Massachusetts Institute of Technology

Henry Zhang
PhD Candidate in Economics
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Research Statement February 23, 2022

Dear Selection Committee,

Thank you for reviewing my application. I am a third-year PhD student at MIT who has taken the first year core sequence and the field course sequence in macroeconomics. However, I have had limited exposure to solution methods for general equilibrium heterogeneous agent models, and I believe I would benefit greatly from the NBER graduate student workshop to learn methodological and computational techniques that complement my reading of the recent literature. In terms of research, I am an empirical macroeconomist who focuses on problems of optimal policy intervention in response to shocks that propagate through networks of production, payments, and trade. I believe that these techniques will be useful both for estimation and for counterfactual simulation in my research.

For a faculty reference, you may consult Christian Wolf, whose email address is ckwolf@mit.edu.

Best regards,

Henry Zhang

MIT Economics

HENRY ZHANG

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DOCTORAL STUDIES

Massachusetts Institute of Technology (MIT)
PhD, Economics, Expected Completion in June 2025
MACROECONOMICS COURSEWORK: First-Year Sequence (14.451 through 14.454, 2019-2020), Macroeconomics I (14.461, Fall 2020), Macroeconomics II (14.462, Spring 2022)

REFERENCES

Clare Balboni
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Christian Wolf
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PRIOR EDUCATION

Swarthmore College — *2017*
BA with Highest Honors, Mathematics and Economics

CITIZENSHIP USA

LANGUAGES English (native), Chinese (intermediate), Spanish (intermediate)

FIELDS Primary Fields: Empirical Macroeconomics, Trade

Secondary Fields: Environmental, Development

RELEVANT POSITIONS

Research Assistant to Michael Greenstone — *2016-2019*

FELLOWSHIPS, HONORS, AND AWARDS

National Science Foundation Graduate Research Fellowship — *2019-2024*

Motivation to Attend the Workshop

While I have taken all of the graduate macroeconomics courses at MIT, I have had limited exposure to HANK models, particularly the computational facets of calibration and estimation. Since I view myself as an empiricist, and I believe that the frontier of macroeconomic research relies heavily on heterogeneous-agent models, I wish to rectify this gap in my skill set through this NBER graduate student workshop.

Research Interests

I am an empirical macroeconomist who focuses on problems of optimal policy intervention in response to shocks that propagate through networks of production, payments, and trade. There are three themes of interest. First, how can we assess the aggregate impact of large idiosyncratic shocks under different fiscal and monetary policy environments? Second, how do production and financial networks interact through firms' demand for funds from loans and issuing equity, and how does this interaction lead to amplification of shock propagation? Third, what is the optimal policy response to minimize the aggregate impact of these shocks, and how can the policymaker use real-time data to inform the response?

In my joint work with Victor Orestes, we study how shocks and frictions in payment networks can affect the real economy through firms' decisions in production networks. The project is motivated both by empirical phenomena in trade credit terms, as well as differential flows in payments flows versus production flows when examining firms' responses to temporary shocks. When firms borrow against accounts receivable, there is counterparty risk for the bank that is increasing in the complexity of the payment network. If another firm faces a liquidity shock, there can be a cascade of non-payment unless the Central Bank intervenes with a well-targeted liquidity injection. Given the frequency of idiosyncratic liquidity shocks, firms adjust their production in expectation of payment issues. We jointly model the production and payments network given payments shocks and frictions, characterize the optimal state-contingent liquidity injections, and describe how a central bank could implement second-best liquidity injections under the constraints of existing technology as well as under a Central Bank Digital Currency with firms holding deposits directly with the Central Bank.

In my joint work with Ananya Kotia and Utkarsh Saxena, we study the aggregate impact of the Indian Supreme Court's abrupt cancellation of all iron ore mining licenses in the state of Goa, in response to violations of environmental regulation that persisted until the cancellation due to weak enforcement capability. There is a long literature that assess command-and-control regulation versus market-based regulation, including in weak institutional environments. However, the literature has a partial equilibrium framing. We build a model of production networks and trade that features a labor wedge and that focuses on a non-first-order approach to estimating the aggregate impacts of an idiosyncratic shock. In addition to the quantifying the general versus partial equilibrium impact of the mining ban shock, we also seek to make a methodological contribution for how to estimate the aggregate impacts of large idiosyncratic shocks beyond the first-order approach, how to best predict the impacts ex ante using pre-shock data, and how optimal fiscal and industrial policy responses change the estimate of the cost of the CAC environmental policy. Under fiscal policy, we consider government consumption by location and sector. Under industrial policy, we consider differences in producer and consumer prices, varying by sector and location, implemented via targeted taxes and subsidies. In an extension, we plan to incorporate heterogeneity among workers by sector, since we observe differential expenditure behavior and India's rigid labor laws result in low sectoral mobility and differential labor wedges by sector. This workshop would be helpful in equipping me to implement this extension.