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To: Senior economic majors

From: Raphael Schoenle, Senior Honor Thesis Coordinator

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Subject: Preparing a senior thesis proposal

Should you be considering dedicating a portion of your senior year to writing a senior thesis, as you prepare your thesis proposal, you will find it helpful to read this and to study the attached proposals that have motivated thesis research in previous years. Before discussing certain key features of a well-structured thesis proposal, let me explain, or remind you of, the following:

- In order to participate in and complete the Senior Thesis Program, you will need to enroll in ECON 99a in the fall semester and 99b in the spring semester.
- You should have identified one or more faculty members in either the Economics Department and/or IBS who can potentially assist you with your thesis research. Ideally, you have had or will soon begin discussions with that person or persons about the content of a formal proposal.
- Your proposal will need to be submitted to me by **Friday, September 2nd by 5 pm.** The proposal should identify the faculty member(s) with whom you have discussed the proposal.
- Based on the content of your proposal and discussion with our faculty, I will assign a lead advisor and propose a second reader for the thesis. Eventually, you will require a third reader, outside the Economics Department, to round out your committee.

Once you have registered for ECON 99a, you will have access to the Latte website for the course. The website includes a rather complete accounting of the requirements, procedures, and dates for the thesis program. It also identifies the teaching assistant who will be assisting the senior thesis students with econometrics-related issues. Finally, the website includes links with a number of sources, including data sources that you may find helpful in carrying out your thesis.

This communication include four prior thesis proposals. (The names of the students are anonymous.) These proposals share several common features. The proposals:

- Are motivated by a question. In the first two proposals, the question is explicit (i.e., followed by a question mark); as second best, the question is implicitly set forth in the second two proposals. I strongly propose that you motivate your thesis research with an explicit question. With an explicit motivating question, you can more easily scan materials to determine if they serve to answer your research question – or not. As you prepare a model, conduct regression analysis, and write your thesis and results, you can consistently ask yourself if you are in fact presenting analysis and evidence that answers your central question. Of course, it is likely that as you get deeper into your research, your motivating research question will itself evolve.
- Set forth a methodology. With or without the help of a prospective advisor, you should attempt to locate and cite relevant research that may guide your own research methodology.
- Identify relevant data sources that will enable the analysis.
- Are clear and reasonably well written.

Note that all of the four attached prospectus' are proposing applied research projects, involving the use of econometric methods to test a hypothesis. While the vast majority of our senior thesis projects are of this form, there are two other research approaches that are worthy of consideration. These are:

- Behavioral economics. Behavioral economics studies the effects of cognitive, emotional, cultural and social factors on the economic decisions of individuals and institutions. Since this type of research often requires experiments with human subjects in a laboratory setting, you may wish to consult with a faculty member in the Psychology Department.
- Theory. It is possible that in your economics training at Brandeis, questions have arisen that do not appear to be satisfactorily addressed in the literature. The challenge of a theory project is that: 1) it often requires far more training in mathematics than that which is typical of our seniors and 2) you need to know quite a bit about the subject before understanding where your own research may be productive and useful for the field.

Should you have any questions, please feel free to contact me.

Title: Pricing agricultural products and profit maximization for farmers and retailers: the case of Ethiopian Commodity Exchange market

Introduction:

ECX is the first institution in Africa, located in Addis Ababa, Ethiopia, to start the commodity exchange market that serves all actors (farmers, traders, processors, exporters, consumers). It trades coffee, Sesame, maize, wheat and Haricot Beans. It has grown enormously since its opening in April 2008. There are current projects to expand it to other African countries as well.

Research Question:

Ethiopia being a dominantly agrarian economy, how has the price for its main agricultural products being determined before and after ECX started working. How has it been benefiting farmers and merchants in terms of efficiency, and profit maximization?

Methodology:

I plan to use quantitative and qualitative methods to explore my research question. I will be using primary data from ECX and other secondary resources from previously done researches to understand the market; what products are marketed and how their prices are determined. I will also explore how product prices were determined before this market emerged.

I will then evaluate how this market has performed by using time series data by exploring profits and other efficiency benefits to everyone involved in the trading.

I will use the methods I learned in Microeconomics as well as Econometrics to analyze the data I find and hopefully come up with a conclusion that could motivate me to do more research in the future.

An Agent Based Approach to the Dynamics of Forecast Heterogeneity

I propose to use Agent-Based Computational Economics (ACE) methodology to investigate the price dynamics of asset markets with heterogeneous agents. In particular, I propose to extend existing ACE models to investigate heterogeneity in the way that agents forecast risk and returns. Previous ACE research on asset markets has taken a similar approach to investigating agent heterogeneity [1] but has not adequately explored the effect of heterogeneous forecasting regimes on influencing market dynamics.

My interest in the modeling of financial markets began in the summer of 2016 when I worked with Professor Blake LeBaron on a project for the Institute for New Economic Thinking. The purpose of the project was to create and compile open-source software and curricular materials designed to facilitate learning and understanding of the comparative features of a set of simple Agent-Based Financial Models by a new generation of economic researchers. Through this experience I developed the technical skills to implement theoretical ACE models into computational simulations. In addition, I received a broad overview of existing ACE research, which exposed the need to investigate the role of forecast heterogeneity in financial markets.

The question my thesis will address is: How does heterogeneity in the way that agents form market forecasts affect the dynamics of simple agent based models and are these dynamics reflected in aggregated returns and forecasting data? To answer this question I will first develop and simulate an agent based model in the same vein as the model discussed in LeBaron (2014)[2] with the potential augmentation that agents will choose between a set of variance forecasting strategies. Important aspects of the model that need to be clarified before programming can begin include identification of a set of risk forecasting strategies and the metric that informs the adaptive rule selection, or each agent's choice of forecasting rule in each period.

I will then test the behavior of my model against quarterly survey data measuring the risk forecasts of CFOs and an extensive data set measuring U.S stock returns. The Duke Fuqua School of Business conducts a quarterly survey of CFOs, which includes estimates of one year and ten year forecasts of S&P 500 returns and standard deviations. The data set on stock returns has been constructed by merging data from The Center for Research in Security Prices for the period between 1926 and 2012 and from a data set constructed by Robert Shiller for the period between 1871 and 1925. I may also be using volume data, as market volume has the potential to be used as a proxy for general disagreement in a market, and could thereby be a measure of forecast heterogeneity. I will use these data to evaluate the success of my model's ability to explain associations between changes in forecasting regimes and market stability as well as its ability to replicate any empirical regularities of the stock return time series.

1. LeBaron, B. (2002). Short-memory traders and their impact on group learning in financial markets. *Proceedings of the National Academy of Sciences*, 99(suppl 3), 7201-7206.
2. LeBaron, Blake. *Heterogeneous Agents and Long Horizon Features of Asset Prices*. Working paper. Brandeis International Business School, Sept. 2014. Web.

Teacher race and student achievement

In their book *The Price We Pay: Economic and Social Consequences of Inadequate Education* (2007), Clive Belfield and Henry Levin show how costly dropping out of high school is for the dropout and for society, and, conversely, the tremendous benefit society could reap by reducing the dropout rate. Using cost-benefit analysis, they show that there is no trade-off between efficiency and equity in expending more of the public's resources on programs that have been effective at reducing the dropout rate. In particular, they find several pre-kindergarten programs whose students graduated from high school at greater rates than comparable students who did not attend such programs. Their work has contributed to the idea that the best way to improve the prospects of low-income and otherwise disadvantaged children is to intervene as early as possible in their lives. Meanwhile, some researchers have looked for other ways to improve the academic achievement of disadvantaged groups. Using data from Tennessee's Project STAR class-size experiment, Thomas Dee (2004) found that having a teacher of one's own race positively affected a student's achievement in elementary school. Given that finding, perhaps increasing the number of minority elementary school teachers—through especially heavy recruitment, affirmative action, or other means—would be an effective way to increase academic achievement among minority students, another type of early-life intervention that could improve the prospects of disadvantaged children. However, before one jumps to the conclusion that school districts should invest extra resources to recruit and hire more minority teachers, it would be useful to know if the positive effect of having an own-race teacher lasts beyond elementary school. Belfield and Levin found that the pre-K programs impacted their students through high school. Might an own-race teacher early in a child's school career do the same? For my senior honors thesis, I propose to study whether having a teacher of one's own race early in elementary school increases a student's likelihood of graduating from high school. To do so, I plan to use data sets from Tennessee's Project STAR, the same data that Dee used. Project STAR randomly assigned students and teachers to classes of different sizes. This random assignment obviates many difficult econometric issues in trying to sort out causations from correlations. This data is publicly available online from the website of HEROS Inc., a non-profit organization devoted to assessing the impact of programs that affect children and families. I will conduct regression analysis with high school graduation as the dependent variable and teachers' and students' races as the explanatory variables of interest. The STAR data set has information on class size, family income, and other potentially relevant variables. I will also draw heavily on the literature on the significance of teacher race, the economic consequences of dropping out versus graduating high school, and Project STAR itself.

**One thing I have added since I submitted my proposal: I also plan to look at the lasting effects of class size, using number of students in the class, or a binary variable of whether the student was in a small class, as another explanatory variable of interest.

Senior Thesis Proposal

For my senior thesis I would like to examine the effects of the 2006 Massachusetts HealthCare Reform as it relates to the change in reported unplanned pregnancy amongst young adults. The HealthCare Reform widely increased the availability of contraceptives by mandating insurance companies to both cover the cost of contraceptives and allow for dependent coverage up to age 26. My objective will be to determine the effects of these mandates on unplanned pregnancy rates across several categorizations. I would like to use a difference-in-differences model with a “treatment group” that is included in the dependent coverage age range and a “control group” just outside this age range. I would then like to examine each group by marital status, socio-economic status and race/ethnicity to determine the change in unplanned pregnancy rates specific to each group. Though this is the general subject I would like to research for my senior thesis, I understand that depending on the nature of available data sets, the focus and/or methodology of my proposal is subject to change.

My interest in this subject is derived from both hot button topics in the current landscape of American politics and a personal belief in implementing and teaching “safe sex” education to America’s youth. Moreover, this research—specific to Massachusetts—could have implications on a national scale as the Massachusetts Health Care Reform served as a model for many of the policies included in the Affordable Care Act (ACA), making it a good basis for comparison. My decision to study effects of the 2006 Massachusetts reform, rather than the larger scale ACA effects, is two-fold: one is the availability of government surveys and data sets I would need to undergo my research and the other is the longevity (and therefore volume of information) of the Massachusetts reform as compared to the national reform. Despite my Massachusetts focus, I believe that this research is well motivated as it can have relevance and scope on a national level.

Currently enrolled in HS104B: American HealthCare and hope to gain more incite on this matter through the class in addition to my independent research