

The Senior Thesis Experience

Adriano Fernandes, Class of 2016

I intend here to share lessons taken from my experience of writing an Honors Senior Thesis in the Department of Economics. I do NOT propose to write a guideline of how to succeed in the thesis experience (in which I mean finishing it.) I am a firm believer that such an experience is highly subjective, tailored to particular tastes and schedules of those who engage themselves in the dissertation process.

The process began in my Junior Spring. I was taking a seminar, thinking about course materials that I had encountered, and trying to figure out how I could adapt or propose an empirical analysis of a theoretical framework. I had been interested in Financial Economics, and taking Prof. Woodford's Cognitive Mechanisms and Economic Behavior course consolidated my interest in Behavioral Finance. I had found a possible area to explore. Thus, I recommend that those willing to write a thesis think carefully about all the courses they have taken, or the research they have conducted: has someone really caught your attention? Did you become passionate about it? Did you completely buy the idea after exercising sufficient skepticism? If so, you have found a good area.

After my summer internship, I started to read papers on my area of research that I found interesting. Those were mainly in Behavioral Finance, Empirical Finance, and Time Series Econometrics. I read several papers during this time, for I was still trying to select an area to focus. When I thought I had three solid ideas, I contacted three professors I thought I would be able to work with. Two of them promptly replied and, once reading my proposals, accepted to be my advisors before the submission of the thesis application was due. Hence, firstly, I believe that taking your time to write a **thoughtful, in-depth application** will already give you a flavor of what you will constantly be doing over the year: drawing inspiration and methodologies from the literature. Secondly, **finding an advisor** and indicating it in your application is very favorable: it ensures you will be paired with a faculty member that not only knows you (and that hopefully you know enough whether to know he is a good advisor – PhD students can be a good source of information on that,) but also has some interest on your project.

A note on topic selection: if you are thinking of **theoretical work**, be advised that you are expected to be able to learn techniques (normally, mathematical) that will allow to develop your original theoretical work. If you haven't been a fan of the theoretical models you studied, maybe it is not a good idea to go into theory. Moreover, make sure the advisor you approach is a theorist. Nothing against empirical work, but a theorist will better understand the difficulties you face: when your models don't seem to deliver good results, when you are stuck in a particular part of the model, when you cannot interpret what your model is producing (and, sometimes, you really can't, and it is extremely helpful when they tell you so,) etc. Moreover, though writing beautiful mathematical models can be entertaining, oftentimes the very own nature of the literature does not satisfy itself only with theory. For instance, if you propose a model to explain the equity risk premium, given that this phenomenon is an inherently quantitative puzzle, your model should be empirically tested. Same if you came up with a new econometric estimator, for instance.

If you are thinking of **empirical work**, then your main concern should be **data**. Data can be hard to get: sometimes what you want is scattered around many datasets, and you have to consolidate those into your own dataset. Or it might be the case that the dataset that you need

does not exist, in which case you have to create it (for instance, Siran Jiang went over multiple annual reports and legal settlements to create her dataset on legal settlements of generic patents.) It can also be the case that your dataset is extremely expensive, and you do not have funds to buy it. It is better to think of those issues early on. Finding the econometric technique is then a matter of researching, and hopefully your advisor and your literature review will guide you towards a good model.

So you have been granted the opportunity to write a thesis, congratulations! Now the real work starts. Immediately work on your **literature review**. First, because it will give you an assessment of what is the level of difficulty of what you are exploring. If you need to learn a new technique, theoretical or empirical, you want to do it as early as possible. It also makes a good first draft of your thesis, especially if you situate your work within the literature.

If you are writing **theory**, start your model early. My first model was just an extension of a pre-existing model in the literature. Over the year, it evolved to a novel model, with no literature precedents, and much more complicated than the original work I had started with. My advisor had written extensive theory, and always gave me detailed feedback: on the assumptions I was making, on the results that mattered most, and even sometimes in what looked “weird,” which could signal something was off (for example, maybe an algebra mistake.) Having an advisor that does theory allows you to have access to someone that has the knack for theory that you probably won’t have. Moreover, it is important to realize that you **will get stuck**.

Sometimes, you don’t know how to manipulate the model as to obtain expressions that you can interpret, you can’t further simplify the model without questionable assumptions, or even you don’t fully understand the mathematical tools to deepen your model, in which case you need time to study these techniques. In my case, I learned dynamic programming, specific stochastic processes, asset pricing theory (which uses some peculiar mathematical techniques,) and even Generalized Method of Moments for my model empirical analysis. You need time to fix all those things.

If you are doing **empirical work**, start cleaning your data and figuring your model early. Even if you are doing theory and then you go on to test your model, once you are done with modeling, you will need to know how you need your data to be like, and what empirical strategy you will use. Mostly because, even when you have your dataset ready, and you know what models you will try, there are too many degrees of freedom in estimating a model. For instance, if you are estimating some variation of a regression model, there are different choices of independent variables and dependent variables, different standard errors, different tests, etc. I personally estimated over 500 GMM models to choose what I was going to present.

So you have been writing your model/cleaning your data, and starting to run some models. Do not forget to **write**. Writing what you do, even if you will later cut it when coming up with your final thesis, will make it easier to consolidate the project. Though you will have progressions to turn in, some people do not turn theirs in consistently, and are faced with writing 50 pages shortly before the deadline.

A few leftover topics that haven’t been touched on:

- Relationship with you Advisor: you should be comfortable to speaking with your advisor about your project; You will likely want his help at points; Moreover, be cognizant of your advisor’s time: send substantial material for review, meet when you have substantial material to discuss, etc. They will appreciate it, and it will

force you to refine your work as much as you can by yourself before turning to the helping hand;

- Time Management: The Fall semester is slow; I wish I had worked more during the Fall; the Spring semester will be invariably tough: there is a lot to do, there is the need to finish, and you can't drop at this point (if you haven't taken a seminar previously and still want to graduate;) Not to scare you, but most people exhaust themselves in the 2 last weeks before the final deadline, when you also have to do your final presentation;
- Support: your friends are here for you. Your advisor should be there for you. Make sure you take care of yourself. Thesis is a demanding and stressful process. It is not like doing a casual research assistant position or writing original research when you are tenured. There is the pressure. There are no co-authors. There is a deadline. You will get a grade. You will at times feel extremely frustrated and not want to continue. Persevere. And ask for your friends' support. I wouldn't have finished without my advisor and my friends telling me I could do it.

Mind yourself of why the "Honors" is attached. You are expected to produce work that should get you "Honors" as an undergraduate. That does not mean you need to write a third-year PhD paper, but the expectations are going to be higher than running some regressions and reporting results on some dataset... The expectations can also be misaligned sometimes: your advisor might think of your project as something that will force you to go after that 3rd year PhD paper level at times, though you are just expected to produce an undergraduate-level work. Embrace it, push yourself as much as you can, and be honest when you have reached your limits. All in all, I hope this can help you to understand what are the main challenges you will face in writing an Honors Thesis.