1 Being a Graduate Student in Economics

Graduate advisors make the same recommendations to their students over and over. They often feel that much of this advice should go without saying, that they should not have to give it in the first place. But perhaps it is unfair to expect that students should guess all that needs to be done. What goes without saying may need saying after all. In fact, all professors remember things they did as graduate students that they wish they had not done, and others that they did not do and wish they had. Yet, in retrospect, it is pretty obvious what was in their interest.

This is why I wrote these notes. I take up a number of issues in the rough temporal order in which you, the graduate student, will confront them in your studies. It is difficult to separate the short-term benefits (writing a dissertation), the midterm benefits (getting the best possible job), and the long-term benefits (having a successful career) of the recommendations I make, and I will not always indicate how the relevance of each of them depends on the horizon.

Although most of what I say should apply to any graduate program, some of it may be particularly suitable to U.S. universities, with which I am the most familiar.

Not everything will agree with your experience in your department. If in doubt about any issue, talk to your classmates and your professors. In the early years of your program, for advice about courses and fellowships, talk to your department's director of graduate studies. For administrative questions, talk to your graduate secretary. Later on, when you have an advisor, consult him or her.

1 Financial Support

Your acceptance to the program will usually include tuition and fellowship support (stipend). Initially, a university-wide fellowship may be added to a departmental fellowship in an attempt to attract an exceptionally promising student, one who is likely to receive offers from competing schools.

Support is usually offered for several years but its renewal each year requires that you be in good standing. For instance, your grade point average may have to be above a certain threshold. Also, you should pass certain exams and reach certain milestones by certain dates; typical among those are completing a research paper or having a dissertation proposal approved by a member of the faculty.

The level of support you receive may be set for several years at the time you are admitted, but in some schools, after your first year, it may depend on your performance and be adjusted from year to year. Some schools have one standard fellowship, but others have two; some offer support at three levels, and others at more than three; some schools fine-tune their support and have no set levels.

There is always a time limit for the support you receive. Four years or five years are standard, and it rarely extends beyond the fifth year. If you are not done then, it is up to you to find a way to survive. Anticipate your needs.

You may also have support from external sources, at least initially. If you are a foreign student, you may be granted some from your home country. The terms under which any money is awarded may include the obligation to disclose all other support you receive. Both your department and the agency providing external funding may make adjustments down if you have other income.

There may be reimbursement clauses if you do not return to your home country after completing your studies. In the longer run, you may be better off having accepted lower support with no strings attached. So, if you have the choice, think about your future flexibility.

In addition to your stipend, the following additional sources of funding are often available:

- Internal research assistantships offered by your department. (Your advisor, when you have one, may have access to money for that purpose.)
- Research grants from external agencies for which you could apply. A list is available from the graduate office.
- Teaching opportunities (listed below).
- Tutoring or mentoring undergraduates in yours or other departments.

• If you are an empiricist, you may need special datasets and software that are not available for free through the library. Your advisor, when you have one, may agree to use his or her research account to purchase what you need, or there may be department funds available for that purpose. This is especially true if this material would be useful to several students. The dean of graduate studies may also support such purchases.

If you have the choice between a teaching assistantship (TA position) or a research assistantship (RA position), you may be tempted to choose the latter over the former, thinking that it will help you develop skills that are more important for your own research, but that really depends. RA work sometimes consists of mindless tasks that will not benefit you much. Get details before you sign up. Teaching can also be very useful to your research.

2 Your Daily Life

2.1 Some General Comments

Different students experience difficulties at different points in the course of their studies. The first year is trying for most. Not knowing what is expected from you or how much to study, being envious of the accentless English of your classmates or being intimidated by their superior background (some may have a master's degree and some may have published already), having to deal with disappointing grades—all may contribute to the anxiety. Some students sail through coursework but have trouble settling on a dissertation topic. Others may not shine in the former but are at ease in formulating research questions, and have no problem motivating themselves to explore topics on their own.

Absorbing knowledge is the main purpose of undergraduate education. As a graduate student, your primary goal is creating knowledge. Previously, you were asked to prove that a particular proposition was true, the assumptions being carefully and generously spelled out for you. Now, you have to formulate, and reformulate, your questions. You have to imagine which statement may or may not be true. You have to decide what to write down on either side of the implication sign. It is a completely difference exercise. (Incidentally, if you have trouble showing that a certain proposition is true, alternate between attempting a proof and looking for a counterexample.)

If you are a foreign student, you have to deal with cultural issues on top of academic ones. Recognize how U.S. universities and your universities back home differ. Certain behaviors that in your home university might be discouraged, frowned upon, or even considered completely unacceptable, may be the norm in a U.S. university. The converse is true too. In some countries, the relation between an undergraduate and a university administration, (at least as perceived by the student,) is mainly adversarial. That will not be the case in a U.S. university, and certainly not at the graduate level.

Most foreign students find it difficult to call their professors by their first names, because it seems rude to them. Nevertheless, if you notice that it is how a junior professor is addressed by the more advanced students, that is probably what you should do too. Eventually, you will have to make the switch; the longer you wait, the more difficult it will be. Using first names does not show lack of respect. First names are much less "personal" in the United States than in most other cultures. Using first names will be the easiest with the young professors (in fact, newly appointed professors often do most of their socializing with graduate students), and I do not recommend that you use first names with the senior professors unless they invite you to do so, and even if they call you by your first name. Different departments have different traditions concerning how professors and students relate. Be attuned to your environment.

In general, you need to be much more assertive than you were accustomed to being in your home country, but you can be assertive and respectful at the same time. Being successful in your program requires you to take initiative.

For women, a useful resource is the newsletter put out by the Committee on the Status of Women in the Economics Profession, sponsored by the American Economic Association (AEA). A similar newsletter for foreign students is badly needed, although the great variety in backgrounds might make it a delicate enterprize.

If your English is lacking, please take remedial courses right now. I say "please" on behalf of my colleagues too because you would be doing us a favor, in addition to doing yourself one. In selecting your roommates, do not limit yourself to students from your own country. Include some native speakers of English.

The path to publication is often arduous: you may have picked a truly untractable problem; a reasonable research strategy in which you have invested several weeks or months of hard work may lead to a dead end; you may not be able to get hold of the data that you really need. Later on, you will have good reasons to be annoyed with the publication process, the time it takes, and the seeming unfairness of the referees. Why are they so stubborn in not seeing how innovative your paper is? Don't they understand basic mathematics? And since you easily took care of the referees' and editor's requests, why can't the journal accept your revision now? This would allow you to put your paper down on your CV as "forthcoming" when you enter the job market, but the editors do not seem to care.

If you experience serious difficulties beyond the predictable stress that is the lot of an overworked and impoverished graduate student, you need to talk to someone. Talk to your friends and to your family. If you feel awkward about confessing psychological problems, universities have counseling services that will respect your privacy. Use them. If you are so distressed that you cannot function, you need professional help. You may have to take a break, to go home for a while. But please do not disappear without telling anyone (tell at least one classmate, and tell the graduate secretary). Obviously, do not drop out of the program without speaking to the director of graduate studies, and stop cashing your fellowship checks if you have decided not to return.

It may be that you are not a good fit, in terms of abilities or interests, for the particular program in which you enrolled. The sooner you recognize and acknowledge this fact, the better. You may be able to transfer to one that is better suited for you at the beginning of your second semester, or at the end of your first year. During the winter break, there is time to make provisions to transfer. Do not wait until the end of your first year, when it will be too late to enroll in another program for the following September, or you may end up losing two years.

Most likely, you will need intellectual and emotional support throughout your program. Your classmates will provide both—particularly students from your home country. Also look to the other students in your field, your cohort in general, and your family back home obviously.

Conversely, of course, offer your assistance to your classmates in need. They may not admit to having difficulties. Be perceptive. Extend your hand.

Do not take refuge in your apartment, isolated from your classmates. With any luck, there will be a critical mass of students working on subjects similar to yours and with whom you will have productive regular exchanges. Talking with your fellow students will help you discover your strengths and weaknesses. Most of them study other fields, where research traditions and methodologies differ, and you will better understand the benefits and limitations of your own approach.

2.2 Courses You Take

In your first year, you have no choices concerning the courses you attend. Series in microeconomics, macroeconomics, and econometrics constitute the central and obligatory curriculum in most programs, often complemented with a course on mathematical techniques ("Mathematics for Economics"), and your schedule may allow you to take one elective in the second semester or third quarter. In the second year, most of your courses are electives. That is when you start focusing on one area. There will also be distributional requirements, whose purpose is to ensure that you do not specialize too quickly.

Exams on the core curriculum are the most important ones in some programs, and they are given at the end of the first year. In other programs, the critical ones are field exams, and they are given at the end of the second year. You have to pass these exams to be allowed to continue. If you fail on your first try, you usually have a second chance a few months later. If you fail again, you will typically be asked to leave the program. At that point, your record may entitle you to a master's degree (even though your department may not have a separate master's program), so you will not leave empty-handed.

Although fulfilling the course requirements takes the first two years of most programs,[1] you may be able to start research in your second year, in the context of some course you are attending. A paper you write to satisfy a course requirement may develop into a regular research paper. It may even end up as a chapter of your dissertation.

Research is your principal activity from your third year onward, but you will also have teaching obligations and opportunities.

By the time you leave your program, you should have attended most of the courses your department offers in your area of research, broadly defined. That includes some courses that were not covered in your field exam when you took it, some courses that you did not have the time to attend in your second year, some courses taught by faculty who joined your department after you met the course requirements and passed the field exam, and some courses taught by visiting faculty. You should continue to strengthen your mathematics background by taking or auditing courses in the math department.[2] Courses in others schools or departments (business school, statistics, political science, philosophy) may be relevant too. Courses on applied subjects are a good idea whether you

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1. European programs differ significantly in that respect, as many have a much more limited list of course requirements.
2. You will find suggestions on T. Sargent's web page, <http://homepages.nyu/ts43>.

are a theorist or an applied economist. In a small department, you may end up with as wide an exposure as you would in a large department if you take advantage of all of its offerings. But the focus should be on building general skills as opposed to learning facts.

You do not have to formally register for these additional courses. In fact, you will not have the time to work for a grade. You already know that the benefit derived from a course that you audit is but a fraction of the benefit derived from a course that you take for credit. Keep up with the readings and do some of the assignments, even if you do not turn them in. The more challenging ones are of course the ones you should pick. This will certainly require self-discipline. Be realistic though. Assess whether you will have the time. If yes, commit yourself to the course. There is no point registering for a class if it is likely that you will have to drop it.

Having a broad knowledge of economics, knowledge that extends beyond your area of research, is very valuable for many reasons. Ours is a very vast subject, as you will see by stepping back a little. For instance, scan the program of the annual Allied Social Science Association (ASSA) meetings. You will discover many sessions on topics that are totally unfamiliar to you.

Also, you never know when a technique or a result that at first sight did not seem very relevant becomes critical. If you are a theorist, experience with applied research will help you formulate interesting research questions and keep you away from the ivory tower. If your work is mainly empirical, an appreciation for theory will help you establish the solid foundations that your model needs. Knowledge outside your area of research will allow you to better interact with your fellow students, your professors, and your future colleagues and enlarge your potential teaching expertise. You will be a more attractive candidate when on the market; more important, you will develop into a better economist.

More immediately, these courses are a good opportunity to make yourself known to professors other than your advisor. Impress them with your clever comments or smart answers to their questions. Do not overdo it though, as you may end up disturbing the flow of the lecture and prevent the professor from presenting the planned material. Also, do not show off. Professors on whom you have made a good impression will speak up on your behalf when the faculty meets to discuss fellowship support or the job market. It happens too often on those occasions or in informal discussions that a colleague mentions being aware of a student taking his or her class, only to add that the student never spoke up, so there was really no way to tell how good or interested the student was. The exam could have helped in that respect, but it may not have been given yet. Besides, exams don't come close to telling us everything there is to know about a student.

During your research, you may need help with the literature or with techniques that professors have discussed in class. They will be much more responsive if you have shown prior interest in their subject. Giving you a private lecture about a topic presented in a class you did not attend is not how your professors want to spend their time.

You will need to ask some of them to write letters of recommendation when you are on the job market.

You will also need to compose a dissertation committee.

These are many reasons already why you should be more than a name, or a face, in your department.

2.3 Teaching

You will be required or asked to be a teaching assistant (TA), usually in undergraduate classes, but also in some graduate classes when you are more advanced in your program. You will learn much by being a TA in a graduate class. You will discover that the only way to really understand something is to explain it (not the other way around). Being a TA will give you an opportunity to get to the bottom of issues that so far you had (unfortunately) managed to avoid.

Compiling a good record as a TA is helpful also when you are on the job market. Potential employers want to know whether you will be an effective teacher. Business schools are particularly demanding in that respect. Your department probably collects statistics on the performance of TAs, and may even rank TAs on the basis of feedback from the class—in particular, the students' formal course evaluations. If English is not your native language, concrete information about how well you did as a TA can be included in your application package to reassure universities that your language skills will not get in the way of clear communication. (One of the purposes of the interviews at the ASSA meeting is determining the English proficiency of the candidates.) Even if you are seeking a nonacademic job, the ability to interact well with colleagues will be necessary to land the job that you deserve.

Teaching can be another source of letters of recommendation from faculty you assisted. Such letters are particularly useful if you guest-lectured in an advanced course, since the professor may also be able to comment on your mastery of the material.

The lectures you prepare now will be there for you to revise and use after you graduate and start teaching, thereby facilitating the transition to your life as a professor.

Departments offer a number of teaching opportunities:

1. Compulsory TA work, which may be a precondition of the financial package you received when admitted. These obligations vary widely from department to department. In some, they start in the very first year and stretch over several years. In others, you will be free of them during the important first year, and they may be limited to one or two years. Teaching assistantship usually means grading, holding recitation sessions and office hours, and perhaps giving one or several lectures (for example, when the professor is out of town). The amount of work very much depends on the number of students you will be responsible for; also, there is a wide range in what professors expect. Try to get that information.

   Additional teaching assistantships, for which you may get additional remuneration, may be available.

2. A math (or statistics) review class for incoming graduate students just before school formally starts, offered by most departments. To be assigned this course, you will naturally have to demonstrate proficiency in the subject—you will have been among the best students in theory courses—and your English has to be good.

   The course is usually intensive and you will need to devote much energy to get ready for it. During the period in which you deliver your lectures, you will not have any time for anything else. However, you will greatly benefit from the experience. It will also look good on your CV that you have been trusted with this assignment.

3. Summer courses for undergraduates. Some of them are basic courses (introductory economics; intermediate micro or macro), which are taught regularly. In some departments, you may have the opportunity to submit a proposal for a course. Whether it is accepted may depend upon how many students register for it, and whether it is confirmed on actual enrollment as the start date approaches. It is obvious that you will not be assigned the course if you have not shown interest and ability in the related graduate courses that you have taken.

4. Evening courses, which may be an additional possibility.

5. Individual professors whose courses you have attended may ask you to give a lecture in their graduate class if you have done well in it.

6. Teaching opportunities in neighboring colleges and universities. If they are satisfied with your performance, they will invite you to do it again. This will be good, since the preparation time will be considerably less on the second or third round.

7. Teaching in your home country, when you return for summer vacation. It should be a short course, however, since you need to spend time in your department doing research, in close proximity to your advisor. You advisor's summer travel schedule will make it more complicated than you think. Try to coordinate with him or her so as to maximize overlap of the intervals when you are both in town.

Obviously, accumulating extensive teaching experience will be at the expense of your research, and that should not be your priority unless your objective is to get a teaching job. Your research is really what counts to get into a high-level research university. You will be expected to take teaching seriously, but whether you get in will be decided on the basis of your research record and promise.

2.4 Workshops and Visitors

Attend workshops Attend *all* workshops and seminars in your field, whether or not they are on your specific subject. Most won't be anyway. Read the papers that will be presented.

Ask questions. It will be hard at first. You may feel that you should defer to the professors and to your older classmates. You may fear that your questions will not be very good, that they will expose your lack of knowledge and understanding of the subject. Therefore, to get practice, start with clarifying questions. Most likely though, if you are confused about some point, so are others in the audience. Your classmates will tell you they were glad you asked.

Also, by itself, asking questions will help raise your interest in a seminar that you may not find too exciting. You have opted to spend an hour and a half in a windowless room, so try to make this time as productive as possible. Don't sit in the back of the seminar room, disengaged and ready to leave.

Attend seminars in other fields too. Some seminars in the business school or the political science department may be relevant as well.

Meet visitors In some departments, you will be given the opportunity to meet with the visiting speaker, especially as your own work reaches maturity, and even more so if it is related to the speaker's. That should be an additional reason to read the paper that the visitor will present, perhaps others that he or she has written, as well as papers that constitute the background of the visitor's presentation. Prepare questions.

Also, be ready to talk about your own work. You may get very useful comments from someone who often will have a different perspective from that of the faculty you know. When you are getting close to entering the job market, meeting with speakers will help you advertise your accomplishments. Mainly, it will teach you how to do so, since these occasions will serve as practice interviews. The circumstances will differ from actual interviews in a number of respects (you will not have a blackboard then; you will be facing a committee of more than one individual, and the stakes will be higher). Nevertheless, these one-on-one meetings will be useful preparation. You can also send your paper ahead of time to a visiting speaker. In writing these notes, I asked several of our recent graduates for comments on their experience on the job market. A most frequent comment was that they had found meetings with visitors extremely valuable in the preceding years. To fully benefit from the opportunity, do not wait until your last semester. Your third year is not too early to start signing up occasionally.

At first, you will feel uncomfortable, but practice will help. Undoubtedly, some visitors are difficult to approach, but these too provide a useful experience. You may also meet a visitor as a group, with one or two fellow students, especially on the first few occasions. You may invite the visitor to the neighboring coffeehouse. Most students find that visitors are quite responsive, and they enjoy the interaction. The pleasure is mutual. After returning home, visitors often make a point of writing that they were glad to meet with students. It is also not uncommon for visitors to take the initiative and ask to meet students when planning their visits.

These occasions will help you negotiate your transition to being a professor. The image you need to project when on the job market is that you are ready to be a professor: you have the maturity that allows you to discuss economics with established professors in such a way that they think of you as one of their own.

Seminar speakers usually come for a single day, but some visitors may stay longer, from a few days to an entire year, providing great opportunities for you to learn about new subjects, interact with new people, and get comments about your work from people with different expertise. You may have shown your work to quite a few people already, but you will find that every new reader makes points that have never been made before. Visitors are free of their usual duties and may be quite accessible, sometimes more so than your own professors. Here, too, you may meet with a visitor as a group, but for a visitor who stays more than a few days, individual discussions are certainly possible. Ask your advisor to arrange a meeting. Even better, be bold and knock on a visitor's door to set up an appointment yourself. But you need to do your homework first: consult the visitor's web page; read his or her papers.

2.5 Working with Classmates

In some courses, joint homework is encouraged, which is good. You may also write papers with classmates, but it is preferable that your job market paper not be written with a fellow student, or with a faculty member. How is the recruiting committee supposed to disentangle your contribution from that of your coauthor? The problem is compounded if you and your coauthor are not in the same graduating class; your coauthor may already have graduated. Committees, rightly or wrongly, will tend to think of your coauthor as the senior partner.

That being said, I can cite very successful careers that began with two students writing joint papers.

For healthy long-term relationships with your coauthors, and although your respective contributions cannot always be equal, it is preferable that they not be too unbalanced. At least, if your collaboration extends over several papers, they should not be too unbalanced on average.

In the evaluation of files for renewal or promotion, it is certainly not true that a joint paper with k coauthors counts for $\frac{1}{k+1}$ of one paper. Some discounting of joint work does occur but it is not very substantial. My empirically minded colleagues proposed that you will be credited with up to three-fourths of a paper on which you have one coauthor. So will your coauthor. Moreover, you will progress much faster by having coauthors.

Moreover, the friendships and collaborations you form in graduate school will be a most rewarding source of intellectual exchange and support throughout your career.

So, do write papers with your fellow students, but have other projects too, and let your job market paper be your own.

2.6 Where to Study

In your first or second year, you most often will not be assigned an office, but as early as your second year, you may be given one to share with one or several fellow students. If that is not the case, do not hide in the library stacks or at home, emerging only for the lectures and the exams. You need to be in regular contact with your classmates, to discuss courses, class assignments, and other aspects of the program. It is because of these exchanges that you will understand what a particular course is all about, that you will learn what a grade from a particular professor really means, and that you will be spared an entire weekend trying to solve a homework assignment whose statement is critically flawed by your professor's typing mistake. Ask the more advanced students to share their experience. If there is an economics library, you are likely to bump into other students there, and that may be a good place to study.

When you are eventually assigned an office, your officemates are a group with whom you will obviously interact regularly. But until then, do not show up in the department only for the weekly seminar in your field. Stop by even if you have nothing specific to do there. Have a cup of coffee with the classmates you run into. Peek in your advisor's office and say hello. Tell your advisor about an exciting paper you have just come across, a new conjecture you have formulated, or some progress that you have recently made in solving a problem. Your advisor may or may not have the time to chat with you for very long, but that does not matter. During the course of a five-minute conversation in the hallway, you may get an important reference, or a critical insight, or even the key to the solution of a problem that you have been struggling with for a week. It may save you several days of frustration.

These interactions will help your advisor remain aware of what is happening in your life, and your advisor will be grateful for them.

Participate in the department's social activities: the yearly picnic, the holiday parties. Attend the named yearly lectures given by famous people, even if their topics are not directly relevant to your research. You should not have to be told to time your vacation so that it does not interfere with a conference in your field that is held on campus. Attend the social events connected with the conference. These are important for gaining practice talking about your work and other people's work in an informal setting, as well as for networking.

Obviously, you need to take vacations, and putting aside your research entirely for a while is not a bad idea. However, do not go away as soon as classes end in the spring, only to return when they resume at the end of the summer. You will fly home with the best intentions to get work done, but students invariably confess to having studied little or not at all when at home. Even though there is always email to stay in touch, you probably will not accomplish much when far from your department.

3 Doing Research

3.1 Getting Research Ideas and Writing

Always read with research in mind. That is, read each paper not just to find out what's in it but, also and rather, what's not in it. Read it to identify the various ways in which it can be improved. What you should look for are not only the conclusions the author was able to draw, but the conclusions the author was not able to draw. What questions is the paper not answering? Read with a pen (pencil, yellow highlighter) in your hand. When you are still taking courses, add to each of your homework assignments one or several questions that are *your* questions. Try to answer them. After reading each paper, ask, "So, what are my questions?" Whether you can answer them is a different matter of course, and the really interesting questions usually do not have easy answers. But as you will discover, a very simple question that (surprisingly) nobody has asked yet can be very interesting. Also, answering an interesting question does not always require superior feats of scholarship. There are many examples in the history of economics, some of which completely changed its course. You might be making a big mistake by dismissing a simple question for being too simple. Reading the Nobel citations should easily convince you of that.

Attend seminars as early as you can. You probably will not have any time for that in your first year, but in your second year already you will be able to attend a few. From your third year on, attend them regularly. Once again, attend each seminar with an eye as to whether you can get a project out of them.

Download papers as they become available on the web pages of journals. You can subscribe to email lists of journals for articles in press and for working papers. Science Direct is a user-friendly site. Learn to use library resources such as EconLit, SSCI, and SRN. For new papers, look at <http://repec.org>. Also, check the individual web pages of the researchers who are important in your field.

Do not spend all of your time reading, however. Any paper you read builds on others that you do not know and will want to read. When reading those, you will come across others that you may feel you should read too. Stop. You will certainly acquire a vast knowledge of the literature, but that will be at the expense of your creative work.

Always have some project to work on. It may not yet be the big project that you need, but you will get some satisfaction from solving questions, and you will gain practice in figuring things out and writing down the answers. Besides, you never know how a project develops. The twists and turns that research takes may well transform what looked like an easy exercise into a nontrivial and interesting one. Subtle issues may arise that you had not noticed at first, and you may develop ideas for generalizations. As it evolves, a mundane project may become worthy of your full commitment.

In fact, have several projects to work on. When frustrated or disappointed with one, you can turn to another. On the other hand, do not have too many projects; if you do, you may not finish any one of them. New ideas are always more exciting to work on. Resist the temptation to forever drop older projects and jump into new ones. But do drop a project if your new ideas look much more promising.

Some of your research projects will lead nowhere, and disappointments will occur. When you have successfully tackled a problem, there is also the risk that someone else has already solved it, has published the answer, or is about to publish it. Brace yourself for these possibilities.

Occasionally, you will discover that a subject has been developed in parallel in a field other than economics, such as operations research, mathematics, and computer science. Economists may not be aware of this literature, and conversely, economics literature may not be cited there.[3] The terminology used in different fields to designate the same concepts is not uniform, and searching the web does not guarantee that you will find out if you are duplicating someone else's work.

On the other hand, researchers in other fields often ask questions that are quite different from the ones we economists ask, ignoring issues that are central to us, focusing on others that we do not perceive as central.[4] Even though there may be overlap between your work and previous work, it is rare that earlier writers have addressed exactly the same questions, or have sought an answer in exactly the same way. For instance, there usually is a wide range of modeling choices that one can make. These modeling choices may affect the generality of the answer, but each may be worth pursuing. Your paper may not be as important as you were hoping, but some of it can probably be salvaged. Swallow your pride and repackage your results so as to bring out what is specifically

3. Fairness, matching theory, and cost allocation are examples with which I am familiar.
4. Mathematicians sometimes ask questions that we perceive as technical, or that we avoid having to face by imposing assumptions that (we feel) do not limit very much the interest of the answers we get. Computer scientists obviously address computational issues, whereas economists are often satisfied with results stating the existence of certain objects. Normative concepts that we take for granted are not discussed in these other literatures. Efficiency is an example here.

yours. Acknowledge priorities that have to be acknowledged. You may not have been aware of some previous literature when you wrote your paper, but that is irrelevant: you have to rewrite it as if you knew it. Do so and move on. Finally (and yes, I know that this is small consolation when you have just been scooped), if you had this excellent idea already, there is no reason why you shouldn't have others.

It is not useful to begin writing a paper with a particular journal in mind. The unexpected changes of direction that a research project can take as it develops makes this pointless. It is when your paper reaches completion, when you have most of the results, that you can start thinking about an outlet. Most journals do not require submissions in their format until a paper is accepted, but the style of your paper should match that of the journal you approach. You may have to submit your paper to several journals in succession, and in the process of widening the scope of your search for an outlet, you may have to make important adjustments in its style. After your paper is accepted, and in preparing the final version, follow the explicit formatting and stylistic guidelines of the journal.

3.2 Presenting Your Work and Circulating It

Presenting your work As you complete your papers, look for opportunities to present them. You have surely already shown most of it to your advisor and to your friends. A seminar in your own department will be your first important public forum. Before that, you may also speak in a student seminar series, or a lunchtime series. These are often less formal (also shorter, perhaps one hour instead of the very common hour and a half for regular seminars) and presenting work in progress is encouraged. If there is no such series, why not get together with your classmates and set one up? In a small department, enlisting speakers to make it a weekly event may be difficult, but it does not have to be held weekly. Hold it every other week, or monthly, or whenever someone is ready.

If you are a foreign student, you may have the chance to present a paper when you are back home during a trip over the summer.

Also, be on the lookout for conferences. Lists of future events are available on the web. Some departments provide funds to advanced students for the purpose of attending conferences, although receiving some may require that you be on the program.

You will gain experience and confidence with conference presentations. However, choose them judiciously. If you are aware of specific things that would improve your paper and you are able to carry out these improvements, it is counterproductive to present it in front of people who are important in the field. Don't show work in progress just for practice. A poor performance may be the main memory that someone in the audience retains of you for a long time. The next opportunity to correct a negative impression may lie many years ahead.

Circulating your work Every paper you write has been inspired by some previous work, and you will want to have the authors' comments. You should seek them, but do not do so until you have your advisor's green light. Do not waste an occasion to make a good impression on people whose opinion you care about—and will care about for several, perhaps many, years—by sending a flawed document.

When you start circulating your paper, it is often better to proceed sequentially, at least initially. Send it first to a few people who are likely to respond and make suggestions. Those are people whom you have met in person, or people who have been responsive to such requests in the past. Obvious candidate recipients are fellow students who graduated a year or two before, and with whom you had a good relationship; some faculty in related fields whose courses you attended, especially if you did well; people you have met at conferences (you may have shared a session); people who visited your department and to whom you showed an earlier version of your work on that occasion (they may have given you comments and remained curious how it developed.)

Keep the version of the paper that you sent out on file, as some of the comments you get may refer to specific lines on specific pages; the reformatting that your intervening revisions entailed may have shifted the part of text to which a comment refers to a different page, which you may have trouble identifying.

Revise your paper according to the comments you get, and send it to a few more people. You may once again get suggestions. Revise it again.

After the suggestions have dwindled to a few minor comments, send it to a wider audience.

By proceeding in this way, you avoid duplication of efforts on your readers' part, saving all but a few of them from struggling with an ambiguous definition or with a proof that you could simplify. That is nice to them. Also, at each round, you make a better impression than you would have otherwise, and that is good for you. If there is a problem somewhere in your paper, it is better to limit how many readers see it.

Similarly, if you are about to present your paper at a conference for the first time, do not necessarily circulate it then. You will often receive comments there that will lead to a better version. That is the one you should circulate. As your paper gets more polished and you have presented it a few times already, your confidence will increase that everything is done correctly, and you can start allowing it to be posted on conference websites (instead of only posting the abstract). Then, interested participants may look at it ahead of time and give you feedback based on the complete version.

After you start circulating your paper, it is in the public domain. Anyone can work on the open questions you raised, or attempt more general results, and that is another reason to not present unfinished work. If you had a good chance of doing so yourself, you may be deprived of the opportunity. You should also carefully consider when to post the data you have painfully collected. You may want to fully exploit it before making it public. Ask your advisor what is the best strategy to follow.

It is very possible of course that you will get no comments. Do not sit on the paper forever waiting to get some.

There is another reason why you should consult with your advisor before circulating your paper. It is that your paper will affect the perception that others have of the quality of the work done under his or her direction. Even though we all understand that receiving a paper does not mean that the work has been formally and fully endorsed, your advisor prefers that the best possible image of his or her research group be projected to the outside world. Advisors do not only have the interest of their current advisees in mind. They also care about the interest of their future students, their own reputation, the reputation of their department, and how their field is perceived in the profession.

3.3 Submitting Your Papers to Journals

Similarly, do not submit your paper to a journal without consulting your advisor. There is some strategizing in choosing when and where to submit your work. Your advisor will help you weigh all the considerations that go into selecting the right journal. There should be a good match between paper and journal in several dimensions, and obviously there cannot be a perfect match in all dimensions. Trade-offs will have to be assessed. These dimensions are:

1. Subject matter. Whether a particular journal has published in your area of research is an important consideration. Submitting your paper

to the journal in which the papers that directly inspired yours appeared is natural: the journal is more likely to have knowledgeable associate editors on its board, and these editors to have access to referees who are competent and have an appreciation for the subject. Also, some journals value being perceived as the main outlet for a particularly successful line of inquiry, having published the papers in which it originated.

A field journal has the advantage of ensuring that people in your area will become aware of your work, but there are benefits to publishing in a high-level general-purpose journal; there, you will be noticed by people in areas different from yours. Over time, a mixture is best.

2. Methodology and style. You should consider whether your contribution has potential policy implications, or applications, or whether it should mainly be seen as theoretical or technical. How formal or discursive your style of writing is should affect your choice too.

3. Quality and rank. Whether your paper has a reasonable chance of being accepted matters. There is a significant random component to acceptance decisions, however, and you might as well attempt to benefit from this randomness by shooting somewhere above your perception of the quality of your paper. This is especially so as this randomness will play against you on other occasions.[5] In any case, you may not be the best judge of the quality of your own work. The ranking of the journals in which you publish is important. Publishing in a higher-rank journal gives young authors more visibility, and it counts when promotion is being considered.

4. Response time. The response times of journals vary significantly (but there is a lot of variation from one journal to the next). When you are on the job market, it will be particularly valuable for you to have an acceptance or a revise-and-resubmit. (Whether the paper is actually published does not matter.) Submitting a paper in your third year is a reasonable objective, so that by the time you are on the market you have a good chance of having an acceptance. But an acceptance from a second-tier journal when you have every right to expect a job in a first-tier university will not contribute much to securing that job. In fact it may be counterproductive; a publication in a low-level journal may send the wrong signal about the quality of your work and your ambitions.[6]

5. Later on, once you have a job, if you are not facing any critical deadlines, such as tenure review, you can afford also to take more risk.

6. A few short years after you graduate, as you start hearing the deafening ticks of the tenure clock, the timing of your submission and where you submit will become critical again.

5. Long-term publication objectives. When choosing a particular journal for a paper submission, you need to think about where you will submit your next one if it is close to completion. You should not overwhelm a particular journal by sending it several chapters of your dissertation in short succession, even though it may well be that the journal would be a legitimate outlet for each of them. Journals seek some diversity in the authors they publish, and you should seek some diversity in the outlets you choose.

A paper can be submitted to only one journal at a time, and it is a serious breach of ethics to approach several journals simultaneously. (On the other hand, books can be submitted to several publishers at once, but you are not there yet.)

3.4 Dissertation

Nowadays, the role of the document called "dissertation" is quite limited. It is no longer intended to be an in-depth study of a particular subject, composed of chapters attacking it from several angles. A dissertation is simply a set of essays, whose thematic link is often very tenuous, if it exists at all. (Later on, I warn against being too dispersed in one's research, however.) That is why the generic title has become "Three essays in labor economics," or "Three essays in game theory." Three is most common, but there is nothing obligatory about that number either. There is also no universal law that dictates how long a chapter should be.

In any case, do not set out to write a dissertation but, instead, write papers. In fact, just begin working on one, which you'll find a much less daunting task.

How you parcel your work into individual papers for submission to journals is what is important. That is separate from how you package it into the chapters of your dissertation.

The one remaining advantage of a dissertation is that you face no space constraint. It is where you can put on record material that you will suppress, or that referees will ask you to suppress, from your first published papers. Your dissertation will stamp a date on it. Tedious and routine calculations from which there is little to be learned, the detailed protocols or lengthy questionnaires of an experimental study, the raw data on which an empirical study is based, an alternative way of proving some result are examples here. Most readers of your papers will not be interested in this information. Some may, of course, which is why it should be available. You can also use your web page for material that you will not publish but that is complementary to your published work.

A focused and crisp study, making one point in a clean way, is optimal for submission to journals. However, on the job market, you are more likely to impress your potential employers with an in-depth study of one problem, showing all of your findings, with all the steps of your proofs, data collection, or econometric subtleties, and their multifaceted implications. Thus, your job market paper is typically too long and detailed to be submitted in its entirety.

Joint work with a fellow student or with your advisor can be part of your thesis. However, you may find it personally more satisfying to include only essays of which you are the sole author, even though this will result in a thinner document.

4 Your Advisor

4.1 Selecting Your Advisor

It is usual for a graduate student to approach a faculty member that he or she would like as his or her advisor.[7] However, a professor may approach a student who has impressed him or her in class. Most often, however, the formal advisor-advisee relationship emerges from successive exchanges that progressively gain in depth: a class discussion is a frequent first step; a conversation in the professor's office may be the occasion for a more personal interaction; a class assignment that the student has taken beyond what was required may be the source of follow-up questions from the professor, on which the student may further expand on his or her own. If you take initiative, and do so repeatedly, the professor is much more likely to be willing to take on the formal responsibility of being your advisor.

These interactions may even evolve into joint work—a note perhaps, or more substantial joint research. At some point, and this is the ideal way in which these kinds of relationships grow and solidify, it has become obvious that the professor should be your advisor. The formal step may only be taken months later however, when the graduate secretary sends you a form to fill out and you have to put down a name in the box labeled "Advisor." Needless to say, obtain that person's approval first.

An obvious prerequisite for you to ask a professor to be your advisor is that you have taken the advanced course or courses this professor teaches. You should be familiar with the professor's research program. The professor may have been on leave during your second year, which

7. In fact, some students enroll in a program with a particular advisor in mind.

is when you would normally make the connection, or may not have taught the material that interests you that particular year. Then, if you really want to work with him or her, attend the course in your third year. Even if you do not take it for credit, as you will probably have satisfied most requirements by then, follow it assiduously. Come to the lectures regularly and show up on time, perhaps do some of the homework assignments; certainly, do the readings and participate in class (although you may want to let the second-year students answer questions first).

Some students show up one day in a professor's office with a completed paper, perhaps feeling that they have to demonstrate their worth and independence first. They certainly achieve that, but why not do so through superior performance in the professor's classes (in the way discussed earlier)? Although delivering a finished paper to a professor makes the point, it can't be the optimal way to learn to do research. Surely, there is something to gain from interacting with faculty. So why deprive yourself of the opportunity? The advisor is there to advise, not just to put his or her stamp of approval on work that you have done on your own. Besides, you may be on the wrong track entirely. So, you are taking an unnecessary risk by not talking to anyone.

Having an experienced and well-known senior professor as advisor will give you greater visibility when you are on the market, but junior faculty will be more available to spend time with you.

4.2 What You Should Expect from Your Advisor

What you can expect from your advisor ranges from tips on writing, to practical recommendations on specific research questions, to general intellectual guidance. Your advisor will help you judge whether a line of research is likely to be productive, and, when you are engaged in a specific project, evaluate the chances that a conjecture is true and a proof correct. Your advisor will instruct you in the protocols of research, suggesting that you verify a proof by working out an example and reminding you to explore variants of your hypotheses and verify their logical independence, seek applications of your general theorems, look for different datasets, use different econometric techniques, and perform additional statistical tests.

You will also benefit from your advisor's experience concerning certain questions that are not the subject of any courses and for which there is no manual to consult, and yet are critical to your training: familiarizing yourself with professional etiquette, dealing with ethical issues such as a possible conflict of interest in writing a referee report, deciding which conferences to attend, and advertising your work are examples of such issues.

You can also expect encouragement when you are doing well and support when you are not.

How frequently will you meet with your advisor? This varies greatly among advisors, and different departments have different traditions in that regard. It depends on you too. Some advisors will ask that you make an appointment. Others have an open door policy and will talk to you when you stop by if he or she is available. So, you will meet your advisor anywhere from a few times a semester to several times a week. At critical times, at peaks of your creativity, when you are making fast progress on a paper, or conversely, when you are in the doldrums or frustrated with a project that seems to go nowhere, the frequency of your meetings with your advisor will increase. As the job market nears, you will see your advisor more often too.

If there is a specific question you want to discuss with your advisor, write it down first. Doing so will sharpen your understanding of it. It may even solve that question, or help you formulate a more general or interesting one.

Your advisor will also advertise you and your work. When you are on the market (perhaps before that, if your work develops early), he or she will tell or email colleagues about you, in addition to writing a letter of recommendation.

4.3 What You Should Not Expect

You should not expect your advisor to provide you with research topics.

Professors may of course supply some in classes you take. They may for instance raise questions that came up in their own work and that they did not have the time to handle or could not solve, and encourage or challenge students to attempt a solution. An advisor may suggest research ideas if he or she perceives an advisee as floundering, in order to get him or her started, or restarted. The advisor may point out certain papers that have recently come out and seem to open up interesting avenues of research, without stating particular questions to investigate. If the student still has trouble generating such questions, the advisor may be more specific.

However, formulating your own questions is something that you should get in the habit of doing from the very beginning of your graduate studies. Papers based on your own ideas are what you need to write.

Research does not occur in a vacuum, and undoubtedly the questions that you ask will be closely related to subjects discussed in classes you took, in seminars you attended, or in conversations you had with fellow students and professors. Those can be your starting point but as your research develops, you will get better at formulating research questions that are both tractable and interesting, and they will be more and more often entirely your own.

Your research may begin with a joint paper with your advisor, and I have seen successful job applications in which the job market paper was in fact coauthored with the advisor. However, this is risky. The obvious reason is that recruiting committees will wonder about the contribution of each of you. How much credibility should one attach to the advisor's assurance in his or her letter of recommendation that you contributed more than your share? Such assurance is very common, but think about the advisor's incentives; why not make the unverifiable and virtually costless claim that he or she has contributed less than 50 percent of the work if it helps the student land a better job?

Do not think that your advisor will check all your proofs or verify how correctly you conducted your empirical study. Your advisor may go over some steps of an argument, or ask you to show some parts of proofs on the board in his or her office. However, successive revisions of some aspect of a paper will often impact on others, which will have to be adjusted repeatedly. You cannot expect your advisor to go through the multiple successive drafts of your paper with equal care. The purpose of the first two years of your program and of the qualifying exams is to certify you as ready to engage in research: at that point, you can set up a model, manipulate data, and do proofs, and you understand the principles of good writing and of clear exposition. (Similarly, do not expect referees to have verified all your calculations and proofs. Ultimately, you alone are responsible for what's in your paper. A lenient referee who recommends too quickly that your paper be accepted is not doing you any favors.)

There are of course many components to the process of research, and it would be unreasonable for your advisor to demand perfection from you at the first shot. Your advisor is there to accelerate the process. But you are not entitled to as much help on your second paper as you got on your first one, and as much help on your third paper as you got on your second one.

Your relationship with your advisor will evolve with time, as you mature as a researcher. It is only when confronted with a particular issue and having dealt with it inadequately that you will really understand the advice you received from your professors or read in manuals. Your advisor will remind you why an issue is important and what to do about it, but he or she will get impatient with repeated inadequacies in dealing with problems that the two of you have already discussed. For that reason, make sure you fully understand your advisor's suggestions before you leave his or her office. If your cultural background demands that you pretend understanding even when you don't, set it aside no matter how difficult that is.

Your advisor is not your proofreader either. When examining your work, you advisor will certainly point out typos and occasionally correct your English, but that is not his or her job.

If your research is sufficiently close to your advisor's, he or she probably knows most of the papers that have been written on your subject. But even then, your advisor will often not be aware of all of them. It is up to you to track down the relevant work. Consult the web pages of authors who are active in the field and of journals that tend to publish in the area. Inspect the programs of the relevant conferences. You have more time to do so than your advisor does. Bring the papers you found to his or her attention. On the other hand, your advisor is more likely to make some useful connection with older literature and help you recognize how your contribution fits in the history of the subject. Altogether though, you will (or should) soon be the world's expert on your subject, not your advisor.

Most advisors will encourage you to develop your own ideas and will not insist that you follow the specific research program that he or she is engaged in. That is the reason why you will end up being your advisor's instructor on your subject. On the other hand, it is dangerous to choose a research topic in which no one on the faculty has any expertise.

It is not your advisor's mission to turn you into a future Nobel winner, but to help you identify your weaknesses and overcome them, discover your strengths and make the best use of them—in short, to realize your potential.

Over the several years during which your advisor will perform this role, he or she will have many occasions to make the points that I discuss here. However, your advisor cannot constantly be on your back, checking that you are following his or her advice. Ideally, a piece of advice should be given only once. Your advisor is not your mother.

Or your valet: Claude Henri de Rouvray, Comte de Saint-Simon (1760–1825) instructed his valet to wake him every morning with this admonition and encouragement: "Levez-vous, Monsieur le Comte, vous avez de grandes choses à faire" ("Rise, Monsieur le Comte, you have great things to achieve"). You should get up on your own.[8]

You may discover at some point that the match with your advisor is not as good as you originally thought. Your interests or your advisor's may shift; or your advisor is not able to provide the support that you need. Formally dissolving the relationship may be awkward, and you have to develop one with another professor, who eventually will become your main advisor. The formal switch does not have to occur right away; wait until you have accomplished sufficient work under that second person's supervision; the switch will be easy then.

An advisor's leave of absence can be a serious problem for you if it occurs at a critical stage of your research. In our field, mobility is high, since we need nothing more than pencil and paper. Your advisor may take a job elsewhere, leaving you stranded. If you have not yet started research, you most likely will be better off selecting a new advisor. If you are sufficiently advanced in your research, however, make arrangements to follow your advisor (although your diploma will be awarded by the university where you are enrolled). Your personal circumstances may make it difficult to move. If you have a family, the cost may be prohibitive. You should then make extended trips to visit your advisor. By "extended," I mean at least one week long. A three-day trip may indeed not be very useful. During such a short period, your advisor's commitments may not allow for more than one meeting.

5 Job Market

For answers to the many questions that you may have about the job market—including statistics concerning salaries, terms of employment, and dress code for interviews and campus visits, even the minutiae of etiquette at the dinner table—an excellent source is Cawley 2008. I add only a few comments.

No matter how well things go during their studies, almost all students have a hard time dealing with job market stress. Unless you are one of the handful of superstars that the market produces every year, the

8. Saint-Simon is the founder of a proto-socialist movement that played an important role up to the nineteenth century, even influencing Léon Walras. A ruined aristocrat, he is said to have also relied on his valet for financial assistance. Your advisor not being your valet means that you will have to seek this kind of help somewhere else. The same comment applies to advice on personal matters. Providing such advice is not your advisor's job.

experience is likely to be filled with uncertainty and anxiety. It will involve a lot of waiting: waiting for interviews, for invitations to campus visits, for job offers. You will travel to cold and distant outposts, where you know no one, only to face roomfuls of people determined to ask you questions that you cannot answer (they are not really, but that may be the way you will experience them anyway).

But these emotions will be mixed with the excitement of entering a new phase of your life, standing at the cusp of new responsibilities and opportunities. The experience will have its enjoyable moments too. In fact, it probably will be many years until you receive as much attention as you are getting when on the market. Also, you will learn much from it, about the research of others, about your own research, and about yourself.

Incidentally, if you have not submitted your job market paper yet, wait until the end of the process to do so. At each campus visit, you will receive suggestions for improvements. Revise it as well as you can after each such occasion. When you are done with the whole search process, your paper will be in much better shape than at the beginning. If you have recently published a paper, you will be tempted to present it; a journal has certified its quality after all. However, you can't present published work except as an introduction to substantial newer material. If you just received an acceptance for your job market paper, you can still present it of course. In fact, let your interviewers know the good news.

In any case, brace yourself for the trials and tribulations of the job market, and try to focus on your work. Keep revising your papers, and keep practicing your talk.

Throughout the process, update your web page as needed. The information supplied in October in the packets sent out by your department is not necessarily what members of search committees will limit themselves to. They may visit your page at any point. In fact, the further the process advances with you, the more they will want to know about you. They may for instance read the papers that they did not have the time to look at in the early rounds. They should be able to download them. Thus, if you complete a paper that you felt was not sufficiently polished to post at the beginning of the process, update your page. If you receive an acceptance from a journal, update your page.

Here too, do not make any decision concerning the job market without consulting your advisor. (I should qualify this, and say, do not make any *important* decision without consulting your advisor, but since you may not always know which ones are the important decisions, do not make *any* decision without consulting your advisor.)

A graduate secretary will tell you what you need to do and inform you about your department's internal deadlines. A very important one is when to submit your CV for inclusion in the packet sent out by the department. Respect these deadlines. There is no reason why he or she should have to chase you for the document. The graduate secretary will also collect information about job openings, and will forward to you messages from schools about positions.

A professor in the department is also assigned the job of placement director. The graduate secretary and the placement director generally hold a meeting early in the fall to walk you through the steps of the job search process. During that whole period, they will answer questions you may have.

One of the other functions of the placement director is to take calls from search committees in other universities inquiring about the fields of specialization and the quality of the students on the market in your department. This occurs in November and early December. Information about job market candidates is collected separately by faculty members calling their colleagues and friends in other departments, one of the functions of search committees being to aggregate that information.

5.1 When to Be on the Market

You will want to know how long it takes to write a thesis, but the important question really is how long it takes to get ready to be on the market. I do not have statistics, but casual empiricism suggests that time-to-market has significantly increased in the last ten years. A good proportion of students used to finish in four years; five or six years is most common now. It is reasonable and desirable to make four or five a target, but on the market there is little discounting of what you have accomplished if you take six years instead of the five you may have aimed for. The increase in the depth of your research and the additional maturity that this extra year will allow you to gain will more than compensate for the fact that you did not finish quickly. The best candidates arrive with publications on their résumés, and this should be a strong reason for you to attempt to do the same. Six years may be longer than you expected when you enrolled, but immediate financial considerations set aside, if a sixth year means getting a job in a school whose rank is significantly higher, it is worth it. Seven years raises eyebrows, however, especially if you cannot show a commensurate amount of work.

A better question than how long it takes to write a thesis is how much work you should have accomplished to be on the market. One paper may be enough, but it had better be outstanding. Two substantial and polished papers is common at the time of application, with some evidence of other work. By the time of the ASSA meeting, most job market candidates can show a third paper at an advanced stage of completion. However, how many papers you have written is much less important than their originality, their depth, and their execution.

Determining when you are ready to go on the market may be delicate, since the development of your work is unlikely to follow a linear path. Instead, you will have spurts of productivity with long stretches of daily grind in between. The main idea for a paper, perhaps the central result, may occur to you in the course of a single weekend (although it may take months to develop it fully and to draw all of its implications). By the way, this is one fact about research that should keep you from discouragement when things do not go well. You may feel that you have nothing to show for all the work that you have put into a project. But it has rarely been in vain. Think of it as an investment. The returns will be unpredictable in their timing and magnitude. You need to be patient.

Early in the fall, when you have to decide whether to go on the market, you may have done almost but not quite enough work. Should you take the chance? This is of course when you should have one of those important conversations with your advisor. Although the paper you intend to use for the job market will typically not be quite done in September, by October you should have a document that you feel comfortable sending out. The main results have to be in at that point. Obviously, personal considerations—financial or otherwise—may affect your decision, and you may have to weigh them against purely academic ones. Your advisor will help you assess the academic consequences of your decision, but the ultimate choice is yours. Nevertheless, do not ignore the firm advice not to go.

For sure, do not go on the market with the idea that if things do not work out, you can return the following year for another shot. You should be ready, and return only if you have no choice. People will remember a failed attempt and wonder what went wrong.

Also, position yourself so as to start your career in the best possible department. Climbing up the hierarchy of schools with hard work is possible, but uncertain, slow, and difficult. In the higher-ranked schools, you will have better colleagues and students, more opportunities to teach courses that interest you and help you grow as a researcher, and a broader range of seminar series, with a greater chance that one will be in your very field.

A small number of postdoc positions are available. Such a position is most useful if, at the same time, you land a regular job in a desirable department. Many departments will let you reap the benefit of an additional year of research, free of TA obligations, and the tenure clock will not start until you actually join them. (Some postdocs are two-year appointments and it is not as likely that a department that offered you an assistant professorship will let you take such a position for both years, but usually turning a two-year postdoc position into a one-year postdoc is possible.) Do not worry about the department whose offer you accepted; they will find a way to cover the courses that they were hoping you would teach. When you eventually assume your position, you will have developed your intellectual capital further and be a more valuable asset to them.

Of course, you can also take a postdoc without going on the market at all, and seek a regular position from your postdoc position. A one-year postdoc position will give some time to complete papers and to get some acceptances from journals. However, if you were also offered a tenure-track position that does not meet your expectations, it is very risky to turn it down to accept a postdoc instead, in the hope of getting a better job after one year of additional research. First, some postdocs come with some teaching obligations, so you may not be totally free; look at the terms carefully. Second, you will have to prepare yourself to go back on the market almost immediately after you move, without much time to start new projects, or to develop relationships with new people from whom to ask additional letters of recommendation. You will incur the costs of moving (financial, emotional, in terms of time) twice in a short period.

5.2 Your Application

Résumé Do not list every paper you have ever written. You may indicate work other than your dissertation in order to show the breadth of your interests, but if you do, you should be ready to talk about it intelligently during the interviews and fly-outs. You should also know how the subject has evolved since you did the work. During an interview, you cannot say that because you wrote a paper for a second-year class assignment, you do not remember it well and are not ready to answer questions about it.

Similarly, do not put down all of your incomplete papers, even if you apologize for their state by listing them "in progress." Including one or two such works is acceptable, and even desirable, since it shows that you have a research program. By definition of a program, incompleteness is expected. But there should be substantial results in each of the papers you list.

Although the topics of your various papers need not be closely related, in your job applications your identity should be clear. Your potential employers need to know who you are. The interest in your work does not come from an abstract entity, such and such school, but from specific flesh-and-blood individuals. Your advocates are likely to be people who see you as strengthening a particular area in their department (usually theirs). Thus, if you wrote a paper on social choice for a second-year course, but then specialized in macroeconomics, the paper will only be of marginal help to you. As an undergraduate, you may have written or even published a paper in a completely different field. Again, this will be useful testimony about your ability to negotiate the process of writing, submitting, revising, and publishing, but it will not be weighted very heavily by the group of researchers that you are hoping to join.

If your paper develops a theoretical model that you then test empirically or experimentally, they will want to know whether your future work will maintain this balance or will veer toward the theoretical or the empirical. Having demonstrated both skills will be an argument in your favor, but do not dilute your support. Doing too many things may mean that you do none of them with sufficient depth to impress anyone in any field.[9]

Dissertation abstract Each summary of a chapter should begin with a concise statement of the problem you are addressing. Obviously, there is no space for a review of the literature, but you should cite one or two critical references. Do not use minuscule font to write more. In your opening sentence, state the question you set out to answer. Your main findings should be easy to pull out from the text. You may print in different typeface (italics, for example) each of your central conclusions. As always, a reader should be able to find out what you have done without reading the whole document. Picture this reader: she has a pile of files sitting on her desk, her assignment being to recommend to her department

9. The same comment applies later on, when the tenure decision comes. If you have dispersed yourself too much, it will be difficult to identify letter writers who will speak with a strong voice on your behalf.

candidates to interview. There is no way she will have the time to take a look at more than a few of the papers themselves, let alone read them; many of them will pertain to subjects that she knows little about. You need to grab her attention even if she only skims your application.

Sometimes, the evaluation of the applications is parceled out among faculty members according to fields, and whoever is assigned yours may have a very good understanding of your work.

Recommendations Recommendation letters are very important. The letter from you advisor will discuss the totality of your work. It will explain its significance, sometimes in terms different from yours in your own papers, and often with the hyperbole that has to be absent in your own statement of accomplishments. It will explain its genesis. A good letter is one that emphasizes the independence and the maturity that you have shown in formulating the questions you addressed, developing the skills you needed, and meeting the various conceptual, technical, and emotional challenges that you faced along the way. If you have shown initiative throughout the program, it will certainly be mentioned. Your being an active participant in classes and workshops will be noted. The letter will also discuss your personal character, work ethic, and collegiality, as well as the quality of your English and your record as a TA or an RA. Letters from other members of the faculty will often be more limited in scope.

Approach faculty ahead of time for their letters. A couple of months before they are needed is not too early. A professor who does not know you well will be reluctant to accept. Also, a letter full of generalities about you, or that does not go much beyond your performance in coursework, will not help you. Schedule your job market practice talk in your department at least two or three weeks before the letters are due, since professors will often wait to have seen you in action to write their letters. But having attended a seminar you gave is still little information on which to base a recommendation, and it will show. You need to establish connections with professors much earlier than the fall semester of the year when you are on the market. Bring them your papers as you complete them.

Recommendations are not usually tailored to schools, with the writer showing more enthusiasm in letters destined to lower-ranked schools. However, in special circumstances, a generic letter can be modified to fit a specific position for which a student seems to be particularly well suited.

Recommendations for the job market (and later, to support a contract renewal or a promotion) are often revisions of previous ones. Someone who has already written on your behalf will be much more likely to be willing to do it again than someone who has to start from scratch. You may have requested recommendations in the second or third year of your program—say, for a grant or a research fellowship application. These are easy letters to write because they only call for a belief in the candidate's potential achievements, not a discussion of actual achievements; yet they do require that the writer be able to say a few specific things, and adding to them later on so as to turn the letter into a proper recommendation for the job market will be less work.

A letter of recommendation can be written by someone outside your department. It could be a person with whom you corresponded about your work, or met at a conference where you presented it, and who commented on it in complimentary terms, beyond what politeness seemed to require. It speaks well of a student that his or her work is already known beyond his or her own department. If the person has initiated an exchange with you, there is a much better chance that the person is sincere. Your advisor may have independent confirmation of the good opinion that the person has of you. If you have taught outside your university, a letter from that institution could also offer independent and credible testimony on how well you fulfilled your obligations.

Research statement Although in your résumé, you may precede the description of your various papers with a short paragraph unifying them in a general research statement, a more substantial and separate statement may also be included with the application. This could be an important document, since it will help the committee grasp the scope of your research program, the significance of what you have accomplished, and your ambitions.

5.3 Mock Interviews

Most departments arrange mock interviews. The practice is extremely valuable. Do not miss it. You will be surprised how intimidating it is to suddenly face a row of your professors, even though you have taken classes from most of them and have often interacted with them since, and the interview occurs within the confines of your own department. The committee will stay in character during the entire interview and will give you feedback only when it is complete. That is how you should approach the experience too: pretending that it is the real thing. You may be asked tough questions. Be grateful. If your department arranges for several interviews for each student that day, you will probably notice a significant improvement in the way you handle them as you go from one to the next. This is certainly what we observe on our side; the learning curve is very steep.

For practice, put yourself in the shoes of your interviewers, and make a list of questions that they could ask. At various points when developing your work, you were forced to make assumptions that you would have preferred not making, but you have since forgotten about them. Your interviewer may hone in on those, however, and challenge you. Refresh your memory and stand ready to justify why you proceeded as you did.

5.4 Where to Apply

Just like a high school student applying to college in the United States, you should have "reach schools" (where your chances of getting a job are limited), "target schools" (from which you can legitimately expect interest), and "safety schools" (schools that will be lucky to get you).

Schools in your home country will be particular significant to you, but you have to be careful in approaching them or in responding to their inquiries. Even if you eventually want to return home, starting your career in a top university is very beneficial. It will allow you to make connections that will be a useful resource to you throughout your career, and to experience academic life as a faculty member and not as a student. So, do not antagonize your home universities by feigning interest if you have none at that point. The U.S. academic market is much larger than most markets—in fact, significantly larger than all others—and there may be only a handful of universities in your home country where you would like to end up. Do not ruin your chances by behaving inconsiderately.

In particular, if you get a job offer from a prestigious U.S. university that dominates them, do not string them along. If a school in your home country has scheduled you for a fly-out, let them know that you will most likely accept the offer you have just received. They may or may not cancel the fly-out. For them too, a long-term relationship is at stake here, and they may want to take advantage of the opportunity to get to know you at that point. Whether or not you inform them of the offer you have received, they will eventually know about it. If you don't volunteer the information, it will be obvious to them when they do that your main objective was to get a free trip home.

Until an offer is officially confirmed, you should go on with your job search. A phone call from a chair that a department has voted to make you an offer is not enough to remove yourself from consideration at other schools, whether or not in your estimation they are less desirable. Offers have to be approved by university administrations, and issues sometimes occur that cause delays or even derail the process. You need to get a letter confirming the offer. Each offer comes with an expiration date. You should inform of this offer any school that you have visited and that you would prefer.

There is in general no good reason to apply to a department whose offer you know for sure you will decline.

Many schools will hire with no field constraint and search for the best possible candidate. When a school advertises in a specific field, understand the job description broadly.

Most schools will not hire their own graduates (at least not initially), and that is good for both sides. Your professional development requires that you move on.

In any case, there remain plenty of schools where your candidacy is legitimate. JOE (Job Openings for Economists) is the place where you will find all positions advertised, but there are other sources.

5.5 Early Fly-Outs

You may be offered a fly-out before the ASSA meeting, without a face-to-face interview or with only a phone interview. Indeed, some schools pursue their preferred candidates aggressively, inviting them for campus visits in December. Early interest from a school certainly signals that you will be particularly welcome there, and you should keep that in mind when making your final decision. But you should consider with care an invitation for a fly-out before the main market activities, no matter how flattering. Accepting it may be counterproductive if you are not fully ready. In the course of the ASSA interviews, you will have to deal with a whole gamut of questions about your work, many of which will likely come up again during your campus visits. Giving good answers during these visits matters the most. The ASSA interviews will give you the opportunity to practice and polish your answers. You deprive yourself of the experience by accepting an early fly-out. In any case, the department that invited you early will not withdraw the offer to visit if you indicate preferring a fly-out after the ASSA meeting. The department is also unlikely to extend an offer to you before the ASSA process takes its course, even if you did well when you visited. You are unlikely to accept such an offer before knowing what your opportunities are.

5.6 Interviews at the ASSA Meeting

Logistics If your first interview is at 1:00 p.m on Thursday, do not plan to arrive that same morning. You should arrive on Wednesday. The ASSA meetings always occur in early January, when weather disruptions are frequent. Your plane may be delayed or even canceled. You may miss a whole day of interviews. Arriving early will eliminate the risk of having to reschedule interviews. Rescheduling may not be possible anyway; even if it is, you may end up facing a reduced committee, or squeezing an interview tightly between two others, delivering three mediocre performances. Also, you will be more tired from travel, which will negatively affect how well you do. Finally, you need to study the map of the city where the meeting is held, identify where the hotels are and where your interviews will take place, and review their entrances and elevators.

Be on time for each interview. Do not underestimate how long it takes to come down from the twentieth floor of one building and climb up to the twenty-fifth floor of the building on the adjacent block; elevators will be packed with hundreds of people negotiating overlapping itineraries. A five-minute wait for an elevator is not uncommon. Half an hour between two interviews is barely enough unless they are in the same hotel. You also need to reflect on the interview you just had before jumping into the next one. You have to collect your thoughts or yourself if things did not go well, and indeed, some interviews are likely to not go well. Be ready for that and do not get too upset. If possible, schedule one hour between two successive interviews.

Interviews take place in hotel rooms, in the living room of a suite, or in an ordinary room. You will be offered a chair and a glass of water but some of your interviewers will be sitting on the bed; the circumstances will definitely be awkward. Some schools will conduct several interviews in parallel, their faculty being divided in groups assigned to different fields. One group may be in the living room of a suite, and the other in the bedroom. Your interview may be disrupted by loud conversation next door or bursts of laughter. The TV could even be on.

Some interviews take place at interview tables in a reception hall.

Your interviewers will often be dressed casually, but you should not, although I do not see the need to wear a suit, except when you interview with a business school. (Some disagree with me on this point and would recommend the suit.)

Get an idea ahead of time of the composition of the committee, to help you pitch your presentation at the most appropriate level. Often you will have been sent the names of your interviewers (although last-minute additions or subtractions to committees are frequent). Consult their web page, identify their fields, check the relevance of your work to the papers they may have written. An interview may start with questions asked by a committee member who has perceived a connection between his or her work and yours. Being able to talk about this connection will be a very good way to begin a meaningful conversation.

Types of questions you face To prepare yourself, make a list of, say, one hundred questions (I really don't think that it's too many) that an interviewer may ask you. Prepare answers.

In a job interview, there will often be at least one member of the committee whose main field is the same as yours, but sometimes there will be none. Addressing a mixed audience requires particular skills. The same comment applies to your job talk, since it will be attended by the entire department, and most of the audience will be quite unfamiliar with your field. Also, do not assume that they have read your paper. However, on most committees, someone will have read enough of it to be able to ask you specific questions.

In a heterogeneous committee, one person—whoever is closest to your field—will typically take charge of the interview, with the others limiting themselves to the occasional follow-up questions, and to general questions. If the committee is composed entirely of people in your area, questions will come from all of its members.

Facing a heterogeneous committee, there is no way you can pitch your presentation at a level that will fully satisfy everyone. That is not your fault and everybody understands the difficulty. Start without technical jargon, but be ready to go into technical details if asked. You may well lose some of the committee then, but that is acceptable if it is in response to a specific line of questioning pursued by one of its members.

Most of the questions that you will face will concern your job market paper. A paper is an answer to a question: "What is that question?" You will also be asked what your paper means to the field: "What are the most significant points of your job market paper?" You claim that your results are important: then, "How will it influence the way people think about the subject and affect the direction of future research?" Some questions will address very specific aspects of your job market paper and will be quite technical, but you will also be asked questions that go beyond the work you have done: "What is the next step in your research program?" The committee does not expect you to stick to this program—one needs to have the flexibility to adjust a research program as it develops—but it is nevertheless good to have a vision of where to go.

Other questions will be meant to test how quick you are on your feet. Some will be provocative and perhaps sound aggressive: "What is the weakest part of your job market paper?" "Which assumptions are you the least comfortable with?" "Which dataset would you have preferred working with?" The committee wants to see that you have the ability to put yourself above your work, that you have perspective and can recognize its limitations, and that you have enough self-confidence and modesty to discuss how your paper can be improved.

Your interviewers will want to find out how broad your knowledge of economics is: "What interesting papers have you read lately?" The committee expects more than the classic references in the field or the two or three papers that obviously inspired your dissertation. They want to see that you have an active interest in economics as a whole. Citing only those sources will not help convince them that it is the case. Some subjects are amenable to high-quality research without much appreciation for economics as a whole being needed; a good mathematics or computer science background may suffice. One of the purposes of this kind of questioning is to figure out how much of an economist you really are. At the faculty meetings where offers are decided, the intellectual "externalities" that various candidates are likely to generate are always mentioned and debated.

Some of the questions do not have right and wrong answers. Your interviewers want to see what strategy you would follow in addressing them. If you are stumped, admit it. Do try to address the question; you may be able to provide elements of a possible answer. If the complete answer eludes you, recognize the fact and accept it. Being defensive in an interview or during your job talk is always perceived badly. Pretending you know when you don't is the worse thing you can do.

Be attuned to the reactions of the committee and make adjustments in what you say, and how you say it, as a function of what you observe.

In answering questions, you will often have to make choices to go one route or another. When in doubt about whether you should state a definition or describe a previous finding, simply ask your committee what they would prefer. Ask "Would you like me to state the definition?" and "Should I give you the intuition for the proof?" and "What about another application?" These invitations will shift some of the burden of the exchange onto them. The questions will force them, and help them, to get involved.

Too often candidates launch into a high-speed recitation of all the details of their models. Don't. You will soon have done your spiel so many times that it will certainly be the easy course of action. But the goal is not to cram into the half hour of the interview complete descriptions of the three essays in your dissertation. Rather, it is to engage the committee in a conversation about your research. When you talk to a friend about your work, you would not embark in an enumeration of all of your assumptions. She will quickly lose interest. You need to intrigue her with some question that she can understand, and impress upon her that the question is important and your answers interesting and not obvious. She will listen if given the opportunity to interact, to ask questions. By inviting her to question you, you are more likely to keep her interested long enough for you to be able to communicate what your research is about.

In summary, a conversation, not a recitation, is what a successful interview is. If it is an exchange, a give-and-take with the committee, they will already perceive you as a colleague, and not as a student. The key is engaging them.

Your questions to them In the last few minutes of the interview, the committee may invite you to ask questions about their department. Students often answer that they already know a lot about it by consulting its web page. I find that to be a very acceptable answer. At that point, too little time remains to have a meaningful conversation about the issues that you will want to be clarified if you are offered a job.

It is certainly true that not all issues that you are legitimately curious about are discussed on a department's web page. Your salary is one of them, but you can't bring that up. However, you can ask about terms of employment that would enhance your professional development. Examples are whether course release is offered in the first year of an appointment, whether one-semester leaves are awarded at the beginning of the second contract, whether junior faculty are involved in organizing workshops, and whether joint teaching is possible or encouraged.

Fly-outs are a much better occasion for you to ask the multiple questions of this type. And many more can be asked after you receive an offer. Then, you need to fully understand the terms of your contract. You can also attempt to influence them. Hard bargaining on your part will not make a good impression, but as economists, we also know and accept that you will be looking for the best opportunity for yourself.

You should address your interviewers as Professors, unless they suggest otherwise.

From the interviews on, there is little that your advisor can do for you. At that point, schools will make their decision about you on the basis of what they have read of your work and of how you conducted yourself in the interviews and fly-outs. You are essentially on your own.

5.7 Campus Visits

When you receive an invitation for a fly-out, call or email schools in the neighborhood (in same state, say, if you fly from across the country) that have interviewed you to ask if they would like to take advantage of your proximity to offer you a campus visit. It is proper for you to do so. They will save money and it will be less stress for you. Don't underestimate how trying the process will be. Avoid unnecessary travel. Resist the temptation to accumulate miles on your frequent-flier program.

Before each campus visit, return to the web page of the department and learn in greater depth than at the interview stage about its faculty, its prominent professors, its seminar series, and its strengths and weaknesses.

You will be scheduled to meet many members of the faculty. Most of the professors in your field will be on your list, but there will be some in other fields. You will also meet the chair of the department and the dean of the college. Each appointment will usually last for half an hour. You will be asked again about your work, but you also will often be told about the department and the university. Your schedule is likely to include some preparation time (half an hour) to allow you to collect your thoughts before the seminar. If the interview that precedes this important time-out runs late, point it out so that it does not impinge on it too much. However, if the conversation is going well, pursue it; it may mean that one more person will speak favorably of you when the faculty meets to discuss offers. Also, ask to check the equipment before your seminar. It always takes a few minutes for the room to be ready. Up to five minutes is not rare. The seminar will almost always last an hour and a half, but in some departments, an hour and a quarter is the tradition.

You will have lunch with a group of two to four faculty members and dinner with another group of similar size. Meals will be a quite different experience. Your potential colleagues will try to learn a little more about you as a person. They may ask what your hobbies are, whether you like country music or cross-country skiing. After all, many years of daily interactions are at stake. They will also begin to advertise their department and their city. If you are single, you can be sure that it has an exciting night life, and if you have a family, that it is a great place to raise kids. You will be told what it offers along the lines of the nonacademic interests you have indicated. However, stay focused and alert. Your paper, your research, and economics in general will be discussed. You may not remember what you ate that day, even though you will be taken to a nice restaurant.

6 Dissertation Defense

How do you know if you are ready to defend? By the time you are on the market, you have completed at least two, often three, papers. Thus, it is natural to expect that you will be done by the end of that academic year, certainly by the end of the summer. It is really desirable that you defend before you take your position, so as to better focus on settling down, preparing your first lectures, submitting your papers, and so on. It will be hard to finish at the same time that you are dealing with these issues. So, when you are back from your fly-outs, talk to your advisor about scheduling your defense. (Some employers make your title depend on whether you have been granted your degree, and there might financial incentives in your contract.)

6.1 Committee

Apart from the chair of the examination committee, who is usually selected by the central administration of your university, the composition of the committee is usually up to you and your advisor. In most schools, by rule, the chair is not a member of your department, but in some schools, the chair is the advisor.

Your committee may have to be formed early on, after you pass the qualifying exams, and all members of the committee will then follow you as your research develops. Formal steps may be taken along the way—you will have to prepare a progress report and present it to the committee, or there may be a "pre-defense" that is attended by the outside members—ensuring everyone's involvement. Most likely however only one person, your advisor, will follow your work closely. The other committee members will be recruited at the very end of the process, when the dissertation committee is formed and your defense scheduled (a few weeks before the defense itself).

Your advisor is automatically a member (except in some rare instances). As for the other members, ask faculty who have helped you with your work. If no one except your advisor has given you comments, think of faculty whose courses you have taken, especially if these courses have been particularly relevant to your research and if you have done well in them. Approach your committee members several months ahead of the defense, because it is not easy to satisfy the multiple schedule constraints faced by all members of a committee. This is especially so in the summer when your defense may well be held. Also, the further off the defense is, the less of a perceived commitment it is to the faculty you approach, thereby increasing your chance of a positive answer to your request. Inquire about the blackout periods when no defense can take place—they occur mainly during the summer—and plan accordingly.

6.2 Defense

The format of the defense varies from department to department, even within a given university. Its length is up to the chair of the committee. Also, the chair has some latitude in how he or she runs it. However, most chairs open the meeting by inquiring about the traditions of the candidate's department and follow them.

Most often, there is no public lecture. A defense usually consists of a short presentation by the candidate (twenty minutes to half an hour, but it can last as little as ten minutes), followed by questions asked in turn by the members of the committee. The central administration sometimes recommends that these questions be asked by the committee members in the reverse order of their intellectual proximity to, or involvement with, the candidate, starting with the outside reader and ending with the advisor. Each is given fifteen to twenty minutes, so that the entire exam lasts approximately two hours. These individual question periods vary widely, however. Some committee members may use the whole time allotted to them; others may only ask a couple of questions. Your advisor will rarely ask more than a few, and may not ask any, having had the opportunity to do so for several years already. The chair often asks none, but may ask some. Clarifying questions and interruptions from any member of the committee may occur at any point. As in job market interviews, the first question is likely to be: "What have you achieved in your thesis, and what is its significance?"

A PhD defense is always successful because the system is designed that way. By the time you defend, you are ready. Your advisor will not let you register for your defense until he or she thinks you are. Also, in most universities, the committee members have received the document several weeks ahead and have had the opportunity to request changes that they feel are needed. Outside readers are sometimes required to write a report beforehand signifying their approval of your work. Committee members are asked ahead of the defense if they see any reason why it should not be held. Any serious objection should be raised at that stage.

At the beginning of the defense, you will be asked to step out of the room for a few minutes as the committee reviews procedural matters. At the end of the question period, you will be asked to step out of the room again, also for a few minutes, as the committee deliberates. The deliberations may last longer than a few minutes, however, but not necessarily because of any doubt the committee members have about your deserving the diploma. The most common issue concerns the changes to ask you to make. Should you be required to clarify a proof, give better motivation for a hypothesis, add an example or a diagram, run some additional regressions? Sometimes the issue of a distinction to be awarded arises, or perhaps of a prize for which you could be nominated. University gossip may also be exchanged. The point is that there is nothing to worry about. You will eventually be called back into the room and offered the congratulations of the committee.

You may be asked to make changes in the days that precede the defense. During the defense itself, issues will come up that require additional modifications, as just discussed. Some members of the committee may have annotated your dissertation when reading it, and they will hand you their copies. You should visit them in their offices in the following days to thank them for their participation, and ask if they have additional suggestions for improvements.

You have a few weeks to make these changes before you deliver the final version of your dissertation to the registrar. If they are substantial enough, the chair may ask your advisor to sign off on them. Do not plan to leave campus until these few weeks have passed.

Before returning home for a well-deserved vacation, spend a few days exploring the city where you will live, and get the advice of your future colleagues as to where to rent an apartment for the next academic year.

At the end of the summer, arrive on the campus of your new university a week or two before school starts.

Congratulations, and welcome to the labor force.

Reference

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