COLLEGE OF LIBERAL ARTS

TEXAS A&M UNIVERSITY

Department of Economics

December 9, 2019

Dear Selection Committee,

I am applying for your consideration to attend the Behavioral Macroeconomics Research Boot Camp in March 2020.

I am a a 5th-year Ph.D. student at Texas A&M University. I use both experimental and empirical methods to study the effectiveness of existing and emerging monetary policy tools. Using empirical methods allows me to study the real-world implications of policies past and present via macro-econometric analysis of aggregate data. I rely on the laboratory to study questions that I cannot answer using standard macro-econometric approaches. For example, I use the laboratory to observe equilibrium selection, study expectations formation, learn the heuristics underlying important economic decisions, compare the efficacy of alternative policies, and explore the robustness of a particular policy intervention.

My recent research investigates the ability of monetary policy, central bank communication, and macroeconomic projections to stabilize and guide expectations and markets.

My primary motivations for attending this workshop are furthering my knowledge of behavioral economics and developing relationships with like-minded peers with whom I can collaborate on future research.

Catherine Eckel (ceckel@tamu.edu) will send my letter of recommendation.

Thank you for your time and consideration.

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Ryan Rholes

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Education

Texas A&M University

Ph.D. in Economics — Aug. 2020 (Expected)
Advisor: Catherine Eckel
Committee Members: Luba Petersen and Sarah Zubairy

Texas State University

Honors B.B.A. in Economics — Jan. 2012 – Dec. 2014

Honors B.S. Mathematics — Jan. 2012 – May 2015

Prior Work Experience

United States Marine Corps — Aug. 2007 – Aug. 2011

Research Fields

Empirical Macroeconomics, Behavioral/Experimental Macroeconomics

Academic Awards/Grants

- NSF Doctoral Dissertation Improvement Award (Spring 2019 — Co-P.I.)
  P.I: Catherine Eckel, Co-P.I: Luba Petersen
- Dr. John Van Huyck Fellowship, Texas A&M (2018)
- Private Enterprise Research Center E. Ralph Daniel Fellowship, Texas A&M (Summer 2017)
- Vision 2020 Fellowship, Texas A&M (2015)
- Diversity Fellowship, Texas A&M (2015)
- Merit Fellowship, Texas A&M (2015)

Teaching Experience

Instructor

- Intermediate Macroeconomics, Summer 2019

Research Assistant

- Tatevik Sekhposyan, Fall 2019

Teaching Assistant

- Econometrics, Dr. Haeshin Hwang, Spring 2019
- Econometrics, Dr. George Naufal, Fall 2018
- Macroeconomic Theory (graduate), Dr. Pedro Bento, Spring 2018
- Econometrics, Dr. Yonghong An, Spring 2017
- Intermediate Macroeconomics, Dr. Sarah Zubairy, Fall 2017
- Econometrics, Dr. George Nafaul, Fall 2016

• Conference Presentations

- Experimental Science Association - North American Meetings , 2019
- Texas Experimental Association Symposium, 2018 & 2019
- Economic Science Association World Meeting, 2018

Workshops

- 7th Spring School in Behavioral Economics, 2019
- 23rd Annual iFREE Graduate Student Workshop, 2018
- 8th Annual Experimental Macroeconomics Workshop, 2017
- SPUDM Workshop on Machine Learning, 2017

Completed PhD Courses

- Econometric Theory 1 & 2
- Microeconomic Theory 1& 2
- Macroeconomic Theory 1& 2
- Public Economic 1 & 2
- Advanced Macroeconomics 1 & 2
- Experimental Economics
- Behavioral Game Theory

Research

"Escaping Secular Stagnation with Unconventional Policy" with Luba Petersen (JMP)

We design a new experimental framework to study policy interventions in secular stagnations and liquidity traps. Our overlapping-generations framework is built on the model of secular stagnation by Eggertsson, Mehrotra, and Robbins (2019) where monetary policy is limited by the existence of a binding zero lower bound. We observe that participants are able to coordinate on high inflation full-employment equilibria. Permanent exogenous deleveraging shocks induce pessimistic expectations that precipitate persistently deflationary episodes. We currently explore two policies aimed at re-anchoring expectations and the economy on the high inflation steady state. Permanently increasing the central bank's inflation target is insufficient to generate inflationary expectations. Eliminating the zero lower bound, on the other hand, is consistently effective at stimulating spending and generating the necessary inflation for the economies to escape the zero lower bound. Our findings suggest that inflation expectations and demand are more effectively stimulated through realized wealth effects than they are through coordination on rational expectations equilibria.

"Central Bank Density Forecasts and Asset Prices: Do Revisions to Higher-order Moments Matter?" with Tatevik Sekhposyan (Texas A&M University)

This paper considers the Bank of England's density forecasts and their revisions to quantify the effects of information flow on the financial markets. This fits into the broader literature on the effects of macroeconomic news on financial markets. It is, however, interesting also from a monetary policy perspective. Communication and forward guidance, i.e. communicating expected monetary policy actions, are increasingly becoming an important part of the central banks' toolkit around the world. One way a central bank communicates is by publishing its forecasts. The point forecasts and their revisions have been shown to move the market. The effects of the higher moments, however, have not been investigated thoroughly, and

this is primarily due to data limitations. Bank of England, on the other hand, publishes information on its density forecasts since the late 1990s, making it useful for our analysis. Using daily information on the financial markets, we find that the updates of higher moments are at least as important in moving the financial markets as the revisions to the first central moment of the density forecast.

Confidence, Uncertainty, and Central Bank Projections with Luba Petersen (Simon Fraser University)

This paper uses an experimental methodology to study how central bank density forecasts impact expectation formation along several dimensions. Many of the world's central banks abandoned an opaque monetary policy approach in the 1990s and pursued instead operative transparency. Part of this transparency movement was the publication of internal forecasts of important macroeconomic variables. Much theoretical and empirical work has now shown that publishing such forecasts has the benefits of better coordinating market expectations. However, an unexplored area of research is how uncertainty expressed by central authorities in these forecasts influences expectations formation. This project explores the impact of introducing uncertainty into forecasts on the heuristics that people use to form forecasts for macroeconomic variables and also the accuracy of those forecasts. We explore this question using a learning-to-forecast (LFT) framework in a laboratory economy and systematically vary, using a between-subjects design, the information and uncertainty presented to subjects. Novel in this experimental design is the elicitation of participants' own level of forecast uncertainty. This allows us to study how density forecasts, relative to point forecasts or no forecasts, impacts forecasters' own level of forecast confidence. Our preliminary findings suggest that projections do work effectively to guide expectations and stabilize aggregate dynamics. Participants focus on the central bank's point forecasts to form their forecast, regardless of whether it is presented with a density. Density forecasts do, however, reduce forecasters' confidence in their own forecasts.

"The Role and Evolution of Beliefs in an Experimental Labor Market" with Andrea Guido (Institute for Futures Studies, National Research Council) and Alejandro Martinez-Marquina (Stanford University)

This paper studies how beliefs and information contribute to the formation of wage rigidities. We do this by using a laboratory gift exchange setting where we introduce either expansionary or contractionary demand shocks and also vary information about prevailing economic conditions around these shocks. We find under symmetric information conditions that, across the business cycle, the majority of employers either pay a belief-consistent profit maximizing wage or higher. Interestingly, firms who act according to some altruistic or fairness motive and purposefully pay a wage higher than the belief-optimal wage are closer to the ex-post optimal wage following a contractionary shock. However, this same practice makes the firm worse off following an expansionary demand shock. Further, we see that workers self-select into sharing negative shocks and that reactions in both beliefs and effort responses are strong to negative than to positive shocks. If only firms learn about an economic shock (asymmetric information), we see that wages following a contractionary shock decrease considerably less than they do in response to a shock of the same magnitude when both firms and workers learn about the shock. Workers under asymmetric information set lower effort levels on average than workers in symmetric information treatments. This is true even though asymmetric information workers face less severe wage cuts than do workers in symmetric information treatments. Further, we observe that firms in asymmetric information treatments gradually increase post-shock wages toward pre-shock levels. Nevertheless, workers maintain punitively-low post-shock effort levels. This leads to a drastic redistribution of profits that favors workers. Finally, we find evidence of inferential learning. That is, firms become better at understanding the behavior of workers

across parts of the wage distribution never actually experienced by extrapolating from learning that occurs over wages that are actually experienced during game play.

"The Distribution and Evolution of Sectoral Responses to Monetary Policy Shocks"

This paper quantifies the extent of heterogeneity in industry-level responses to aggregate monetary policy shocks and studies how this heterogeneity evolves using both a factor augmented vector autoregression (FAVAR), and a time-varying parameter FAVAR (TVP-FAVAR) estimated using Bayesian methods. Documenting this heterogeneity allows insight into the presence of previously document regional and cross-country differences in the efficacy of monetary policy, and into the redistributive effects of monetary policy. I document a large degree of industry-level heterogeneity and also find that this degree of heterogeneity decreases over time. However, this decrease is not monotonic. Rather, this degree of heterogeneity fluctuates over time, suggesting a cyclical property. I use Bayesian model comparison to explore market conditions and firm characteristics as possible explanations for this heterogeneity and also fluctuations in the distribution of sectoral effects.

"Joint Consumption Smoothing in the Lab" with Logan Miller (University of Arkansas)

Many inter temporal choice problems are solved by groups rather than individuals. Monetary policy is typically set by a committee, companies use collective decision making to guide investment, forecasts are often formed by groups, and decisions about what to buy and how to save are often made by multiple members in a household. This idea of group decision making is even explicitly modeled in some macroeconomic models (for example, the worker-shopper pair a la Lucas and Stokey, 1983). Despite this, macroeconomists studying optimization in an experimental setting almost ubiquitously study the behavior of individuals. Thus, this paper studies the relative ability of individuals and pairs to solve a finite lifecycle problem in the lab. We use a between-subjects design where subjects in both treatments must smooth a stochastic income processes by borrowing and saving. We find that pairs outperform individuals relative to both the unconditionally- and the conditionally-optimal consumption paths. We introduce a novel approach for comparing pair and individual behavior and use this to quantify performance differences. We randomly form synthetic pairs whose per-period consumption decision is the average of each of individual's corresponding consumption decision. We then quantify by how much we can positively handicap decisions of synthetic pairs before real pairs no longer outperform synthetic pairs. On average, we can positively handicap synthetic pairs by about 30\% before we see no difference between synthetic and real pairs using a 10\% significance level. We use the same method to quantify how pairs and individuals improve with experience. We can positively handicap synthetic pairs by approximately 32\% over the first ten periods of play but by approximately 48.5\% in the last ten periods of play. This suggests that pairs may learn more efficiently than individuals. Finally, we document differences in individual and pair consumption heuristics that can help explain this performance gap. Both pairs and individuals primarily make consumption decisions based on a constant marginal propensity to consume (MPC). However, pairs use a relatively higher MPC on average, which leads to fewer and less-severe consumption binges relative to individuals. Further, we find less heterogeneity in pair consumption heuristics relative to individual consumption heuristics.

"Coase Theorem in a Digital World" with Catherine Eckel, Meradee Tangvatcharapong, (both at Texas A&M University) and Jesse Backstrom (University of Chicago)

We test Coase theorem in the laboratory using a 2x2, between-subjects design varying both the mechanism by which we assign property rights (random or contest) and whether the experiment is conducted in a face-to-face or a digital bargaining environment. Our question is whether digitization of the bargaining environment, which ought to reduce transaction costs, introduces behavioral wedges into negotiations that induce inefficiency. We reinforce the assignment of property rights by also using either neutral (with random assignment) or strong language (with the contest treatment) to vary the level of moral ambiguity in the assignment of property rights. We replicate the face-to-face bargaining protocols introduced by Hoff-

man and Spitzer (1982, 1985 — HS hereafter) to form a baseline and then implement those same protocols in a computerized bargaining environment. We first replicate the finding of HS that the random assignment of property rights and moral ambiguity, relative to assignment via a competitive game and no moral ambiguity, yields a higher incidence of equitable final payoff distributions. Further, we find that subjects bargaining in a computerized environment reach efficient (total payoff maximizing) outcomes significantly less often than do subjects who bargain face-to-face. In addition, subjects become significantly more self-regarding whenever negotiating in a computerized environment. Given that efficiency and other-regarding behavior are not invariant to negotiating environment, these results suggest that Coase's theorem may require additional behavioral considerations; in particular, the theorem may lack predictive power whenever negotiations occur under the veil of anonymity.

References

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Ryan Rholes
Texas A&M University

I am a macroeconomics student using a blend of experimental and empirical methods to study the effectiveness of existing and emerging monetary policy tools. Using empirical methods allows me to study the real-world implications of policies past and present via macro econometric analysis of aggregate data. I rely on the laboratory to study questions that I cannot answer using standard macroeconometric approaches. For example, I can use the laboratory to observe equilibrium selection, study how people form expectations, learn the heuristics underlying important economic decisions, compare the efficacy of alternative policies, and explore the robustness of a particular policy intervention.

I am primarily motivated by the recently demonstrated need to better understand the complete monetary policy framework. I am especially interested in the effectiveness of monetary policy at or near the zero lower bound. This is particularly important given that so many developed economies remain at or near the zero lower bound. In particular, my research focuses on policy interventions for economies mired in deflationary traps, on the relationship between expectations and monetary policy, and the role of uncertainty in central bank communications, since each of these are important components of an effective monetary policy framework.

Additionally, I study the role of information frictions and contingent thinking in markets to better understand labor market phenomena associated with recessionary periods. Finally, I use the laboratory to study how groups and individuals make consumption and savings choices in an effort to better understand the strengths and limitations of the micro-foundations of macroeconomic theory.

In future research, I plan to work with Luba Petersen to study negative nominal interest rates as a follow-up to a recent experiment in which her and I showed that negative rates reliably generate sufficient demand to restore economies to a unique, full-employment equilibrium. Subjects in that experiment indicated in a survey of decisions an aversion to negative rates, which aligns with the conventional wisdom that negative rates will likely lead to bank runs and to increased public demand for cash. This is interesting for two reasons. First, a spike in cash demand rather than enduring negative rates means central banks cannot use negative rates as an effective policy tool. Second, the public routinely tolerates inflation, which erodes real wealth similarly to negative interest rates. In fact, the public has routinely tolerated the erosion of real wealth via inflation at rates much higher than those implied by the negative rates we've seen in Europe and that other authorities are now considering. We plan to use a laboratory experiment to study the fol-

lowing: do people exhibit an aversion to negative interest rates that limits critical policy effectiveness? If so, can policy makers overcome this aversion with communication so that negative nominal rates become a more viable policy tool?

Additionally, Tatevik Sekhposyan and I plan to pursue further research impact of higher-order moments of central bank density forecasts by studying how these revisions affect the behavior of private forecasters. Specifically, we will use a high-frequency identification approach to study how revisions to higher forecast moments impact disagreement among private forecasters and how they impact the accuracy of private forecasters. This is a follow-up to a recent paper in which Sekhposyan and I show that financial markets respond at least as strong to revisions to higher-order moments of the Bank of Englands density forecasts as they do to revisions to the central moments of the bank's forecasts.

I am applying for this boot camp because I think it represents an invaluable opportunity to further my knowledge of behavioral macroeconomics. As a Ph.D. student at Texas A&M, I am somewhat secluded due to location. This makes it challenging to meet new people with similar research interests. Importantly, this research bootcamp presents the opportunity to form relationships with behavioral macroeconomists outside my own department with whom I may eventually collaborate. It is this opportunity to meet and work with other graduate students that is of particular importance to me since forming such links will necessarily better connect me into the field of behavioral macroeconomics and improve how it is that I can share information, ideas and best practices with peers.

Further, attending this research bootcamp would give me the opportunity to learn from leading scholars in the filed with whom I almost certainly would not have an opportunity to otherwise interact. I think this will help be give me a panoptic perspective of the field so that I can hone the focus my own future research to align with the interests of the field.

DEPARTMENT OF ECONOMICS

Behavioral Economics and Policy Program

Catherine C. Eckel
Sara and John Lindsey Professor in Liberal Arts
University Distinguished Professor

December 9, 2019

To Whom It May Concern:

I am writing to recommend Ryan Rholes for the 2020 NBER Behavioral Macroeconomics Research Boot Camp. Ryan is in the fifth year of the PhD program in the Department of Economics at Texas A&M University, and I am his advisor. Ryan is a remarkable young scholar, who is using lab experiments along with conventional empirical techniques to investigate questions in macro policy and labor economics. His research is innovative and technically very strong, with high policy relevance. Participating in the Boot Camp would be a terrific opportunity for him.

Ryan's dissertation research uses lab experiments to study secular stagnation. An important challenge of this work was to develop an experimental model of the economy in which secular stagnation occurs, and then to use this as a baseline to test policy alternatives to alleviate secular stagnation. It might seem an unusual approach to use lab experiments to study macro, but this methodology has been used to address many important theoretical and empirical questions in macro over the past two decades. Because the economy can only be "run" once, the amount of data available to researchers to test theories and understand macro dynamics is very limited. The lab provides an alternative way to generate data to investigate important questions in theory and policy. Ryan is part of this movement.

Because Ryan's primary interest is in macro, and there are no macro experimental economists at Texas A&M, Ryan took the initiative to identify a potential external advisor, Luba Peterson at Simon Fraser University, who is one of the leading researchers in experimental macro. Luba has been extremely helpful in developing the experimental project on secular stagnation. Ryan and Luba have developed a productive collaboration, and have coauthored two papers.

Ryan has actively sought out the training and advice he needs to accomplish his research goals. Two years ago Ryan was selected to attend the International Workshop in Theoretical and Experimental Macroeconomics, a summer workshop held each year that brings together scholars and students from all over the world working on macro questions with experimental methods. There he made important contacts and picked up information that has been useful in designing his own work, and he also began a collaboration with two other participants in the workshop (Andrea Guido, Catholic University of Lille, and Alejandro Martinez-Marquina, Stanford University). The resulting paper investigates the role of beliefs and communication in labor markets. It extends the standard "gift exchange" experimental paradigm used in many experimental labor papers to look at how positive or negative shocks are shared between workers and firms. He returned last summer to the workshop, and developed another new project with

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Logan Miller at the University of Arkansas. This project extends prior experimental research on consumption smoothing by individuals to examine such behavior in groups. These projects are in addition to his dissertation work, and both are well underway.

Ryan also is completing a paper using more conventional empirical research, joint with Tatevik Sekposyan, an associate professor in our department. This paper also deals with unexpected shocks, and analyzes the impact of a new central bank policy that produces not only point forecasts for the economy, but also distributional information about the forecasts. He uses Bank of England inflation data and forecasts to examine the effect of releasing distributional information.

Last year, Ryan received a highly-competitive Dissertation Improvement grant from the National Science Foundation that has supported his experimental research on secular stagnation. The Economics Program at NSF gives only a handful of these awards each year. He also has been very active in applying for internal funding for his work, and was awarded the John Van Huyck Memorial Fellowship for excellence in experimental research. (John was an early macro experimentalist in our department.)

Ryan is focused and ambitious, and a creative, independent thinker. His commitment to understanding macro issues through a variety of approaches makes him a strong candidate for the Boot Camp. He already has several papers completed, and several more in progress, which bodes well for his productivity as a scholar. His strong communication skills contribute to his success as a scholar and teacher. Ryan is also a great person to work with, very thoughtful, responsive and hard working. He has my strongest recommendation for the NBER Behavioral Macro Research Boot Camp, and I hope you will accept him.

Please contact me if I can provide additional information.

Sincerely,



Catherine C. Eckel
Sara and John Lindsey Professor in Liberal Arts
University Distinguished Professor