DEPARTMENT OF ECONOMICS
UNIVERSITY of WASHINGTON

Rajarshi Datta
Ph.D. Candidate in Economics

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Dear Sir/Madam **February 27, 2022**

I am writing to express my interest in the Graduate Student Workshop on Heterogeneous-Agent Macroeconomics at the NBER. As a Ph.D. candidate in Economics and a highly motivated research analyst with two years of work experience in business cycle models with heterogeneous agents, I believe that my strong quantitative skills and rich experience in policy-oriented research make me a competitive candidate. I am a theoretical macroeconomist interested primarily in uncovering the distinct role that housing plays vis a vis corporate equity in the interaction of wealth inequality and business cycles in the short run. I have experience with modeling techniques which center around heterogeneous agent models with one/two assets developed both in discrete and continuous time. In discrete time, I have worked with the techniques of Reiter (2009) used in Bayer et al. (2018), (2020). In continuous time, I have worked primarily with the first generation of HANK models based off the seminal paper Kaplan et al. (2018).

My ongoing work is regarding what are the redistributive consequences of monetary policy in the presence of heterogeneous returns. The conventional view states that redistribution is a side effect of monetary policy changes, separate from the issue of aggregate stabilization which these changes aim to achieve. Most models of the monetary policy transmission mechanism implicitly adopt this view by featuring a representative agent. Auclert (2019) shows that in contrast, redistribution is a channel through which monetary policy affects macroeconomic aggregates, because those who gain from accommodative monetary policy have higher marginal propensities to consume (MPCs) than those who lose. Using a monetary expansion, he categorizes who loses & gains from a unit decrease in the real interest rate and a unit decrease in asset prices since everyone is not equally affected by these changes. He identifies three distinct sources of redistribution additional to the traditional substitution & income effects present in representative agent models - the earnings heterogeneity channel for unequal income gains, unexpected inflation which revalues nominal balance sheets with nominal creditors losing and nominal creditors gaining and the final interest rate channel from accurate measurement of consumer balance sheets. He shows that the partial equilibrium response to consumption depends only a set of 7 sufficient statistics, all of which can be measured in survey data. However, he misses the wealth changes from consumption arising due to unrealized capital gains due to a monetary policy shock having different impacts on returns for stocks and houses in the short run which I argue are of first order importance in determining these redistribution channels & subsequently the sufficient statistics. The introduction of heterogeneous returns allows the distribution of wealth & income to affect the monetary transmission through the redistribution channels. Monetary policy which can be termed as exogenous academically is influenced by the wealth & income inequality. Preliminary results suggest that different returns allow household portfolio heterogeneity to lead to vastly disparate implications across the wealth & income distributions. Additionally, we can comment on the relative importance & interaction of household portfolio heterogeneity across different asset classes (holdings of stocks vs houses) as well as within asset class(housing and shares held as assets/debt) for monetary transmission through the redistribution channel in the short run.

Next, I outlay a proposal that is closely related to my current ongoing work. I intend to evaluate the benefits from considering housing distinct from equity in a canonical heterogeneous agent framework with

multiple assets. Houses differ from stocks by providing utility unlike equity while being substantially more illiquid. Firstly, the question is whether the use of two distinct illiquid assets can help us achieve empirically consistent household portfolio heterogeneity. I document evidence of how monetary policy shocks affect asset prices & returns differently in the short run with the chief result being that house prices & returns move slower than equity reflecting portfolio adjustment costs. At the household level, unrealized wealth gains are significantly different across the distribution when we consider separate returns on housing & equity instead of a single equivalent return on a weighted portfolio of housing and equity. Similar results are obtained for volatility of returns. At the aggregate level, this leads to higher wealth inequality since asset returns have first order impacts. The exercise also leads to implied $(r-g)$ differences which strengthens the claim that a model with a composite illiquid asset underestimates wealth Gini & top 10% wealth shares. Subsequently the correlation of monetary policy & higher wealth inequality leads to persistently higher wealth inequality along the transition path. It also leads biases marginal propensities to invest of primarily the wealthy downwards. Moreover as hypothesized by Werning (2015), the separate study of housing & equity can generate pro-cyclical portfolio liquidity which strengthens the sensitivity of consumption to interest rates. The substantial computational cost in incorporating housing is more than outweighed by the resulting benefits from the differential impacts of housing & equity for fiscal policy. I also use exogenous asset returns which circumvents the equity premium puzzle while endogenizing household portfolio heterogeneity in the short run.

I am excited about this opportunity and demonstrate try I am a great fit. Please find my CV and research statement as required for your review. Thank you very much for your time and consideration.

Sincerely,

Rajarshi Datta

Reference Contact Information

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Rajarshi Datta

October 2021

CONTACT INFORMATION

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EDUCATION

University of Washington — Seattle, WA
Ph.D. in Economics — 2018 –
- Dissertation Topic: Heterogeneous Asset Returns & Wealth Inequality

M.A. in Economics, GPA: 3.84 — 2018 –2020

Indian Statistical Institute — Kolkata, India
M.Sc. in Quantitative Economics, GPA: 7.21 — 2015 – 2017

St. Xavier's College, Kolkata — Kolkata, India
B.Sc. in Economics, Minor : Statistics & Mathematics, GPA: 8.44 — 2012 – 2015

INTERESTS

Housing & Business Cycles, Heterogeneous Agent DSGEs, Applied Econometrics

RESEARCH

Working Papers

Choice of refinance & Hand to mouth status: Evidence from US data *R. Datta, February 2020*

A Dynamic IS-LM Model: Integrating the Short and Long Run *R. Datta, December 2017*

Policy Articles

Capital Inflow into Emerging Markets *R. Datta & R.N. Nag, February 2015*

War Economics & Sino centrism of BRICS *R. Datta & P.P. Ghosh, June 2013*

SKILLS

Programming: Matlab, Stata, Fortran, Julia, Python, R, SAS, C, Java, SQL, LaTeX.
Macro: Continuous time dynamic programming, Jump diffusion processes, Viscosity solutions
Applied Metrics: Markov Switching, Local Projections, GARCH, Cointegration & VECM

HONORS

Grover and Creta Ensley Fellowship in Economic Policy, University of Washington — Autumn 2021
James K. & Viola M. Hall Fellowship, University of Washington — Spring 2019

TEACH EXPERIENCE

Graduate Teaching Assistant
- ECON 509 (Graduate Macroeconomics) — Spr2021

Instructor
- ECON 201 (Introduction to Macroeconomics) — Sum2020
- ECON 200 (Introduction to Microeconomics) — Aut2020

Teach Assistant

- ECON 300 (Intermediate Macroeconomics) Win2021
- ECON 201 (Introduction to Macroeconomics) Aut2018-Spr2020

References

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Graduate Coursework

- ❑ Incomplete Market Models (PhD)
- ❑ Empirical Asset Pricing (PhD)
- ❑ Safe Assets (PhD)
- ❑ Econometric Theory
- ❑ Mechanism Design
- ❑ Contract Theory
- ❑ Inequality & Macro (PhD)
- ❑ International Finance (PhD)
- ❑ International Trade Theory (PhD)
- ❑ Optimization Techniques
- ❑ Non-cooperative & Cooperative Game Theory
- ❑ Industrial Organization

Work Experience

Worked as an Associate Solution Advisor at Deloitte US India from May 2017 till June 2018. Worked in Anti Money Laundering and Model Validation for Comprehensive Capital Analysis Review (CCAR) projects.

Two and a half month Summer Internship at D.E. Shaw & Co. in FinRes/FundamentalReasearch Department during the period May-July 2016. Worked in evaluation and forecasting of financial data from multiple sources.

Seminars & Presentations

Paper Presentation at Confluence, the Annual National Economic Summit of St. Xavier's College, Kolkata-"Capital Inflow into Emerging Markets", 2014, 2nd Position.

Publications in Echo Echoes-the annual magazine of the Economics Department, St. Xavier's College, Kolkata - "War Economics" and "Sinocentrism of Brics", 2013.

Other Information

Language: English (Fluent), Bengali, Hindi
Citizenship: India

OTHER ACHIEVEMENTS

Member of the Editorial Board of Echo Echoes, the Annual Journal of the Economics Department, St. Xavier's College, Kolkata, 2013.

Was awarded a "Scholarship for Higher Education" (SHE) under the Innovation in Science Pursuit for Inspired Research (INSPIRE) programme of the Department of Science and Technology, Government of India, New Delhi, by virtue of performance within top 1% of the School Board Examination at Class XII (2012) tenable up to Ph. D. in Basic or Natural Science courses like Mathematics, Statistics, Physics, Chemistry, Botany or Zoology.

RESEARCH ABSTRACTS

Wealth Inequality & Business cycles: The Role of Housing
(*R. Datta*)

What is the role of wealth inequality in causing and amplifying business cycles & vice-versa? In particular, can we quantify the correlation between housing and estimated business cycle shocks & frictions along the lines of Bayer et. (2020) with its subsequent impact on business-cycles & the time-varying wealth distribution ? I propose to estimate a heterogeneous-agent New-Keynesian (HANK) model in continuous time featuring two illiquid assets and gross positions for housing. The model emphasizes the differential impacts of asset price changes suitably calibrated to match key features of the observed US wealth distribution. The constructed counterfactuals are intended to have strong implications for the redistributive role of monetary & fiscal policy in impacting the wealth-shares of both the top 10% & middle 50-90% in the post-pandemic era.

Choice of Refinancing & Hand-to-mouth Status
(*R. Datta*)

What does the choice of refinancing reveal about the Hand-to-mouth (HtM) status of households? Preliminary empirical analysis from the SCF corroborates the interlinkage between household debt & HtM status. Further evidence from refinance approvals indicate strong demand for home equity extraction in periods of high unemployment often aided by higher house prices. Following Kaplan, Violante and Weidner (2014), I motivate their measurement by setting up a 3 period partial equilibrium model with heterogeneous preferences to investigate the importance of considering mortgages distinctly from other illiquid assets in the determination of HtM status. Better estimates of the same is imperative for understanding the transmission and redistributive effects of monetary policy & fiscal transfers. Simple qualitative experiments in a calibrated model strongly match the current trends in house prices, unemployment and mortgage refinancing.

A Dynamic IS-LM Model: Integrating the Short and Long Run
(*R. Datta*)

A substantial part of Macroeconomic literature has been devoted to address the phenomenon of business cycles in the short run while equally extensive and exhaustive research has been conducted on phenomenon of economic growth in the long run. Yet most of the research carried out in either field has been in complete isolation from each other. Researchers focusing on short run have conveniently ignored the long run and vice-versa. Though much involved work has already been carried out in this regard, the elementary model proposed in the paper does away with all complexity and is instead a very simple modification of the IS-LM framework to explicitly incorporate the dynamic nature of the economy in the short run in an attempt to capture the essence of the problem and analyze the impacts on both the short and long runs. The model shows that while the study of economic growth cannot wish away short run fluctuations, dealing with short run fluctuations alone may prove to be counterproductive. Any study of short run fluctuations cannot be in a purely static framework. It should also incorporate elements that change with time besides considering some form of expectations and behaviour of the agents involved in the economic processes.

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Research Statement

I am a theoretical macroeconomist interested primarily in uncovering the distinct role that housing plays in the interaction of wealth inequality and business cycles in the short run. The modeling techniques center around heterogeneous agent models with one/to assets developed primarily in continuous time which requires related skills of stochastic dynamic programming including HJB & KFE equations and viscosity solutions. My research involved the replication & extension of their model with related skills of stochastic dynamic programming including solving HJB & KFE equations and viscosity solutions, elucidated primarily in Achdou et al. (2017). My work also involved studying the impact of aggregate shocks in HANK models in both discrete time (Auclert et al. (2020)) and continuous time (Ahn et al. (2018)). In terms of programming skills, I am proficient in Matlab, Julia, Fortran, R, Stata as well as C. In my view, I find that this program seems to be a great fit for research skills and will help me in building a great network for policy-making institutions. There will be a lot to learn from and exchange with my peers. Besides, I will greatly benefit from the in-house and external training activities closely related to work topics. The workshop is the ideal opportunity is ideal for bringing theoretical and applied macro research on the academic side to the practical policy making sphere as well as be exposed to the work bridging academia and actual monetary policy decisions.

My ongoing work is related to evaluating the benefits from considering housing distinct from equity in a canonical heterogenous agent framework with multiple assets. Houses differ from stocks by providing utility unlike equity while being substantially more illiquid. Firstly, the question is whether the use of two distinct illiquid assets can help us achieve empirically consistent household portfolio heterogeneity. I document evidence of how monetary policy shocks affect asset prices & returns differently in the short run with the chief result being that house prices & returns move slower than equity reflecting portfolio adjustment costs. At the household level, unrealized wealth gains are significantly different across the distribution when we consider separate returns on housing & equity instead of a single equivalent return on a weighted portfolio of housing and equity. Similar results are obtained for volatility of returns. At the aggregate level, this leads to higher wealth inequality since asset returns have first order impacts. The exercise also leads to implied $(r - g)$ differences which strengthens the claim that a model with a composite illiquid asset underestimates wealth Gini & top 10% wealth shares. Subsequently the correlation of monetary policy & higher wealth inequality leads to persistently higher wealth inequality along the transition path. It also leads biases marginal propensities to invest of primarily the wealthy downwards. Moreover as hypothesized by Werning (2015), the separate study of housing & equity can generate pro-cyclical portfolio liquidity which strengthens the sensitivity of consumption to interest rates. The substantial computational cost in incorporating housing is more than outweighed by the resulting benefits from the differential impacts of housing & equity for fiscal policy. I also use exogenous asset returns which circumvents the equity premium puzzle while endogenizing household portfolio heterogeneity in the short run.