Smriti Verma
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2150 Summit Street, Apt A1
Columbus, Ohio 43201

18 March 2023

Dear Selection Committee,

I am a third year Economics PhD student and am writing to apply to the second annual Graduate Student Workshop on Heterogeneous-Agent Macroeconomics, hosted by the National Bureau of Economic Research (NBER) on June 12-14, 2023, in Cambridge, MA.

As I progress toward my thesis proposal defense and candidacy, my present research is focusing on the heterogeneous distributional impact of monetary policy across age groups and the related question of the design of monetary policy during demographic transitions. I am augmenting a canonical Heterogeneous Agent New Keynesian (HANK) model with lifecycle features by introducing multiperiod overlapping generations of households into the HANK framework, along with non-stationary demographics, income dynamics, and asset structure that capture salient lifecycle features of the data.

The opportunity to attend this workshop is, therefore, very timely for me. It is perfectly suited to my research interests and is well-timed as I start out to explore interesting questions that this genre of models has the capacity to address in a robust and authoritative manner. This workshop will give me the opportunity to gain a strong foothold in the past literature and current research on heterogeneous-agent macroeconomic models. It will also expose me to state-of-the-art modeling techniques and solution methods for general equilibrium heterogeneous-agent models, which I can develop and augment for application to my own research. Attending this workshop will equip me with the necessary knowledge and tools to apply these skills in my own research in this area.

I am a quick learner and a motivated and diligent individual. The objective of this workshop aligns perfectly with my research interests and motivations. I, therefore, believe that I will be well-suited to qualify to attend this workshop and make the most of it in conducting my own research in this area. I look forward to hearing from the committee about my selection.

My PhD advisor, Professor Aubhik Khan, at the Ohio State University, can be reached at his email address (khan.247@osu.edu) for providing a recommendation for my application.

Thank you,

Yours sincerely,

Smriti Verma

Dear Selection Committee,

I am a graduate student in Economics at the Ohio State University, set to advance to candidacy later this Spring. My research focuses on the heterogenous impact of monetary policy across age groups and the related question of the design of monetary policy during demographic transitions. To this end, I am augmenting a canonical Heterogeneous Agent New Keynesian (HANK) model with overlapping generations features, non-stationary demographics, and rich-enough income dynamics and asset structure as to capture salient lifecycle features of the data. My model is, therefore, a conjunction of the overlapping generations structure of households positioned in the HANK framework that is well-established as the workhorse for monetary policy analysis, with minimal ingredients to take cognizance of quantitative features of interest, including age and wealth heterogeneity. In developing my own model to suit my research question, I have been exploring the literature widely and deeply, to learn about and be up to speed with the variety of modeling techniques that are employed in the literature to mirror empirical observations more closely. In this quest, I have learnt new computational methods that are being used to compute such complex models with greater precision and significantly less computation times. These include sophisticated methods in discrete and continuous time, such as the "model reduction" literature which uses the perturbation method such as Reiter (2010), Winberry (2018), Bayer and Luetticke (2020), Ahn et al (2021), and using the sequence space Jacobians to estimate two-asset HANK models (Auclert et al 2021) wherein the absence of model reduction keeps heterogeneity in the model intact.

I am beginning to use some of these modeling techniques and computational methods in my own research work as I proceed in my PhD toward my thesis proposal and defense. This workshop is a well-timed golden opportunity for me to not only learn in a compact format state-of-the-art modeling and computational methods at the frontier in the HANK literature as it evolves, but also get hands-on experience in implementing these techniques and methods in practice with faculty members and researchers who have been engaged in developing and exploiting these techniques.

While monetary policy may not be the most appropriate tool for achieving redistributive or insurance goals in the economy, the close links that the HANK literature establishes between monetary and fiscal policies certainly attributes monetary policy with important "fiscal footprints" that have significant consequences for the extent of redistribution across households (Kaplan et al 2023). Age patterns are significant determinants of asset ownership in an economy. In multiperiod lifecycle models, propensity of the retired to hold on to assets for precautionary desires can attenuate the pressure on asset prices. Changing demographics can also affect the "natural" rate of interest that is consistent with full employment and steady inflation, and which serves as a benchmark for setting the real Federal Fund's rate in making monetary policy decisions. Distributional effects of monetary policy may vary based on the economy's demographic profile. Greenwald et al (2022) investigate the extent to which increase in measured financial inequality over the post-war period can be attributed to decline in interest rates, and their calibrated model implies that interest rate declines are not consumption neutral. My model designed to accommodate lifecycle features in a HANK framework will have the capability to address interesting questions and evidence such as these. I am deeply motivated to attend this workshop and learn to develop and compute complex HANK models suited for addressing a variety of questions. I aim to use this competency to build and efficiently compute my own model to address relevant questions that will lead my research toward my PhD thesis, and beyond.

Yours sincerely,

Smriti Verma

Smriti Verma

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EDUCATION

2020- Economics, PhD (ongoing), Ohio State University (Columbus, Ohio, US)

Macroeconomics courses in 1st year:

ECON 8721 - Macro Theory 1A (15128)
ECON 8722 - Macro Theory 1B (15135)
ECON 8723 - Macro Theory 2A (27646)
ECON 8724 - Macro Theory 2B (27431)

Macroeconomics courses in 2nd year:

ECON 8822 - Adv Macro 2 (34130)
ECON 8825 - Adv Macro Methods (13155)
ECON 8823 - Adv Macro 3 (19855)
ECON 8863 - Int Econ 3 (21593)

Macroeconomics/International Econ courses in 3rd year:

ECON 8862 - Int Econ 2 (36468)

Others: Macro workshop, Macro Colloquium, Macro Seminar

2021 MS Economics, Ohio State University (Columbus, Ohio, US)

2012 MSc Economics for Development, University of Oxford, Kellogg College (Oxford, United Kingdom)
Grade: 66.8 percent
Extended Essay: *A Structural Break Analysis of Monetary Policy Rules in India*; supervised by Dr. (Prof) Christopher Adam

2011 BA (Hons) Economics, Lady Shri Ram College for Women, Delhi University (New Delhi, India)
Grade: 70.9 percent (First Division)

2010 Summer School in International Economics, London School of Economics and Political Science (London, United Kingdom)
Grade: A+

2008 Class 12 (Indian School Certificate), Seth MR Jaipuria School (Lucknow, India)
Grade: 93 percent

2006 Class 10 (Indian Certificate of Secondary Education), Seth MR Jaipuria School (Lucknow, India)
Grade: 94.4 percent

AWARDS

2020 Graduate Fellowship, Ohio State University

2019 Dr. R T Doshi Young Agricultural Economist Award for Best Paper Presentation, 27th Annual Conference of the Agricultural Economics Research Association, Ludhiana (India)

TEACHING EXPERIENCE

SP 2023	Intermediate Macroeconomic Theory	Primary Independent Instructor
AU 2022	Principles of Macroeconomics	Recitation Leader
SP 2022	Intermediate Macroeconomic Theory	Teaching Assistant
AU 2021	Government Finance in the American Economy	Teaching Assistant
	Underground Economy	Teaching Assistant

RESEARCH EXPERIENCE

Research Analyst II Oct 2018 – Jul 2020
International Food Policy Research Institute (IFPRI), New Delhi, India

Impact evaluation of the Million Farmers School training program and the Direct Benefits Transfer (DBT) program in Uttar Pradesh (India)
- Designing and developing sampling strategy, survey questionnaires, other survey instruments (FGDs, key informant interviews, etc.)
- Training enumerators, vetting CAPI programs, pretesting questionnaires, monitoring data collection, and data cleaning
- Empirical and econometric analyses of primary data; PSM, IPWRA, CEM, and IV-residual
- Preparing comprehensive field reports for internal reviews and donor reporting
- Writing and publishing academic papers, op-eds, articles, reports, and policy briefs

Exploring possibilities for introduction of biofortified staples into diets of the poor in Bihar and Odisha (India)
- Analyzing primary data from IFPRI survey and NSS household unit-level data on consumption expenditure
- Reviewing food grain procurement policies in Bihar and Odisha
- Scrutinizing scope and mechanisms for introducing biofortified rice and wheat into the public distribution system and other social safety programs (mid-day meal, ICDS, etc.)
- Estimating prospective impact of biofortified staples on micronutrient deficiencies
- Evaluating seed delivery, dissemination, and adoption mechanisms for biofortified staples in Bihar and Odisha
- Writing and publishing academic papers, op-eds, articles, reports, and policy briefs

Examining the impact of the National Food Security Act (NFSA), 2013, and other social transfer programs in Bihar, Odisha, and Eastern Uttar Pradesh (India)
- Designing and developing questionnaires
- Training enumerators, pretesting questionnaire
- Impact assessment of NFSA and social transfer schemes such as DBT, PM-KiSaN, KALIA in Odisha, diesel subsidies and drought compensations in Bihar, and agricultural loan waivers in Uttar Pradesh

Private investment in Indian agriculture: patterns, trends, and determinants
- Assessing changing composition of private vis-à-vis public investment and input subsidies in Indian agriculture using NSS household unit-level All-India Debt and Investment Survey (AIDIS) data across 17 major states in India

Rural non-farm employment in Eastern India
- Determining its pattern, trends, and drivers, and evaluating its impact

Consultant Dec 2017 – Jul 2018
World Bank, New Delhi, India

Andhra Pradesh Rural Inclusive Growth Project (APRIGP)
- Knowledge management, documentation, dissemination of implementation principles
- Backstopping core teams with secondary data analyses and field insights
- Reviewing implementation of core components through extensive field visits to project sites
- Communicating extensively with internal and external stakeholders
- Publishing features, blog posts, and newsletter feeds on success stories

West Bengal Accelerated Development of Minor Irrigation Project (WBADMIP)
- Documentation and dissemination of key ideas, insights from implementation, and success stories in the Agricultural Support Services (ASS) component
- Conducting cost-benefit analyses of minor irrigation schemes and technological intervention pilots such as micro-irrigation systems and poly-houses (by Rijk Zwaan) and hybrid rice (by Bayer CropScience Limited) in West Bengal
- Publishing features for World Bank Blogs and newsletter

OGE-Piloting Automated Sensor Applications for Improving Rice Water-Use Efficiency
- Estimating costs and returns for potential sensor applications in paddy cultivation in developing countries
- Assessing and documenting socio-economic impact of automated sensor applications in paddy cultivation in West Bengal and Punjab
- Documenting implementation process and replication strategies for internet of things (IoT)

New initiatives in Chhattisgarh and West Bengal
- Data analyses, presentations, write-ups, and status papers for identifying beneficiaries and developing intervention mechanisms
- Drafting the project concept note (PCN)

Consultant Apr 2016 – Nov 2017
Indian Council for Research on International Economic Relations (ICRIER), New Delhi, India

Driving agricultural growth & alleviating poverty in Eastern India: learning from successes in selected areas, Bill and Melinda Gates Foundation (BMGF)
- Empirical and econometric analyses of secondary data for determining sources and drivers of agricultural growth in Uttar Pradesh (India)
- Preparing policy briefs in English and translating into Hindi for wider dissemination
- Reporting on project progress for donor consultations

Financial inclusion of smallholders in high-value agriculture, NABARD Centre for Research in Agri-Economics
- Estimating farmer's share in consumer's rupee and deriving costs and margins of players in the pulses value-chain in major producing states in India
- Conducting extensive field visits, focused group discussions, and interviews with stakeholders
- Drafted a report tracking the pulses value chain in Uttar Pradesh and Madhya Pradesh (India)

Agricultural growth, value-chains, and food security in India
- Investigating structural transformation of agriculture and food systems in India: trends in demand, production, food processing, retail, and agri-business
- Drafted a book manuscript (with Ashok Gulati, Ralph Cummings Jr, Kavery Ganguly) on the emerging demand-driven value-chain approach in high-value agriculture in India

PUBLICATIONS

Papers:

Kumar, A., Bathla, S., Verma, S. (Forthcoming). Revisiting the relationship between public and private capital formation in Indian agriculture: a disaggregated analysis. EPW

Verma, S., Sonkar, V. K., Kumar, A., Roy, D. (2019). Are farmer producer organizations a boon to farmers? The evidence from Bihar, India. Agricultural Economics Research Review 32 (Conference Number): 123-137.

Roy, D., & Verma, S. (2019). Product differentiation to tackle farm distress. Economic and Political Weekly 54(19): 18-22.

Kumar, A., Verma, S., Prasad, A. M., Kishore, A., Saroj, S. (2019). The million farmers school: an evaluation of its impact on farmers' agricultural knowledge in Uttar Pradesh, India. IFPRI discussion papers, 1888.

Verma, S., Gulati, A., & Hussain, S. (2017). Doubling agricultural growth in Uttar Pradesh: sources and drivers of agricultural growth and policy lessons. ICRIER Working Paper No. 335.

Media articles:

Verma, S. (2019). From production to profitability. *The Financial Express*, 6 Dec. p.8.

Verma, S., & Kumar, A. (2019). Kisan Pathshala for doubling farmers' incomes. *The Financial Express*, 28 Oct. p.6.

Kumar, A., Verma, S., & Padhee, A K. (2019). Well begun isn't always half done. *The Financial Express*, 1 Aug. p.9.

Verma, S., & Kumar, A. (2019). Biofortified staples may hold the key to India's rural malnutrition. Thomson Reuters Foundation News. July 08, 2019. Retrieved from http://news.trust.org/item/20190708081833-x8ny1

Gulati, A., & Verma, S. (2017). Tapping agriculture to boost trade surplus. *The Financial Express*, 6 Nov. p.6.

Gulati, A., & Verma, S. (2017). Farm to distant shores. *The Indian Express*, 6 Nov. p.11.

Gulati, A., & Verma, S. (2017). Pulses prices, peasants and policies. *The Financial Express*, 11 Sep. p.6.

Gulati, A., & Verma, S. (2017). No feel for the pulse. *The Indian Express*, 11 Sep. p.13.

Gulati, A., & Verma, S. (2017). Shiv mantra for Yogi Adityanath. *The Financial Express*, 8 May. p.6.

Gulati, A., & Verma, S. (2017). A mantra for Yogi. *The Indian Express*, 8 May. p.13.

Gulati, A., & Verma, S. (2017). Cow, culture and agriculture in UP. *The Financial Express*, 27 Mar. p.6.

Gulati, A., & Verma, S. (2017). Development with cow. *The Indian Express*, 27 Mar. p.11.

Gulati, A., & Verma, S. (2016). Meaty matters. *The Financial Express*, 24 Oct. p.8.

Gulati, A., & Verma, S. (2016). Not chicken anymore. *The Indian Express*, 24 Oct. p.15.

Gulati, A., & Verma, S. (2016). Pricy pulses, politics and policies. *The Financial Express*, 1 Aug. p.6.

Gulati, A., & Verma, S. (2016). The arhar challenge. *The Indian Express*, 1 Aug. p.13.

Gulati, A., & Verma, S. (2016). Making FDI in food work. *The Financial Express*, 18 Jul. p.8.

Gulati, A., & Verma, S. (2016). A thought for food. *The Indian Express*, 18 Jul. p.13.

Reports, proceedings, and policy briefs:

Verma, S. (2019). Stakeholder consultation workshop – million farmers school in Uttar Pradesh,

India: evolution, impact, and way forward. IFPRI South Asia Office. First published online on September 25, 2019. Retrieved from https://southasia.ifpri.info/2019/09/25/stakeholder-consultation-workshop-million-farmers-school-in-uttar-pradesh-india-evolution-impact-and-way-forward/

Kumar, A., Verma, S., & Rashid, S. (2019). Policy forum on social transfers to revitalize rural India and launch of IFPRI Global Food Policy Report - 2019. New Delhi, India: International Food Policy Research Institute (IFPRI).

Verma, S., Gulati, A., & Hussain, S. (2017). Doubling agricultural growth in Uttar Pradesh: sources and drivers of agricultural growth and policy lessons. ICRIER Policy Brief. New Delhi: Indian Council for Research on International Economic Relations (ICRIER).

Blog posts:

Verma, S. (2019, December 27). Farmer Business Schools can help make smallholder agriculture a profitable enterprise [Blog post]. Retrieved from https://www.ifpri.org/blog/farmer-business-schools-can-help-make-smallholder-agriculture-profitable-enterprise

Verma, S., & Kumar, A. (2019, November 15). Million Farmers' School program can be a key element in doubling Indian farmer's incomes [Blog post]. Retrieved from http://www.ifpri.org/blog/million-farmers-school-program-can-be-key-element-doubling-indian-farmers-incomes

Verma, S., & Kumar, A. (2019, October 28). Biofortified staples may hold the key to India's rural malnutrition [Blog post]. Retrieved from https://www.ifpri.org/blog/biofortified-staples-may-hold-key-indias-rural-malnutrition

Kumar, A., Verma, S., & Padhee, A K. (2019, August 8). Can creation of a separate Indian Ministry of Animal Husbandry, Dairying, and Fisheries bring fresh momentum in growth? [Blog post]. Retrieved from http://www.ifpri.org/blog/can-creation-separate-indian-ministry-animal-husbandry-dairying-and-fisheries-bring-fresh

(2018, September 20). Irrigation development brings water and new hope to farmers in India's West Bengal. Retrieved from https://www.worldbank.org/en/news/feature/2018/09/20/irrigation-development-brings-water-new-hope-farmers-indias-west-bengal

Under review:

Kumar, A., Verma, S., Kumar, N., Dhiman, A. (2019). Exploring opportunities for introducing biofortified staples through the public distribution system in Bihar and Odisha

Verma, S., Kumar, A., Kumar, N., Dhiman, A. (2019). Exploring procurement opportunities for biofortified staples in Bihar and Odisha

Kumar, N., Dhiman, A., Verma, S., Kumar, A. (2019). Promoting seed delivery, dissemination, and adoption mechanisms for biofortified staples in Bihar and Odisha

Book manuscript draft:

Plate to plough: emerging value-chain approach in high-value agriculture in India (with Ashok Gulati, Ralph Cummings Jr, Kavery Ganguly)

Work in progress

- Estimating the impact of TRIPS on the pharmaceutical industry in India; synthetic control method
- Difference-in-difference (DID) estimation of change in industrial outcomes in the pharmaceutical industry with India's transition into the TRIPS regime
- Impact assessment of grid separation on energy and agriculture outcomes: the case of Jyotigram Yojana from Gujarat (India)

- Impact assessment of retention pricing scheme in the fertilizer industry in India
- Assessing the effect of Sri Lanka's fertilizer price and subsidy experiments on agricultural performance attributes; synthetic control method
- Macroeconomic and trade impacts of Sri Lanka's fertilizer policy interventions; DID estimation strategy
- Encouragement design for evaluation of the Million Farmers School training program in Uttar Pradesh (India)

PRESENTATIONS

"Are farmer producer organizations a boon to farmers? The evidence from Bihar (India)", Changing Landscape of Rural India, 27th Annual Conference of the Agricultural Economics Research Association, Ludhiana, India, December 2019

"Direct Benefit Transfer of Input Subsidies in Bihar, Odisha, and Uttar Pradesh", National Dialogue on DBT of Agricultural Subsidies in India (in partnership with NITI Aayog and support from BMGF), New Delhi, India, September 2019

"Procurement Policies for Promotion of Biofortified Food Grains", Stakeholder Consultation Workshop on Exploring Opportunities for Promotion of Biofortified Varieties of Rice and Wheat in Bihar and Odisha, Patna, India, September 2019

"Impact of the Million Farmers School", Stakeholder Consultation Workshop on the Million Farmers' School in Uttar Pradesh: Evolution, Impact, and Way Forward, Lucknow, India, September 2019

"Internet of Things in Agriculture: Piloting Automated Sensor Applications for Improving Rice Water-Use Efficiency: A Report from West Bengal", World Bank, New Delhi, India, June 2018

"The Dragon and the Elephant: Lessons from Chinese Reforms for Reforming India's Agriculture", Institute of Chinese Studies Seminar, New Delhi, India, November 2017

"Doubling Farmers' Incomes by 2022: Focus on Uttar Pradesh", National Council of Confederation of Indian Industries (CII), Lucknow, India, September 2017

"Value-Chain Analysis in High-Value Agriculture: Pulses", NABARD Centre for Research in Agri-Economics – ICRIER, New Delhi, India, August 2017

"Exploring India-China Cooperation in Agriculture and Food", India-China Think-Tank Forum – II, Beijing, China, June 2017

"Innovating to Save on Losses and Wastages in Agricultural Value Chains: Global and Indian Experience", Crawford Fund Conference: Waste Not, Want Not: The Circular Economy to Food Security, Canberra, Australia, August 2016

"Driving Agriculture Growth and Alleviating Poverty in Eastern India (Uttar Pradesh, Bihar and Odisha): Learnings from Successes in Punjab, Madhya Pradesh, and Gujarat", BMGF-ICRIER Stakeholder Workshop, New Delhi, India, June 2016

"Does monetary policy affect output and inflation in low-income countries through the same channels as it does in industrialized economies?", University of Oxford, UK, February 2012

"The Mexican Peso Crisis", University of Oxford, UK, November 2011

"An Analysis of Socio-Economic Diversity: Case of Uttar Pradesh", Lady Shri Ram College for Women, Delhi University, New Delhi, India, 2011

"Women Battle for Citizenship Rights: A Case Study from Lebanon", Lady Shri Ram College for Women, Delhi University, New Delhi, India, 2010

COMMUNITY ENGAGEMENT

Founder Trustee, Unnayan Foundation Trust Apr 2014 – present
Lucknow, India

- Spearheaded establishment of the Trust (not-for-profit) for rendering community and social service, with the specific objective of empowering disadvantaged girls and women
- Planning, developing, initiating, and conducting programs for adult education, vocational training, health improvement, insurance protection, and infrastructure development under various government schemes, for the underprivileged, particularly women in target villages in Uttar Pradesh
- Awarded the "SPO India Emerging NGO of the Year 2017 Award" at the 3rd edition of SPO India CSR Summit & Awards 2017, New Delhi, May 2017

LEADERSHIP

2022-2023	Graduate Student Representative in the Diversity, Equity, and Inclusion Committee (DEIC) of the Department of Economics, Ohio State University
2018-2019	Nominated as member of Search Committee for Communication Specialist for IFPRI – South Asia Region
	Organizing workshops and stakeholder meetings for consultations and research dissemination (IFPRI)
2016-2017	Responsible for quarterly progress reporting to NABARD on issues related to water-use, land-use, and value-chains in high-value agriculture (ICRIER)
	Member of the IT Committee (ICRIER)
	Managed and mentored two interns in methods of data analysis and economic research (ICRIER)
2011-2012	Course Representative, MSc Economics for Development to the Graduate Joint Consultative Committee (GJCC), University of Oxford
	Student Representative, Economics Graduate Students on the Library Committee, University of Oxford
2008-2009	Editor for the Economics Department Journal published by the Economics Department, Lady Shri Ram College for Women, Delhi University

MISCELLANEOUS

Languages: Excellent written and verbal communication skills in English and Hindi (Native)

Data Analysis and Statistical Software: STATA, MATLAB, PYTHON

IT Skills: Advanced MS Office (MS Word / MS Excel / MS Access / MS Power Point / MS Publisher); LaTeX

Computer Languages: Basic, C++, Blue Java

Methodologies: Agile, Waterfall, Scrum, Six Sigma

CITI Certified: Completed the Collaborative Institutional Training Initiative (CITI) Program Course on Social and Behavioural Research

Bronze medalist in Inter-College Archery Tournament, Delhi University, 2010