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# Research Statement

My research lies at the intersection of macroeconomics, finance, and sustainability transitions. I study how financial frictions, expectations, and policy-related risks shape firm behavior, investment decisions, and aggregate economic outcomes. My recent work examines topics including intangible capital, supply-chain risks, climate-transition policies and energy policies, and the propagation of uncertainty across firms and the macroeconomy. Methodologically, my research combines structural macro-finance models, firm-level data, and increasingly text-based and computational methods to study how microeconomic heterogeneity and expectations interact with macroeconomic dynamics.

Since joining Nanyang Technological University in 2022, I have developed an active research pipeline spanning macroeconomics, macro-finance, sustainability, and firm heterogeneity. This work has resulted in one forthcoming publication, multiple revise-and-resubmit papers, and several ongoing projects under review or in advanced working-paper stages. My research has been presented at major international conferences, including multiple Econometric Society meetings, and has been supported by competitive internal research grants.

Across these projects, I study how expectations, financial frictions, and policy-related transitions shape firm behavior and macroeconomic adjustment through heterogeneous firm responses. Whether through inflation expectations, supply-chain uncertainty, financing frictions, or climate-transition policies, my work studies how firms respond differently depending on their capital composition, financing conditions, and exposure to policy and economic risks. Together, these projects connect macroeconomic fluctuations, sustainability transitions, and firm-level investment behavior within a broader macro-finance framework.

My research combines empirical analysis with quantitative macroeconomic frameworks. In several projects, I use firm-level and textual data to document new empirical patterns and then develop structural or dynamic models to interpret the underlying economic mechanisms and quantify aggregate implications. This approach helps connect firm-level evidence to broader macroeconomic and policy questions while maintaining close links between theory and empirics.

**Financial Frictions, Intangible Capital, and Macroeconomic Transmission**

One central strand of my research studies how financial frictions shape firm investment and aggregate outcomes, particularly in economies where intangible capital is becoming increasingly important. This research agenda is motivated by the observation that modern economies are increasingly characterized by intangible-intensive production, while many macroeconomic and financial frameworks remain centered on tangible collateral and physical capital.

My paper “The Macro Impact of the Recovery Rate” develops a heterogeneous-firm general equilibrium model with risky debt and endogenous default to study how recovery values affect

equilibrium credit allocation, borrowing capacity, and aggregate outcomes. Motivated by the rise of intangible capital in the U.S. economy, the paper documents that firms and industries with higher asset tangibility exhibit higher debt issuance and lower distance to default, consistent with differences in recovery values across firms. To quantify the aggregate implications, I structurally estimate the model using simulated method of moments (SMM), matching moments related to investment, debt issuance, spreads, and default rates. The results imply that rising intangible capital can generate economically meaningful reductions in aggregate output and welfare through tighter financial constraints and reduced borrowing capacity.

A related paper, "The Impact of Monetary Policy Innovations on Firm Investment: The Role of Intangible Assets in China," examines how intangible capital shapes the transmission of monetary policy in an economy undergoing a structural transformation toward innovation-driven growth. Using firm-level data and a newly constructed monetary policy innovation measure, the paper shows that firms with higher intangible asset intensity respond less strongly to expansionary monetary policy shocks. The findings suggest that financing frictions, differences in depreciation, and collateral constraints weaken the investment response of intangible-intensive firms, implying that structural changes in the composition of capital alter the effectiveness of macroeconomic stabilization policy. This paper is currently under revision and resubmission at Macroeconomic Dynamics.

Overall, this line of research examines how changes in the nature of productive capital reshape financing conditions, macroeconomic transmission mechanisms, and aggregate fluctuations. Ongoing projects examine borrowing constraints, asset tangibility, and the macroeconomic implications of intangible-intensive production using both empirical and quantitative macroeconomic approaches.

**Expectations, Uncertainty, and Supply-chain Risks**

A second strand of my research examines how expectations, uncertainty, and supply-chain risks affect firm behavior and investment decisions. This work is motivated by the increasing importance of global production networks, geopolitical uncertainty, and expectation-driven fluctuations in modern economies.

In "Supply-chain Risk Perceptions and Corporate Investment," I study how firms adjust investment in response to supply-chain uncertainty and directional outlook using text-based measures constructed from earnings-call transcripts. The paper distinguishes between first-moment supply-chain sentiment and second-moment perceived uncertainty and shows that these two dimensions exert systematically different effects on investment behavior. Perceived uncertainty is associated with short-run investment contraction, whereas positive supply-chain sentiment generates persistent investment expansion. Importantly, the responses differ substantially across types of capital: physical investment responds primarily to directional outlook, while intangible investment is more sensitive to uncertainty. The findings suggest that heterogeneity in investment responses arises primarily across types of capital rather than across firms, highlighting the role of capital characteristics, financing constraints, and adjustment frictions in shaping firm responses to supply-chain risks.

This project also reflects my broader interest in integrating textual analysis and unstructured data into macro-finance research. By constructing measures of uncertainty and sentiment directly from firm communications, I aim to better understand how managerial perceptions and expectations shape investment and macroeconomic outcomes.

Relatedly, my work on analyst expectations studies whether inflation expectations generate money illusion in professional forecasts. Using analyst earnings forecasts matched with expected inflation measures, the paper documents that higher expected inflation is associated with upward revisions in long-term earnings growth forecasts that are not fully realized ex post. The evidence suggests that analysts partially interpret nominal inflation signals as information about future real growth, generating systematic forecast errors. This work contributes to the literature on expectations formation, behavioral macro-finance, and inflation perceptions while connecting to broader questions regarding how beliefs and informational frictions affect macroeconomic and financial outcomes.

Across these projects, a common theme is that expectations and uncertainty affect not only the level of economic activity but also the allocation of investment across firms and types of capital. This research agenda seeks to integrate informational frictions, expectations, and textual measures into macro-finance analysis to better understand how firms respond to changing economic and policy environments.

**Sustainability Transitions, Energy Constraints, and Environmental Policy**

A third strand of my research examines sustainability transitions, environmental policy, and the macroeconomic implications of energy constraints. This work is motivated by the growing importance of climate-transition policies, decarbonization, and electricity-system constraints in shaping economic activity and investment allocation.

In my ongoing work on environmental policy and small open economies, I develop an environmental DSGE framework with green and brown sectors to study how carbon taxes and cap-and-trade systems interact with alternative monetary policy regimes. The model examines how environmental regulation affects sectoral allocation, macroeconomic volatility, and welfare across different exchange-rate regimes and monetary-policy arrangements. An extension of this project studies how diagnostic expectations about climate transitions and policy regimes interact with macroeconomic stabilization and structural adjustment during green transitions.

Another project studies how capacity-constrained environmental regulation affects the spatial allocation of electricity-intensive investment in China. Exploiting the 2021 high-pressure warning under China's Dual-Control of Energy Consumption policy as a quasi-natural experiment, the paper shows that tightening energy constraints significantly reduces the deployment and expansion of intelligent computing centers. Rather than generating smooth spatial relocation, the policy shock primarily induces aggregate contraction, reflecting the importance of local electricity-system capacity, adjustment frictions, and power-supply stability. The findings contribute to the literature on environmental regulation, industrial policy, and digital infrastructure by emphasizing the

distinction between cost-based regulation and capacity-constrained regulation.

I have also worked on sustainability-related projects examining strategic green behavior and environmental governance. My paper "Strategic Green Behavior: Conceptual Foundations and Index Development" is forthcoming at Business Strategy and the Environment, while related work on symbolic policy signals and strategic green compliance is currently under revise-and-resubmit stage at Environmental Politics. Both journals are classified as Tier 1A journals under the NTU journal ranking system. These projects extend my broader interest in sustainability transitions, policy expectations, and firm responses to environmental regulation.

Overall, my work on sustainability transitions examines how climate-related policies, energy constraints, and transition expectations reshape macroeconomic adjustment and firm behavior. Rather than viewing environmental regulation solely as an environmental or sectoral issue, I study how sustainability transitions interact with financial frictions, expectations, and macroeconomic stabilization policies. This research agenda connects environmental policy to broader questions regarding investment allocation, macroeconomic volatility, and structural transformation during the transition toward lower-carbon economies.

**Research Impact, Grants, and Academic Visibility**

Since joining NTU, I have actively developed an interdisciplinary and internationally oriented research agenda spanning macroeconomics, macro-finance, sustainability, and firm heterogeneity. My research pipeline currently includes multiple working papers and collaborative projects at various stages of submission and revision, including revise-and-resubmit papers, forthcoming publications, and ongoing collaborations.

My work has been presented at major international conferences and workshops, including meetings of the Econometric Society, the Asian Economic Development Conference, the Singapore Economic Review Conference, and other international conferences in macroeconomics and finance. I have also delivered invited seminar presentations at institutions such as Singapore Management University and Shanghai University of Finance and Economics. These presentations have helped increase the visibility of my research and facilitated collaborations across institutions and disciplines.

My research has received internal funding support from the Ministry of Education Academic Research Fund (AcRF) Tier 1 Seed Funding Grant, the NTU Start-Up Grant, and the NTU--University of Warwick Joint Seed Fund. These projects support ongoing work on firm investment, intangible capital, supply-chain risks, and sustainability transitions.

**Future Research Agenda**

Looking forward, I plan to continue developing research at the intersection of macroeconomics, finance, expectations, and sustainability transitions. A central direction of my future research concerns how changes in financial contract structure reshape firms' responses to uncertainty, financing frictions, and structural economic transitions.

An important line of my ongoing research examines the macroeconomic implications of the rise of

earnings-based borrowing in economies increasingly characterized by intangible capital. Traditional collateral-based lending relies heavily on pledgeable tangible assets, whereas earnings-based lending links borrowing capacity more directly to firms' cash flows and EBITDA performance. This structural shift in financial contracting may fundamentally alter firms' liquidity management, financing constraints, precautionary behavior, and responses to uncertainty shocks.

In joint work with my PhD students, I study how the interaction between rising intangible capital intensity and the expansion of earnings-based lending shapes firms' cash holdings and investment decisions. One project investigates whether earnings-based borrowing partially offsets the precautionary cash-hoarding behavior commonly associated with intangible-intensive firms. Because intangible assets are less pledgeable, such firms often face tighter financing constraints and accumulate precautionary liquidity. However, cash-flow-based lending arrangements may relax these constraints by providing financing that depends less on collateral values. Our findings aim to show that ignoring heterogeneity in financial contract structures may overstate the aggregate "cash-glut" effects associated with the rise of intangible capital.

A related project studies how different financial contracts affect firms' responses to uncertainty shocks. Under collateral-based lending, borrowing capacity is relatively rigid because it depends primarily on the value of pledgeable assets, leading firms to respond to uncertainty with stronger precautionary savings and reduced investment. In contrast, borrowing capacity under earnings-based contracts becomes more state contingent, as it depends directly on firms' cash-flow volatility and EBITDA dynamics. This project examines whether firms that rely on earnings-based borrowing respond differently to uncertainty shocks in investment, cash accumulation, employment adjustment, and hiring behavior. More broadly, I aim to develop quantitative macroeconomic frameworks that incorporate heterogeneity in financial contracts to better understand the aggregate transmission of uncertainty shocks and business-cycle fluctuations.

Another major direction of my future research agenda concerns sustainability transitions, environmental policy, and macroeconomic restructuring. Building on my current work on green finance, energy constraints, and environmental regulation, I plan to further develop heterogeneous-firm macroeconomic frameworks that integrate financial frictions, endogenous innovation, and sustainability transitions. In ongoing work on green finance policy in China, I develop a dynamic, heterogeneous-firm general equilibrium model with financial frictions, endogenous innovation, and firm selection to study how financing-based environmental policies affect resource reallocation, innovation incentives, aggregate productivity, and welfare during the transition.

I am increasingly interested in studying how climate-transition expectations, energy-system constraints, and sustainability-related financing policies jointly shape firm behavior and macroeconomic adjustment. Rather than viewing environmental regulation solely as a sectoral or environmental issue, my research aims to connect sustainability transitions to broader macroeconomic questions involving productivity growth, financial stability, industrial restructuring, and long-run aggregate efficiency.

Methodologically, I expect my future work to increasingly integrate textual analysis, computational

methods, and AI-assisted approaches into macroeconomic and macro-finance research. Recent advances in large language models and AI-based textual analysis provide new opportunities to measure expectations, uncertainty, perceptions of transitions, and supply-chain risks using large-scale unstructured data. I am particularly interested in combining these methods with structural macroeconomic frameworks to better understand how beliefs, informational frictions, and policy expectations jointly affect firm-level decisions and aggregate economic outcomes.

I also plan to continue expanding interdisciplinary and international research collaborations. In particular, I aim to deepen existing collaborations with coauthors at the University of Warwick and further expand collaborations across NTU, including faculty members from the Nanyang Business School and the College of Humanities, Arts, and Social Sciences, particularly on projects related to supply-chain networks, biodiversity, sustainability, and environmental transitions. Over the longer term, I hope to further develop these collaborative research networks into larger interdisciplinary projects and competitive external grant applications.

Finally, I would like my future research agenda to maintain strong regional and policy relevance for Singapore and Asia. Singapore's position as a global financial center, logistics hub, and regional leader in sustainability and digital infrastructure provides a particularly valuable institutional environment for studying supply-chain resilience, sustainability transitions, green finance, energy systems, and macro-financial stability. I hope my future research can contribute not only to the academic literature but also to broader policy discussions related to sustainable growth, financial resilience, and economic restructuring in the region.

Overall, my long-term research objective is to contribute to a better understanding of how financial frictions, expectations, contract structures, and structural transitions jointly shape firm behavior and aggregate economic outcomes in modern economies. I hope to continue building a research agenda that combines rigorous macroeconomic analysis with policy-relevant questions related to sustainability, technological change, uncertainty, and global economic restructuring.