 Math 172 Math 256 Economics Requirements | Intermediate Macroeconomics OR Intermediate Microeconomics Calculus II Introduction to Linear Mathematics (prerequisite Math 171) Most Recommended: EC 305 Money and Banking EC 403 Public Sector EC 420 International Trade EC 433 Managerial |
|---|--|

Fall Senior Year

| | |
|---|---|
| Math 301 Math 222 Math 273 Economics Electives & Requirements | Introduction to Probability and Statistics (prerequisite Math 171 & 172) Introduction to Abstract Math (Fall Only) Calculus III |
|---|---|

Spring Senior Year

| | |
|---|--|
| Math 302 Math 200 Economics Electives & Requirements | Intermediate Statistical Methods (requires Math 301 as a prerequisite) Minitab Statistical Computing (1 credit) |
|---|--|

Suggested Course Schedule 3—Senior’s Program

Frequently, people realize during the spring semester of their junior year that graduate school in economics might be a good option for them. Most graduate programs require at least Calculus I (Math 171) and II (Math 172) and a course in Linear Algebra (Linear Math).

- For those of you who **already took Calculus I and II**, you can get a math minor with some serious work, depending on the number of other classes you need to take.

Fall Senior Year

| | |
|----------|--|
| Math 256 | Introduction to Linear Mathematics (Math 171 is a prerequisite) |
| Math 222 | Introduction to Abstract Math (Fall Only) |
| Math 301 | Introduction to Probability and Statistics (Math 171 & 172 prereq) |

Spring Senior Year

| | |
|----------|--|
| Math 273 | Calculus III |
| Math 302 | Intermediate Statistical Methods (requires Math 301 as a prerequisite) |
| Math 200 | Minitab Statistical Computing (1 credit) |

- For those who **already took Calculus I** or took MBA I and got an A or an A/B (with permission from the Mathematics Department).

Fall Senior Year

| | |
|----------|--|
| Math 172 | Calculus II |
| Math 301 | Introduction to Probability and Statistics (optional but highly recommended) |

Spring Senior Year

| | |
|----------|---|
| Math 273 | Calculus III |
| Math 256 | Introduction to Linear Mathematics (Math 171 is a prerequisite) |

- If you **need to take Calculus I**; You’ll need special permission to take Math 256 simultaneous to Math 172.

Fall Senior Year

| | |
|----------|--|
| Math 171 | Calculus I |
| Math 301 | Introduction to Probability and Statistics (optional but highly recommended) |

Spring Senior Year

| | |
|----------|--|
| Math 172 | Calculus II |
| Math 256 | Introduction to Linear Mathematics (Math 171 prerequisite) |

Or if you can’t take Math 256, take Math 302 (Intermediate Statistical Methods).

Student Research Opportunities

Student-Faculty Collaborative Research Grants

Student-Faculty Research Grants are a great way to organize an original research project. These grants will pay juniors/seniors \$2500 (plus \$500 expenses) to do research with a faculty member on a project of your choosing. These projects can be completed during the summer or during the academic year. To be eligible students must show that they are registered for at least 6 credits during the following fall semester.

The deadline for application is usually in mid January; we'll have specific announcements coming up. If you're interested see or email Marianne Johnson for sample grants. In addition, Professors Gunderson, VanScyoc, and McGee can help you find a matching faculty member. There is information about these grants on the UW Oshkosh Grants website (www.uwosh.edu/grants).

Student-Faculty Small Research Grants

These grants are available on a rolling-basis. Grants are used to fund supplies such as data purchasing and possibly student conference travel. The grant does not provide any salary payment for student researchers. That said, it is still a great way to get a project off the ground. There are also faculty Development Small Grants: These are grants designed to help faculty members finish projects; they can be used for student research assistance. The application process is on a rolling-basis, meaning you can apply at any time.

Independent Study

Another way to do research is to organize an independent study project. You can register for 1 - 3 credits of independent study and the course/project counts as an upper division elective requirement in Economics. To do this, you need to find a faculty member to supervise the Independent Study project; then, together, you will develop the project and set the deadlines and schedule. International students or students planning to travel to another country and who are interested in doing Independent Study projects while at away during the summer or holiday break should see Professor Johnson. She's got some new ideas for this!!

Volunteer Research Assistant

Sometimes faculty members are working on projects and would be happy to have a research assistant help with inputting data, doing internet research, helping with writing, graphs, tables, etc. You can always ask to be involved. (See the small grant options above.)

Fulbright Grant

Students interested in long-term study in another country could consider a [Fulbright Grant](#). These are very competitive, but great opportunities to live in another country doing research and taking classes (supported by the US government). Prof. Johnson met several students doing this in Estonia last spring -- they were all having a great time! The application process is long and time-consuming, so you should start to think about it in early August.

Conferences

If you do research -- on your own, for a class project, for a professor -- a great way to finish off the project is to present your work. There are lots of options:

UW Oshkosh Celebration of Scholarship Day is at the end of April. The deadline for submitting your project for possible presentation is usually in early March. We had several students participate the last couple of years, presenting posters and giving short talks.

UW Symposium for Undergraduate Research is also at the end of April -- it moves between UW Campuses and I don't know where it's going to be next year yet. The last two years we had 8 Economics majors presenting their projects in sessions. Several of the presenters spoke about their Econometrics project for EC 473. They each got to speak about their project for 15 minutes; sessions were well attended and everyone got lots of interesting questions. The deadline for submissions will be in March -- announcements will be forthcoming.

Wisconsin Economics Association Meetings, in October in Stevens Point. The deadline for submitting a student paper is in early September. We can get funding for students to cover the cost of registration and hotel. Contact Professor Johnson for details.

Midwest Economics Association Meetings, in March in Chicago. The deadline for submitting a paper to the student sessions is early November. The best student paper/presentation wins an award of \$200. But, you don't have to give a paper to go...sign up with Professor Johnson and go see what economists do.

Getting the Most out of a Research Experience

See “Getting the most out of the relationship with your research advisor or boss” at http://www-smi.stanford.edu/people/pratt/smi/advice.html#advisor_relationship

Meet regularly - you should insist on meeting once a week or at least every other week because it gives you motivation to make regular progress and it keeps your advisor aware of your work.

Prepare for your meetings - come to each meeting with:

- List of topics to discuss
- Plan for what you hope to get out of the meeting
- Summary of you have done since your last meeting
- List of any upcoming deadlines
- Notes from your previous meeting

Email him/her a brief summary of EVERY meeting - this helps avoid misunderstandings and provides a great record of your research progress. Include (where applicable):

- Time and plan for next meeting
- New summary of what you think you are doing
- To do list for yourself
- To do list for your advisor
- List of related work to read
- List of major topics discussed
- List of what you agreed on
- List of advice that you may not follow

Show your advisor the results of your work as soon as possible - this will help your advisor understand your research and identify potential points of conflict early in the process.

- Summaries of related work
- Anything you write about your research
- Experimental results

Communicate clearly - if you disagree with your advisor, state your objections or concerns clearly and calmly. If you feel something about your relationship is not working well, discuss it with him or her. Whenever possible, suggest steps they could take to address your concerns.

Take the initiative - you do not need to clear every activity with your advisor. He/she has a lot of work to do too. You must be responsible for your own research ideas and progress.

Here’s a couple of additions to that list:

Pick a topic you’re interested in – if you don’t like the topic, you’re not going to want to work on it, and if you’re actually interested in the topic you’ll do good work.

Find places to present your research – the more you talk about your research, the better you’ll understand it. Next spring there will be two opportunities at UWO to present your research: the UWO Celebration of Scholarship and the UW System Undergraduate Research Symposium. You can also present your research in an economics department symposium.

Internships

Internships are becoming more and more valuable, both for getting jobs and for getting into good graduate programs. There are a variety of different kinds of internships available—at businesses, in the local or state government, and through the federal government. If you're thinking about graduate school, internships where you do statistical analysis will really help you out. Many graduate programs hire their students as “research assistants” and experience doing research will make you stand out. Many government internships require that you apply in the fall of the summer before you plan to do an internship. For example, you would apply in Fall 2003 for an internship in Summer 2004.

Internships in State and Local Government:

Department of Planning, City of Appleton: in the past a number of economics majors have gotten summer internships working in the city planning office for Appleton. They have done statistical analysis of business location and have worked to put together economic development plans. This is a nice internship because they actually pay you.

Your local state legislator or US representative: legislators and state representatives often have intern positions available, though usually you work for free. This is a good option, however, if you're interested in government policy or public sector economics. Check your local representatives web site for opportunities. Don't be afraid to email them and volunteer.

The USDA and EPA have offices in each state, and offer internship opportunities. See their website <http://www.wi.nrcs.usda.gov/news/default.asp>.

Internships with the Federal Government:

There are tons and tons of mostly volunteer, but still prestigious, internships available for people willing to work in Washington DC for the summer. Internships of interest to economics students might be at the US Treasury, US AID, GAO, and with the various International Trade and Development Commissions. See the website below for a nearly complete list.

<http://www.house.gov/lowey/federalinterns.html>

<http://www.house.gov/bishop/FederalInternship.html>

Many US government agencies also have overseas offices that have volunteer internship opportunities. You also search the web sites above for overseas internships with US government agencies. The deadline for application is in late October.

World Bank, IMF, and IADB

There are also a limited number of highly competitive internship opportunities with international economic organizations such as the World Bank, International Monetary Fund, and the Inter-American Development Bank. These are fantastic opportunities and we'll do all we can to help you get accepted. Application deadlines tend to be in October or November for the following year.

<http://lnweb28.worldbank.org/hrs/careers.nsf/key/kip>

<http://www.imf.org/external/np/adm/rec/job/summint.htm>

<https://enet.iadb.org/jobs/siprogram.asp>

Time Line

You should start thinking about graduate school during your junior year of college. There is much planning involved, including studying for and taking the entrance exams, choosing programs, filling out applications, getting letters of recommendation, writing personal statements, requesting transcripts, etc. Law School and MBA programs have slightly different processes, but most of the timelines are the same. The important thing to remember is to start EARLY.

- | | |
|-------------------------------|--|
| Freshmen and Sophomore Years | <ul style="list-style-type: none">◆ Get good grades in all classes; narrow down your choices for majors; take extra math classes. |
| Spring Junior Year | <ul style="list-style-type: none">◆ Start looking at programs and requirements.◆ Make sure you've taken all the necessary course work, and even sign up for an additional math class. |
| Summer after Junior Year | <ul style="list-style-type: none">◆ Start studying for your graduate exams: GRE, LSAT, or GMAT. Every point counts!! |
| September/October Senior Year | <ul style="list-style-type: none">◆ Take your entrance exam.◆ Narrow your list of schools to 5 to 10 institutions.◆ Talk to your professors about your plans; they know a lot about different schools, so make use of that knowledge. |
| November Senior Year | <ul style="list-style-type: none">◆ Start to work on your personal statement.◆ Write up a resume (sometimes called a curriculum vita or vitae in academics). Some schools may ask you to include a resume with your application. This will also help you when it comes to filling out your applications.◆ Ask professors for a letter of recommendation |
| December to January | <ul style="list-style-type: none">◆ Deadlines for programs are often Dec. 15, Jan. 1, Jan. 15 or Feb. 1.◆ As a rule of thumb, better schools in every field have earlier deadlines. Applying <u>earlier is better</u>.◆ Make sure that you have <u>plenty</u> of time for transcripts, letters of recommendation, and test scores to be requested and sent (and occasionally lost and resent).◆ Put applications together, mail applications. |
| March and April Senior Year | <ul style="list-style-type: none">◆ Most programs will notify you of acceptance in March or April. The deadline for decisions is usually April 15th. Notification differs by program. Some programs will accept people on rolling admissions, and may let you know sooner (especially for MA programs). Others with later application deadlines might take longer. |

NOTE: Most schools now have on-line applications that are cheaper and faster. However, if you still need a typewriter for an applications form, there is one in the main Economics Department Office in Swart 230.

Picking an Economics Graduate Program

Everyone has an opinion on how you should pick a graduate school. It is important to remember that every school is different, has different specializations, strengths, and weaknesses. As a general rule, you want to apply to a minimum of 5 programs and a maximum of what you can afford (up to 10). Each school will require an application fee of \$30 to \$75, as well as GRE scores (about \$115 for the test and an additional \$13 for each university that you want to send the score to) and transcripts (\$5 for an official UWO transcript or \$7 for rush service). If you apply to 5 schools, you should be prepared to pay between \$400 and \$500 for all fees, tests, and postage.

While there are approximately 107 PhD programs in Economics, there are at least 100 more programs that have a MA or a MS program, but no PhD program. The key is to find an institution that is right for you. Some people pick based on region or location. Others don't care where they wind up for the next 4 or 5 years. Others suggest applying to 2 schools that you think you can't get into, 4 or 5 schools that are good but at which you think you have a reasonable chance of getting in, and 2 "safety" schools.

That said, the process of selecting schools is difficult. A few examples are provided below to help you figure out where you might fit:

1. In 2007, a UWO student and economics major scored a 750 on the Quantitative portion of the GRE, a 4 on the Analytic and a 450 on the Verbal. He had a 3.5 overall GPA and a 3.8 in Economics. In addition, he took Calc I, Calc II, Linear Algebra, Mathematical Statistics, and Math-Economics. He also applied for and received a student-faculty collaborative research grant. He presented his research at the Wisconsin Economics Association Conference. He also did an internship with the U.S. Treasury in Washington DC for one summer. This student received a full assistantship from Syracuse University (\$14K/year), guaranteed for five years and with additional summer support. This also included 24 free credits a year. The same student got a similar offer from Northeastern University in Boston. He did not get accepted to Michigan State, Indiana, or Purdue.
2. A former UWO student and economics major got into the graduate program at the University of Iowa in 2001. He had the minimum of math courses (2 semesters of Calculus and Introduction to Linear Math) and a GPA of 4.0 in his last two years at UWO. His GRE scores were approximately 600 for verbal, 800 for quantitative, and 740 for analytical. He was accepted at the University of Iowa and received a full fellowship (tuition coverage and a living stipend). His weak math background placed him at a disadvantage and he has now left the program.
3. Another former UWO student and economics and applied mathematics double major (with an additional minor in mathematics statistics and Business Administration) applied to Princeton, the University of Chicago, Northwestern, Illinois, UC Berkeley, and UC San Diego. This student had a 3.9 GPA and 510 on the verbal GRE, 770 on the quantitative GRE, and 680 on the analytical GRE. He has completed numerous independent study and undergraduate research projects, including a summer undergraduate faculty-student collaborative research grant. He presented papers at national undergraduate research conferences and the Midwest Economics Meetings. He also won the Nation-wide Omicron Delta Epsilon Frank Taussig award for the best undergraduate research paper of the year (2003). This student was accepted at UC Berkeley, with a full fellowship and tuition waiver.
4. A UWO student who started the applications process late, applied to Iowa, Washington State, Nebraska, North Carolina State, and Florida State in 2003. He had a GPA of 3.7, but did not take the necessary math classes. Spring semester his senior year, he had to take Calculus II and Linear Algebra (as an independent study). His GRE scores were a 530 for verbal, a 720 for quantitative, and a 4.5 for

analytical. This student was accepted at North Carolina State with full tuition coverage and a teaching assistantship, and had similar offers from Washington State and Florida State. He accepted the NC State offer, which was conditional on the fact that he take Calculus III the summer before attending graduate school.

5. This is what alumna Mark Hamilton has to say about the process. Mark was initially accepted into UW Milwaukee's MA program and is currently working on a PhD at UWM. "My cumulative GPA at time of admission was/is 3.459 (cumulative), and 3.667 (in my economics courses). The GRE requirement was worded as GRE or quantitative course work. My understanding of quantitative course work is an undergraduate degree in economics with 3 semesters of calculus. The calculus I will have done by the end of the summer, and I will graduate in December. Really the hardest part of the application process, for me, was my reasons for graduate study statement. It is difficult to even estimate the amount of time I spent on that damned letter. I ran around and showed it to at least 15 different people ranging from faculty to friends. Which I feel befitted me greatly. The only negative point I have to share about my experience thus far is the fact that I missed the fellowship deadline. So, now I need to find an alternative means of financing my education, at least for the spring term of next year."

Other UWO economics graduates have gone on to pursue a PhD at Syracuse University, a MA in economics at University of Wisconsin Madison, a PhD in Agricultural Economics at UW Madison, a MA in public policy at UW Madison, a PhD at University of Wisconsin Milwaukee, a PhD at Indiana, a PhD in Agricultural Economics at Univ. California Davis, a MA at University of Wisconsin Milwaukee, a MA at Kentucky, a MSBE at Marquette, and a JD at Marquette.

Contacts?

Several of our alumni have kindly offered to answer questions about graduate school, the application process, how to prepare, what they wish they would have done, etc. You can feel free to email them with questions directly.

Andrew Hanson is working on a PhD at Syracuse University Email: ahanson@maxwell.syr.edu

Chad Cotti got his PhD at UW Milwaukee Email: cottic@hotmail.com
Chad has an MA Pub. Policy from UW Madison, too!
He is currently a visiting professor at U. of South Carolina

Anna Kovalenko is working on a PhD in Finance at UW Madison Email: kovalenko@wisc.edu

Farshid Haque is working on his PhD in Agricultural Economics Email: fhaque@ucdavis.edu
at University of California-Davis

Laurie Turtenwald is working on her PhD in Economics at UW Email: lo4031@aol.com
Milwaukee. She also got her MA degree in Economics there.

Graduate Studies at University of Wisconsin Milwaukee

UWM has an excellent program in our region, and is a good example of what you might see at other schools. UWM offers two graduate degrees in economics, a MA or a PhD. There are two options for the MA either a thesis or non-thesis option. The requirements for both programs are as follows:

MA

Thesis Option

- Minimum of 24 credits (must take micro theory, macro theory and econometrics)
- One area of concentration in which a 2 course sequence must be taken
- A concentration in Latin America is available
- Thesis
- Comprehensive Examination: must pass a final oral examination in defense of thesis

Non-thesis Option

- Same course requirements as Thesis option
- Instead of thesis must submit a master's paper
- Time Limit: 5 years from enrollment
- Most students who plan to continue with PhD take this option

PhD

- Minimum of 54 credits beyond bachelors degree, 27 must be earned at UWM and 42 must be in economics
- 12 credits in micro and macro theory
- 12 credits in quantitative theory
- Total of 15 credits in two areas of concentration
- 3 credits in research skills
- Can also have a minor field of 12 credits outside economics
- Doctoral Preliminary Examination
 - Exams in economic theory (micro and macro), and two areas of concentration
 - Economic theory exams must be completed first
 - Have 2 attempts at each prelim, 3rd on appeal
- Dissertation and defense (pass an oral exam in defense of dissertation)
- Time Limit: 10 years from enrollment

Specialized Areas of Concentration

Econometrics

Economic Growth and Development

Industrial Organization

International Economics

Labor Economics and Human Resources

Mathematical Economics

Monetary Theory and Policy

Urban and Regional Economics (coming soon)

Economics department website: www.uwm.edu/Dept/Economics

Paying for Graduate School

After paying tuition for 4 years or more years of school as an undergraduate, coming up with money to pay for graduate school can seem daunting. In economics, there are several ways that you can get support to pay for school. Perhaps the best is what is called a “Fellowship.” A fellowship will pay you to go to school and study. Most fellowships cover tuition (providing tuition waivers, meaning tuition is free) and also provide a stipend for basic living expenses. The stipend might range anywhere from \$8000 to \$20,000 a year, depending on the school. Amounts of \$12,000 to \$17,000 are most common.

Similar to a fellowship are what are called assistantships. Assistantships come in two forms: teaching (TA) or research (RA). In these cases, you are paid to work part time (either 10 or 20 hours a week) in the economics department. Assistantships usually cover some or all of your tuition and pay a living stipend. If they do not cover all your tuition, they often guarantee that for what you do pay, you pay in-state prices, regardless of where you’re from or where the school is located. A TA-ship or RA-ship will normally pay you between \$8000 and \$18,000 a year as a living stipend. Some include health insurance and others do not; it depends on the school. TA’s might grade papers, lead review sessions, organize classes, keep track of grades, and otherwise assist professors in the economics department with their teaching duties. Frequently, TA’s will lead a homework/review session once a week for undergraduates in introductory economics courses. Eventually, a TA might teach an entire course on his/her own. Some schools also have additional money available to pay TA’s to teach courses in the summer.

A research assistantship is similar in the number of hours and pay to a TA-ship. An RA’s work might include going to the library, doing research, gathering data, and doing summary statistics and analysis of data. As you gain more experience, you would do more and more serious economic research, supervised by a professor.

In addition, many schools have financial aid packages and will help you to secure student loans. Law Schools and many MBA programs rely nearly entirely on financial aid and loans. However at Michigan State, a few MBA students qualified for TA ships in specific fields like Management. In general, it is easier to find funding to support study for a PhD than it is for a MA in economics. If you will need to rely on assistance for a MA, you may have more luck applying to a program that just has MA’s and no PhD’s. To be eligible for such funding, it is important to apply early. For many schools, the deadline to qualify for assistance is **before** the deadline for acceptance. Further, while sometimes you might not be offered any support your first year, if you do well, you are likely to get some funding for your subsequent years. Some schools like UW Madison offer virtually no funding to first year students, but then increase funding in subsequent years.

This is the help booklet from a professor at the University of Rochester. It has some good advice, so I include it here. But, not everything he says is relevant to all students or applicable to all graduate programs.

Applying for Admission to Economics PhD Programs in the United States

By Christian Roessler (Univ. Rochester), August 2002

When April 15 comes and decisions are made, bringing a few months of anxiety and a frantic hunt for reliable information to a close, the world has a few hundred more economists – and as many newly-minted experts in PhD admissions. This incidental accomplishment yields no incidental return, and the next cohort of applicants is waiting in the wings, about to make the same investment and suffer instant obsolescence on April 15. To salvage something, I've put my fresh memory of the 2002 round to use to cater to the future applicant's appetite for data. Here's my doubtlessly subjective, but for what it's worth detailed, guide to economics PhD admissions. Special thanks to Mark Sourdoutovitch (Northwestern), Scott Joslin (Stanford), Jesse Barnes (Harvard), and Alex Whalley (Maryland) for comments, qualifications, and corrections. Thanks also to the 30+ decision thread participants at the Princeton Review website, whose combined experience this essay largely reflects.

Who wants economists and which economists do they want?

There are 3,000 universities and colleges in the U.S., many of which hire economics PhDs from time to time. There are scores of international universities that do the same. In addition, some public service institutions as well as commercial research and consulting businesses employ PhD economists. U.S.-educated PhDs tend to be the most sought-after and highly-prized on the market by a long way (the London School of Economics, comparable to a top 25 U.S. program, is the only European school that has made inroads). This isn't true for every subject, but it is for economics because American-style graduate programs, with their intense curricula and immersive research cultures, produce competent and productive academics. Besides, the great majority of leading economists, whether originally American or not, hold professorships in the U.S. today.

To meet this demand, American programs award about 300 to 400 economics PhDs in a given year. Their graduates compete primarily for positions as assistant professors, either in a research university, like Harvard, or a teaching-oriented college. Because publications are the road to fame, PhDs generally prefer to join a renowned research university; however, there are no more than a handful of such openings each year. If you guess that they'll go to graduates from the top schools you're right, but there are many more top-school PhDs than "good" academic jobs. In fact, one quarter of all U.S. PhDs comes from one of eleven schools that might be described as forming the elite cluster. Given the oversupply of prestigious degrees, you need to target these programs if you plan to make a mark on the field.

For economists who enter private industry, it is less essential to graduate from a program of high repute. However, the economics PhD is not geared to applied pursuits and doesn't give you much of an edge over MScs or MAs in the job market (not to mention over MBAs, who are often higher paid than PhDs). If you want a business career, you should ask yourself whether the PhD is really something that you need.

How hard is it to get into a good program?

The top eleven programs enroll more than 200 new students each year; nonetheless, competition for these places is fierce. Economics is one of the more popular fields of graduate study, for one thing. Judging by evidence such as GRE scores, economics applicants are on average also among the brightest; only physics, math, and computer science applicants beat them by a little margin. Below I've compiled some data on average GRE scores in each graduate field and the number of applicants scoring in the top 3%. Economics ranks fourth by the first measure and eighth by the second (biology, psychology and literature attract a lot more applicants each year ...)

| GRE Score Concentrations in 28 Fields of PhD Study | | | | | | | | | | |
|---|----------------------------|------------|------------|-----------------|-----------|-----------------------------------|------------|------------|----------|----------|
| <i>Field</i> | <i>Quality of the Pool</i> | | | | | <i>Competitiveness Indicators</i> | | | | |
| | MEAN SCORE BY SECTION | | | MEAN OVERALL | | # PEAK SCORES (TOP 3%) | | | RANKS | |
| | V | Q | A | Tot | Rnk | V | Q | A | Md | Mn |
| BIOLOGY | 514 | 618 | 602 | 1734 | 14 | 484 | 441 | 741 | 2 | 1 |
| CHEMISTRY | 502 | 665 | 612 | 1779 | 10 | 104 | 276 | 280 | 7 | 9 |
| COMPUTER SCIENCE | 515 | 712 | 635 | 1862 | 3 | 237 | 810 | 450 | 3 | 2 |
| EARTH SCIENCES | 528 | 626 | 607 | 1761 | 11 | 86 | 47 | 109 | 16 | 16 |
| MATHEMATICS | 517 | 714 | 646 | 1877 | 2 | 147 | 480 | 386 | 4 | 6 |
| PHYSICS | 536 | 719 | 644 | 1899 | 1 | 189 | 515 | 376 | 5 | 5 |
| CHEMICAL ENGIN. | 506 | 712 | 627 | 1845 | 5 | 45 | 202 | 109 | 13 | 14 |
| ELECTRICAL ENGIN. | 489 | 720 | 612 | 1821 | 7 | 117 | 780 | 240 | 9 | 4 |
| ANTHRO. / ARCHAEOLOG. | 546 | 545 | 584 | 1675 | 20 | 138 | 11 | 75 | 17 | 17 |
| ECONOMICS | 526 | 698 | 633 | 1857 | 4 | 152 | 328 | 256 | 8 | 8 |
| POLITICAL SCIENCE | 535 | 564 | 598 | 1697 | 17 | 250 | 35 | 162 | 11 | 11 |
| PSYCHOLOGY | 489 | 533 | 561 | 1583 | 24 | 537 | 87 | 539 | 1 | 3 |
| SOCIOLOGY | 507 | 540 | 566 | 1613 | 23 | 45 | 10 | 48 | 21 | 21 |
| BUSINESS | 479 | 598 | 562 | 1639 | 22 | 13 | 44 | 20 | 25 | 24 |
| COMMUNICATIONS | 486 | 521 | 542 | 1549 | 26 | 37 | 6 | 23 | 24 | 25 |
| EDUCATION | 467 | 515 | 532 | 1514 | 27 | 66 | 16 | 69 | 18 | 20 |

Explanations: Mean score by section – V = verbal, Q = quantitative, A = analytical, all on an 800 scale.

Mean overall – Tot = total GRE score, on a 2400 scale; Rnk = rank by total. Peak scores – number of scores in the top 3% of each section accruing to the field. Ranks – Md = ranking by the median of peak score numbers across sections; Mn – ranking by the mean of peak score numbers across sections.

Bold-faced ranks reflect above-average “quality” / “competitiveness.”

Source: data reported in ETS Powerprep 2002 software.

Perhaps the best indication of the actual level of challenge is a mix between the quality and competitiveness indices. Thus, getting into the best PhD programs appears to be an easier feat in

economics than in computer science, physics, and math, but it's tougher than just about everywhere else.

Don't fool yourself: admission to good PhD programs in economics is very, very competitive – equally or more so than the race for the most prestigious jobs out in “the real world.” Even some less-than top-ranked schools accept fewer than one in ten applicants, and this from a group of “overachievers” who have excellent grades and scores. If economics and abstract, mathematically-styled research are not your passions, it is a bad idea to take these people on. A more suitable alternative may be business PhD programs, which are still a bit easier to get into (and through!), and provide more generous stipend packages as well as a less saturated job market with higher pay.

What does it take to get in?

Official admission literature from the schools will always say that many factors are given consideration, and this is really true. In the end, the whole picture either looks like a fit with the particular department, or it doesn't. On the other hand, certain weak spots are at once disqualifying. A popular program sees and expects very high undergraduate GPAs (still better graduate GPAs if applicable) at well-known institutions (ideally 3.7 / 4.0 or better, unless you come from a non-U.S. school or system that is understood to have tougher standards). It also expects a quantitative GRE score above 760 (800s are not out of the ordinary) and a decent analytical score above 700. The verbal section is much less important, but a score below 500 looks off-putting. Anything short of these benchmarks lands your application on the reject pile, unless you have some very intriguing other credentials (and usually despite it).

You will need a number of math-related credits from your undergraduate studies. Two or three terms of calculus, and often linear algebra, are deemed minimum preparation; real analysis is an excellent complement, as is mathematical statistics. Graduate study in economics follows a theorem-proof approach and uses rigorous notation, so the adcoms pay a lot of attention to how comfortable you look to be with pure mathematics. Background in intermediate microeconomics and macroeconomics is also preferred, but perhaps not as essential. In all these, you should have earned good grades. Having taken too few math courses (less than three) in college, or having performed poorly in them, rules you out of a top school.

Letters of recommendation carry a lot of weight. Contrary to popular belief, they do not need to come from famous professors. Of course, a distinguished referee can't hurt, but getting an enthusiastic, specific letter from someone who knows you well is more important. Because lukewarm letters are very damaging, be sure to ask referees in advance whether they can support you whole-heartedly; a good way to breach the topic is to ask their advice on the type of programs you should apply for. It's also proper to provide a background sheet with your grades, scores, and other credentials to these professors and to refresh their memory about things you've done in class.

Much is made of the Statement of Purpose, but apparently it has a smaller impact in economics than in other subjects. Little that's definite is known, but in my opinion, overly enthusiastic homages to economics or the department should be avoided as they sound artificial and waste space. Don't forget that the professors who will read it are very intelligent people and would not fall for something in the style of your college admission essay. Nor do they care much about your love for economics, your presidency of the toastmaster's club, or the good things you've done in your community, as long as you can read and construct proofs. They also know you're applying

to other top schools and would gleefully go to any of them if you had the chance. The best approach is a conservative one, stating your credentials and objectives in a clear and focused way, outlining a specific research idea (without sounding rigidly attached to it – a delicate balance needs to be struck here), and mentioning how the school’s particular strengths fit into your plans. Look up the faculty’s research interests and histories to determine this.

Shortlisting and scheduling

Which schools should you apply to, and when? Almost everybody tries one or two really prestigious programs (Chicago, Harvard, MIT, Princeton, and Stanford are known as the “Big Five”), more if very confident. Even if you think that admission there is unrealistic, you’ll feel better afterwards for having probed the limit. The rest depends on how competitive you expect your application to be, and how safe you want to play. Normally, the final list will comprise five to eight departments and include one or two back-up choices where admission seems very likely. But if you wouldn’t want the economics PhD unless from a top school – because you have other options or you can afford to wait and reapply if necessary – it is perfectly reasonable to have no safeties at all. There is a tradeoff between number and quality of applications; they do take time (particularly if you wish to understand and address what is special about the programs you picked), and your recommenders will be better motivated writing to a small number of appropriate choices than lots of inferior or unreachable ones.

How do the schools stack up? In the early stages of the process, this question burns in most people’s minds! Well, the top five are obviously the “Big Five” – nobody would seriously deny that they’re in a class of their own. What it means is that Chicago, Harvard, MIT, Princeton, and Stanford are great in every major subfield of economics. Other renowned programs are on par with the Big Five in some areas, but not in all. You’ll need to spend some time looking up the faculty’s research and identifying departments that have at least two or three well-published Associate Professors or Professors working on the topics you’ve earmarked for specialization. In graduate study, what you’re doing is as important as where you’re doing it; the job market regards PhDs from a certain program as top shelf in one area and as much less interesting in another.

Nonetheless, we’re all consulting, and subjecting a good part of our judgement to, “the rankings.” Not to do it would be foolish, since rankings contain fairly objective information, which is hard to come by through our personal contacts. But which ranking to use? There are two major types: reputation rankings and publication / citation counts. Economists know their colleagues and the work done at the leading departments; in reputational rankings they take all factors into account and provide a more or less balanced assessment. Aggregated over a large and representative sample, these ratings mean a lot. US News & World Report publishes the best-known reputational rankings of graduate programs each year – but even better are the NRC (National Research Council) studies, conducted every ten years. The two key indices reported by the NRC are the “program effectiveness” and the “faculty quality” rating, each ranging from 0 to 5, where fives indicate universal agreement that the program is “extremely effective” and the faculty “distinguished.” The ranks of 107 American PhD programs based on the sum of the two indices are reported at the end of this guide.

The best-known publication ranking is that by Dusansky and Vernon – but a purely quantitative measure offers limited information, and I advise against relying on it as an overall evaluation of programs. However, one reader made the case (and so do Dusansky and Vernon themselves) that publication rankings can be a leading indicator of future recognition. I find this convincing by

circumstantial evidence, but one can find logical reasons, too (key faculty additions, spillover from success in a subfield, emergence of fringe and frontier research as mainstream topics). The Dusansky-Vernon ranking is displayed in the next panel; note that departments like NYU, Boston U, Texas, Maryland, JHU, and U Pitt, widely perceived as up-and-coming, do much better here than on the NRC list.

Plan to mail your applications by early December. You should have your final GRE score by end of October or early November: this means, start practicing for the GRE no later than early September. You might get the best results from taking two sample tests in a row, about once a week. This builds up stress resilience and won't make you as hostile to the GRE as looking at it every day, over a two-week period, would. Review math, but don't memorize word lists – increasing the verbal score doesn't help your application. Sit for the GRE by October, so that you have a chance to retake in November (you are allowed to test once per calendar month). Don't try to improve a result that's already good enough (quantitative part is 780 or better) – ETS will report all scores to the departments, and if you do worse the second time around, it discredits your initial, satisfactory performance. Draft your statement of purpose by early November and revise it several times, in intervals, until December until it sounds genuine. If a sentence looks dry, tortuous, or pompous to you, it will also look that way to the reader.

One thing that's frequently not appreciated is that all your communication with the department becomes part of your file and assessment, once you have submitted an application! This includes e-mails, so don't write colloquially to anyone, including the secretary. You can turn this to a small advantage by submitting a neat and inventoried package that makes the secretary's life easy and displays your professionalism (show not only what's enclosed, but which letters and transcripts are to be expected when and from whom). The secretary is among the most influential people in a department; engage her in your most polite, assiduous, and organized manner at all times.

When will schools notify me of their decision?

Some begin sending out acceptances in early February, but most of the action takes place in the last February week and the first week of March. Almost all schools notify admits by March 15; only waitlisted and rejected applicants will not hear until later. Generally, schools take care of their admits first – many immediately e-mail these applicants when a decision has been reached, though quite a number of schools still send acceptances by post. Rejections almost always come by letter, and weeks later, but if you politely enquire about your status by e-mail, the graduate secretary will usually reply after decisions have been reached.

You could be waitlisted for admission or for financial aid. It's hard to predict whether this will eventually result in an offer; sometimes it does and sometimes not. The schools initially take in a number of people of whom they expect a number, not exceeding the enrollment target, to come. Programs that offer most or all applicants funding (such as Stanford) make a conservative round of initial offers, and extend more offers once they get a picture of who's accepting. Waitlists are frustrating. Getting waitlisted does not reflect uncertainty about your eligibility (in that case, they'd just reject you), it is a question of enrollment targets. All depends on which way the initial admits decide, and when.

How much money can I hope to get?

Economics departments give considerably lower fellowships than business schools or science departments. Worse yet, some people will be admitted without fellowships and a few end up paying tuition. Generally, the best and most competitive programs offer the most generous funding – MIT, Princeton, Harvard, Stanford, and Yale admits can expect to get a decent package of, perhaps, between \$ 16,000 and \$ 20,000 per year (with tuition waiver). Most other schools offer lower awards or awards tied to teaching duties, and the less prestigious the program, the less money tends to be available, and the more teaching is allocated. Some schools offer good first-year fellowships that will not be renewed subsequently (but can be replaced with a teaching or research assistantship).

To a minor extent, and for the right reasons, it is possible to bargain for a higher award if you have only received a tuition waiver or a small fellowship (say, below \$ 10,000). This needs to be done with tact and with stress on the insufficiency of the funding to meet your basic needs, rather than by pointing out your other options. Money is always a sensitive issue, and departments don't want to "bid" for students. Asking a program to match or beat another offer suggests that the department's academic qualities aren't enough to attract you. In this case, they'll gladly let you go. Exceptions may apply – but weigh carefully whether the slim prospect of a significantly better deal justifies the risk of alienating some people you may soon be working with. Communicate your respect for the department before everything else.

Which offer to take?

If you are in the comfortable position to have to choose from several good offers, you need more information. Fortunately, departments will be much more responsive to your enquiries when you've been admitted, and it's easy to get in touch with current students. You'll be committing something between five and seven years to the program, so the personal chemistry in such correspondence is a factor not to be discounted. You'll also want to check how many students fail to complete the degree and why (because they are asked to leave? fail the exams? enter better programs? take industry jobs?). Some schools are notorious for taking in a lot more students than they plan to graduate, in order to have a large pool of budget-friendly TAs on hand. The implication is that many won't pass the qualifying exams or, most commonly, will not continue to get funded at some point.

Another key aspect to consider is the track record of the program. This involves a review of recent PhD placements – most departments make this information available on their website or in brochures. A historical perspective of the eventual success of PhD training is offered in a 1992 article in the *Journal of Economic Education*. It ranks departments by current faculty positions occupied by their PhD graduates. The sample includes virtually every academic economist at a PhD-granting school in the U.S. in 1992, making this a particularly objective effort that looks at labor market outcomes which necessarily reflect careful evaluation, since hiring institutions "put the money where the mouth is." On the negative side, the list is biased towards long-standing and large programs, and recent developments have little influence.

National Research Council Rankings of Economics PhD Programs

There are actually many different rankings systems, including US News and World Report, the Gorman Rankings, etc. Each ranking system will give a slightly different order of schools, though they should all be relatively consistent. These are the rankings from the National Research Council. The score is on a scale of 1 to 100; educational efficiency (graduation and graduate placement) is on a scale of 1 to 5; faculty quality (faculty education and publications record) is on a scale of 1 to 5. In all cases, higher numbers are better.

| Ranking | School | Score | Educational Efficiency | Faculty Quality |
|----------------|-----------------------------|--------------|-------------------------------|------------------------|
| 1 | MIT | 96.40 | 4.71 | 4.93 |
| 2 | Univ. of Chicago | 95.80 | 4.63 | 4.95 |
| 3 | Princeton University | 95.30 | 4.69 | 4.84 |
| 4 | Stanford University | 95.00 | 4.58 | 4.92 |
| 5 | Harvard University | 92.80 | 4.33 | 4.95 |
| 6 | Yale University | 87.10 | 4.01 | 4.70 |
| 7 | Univ. of Cal. Berkeley | 86.00 | 4.05 | 4.55 |
| 8 | Northwestern University | 84.30 | 4.04 | 4.39 |
| 9 | Univ. of Pennsylvania | 83.40 | 3.91 | 4.43 |
| 10 | University of Minnesota | 83.00 | 4.08 | 4.22 |
| 11 | University of Rochester | 79.70 | 3.96 | 4.01 |
| 12 | Univ. of Wisc. Madison | 77.20 | 3.79 | 3.93 |
| 13 | University of Michigan | 76.80 | 3.65 | 4.03 |
| 14 | Univ. of Cal. Los Angeles | 76.70 | 3.55 | 4.12 |
| 15 | Univ. of Cal. San Diego | 76.30 | 3.83 | 3.80 |
| 16 | Columbia University | 75.00 | 3.43 | 4.07 |
| 17 | California Inst. Technology | 73.50 | 3.81 | 3.54 |
| 18 | Cornell University | 69.20 | 3.36 | 3.56 |
| 19 | New York University | 68.40 | 3.22 | 3.62 |
| 20 | Brown University | 67.20 | 3.38 | 3.34 |
| 21 | Duke University | 66.50 | 3.29 | 3.36 |
| 22 | University of Virginia | 64.60 | 3.26 | 3.20 |
| 23 | U. of Maryland Coll. Park | 64.50 | 2.99 | 3.46 |
| 24 | University of Washington | 63.20 | 3.17 | 3.15 |
| 25 | Univ. of North Carolina | 63.20 | 3.16 | 3.16 |
| 26 | Michigan State University | 61.80 | 3.09 | 3.09 |
| 27 | Boston University | 61.50 | 2.76 | 3.39 |
| 28 | University of Illinois | 60.10 | 2.94 | 3.07 |
| 29 | University of Iowa | 58.90 | 2.92 | 2.97 |
| 30 | Johns Hopkins University | 58.70 | 3.00 | 2.87 |
| 31 | Washington University | 58.20 | 2.82 | 3.00 |
| 32 | Iowa State University | 56.80 | 2.90 | 2.78 |
| 33 | Univ. of Texas at Austin | 55.70 | 2.66 | 2.91 |
| 34 | University of Pittsburgh | 55.40 | 2.71 | 2.83 |
| 35 | Ohio State University | 55.20 | 2.69 | 2.83 |
| 36 | Texas A&M University | 55.20 | 2.69 | 2.83 |

| Ranking | School | Score | Educational Efficiency | Faculty Quality |
|----------------|--|--------------|-------------------------------|------------------------|
| 37 | State U of New York (SUNY) Stony Brook | 53.20 | 2.59 | 2.73 |
| 38 | University of South. Calif. | 52.20 | 2.57 | 2.66 |
| 39 | University of Florida | 52.20 | 2.57 | 2.65 |
| 40 | University of Arizona | 52.20 | 2.44 | 2.78 |
| 41 | Indiana University | 51.90 | 2.68 | 2.51 |
| 42 | Penn. State University | 50.90 | 2.60 | 2.49 |
| 43 | Univ. of Calif. Davis | 50.90 | 2.34 | 2.75 |
| 44 | Purdue University | 50.50 | 2.68 | 2.37 |
| 45 | North Carolina State | 50.40 | 2.43 | 2.61 |
| 46 | Boston College | 50.00 | 2.47 | 2.53 |
| 47 | Univ. of Mass. Amherst | 49.20 | 2.55 | 2.37 |
| 48 | Vanderbilt University | 48.80 | 2.48 | 2.40 |
| 49 | University of Colorado | 48.40 | 2.59 | 2.25 |
| 50 | Univ. of Cal. Santa Barbara | 48.40 | 2.46 | 2.38 |
| 51 | Rice University | 46.80 | 2.21 | 2.47 |
| 52 | Rutgers State University | 46.50 | 2.29 | 2.36 |
| 53 | George Mason University | 46.00 | 2.14 | 2.46 |
| 54 | City Univ. of New York | 45.40 | 2.28 | 2.26 |
| 55 | Syracuse University | 43.40 | 2.13 | 2.21 |
| 56 | Georgetown University | 41.80 | 1.93 | 2.25 |
| 57 | University of Houston | 41.60 | 2.02 | 2.14 |
| 58 | State Univ. of NY Buffalo | 39.50 | 1.86 | 2.09 |
| 59 | Claremont Grad. School | 39.20 | 1.90 | 2.02 |
| 60 | Florida State University | 38.90 | 1.92 | 1.97 |
| 61 | Southern Methodist | 38.50 | 1.81 | 2.04 |
| 62 | University of Kentucky | 37.70 | 1.87 | 1.90 |
| 63 | SUNY Binghamton | 37.40 | 1.86 | 1.88 |
| 64 | University of Georgia | 37.20 | 1.77 | 1.95 |
| 65 | Arizona State University | 36.60 | 1.81 | 1.85 |
| 66 | Clemson University | 36.20 | 1.95 | 1.67 |
| 67 | George Washington Univ. | 36.10 | 1.78 | 1.83 |
| 68 | University of Oregon | 35.70 | 1.59 | 1.98 |
| 69 | Georgia State University | 34.40 | 1.67 | 1.77 |
| 70 | University of Kansas | 34.30 | 1.72 | 1.71 |
| 71 | Univ. of South Carolina | 33.90 | 1.50 | 1.89 |
| 72 | Louisiana State University | 32.70 | 1.74 | 1.53 |
| 73 | American University | 32.50 | 1.53 | 1.72 |
| 74 | University of Wyoming | 31.30 | 1.48 | 1.65 |
| 75 | Univ. of Illinois Chicago | 30.90 | 1.38 | 1.72 |
| 76 | SUNY Albany | 30.40 | 1.44 | 1.65 |
| 77 | Univ. of Cal. Riverside | 30.00 | 1.32 | 1.72 |
| 78 | University of Notre Dame | 29.60 | 1.47 | 1.53 |
| 79 | Washington State | 29.60 | 1.54 | 1.42 |
| 80 | Southern Illinois | 29.50 | 1.30 | 1.65 |
| 81 | Auburn University | 29.50 | 1.27 | 1.68 |
| 82 | Univ. of Tenn-Knoxville | 29.20 | 1.30 | 1.62 |

| Ranking | School | Score | Educational Efficiency | Faculty Quality |
|----------------|------------------------------|--------------|-------------------------------|------------------------|
| 83 | Tulane University | 28.40 | 1.30 | 1.54 |
| 84 | University of Connecticut | 27.00 | 1.30 | 1.40 |
| 85 | UW Milwaukee | 24.80 | 1.31 | 1.17 |
| 86 | West Virginia University | 24.10 | 1.35 | 1.06 |
| 87 | Univ. of Hawaii Manoa | 23.70 | 0.99 | 1.38 |
| 88 | Oklahoma State Univ. | 22.70 | 1.04 | 1.23 |
| 89 | Lehigh University | 22.70 | 1.11 | 1.16 |
| 90 | University of Utah | 21.50 | 1.00 | 1.15 |
| 91 | Temple University | 20.10 | 0.90 | 1.11 |
| 92 | Univ. of Missouri Columbia | 20.10 | 1.31 | 0.70 |
| 93 | Fordham University | 18.70 | 0.94 | 0.93 |
| 94 | Northern Illinois University | 17.10 | 0.69 | 1.02 |
| 95 | University of Alabama | 16.80 | 0.69 | 0.99 |
| 96 | University of Cincinnati | 16.50 | 0.75 | 0.90 |
| 97 | Univ. of Nebraska | 16.40 | 0.45 | 1.19 |
| 98 | Rensselaer Polytechnic | 15.30 | 0.83 | 0.70 |
| 99 | University of Texas-Dallas | 14.60 | 0.57 | 0.89 |
| 100 | Utah State University | 14.30 | 0.79 | 0.64 |
| 101 | Howard University | 13.90 | 0.56 | 0.83 |
| 102 | Univ. of New Hampshire | 13.50 | 0.61 | 0.74 |
| 103 | Colorado School of Mines | 13.20 | 0.67 | 0.65 |
| 104 | Colorado State University | 12.60 | 0.45 | 0.81 |
| 105 | Clark University | 10.10 | 0.42 | 0.59 |
| 106 | Northeastern University | 6.10 | 0.14 | 0.47 |
| 107 | Suffolk University | new | new | new |

Here's another view provided by Furman University.

The following information has been compiled to help students who are considering graduate study in Economics. Much of the information was taken from Chapter 24 of Mark Rush's *Study Guide* to accompany Michael Parkin's *Microeconomics* (3rd edition) and *The Economics Institute Guide to Graduate Study*.

What Will a Graduate Degree in Economics Enable You To Do?

Graduate programs in economics, particularly Ph.D. programs, emphasize the training of teachers and researchers. While economists are involved in a variety of jobs, the vast majority of those with graduate degrees are involved in research in either industry or government or in a combination of research and teaching in colleges and universities.

The Graduate School Experience

The approach to the study of economics in graduate school is quite different from most undergraduate experiences. The textbooks and journal articles a student reads in graduate school are often theoretical and abstract. Visits to graduate programs during which one sits in on classes provide a good source of information; furthermore, one may read comments from recent graduates. See, e.g., *The Making of an Economist* by Arjo Klamer and David Colander (Boulder, Colo.: Westview Press, 1990). An article (of the same title) by these authors was published earlier in the *Journal of Economic Perspectives* (1987).

The Committee on Graduate Education in Economics (COGEE) conducted a review of graduate education in economics and reported its findings in the September 1991 issue of the *Journal of Economic Literature*. COGEE asked faculty members, graduate students, and recent Ph.D.'s to rank the most important skills needed to be successful in the study of graduate economics. Most important were analytical skills and mathematics, followed by critical judgment, the ability to apply theory, and computational skills. Least important were creativity and the ability to communicate. If you are interested in economic issues but do not have the characteristics required by graduate economics departments, there are other economics-related fields to consider, such as graduate school in public policy. Many economics majors go to business schools to obtain an MBA and are often better prepared than students who have undergraduate degrees in business.

Graduate students in economics may pursue programs leading to the master's and/or doctoral degrees. The requirements for each of these degrees vary significantly among schools, so you should consult specific university catalogues (or *The Economics Institute Guide to Graduate Study*) for particulars. However, programs leading to a master's degree in economics usually take from one to two years of graduate study to complete; some require that a student complete a master's thesis. Most Ph.D. programs in economics require two or three years of coursework, after which you have to pass a theory exam and two or more field exams. The last stage of the program requires that you conduct some original research and report the results in a dissertation. Ph.D. degrees in economics can be completed in four years, but they often take longer. In the social sciences the median time that it takes for a student to complete the Ph.D. degree is about 7.5 years. Furthermore, a high percentage (roughly 50 percent) of students do not complete their doctoral degrees.

Finances

There are several sources you may consult to ascertain the cost of various programs (which vary considerably from school to school); two good references are the *Chronicle of Higher Education's* annual

listing and the College Board's *The College Cost Book*. Of course, individual university catalogues report these figures as well.

Most universities offer aid to graduate students in the form of scholarships, fellowships, assistantships, or loans. It is common for Ph.D. programs to hire their economics graduate students as teaching or research assistants. Teaching assistants begin by grading papers and running review sessions and can advance to teaching classes on their own. Research assistants generally do data collection, statistical work, and library research for professors and often jointly write papers with them. Most assistantships will pay for tuition and provide you with enough money to live on. Keep in mind that students applying for financial aid must submit their applications for admission earlier (sometimes before the end of December) than those who are not. Information on deadlines and necessary forms should be obtained from individual schools.

Where Should You Apply?

The best graduate school for you depends on a lot of things, especially your ability level, geographical location, areas of research interests, and, of course, financing. You should talk with your professors about ability level and areas of research. In addition, there are informative articles that give overall departmental rankings and rankings by subfield. See especially John Tschirhart, "Ranking Economics Department in Areas of Expertise," *Journal of Economic Education*, and David Colander, "Research on the Economic Profession," *Journal of Economic Perspectives*, Vol. 3, no. 4, Fall 1989, pp. 137-148. The following list reports the rankings done in 1995 by William H. Kaempfer and Chao Jing of the University of Colorado at Boulder. Their list compiles six earlier studies into an aggregate ranking.

Rankings

| | |
|--|---|
| 1. University of Chicago | 35. University of Texas, Austin |
| 2. Harvard University | 36. University of California, Davis |
| 3. Massachusetts Institute of Technology | 37. Purdue University |
| 4. Princeton University | 38. University of CA, Santa Barbara |
| 5. Stanford University | 39. California Tech |
| 6. Northwestern University | 40. Boston University |
| 7. Yale University | 41. Pennsylvania State University |
| 8. University of Pennsylvania | 42. Rutgers University |
| 9. University of CA, Berkeley | 43. Pittsburgh University |
| 10. University of CA, Los Angeles | 44. University of Houston |
| 11. University of Wisconsin, Madison | 45. Virginia Polytechnic Institute |
| 12. University of Michigan | 46. State University of NY, Buffalo |
| 13. Rochester University | 47. NC State University |
| 14. Cornell University | 48. University of Arizona |
| 15. New York University | 49. State Univ. Of NY, Stony Brook |
| 16. Carnegie Mellon University | 50. Vanderbilt University |
| 17. University of Minnesota | 51. University of Georgia |
| 18. Columbia University | 52. University of Colorado, Boulder |
| 19. University of Washington | 53. Boston College |

| | |
|--|--|
| 20. The Ohio State University | 54. University of Delaware |
| 21. University of CA, San Diego | 55. Southern Methodist University |
| 22. University of IL, Urbana-Champaign | 56. Iowa State University |
| 23. University of Virginia | 57. Brigham Young University (no grad. degree) |
| 24. Michigan State University | 58. George Mason University |
| 25. University of Maryland | 59. Louisiana State University |
| 26. Duke University | 60. Binghamton Univ, State Univ/NY |
| 27. Texas A&M University | 61. Auburn University |
| 28. University of Florida | 62. Arizona State University |
| 29. University of NC, Chapel Hill | 63. Wesleyan University (no grad. degree) |
| 30. University of Iowa | 64. Univ. Of Wisconsin, Milwaukee |
| 31. Brown University | 65. Rice University |
| 32. University of Southern California | 66. University of Wyoming |
| 33. Johns Hopkins University | 67. University of Massachusetts |
| 34. University of Indiana | 68. Tufts University |

Preparation for Graduate School in Economics

Mathematics is an integral part of the preparation for graduate study in economics. Calculus through multivariate analysis plus linear algebra and probability and statistics would provide adequate preparation. Thorough preparation in mathematics is as important as your economic courses. In fact, an economics major is not required.

Most graduate programs require strong grades in math and economics, a good score on the Graduate Record Examination, and solid letters of recommendation. It is a good idea to get to know a few professors very well and offer child care services to them so that they can write glowing letters about you.

The choice of a graduate program takes careful research and planning. The information given here should help you narrow your choices. Once you have identified several schools of interest, you should plan to talk directly to the director of graduate studies. A campus visit would be ideal. *The Economics Institute Guide to Graduate Study* (see Dr. Horney) offers program descriptions, complete with e-mail addresses and names of the Directors of Graduate Studies, for many universities in the US and Canada. The following list of questions should help guide you as you inquire about the specifics of each program. The sooner you have the answers to these questions, the better you can prepare yourself and the more educated decision you can make.

1. What are the math requirements for this program?
2. What are the "core (required) courses" for this program?
3. Which texts are usually used in the first Micro, Macro, Statistics, and Econometrics classes?
4. What financial aid opportunities are there within the department (assistantships, fellowships, etc.) and what work responsibilities are associated with these opportunities?
5. What are the average living costs in the area of the university? Can one "get by" on a graduate assistantship (if awarded)?
6. What percentage of applicants are typically accepted into the program? What percent are accepted with financial aid?
7. How long does it take to finish the program on average?

8. What percent of those accepted (on average) actually finish the program?
9. Do those who leave the program usually do so of their own volition or are they asked to leave?
10. How many qualifying (preliminary) examinations does one take in this program?
11. In which fields are these exams given? How many chances does one get to pass the exams?
12. Where do most of your graduates work upon finishing their degrees?
13. If one enters the Ph.D. program but for some reason does not finish it, will a Master's degree be awarded (after completing a certain number hours)?
14. Which economics fields are perceived to be the strongest in this program?
15. Are there any special opportunities that are offered in this program (e.g. research centers that attract special projects, research money; joint programs in law and economics, etc.)?
16. How long have the graduate faculty been there? Is there a high turn over rate among the graduate faculty?

Suggested Reading For Those Considering Graduate

The following articles are available in the filing cabinet in FH 132:

- Colander, "Research on the Economics Profession," *Journal of Economic Perspectives*, 3(4) 1989, pp. 137-48.
- Colander and Klamer, "The Making of an Economist," *Journal of Economic Perspectives*, 1(2) 1987, pp. 95-111.
- Debreu, "The Mathematization of Economic Theory," *American Economic Review*, 81(1) 1991, pp. 1-7.
- Hansen, "The Education and Training of Economics Doctorates," *Journal of Economic Literature* XXIX (9/91), pp. 1054-1087.
- Kasper, et.al., "The Education of Economists: From Undergraduate to Graduate Study," *Journal of Economic Literature* XXIX (9/91), pp. 1088-1109.
- Krueger, et.al., "Report of the Commission on Graduate Education in Economics," *Journal of Economic Literature* XXIX (9/91), pp. 1035-1053.
- Thornton and Innes, "The Status of Masters Programs in Economics," *Journal of Economic Perspectives*, 2(1) 1988, pp. 171-178.

Here's Professor Mark Foley's (of Davidson College) take on things:

So you're thinking about applying to graduate school in economics ...

Why go to graduate school in economics?

Graduate school in economics is not an easy road, but it can be a fulfilling, challenging, and enjoyable process. You should consider graduate school in economics if it will help you get the job and lifestyle that you want. Depending on your ultimate employment goal, a Master's, Ph.D., or even M.B.A. will best facilitate your achievement of that goal. Please contact any of the [faculty](#) early to ask questions and discuss your plans. Preparation is key, so seek advice **during your first two years** on what courses to take during your remaining semesters.

How long does it take to get a Ph.D. in economics?

Generally five to six years, although four is not unheard of and some students do have a hiatus or linger in graduate school. Typically, the first two years are consumed with coursework and passing comprehensive examinations, followed by two or more years of writing a thesis proposal and completion of the dissertation.

What is a typical course of study?

Typical first year courses are microeconomic theory, macroeconomic theory, quantitative methods/econometrics, and economic history (although it is my understanding that, unfortunately, some programs are phasing out the history requirement), followed by written comprehensive exams in micro, macro, and econometrics. Second year courses are in applied fields and advanced theory, followed by qualifying examinations in 2 to 3 fields of the student's choice (written at some places, oral at others). This is followed by a period in which you attend and participate in the department's seminars and workshops and develop a proposal for your dissertation. Some programs require an oral defense of your proposal, others simply written approval. Then comes the dissertation writing stage in which you work with your advisors to develop a body of original work worthy of a Ph.D. and which culminates in the dissertation defense, a forum, typically open to anyone but in practice attended primarily by your committee, where you present your work and answer faculty questions. You will have anywhere from three to five faculty members on your dissertation committee. With some you will work closely; others will be less involved in your work, serving primarily as readers.

What can you do with a Ph.D. in economics?

A Ph.D. in economics can prepare you for a wide variety of careers. You can go into academics (teaching and research at a university or college), work in the private sector (at economic research institutes, consulting firms, investment banking, etc.), or work for the government (the Federal Reserve banks, Bureau of Labor Statistics, Census Bureau, Social Security Administration, Federal Trade Commission, etc.). There are also lots and lots of economists at international development and financial institutions such as the [World Bank](#), (the [Young Professionals](#) (YP) program there is a very cool job; also check out the Young Economists program), regional development banks ([Asian Development Bank](#), [European Bank for Reconstruction and Development](#), [Inter-American Development Bank](#), [African Development Bank Group](#), etc.), the International Monetary Fund ([IMF](#)), and other international organizations ([OECD](#), [ILO](#), [WTO](#), [UN](#)). Many business schools also offer doctoral programs. For example, the Wharton School of Business at the University of Pennsylvania has ten doctoral programs: finance, accounting, management, marketing, health care systems, insurance and risk management, public policy and management, operations and information management, real estate, and statistics. These will also prepare you for a career in academics and the public or private sector.

For a sampling of recent jobs available, see the list of job openings, often referred to as "[JOE](#)" (Job Openings for Economists), maintained by the American Economic Association (AEA). This is the first place many employers, especially colleges and universities, go to find econ Ph.D.'s. It contains academic, non-academic, and foreign listings. [Inomics-JOE](#) has a European focus. [UK-JOE](#) emphasizes jobs in Britain. The [Chronicle of Higher Education](#) also maintains a job listing. The AEA has its annual conference shortly after January 1st, which is when initial interviews for many jobs take place. A [timeline of the job market](#) explains what you should be doing the year before you plan to apply for jobs and what to expect both before and after your interviews at the annual conference.

Should I get a Master's degree in economics?

The Ph.D. is the terminal degree in economics, however many institutions offer a terminal Master's degree (e.g., [Miami \(of Ohio\) University](#), [Delaware](#), [UNC-Greensboro](#), [Duke](#), [East Carolina](#), [Minnesota](#)) which typically requires 12-18 months of full-time study. If you're interested in teaching at a university or college, you need to earn a Ph.D. If you're interested in doing economic research at a government institution or research institute, the Master's may be a good choice. Note that you can, typically, leave a Ph.D. program after one year with a Master's degree in economics.

That said, a Master's degree can enable you to gain a more sophisticated treatment of micro and macro theory as well as econometrics before moving on to a Ph.D. program. By reputation, the best place to go for this "preparatory Master's" is the London School of economics' [M.Sc. in Econometrics and Mathematical Economics](#) program. Other good programs, all in Canada, are [Queen's University](#), [Univ. of British Columbia](#), [Univ. of Toronto](#), [Univ. of Western Ontario](#), and [McGill](#). It is not uncommon to see students at top 10 programs with Master's degrees from one of these institutions. If you're interested in financial economics, Princeton has a new [Master's in Financial Economics](#) program which is also excellent preparation for a Ph.D. program.

What is the Diploma in economics?

The London School of Economics offers a 9-month program which can be a useful way of improving your economic, statistical, and analytical skills before continuing on for a Ph.D.

What about a Ph.D. in public policy?

It is also possible to obtain a Ph.D. in public policy during which time you may be able to take the first and second year Ph.D. economics classes. If you're interested in taking this approach to your graduate education, contact program directors directly (get their contact info from these websites) and then discuss this plan with one of the [faculty](#) at Davidson. The top 4 schools for this (according to [U.S. News](#)) are Syracuse ([Maxwell School](#)), Harvard ([Kennedy School of Government](#)), Indiana ([School of Public and Environmental Affairs](#)), and Georgia ([School of Public and International Affairs](#)). Formerly in Top 5: Princeton ([Woodrow Wilson School of Public and International Affairs](#); the Associate Dean, James Trussell, is a Davidson alum!), and Berkeley ([Goldman School of Public Policy](#)). I've heard that some, such as Kennedy, place more emphasis on economics, for which strong math skills will be most helpful.

Should I go directly to graduate school?

Not necessarily. Some students have chosen to work in economic research (for example) before applying to graduate school. This can be a good method to see whether you like that type of job and to further develop your quantitative and analytical skills. Plus, it is not uncommon for first-year economics grad students to have worked in the research departments at places like a Federal Reserve bank or other institutions for a couple years.

How much does graduate school cost?

Tuition and fees will vary greatly by type of institution (public or private) and residency status (in-state or out-of-state). Check with schools of interest for specific numbers. Financial assistance for incoming

students comes in the form of tuition scholarships, fellowships, and assistantships (scholarships are not taxed while fellowships and assistantships are). Financial awards range from no aid to full support, with outstanding students receiving fellowships to attend graduate school. These fellowships typically include a scholarship for tuition and health insurance plus a fellowship stipend for living expenses. Note that it is possible to enter a program without any support and then, by excelling in your classes, earn tuition remission and research or teaching assistantships for your 2nd year and beyond. If you are accepted in a program without financial support, ask about their recent experience with students earning support after the first year.

A large cost of graduate school is the opportunity cost of not working during your studies; however, many students find summer employment with consulting firms, economic research institutes, international development agencies, or other companies. These experiences may even aid in the completion of your dissertation. In addition, many programs will offer admitted students research or teaching assistantships, in which the student takes on research or teaching assistant duties in addition to their required coursework and dissertation. Again, these opportunities can carry great benefits such as gaining teaching experience, learning research skills, and developing relationships with faculty members.

What is the average salary?

The "[Survey of the Labor Market for New PhD Hires in Economics](#)" (Deck, Collins, Curington, 2003; scroll down a bit) reports a mean offer for the 2002-03 academic year of \$71,317 for economists at Ph.D.-granting institutions (up from \$66,361 in 2000-01) and \$54,525 (up from \$53,634 in 2000-01) for those at Bachelor and Master-degree granting institutions.

What you need to be doing now in preparation for applying ...

1. Recommendation letters

Begin thinking about which of your professors you will ask to write reference letters. These are perhaps the *most important* part of your application (along with evidence of your quantitative and math skills), *ceteris paribus*. Your competition will have great letters, so you need to as well. Therefore, you should make a serious effort to get to know your professors, more than just excelling in their classes. Ask about research opportunities with the faculty!

2. Mathematics classes

Graduate school today involves serious mathematics. Your life will be easier the better prepared you are mathematically. Success in the following courses (or their equivalents) will improve your chances of acceptance at a top program. This list has been developed in consultation with faculty at Davidson (based on their graduate experience) and faculty involved in graduate admissions at Yale, Columbia, and UNC-Chapel Hill.

Some top programs say Linear Algebra is a *minimum* requirement, but it's really a sub-minimum; if I had to guess the true minimum expected level of math, I'd say through real analysis. If anyone reads this and has another opinion or perhaps some relevant knowledge, I'd welcome hearing it. Consider this quotation from [Univ of Minnesota's webpage](#) about Lin Alg being a minimum: "In fact, no student has been admitted in the past several years with training limited to this level of mathematics." With that in mind, here are the courses, beyond the requirements for the Econ major, that I think you should definitely take at Davidson:

In the [Economics Department](#) (all the courses for a major, plus ...)

215 Mathematical Economics

317 Advanced Econometrics

In the [Math Department](#)

130 Calculus I

135 Calculus II: Multivariable Calculus (130 prereq or 1 year of HS calc)

150 Linear Algebra and Mathematica with Applications (135 prereq or 130 and knowledge of vectors)

235 Differential Equations and Infinite Series

300 Introduction to Proof, Analysis, and Topology

430 Real Analysis (235 and 300 prereqs)

Note that a Math minor is these classes plus one more numbered above 200; I recommend 360. You might as well (at least) minor in Math.

These courses would also be helpful, but are not as essential: (in descending order of importance)

In the [Math Department](#)

360 Topology (300 prereq)

340 Probability (135 prereq)

341 Mathematical Statistics (340 prereq)

335 Vector Calculus and Partial Differential Equations (235 prereq)

450 Advanced Linear Algebra (355 prereq)

Please note that if you have some idea of what area of economics you wish to do research in, certain classes will be more useful than others. The faculty can help you tailor your schedule depending on your future plans. For example, a budding theorist will want to take Probability, Mathematical Statistics, and Real Analysis.

3. Graduate Record Examination (GRE) Sign up to take the [GRE](#) no later than October of your senior year and possibly a test preparation class. Anything less than a 750 on the quantitative section will make it much harder to get into a top 10 program. Check each program's requirements carefully. Applications for the fall semester are generally due in early January with admission decisions mailed in mid-March and your choice due by mid-April.

4. Contact current faculty at prospective programs who have research interests similar to yours. This is generally done after getting accepted, but if you can somehow swing a research assistant job the summer after your junior year with a faculty member at a Ph.D-granting institution, that would be terrific. Plus, while you may not have a specific idea of what you want to write your dissertation about (which might lead you to go to school X because professor Y, the expert in topic Z, works there), a conversation with a professor at your desired school can greatly inform your decision on where to go. Such contacts may also lead to Research Assistant (R.A.) or Teaching Assistant (T.A.) positions once you matriculate.

What are the admissions committees looking for?

For further details on how competitive it is to get accepted, what the admissions committees are looking for (GRE, GPA, etc.), and how certain departments weigh various admissions criteria. You might also try finding the c.v.'s of current students at your schools of interest to see their background. As for where you should apply, the admissions process is rife with uncertainty, but the familiar strategy of aiming "high, middle, and low" is a good approach. Your outcomes will almost certainly not follow a monotonic path (that's been the experience of students for whom I've written letters in the past 3 years), so if you can afford the marginal costs of application fees and time, more is better. Also bear in mind that the job market for economics Ph.D.'s is not geographically homogeneous. That is, the higher the ranking of your program, the more national will be the corresponding job market, ceteris paribus. Please consult with the [faculty](#) members to discuss your qualifications and interests.

Some Helpful Web Sites

General Advice for Applying to Grad School

http://www-smi.stanford.edu/people/pratt/smi/advice.html#advisor_relationship

<http://www-personal.umich.edu/~danhorn/graduate.html>

(These first two sites are definitely worth checking out.)

<http://www.andrews.edu/CPPS/cho/appgrad.htm>

<http://www.gradschools.com/feedback/hbk.html>

<http://mail.h-net.msu.edu/~burrell/guide/guide1.html>

<http://www.wm.edu/csrvcareer/stualum/graddir/decide.html>

These next two are for psychology, but are still interesting and helpful.

<http://www.kutztown.edu/acad/psyc/gradprep.html>

<http://www.apa.org/ed/getin.html>

Web Sites for Personal Statements:

<http://career.berkeley.edu/Grad/GradStatement.stm>

<http://www.rpi.edu/dept/lc/writecenter/web/text/apply.html>.

<http://depts.washington.edu/psywc/handouts/personal.html>

<http://www.accepted.com/grad/personalstatement.aspx>

<http://www.winningpersonstatement.com/mistakes.htm>

<http://www.psywww.com/careers/perstmt.htm>

Web Sites Regarding Letters of Recommendation

<http://www.kutztown.edu/acad/psyc/recllett.html>

Other Helpful Sites for GRE Testing

<http://www.gre.org/atglance.html>

<http://www.review.com/Graduate>

<http://www.gre.org> and the official site at <http://www.gre.com>

<http://www.test.com/scripts/home.exe> and <http://encarta.msn.com/grad/default.asp>

For Economics PhD Departments and Additional Advice

http://www.albany.edu/econ/eco_phds.html

<http://www.wiwi.hu-berlin.de/wpol/pdf/How%20to%20get%20a%20PhD.pdf>

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