Research Statement

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I study topics in international macroeconomics. My research focuses on sovereign debt, firm dynamics, and financial aspects of trade. Within sovereign debt, much of my research centers on the interactions between sovereign debt and labor market. Specifically, I study how labor market outcomes—such as inequality, migration, and remittances—affect sovereign default risk, and conversely, how sovereign default risk affects these outcomes. My work in this field also examines local government finances, with a particular focus on state governments in the United States. My research on firm dynamics evaluates firm investment and innovation, and how firms finance these activities with equity and debt, especially during financial crises. A relatively new aspect of my work involves building world general equilibrium models to study trade and financial frictions.

1 Sovereign Debt and Default

The first part of my research explores the determinants and consequences of sovereign default risk. The connection between the sovereign debt crises and households is a major open question for international macroeconomics. In **"Migration and Sovereign Default Risk" (Journal of Monetary Economics, 2020)** with George Alessandria and Yan Bai, we document a large worker outflow accompanies a rise in sovereign debt spreads. We develop a sovereign default model with an endogenous migration choice to understand how migration interacts with default risk and propagates a debt crisis. The model has a two-way feedback. Default risk lowers workers' welfare and induces emigration, which in turn intensifies default risk by lowering tax base and investment. Compared with a no-migration model, our model produces higher default risk, lower investment, and a more profound and prolonged recession. We find that migration accounts for almost all of the lack of recovery in GDP after the European sovereign debt crisis in Spain around 2012.

Migration often leads to remittances, which constitute a major source of income for many developing countries. In **"From Diaspora Dollars to Default Risk: Remittances and Sovereign Spreads" (working paper)** with Armen Khederlarian, we study the role of remittances in sovereign default risk. Most developing countries are characterized by net emigration and net remittances received. In theory, the effect of remittances is ambiguous. On the one hand, they provide additional income that increases the governments ability to repay. On the other hand, they reduce the production share of income and thus undermine the sanctioning mechanisms enforcing repayment available to international lenders. Using a panel of developing countries, we document a positive correlation between spreads and net remittances. We then construct a sovereign default model with emigration and remittances. Critical to the ability of the model to reproduce the positive correlation is the countercyclical nature of emigration and remittances. Because the government internalizes that default leads to an increase in remittances that partially cushions against the default penalties, in equilibrium, countries with a large income share from remittances face a steeper government bond spread schedule and hold less debt. Our model, calibrated to countries' average emigration and net remittances, successfully replicates the observed correlations between emigration, remittances, and spreads.

What determines a government's capacity to repay debt? The existing literature on sovereign default generally focuses on government decisions based on aggregate indicators such as total debt and GDP. However, in practice, governments often face competing responsibilities that may conflict with debt repayment goals. For example, distortionary taxation is commonly used to reduce income inequality, but it is not conducive to maximizing GDP. In **"Inequality, Taxation, and Sovereign Default Risk" (American Economic Journal: Macroeconomics, 2024)**, I empirically document and theoretically demonstrate that governments face a trade-off between income redistribution and sovereign borrowing costs (i.e., sovereign spreads). When income inequality is high, the government has strong incentives to redistribute income through progressive taxation. However, progressive taxes can discourage labor supply and induce emigration—particularly among high-income workers—thereby shrinking both the current and future tax base. This erosion of fiscal capacity weakens the government's ability to repay debt, raising default risk and increasing sovereign spreads.

When inequality is a central policy concern, governments may choose greater redistribution at the cost of higher borrowing costs.

Although in practice governments make joint decisions about taxation, debt, and default risk, these topics are typically studied in two separate literature. The optimal taxation literature focuses on designing tax systems—such as the degree of progressivity—often without considering government indebtedness or the risk of default. In contrast, the sovereign default literature generally abstracts from taxation altogether, assuming that the government has access to the entire GDP as a resource for repayment. This separation overlooks important interactions between redistribution policies and sovereign risk. In **"Pareto Weights in Indebted Economies" (working paper)**, I study tax progressivity and its interactions with government debt and default risk. I show that government debt and the associated risk of default can alter both the optimal degree of tax progressivity and the distribution of welfare weights—commonly known as Pareto weights—that support social welfare maximization. I calibrate the model to the key features of Brazil's income distribution and use pre-tax and post-tax data to uncover the Pareto weights consistent with current redistribution policy. The analysis reveals that Brazil's existing tax progressivity is about 40% of the level that would be optimal under a utilitarian government with equal weights. The Pareto weight of the richest quintile is 12 times as large as that of the poorest quintile. A high debt burden and default risk constrain redistribution by lowering optimal tax progressivity. Without default risk, the after-tax Gini index would fall from 0.49 to 0.45. A gradual reduction in debt increases output, allows greater income redistribution and reduces consumption inequality over time.

My work in this field also examines local government finances, with a particular focus on state governments in the United States. In **"Public Financing under Balanced Budget Rules" (Review of Economic Dynamics, 2025)** with Chang Liu, we analyze the impact of a balanced budget rule (BBR) on government financing costs and its implications for the government balance sheet. Exploiting the variation in BBR implementation across US states, we find that states with more stringent BBRs exhibit significantly lower bond spreads and credit default swap spreads, demonstrating the crucial role of default risk. Our model

with long-term debt, endogenous investment and output, as well as a BBR, aligns with the empirical result. Calibrated to Illinois, our quantitative analysis suggests that implementing a BBR could dramatically decrease the state bond spread, gradually lower the debt, and improve welfare in the long run.

U.S. state governments, like other sovereign countries, cannot declare bankruptcy as cities and municipalities can. This is because they are considered sovereign entities under the U.S. Constitution and are protected by quasi-sovereign immunity, which means they cannot be sued without their consent. While there has been ongoing debate about whether states should be allowed to file for bankruptcy, these discussions have not been based on a formal economic framework. In a short paper **"A Note on Allowing State Bankruptcy" (Macroeconomic Dynamics, 2025)**, I provide a formal economics framework for analyzing the impacts of allowing state government bankruptcy. Allowing bankruptcy increases ex-ante risks for the government to refuse repayment, but provides ex-post benefits of reducing default costs and saving federal bailouts. Event analysis shows that an unexpected switch in bankruptcy rules that allows for bankruptcy would decrease government debt-to-GDP ratio by 9.2 percentage points, increase consumption by 0.69 percent, but increase spread by 1.1 percentage points.

In ongoing work with Min Fang, Zibin Huang, and Chang Liu, we study government fiscal condition as a determinant of worker spatial allocation across the U.S. states. We first show stylized facts on the strong correlation between migration flows and government fiscal condition: workers migrate away from states that are highly indebted. Then, we build a spatial equilibrium model that incorporates worker migration and government debt. Each worker can migrate to other states. They decide where to live according to wages, housing costs, taxes, public services, and an idiosyncratic utility shock at each possible destination. The model can tell us about the unobservables, for example, the implied migration cost over time and across the states. We are also working on quantifying the role of government fiscal condition on worker spatial allocation.

2 Financial Frictions and Firm Dynamics

My research covers financial frictions not only at the government level but also at the firm level. Specifically, I focus on how firms finance their investments and innovation. In **"Debt Maturity Heterogeneity and Investment Responses to Monetary Policy" (European Economic Review, 2022)** with Min Fang, we study how debt maturity heterogeneity determines firm-level investment responses to monetary policy shocks. We first document that debt maturity significantly affects the responses of firm-level investment to conventional monetary policy shocks: firms who hold more long-term debt are less responsive to monetary shocks. The magnitude of responses due to debt maturity heterogeneity is comparable to the well-documented responses due to debt level heterogeneity. Evidence from credit ratings and borrowing responses indicates that the higher future default risk embedded in long-term debt plays an essential role. We then develop a heterogeneous firm model with investment, long-term and short-term debt, and default risk to quantitatively interpret these facts. Conditional on the level of debt, firms with more long-term debt are more likely to default on their external debt and consequently face a higher marginal cost of external finance. As a result, these firms are less responsive in terms of investment to expansionary monetary shocks. The effect of monetary policy on aggregate investment, therefore, depends on the distribution of debt maturity.

Investment in intangible assets accounts for an increasing share of total investment, and the literature has documented their importance for future productivity and growth. In **"Sovereign Risk and Intangible Investment" (Journal of International Economics, 2024)** with Chang Liu, using Italian firm-level data, we show that firms reallocated from intangible assets to tangible assets during the 2011–2012 Italian sovereign debt crisis. This asset reallocation is more pronounced among small firms and high-leverage firms. This reallocation affects aggregate output and TFP. To explain the reallocation pattern and quantify the output and TFP losses, we build a sovereign default model incorporating firm intangible investment. In our model, sovereign risk deteriorates bank balance sheets, disrupting banks' ability to finance firms. Firms with greater external financing needs are more exposed to sovereign risk. Facing tightening financial constraints, firms shift their resources towards

tangibles because they can be used as collateral. At the aggregate level, we find that elevated sovereign risk explains 45% of the observed output losses and 31% of the TFP losses in Italy from 2011 to 2016.

How can firms better finance their innovation? In **"Financing Innovation with Innovation" (working paper)** with Zhiyuan Chen and Min Fang, we document that firms are increasingly financing innovation using their existing innovation stock, measured by patents. Using patent collateral data from both the U.S. and China, we show that the total number and share of patents pledged as collateral have been rising steadily both in the U.S. and China. However, Chinese firms use patents as collateral on a smaller scale and with lower intensity than U.S. firms. In both U.S. and Chinese data, pledging patents as collateral allows firms to borrow more, increase investment, and raise R&D expenditures. We then develop a heterogeneous-firm general equilibrium model featuring idiosyncratic productivity risk, investment in innovation capital, and borrowing constraints tied to patent collateral. The model highlights two key barriers to using patents as collateral: high inspection costs and low liquidation values of patent assets. We parameterize the model and find that both barriers are significantly more severe in China. Counterfactual analyses reveal that reducing inspection costs in China to U.S. levels would lead to substantial gains in innovation, output, and welfare—larger than those resulting from improving the liquidation value of patent assets.

In ongoing work with Chang Liu, we study the pecking order of firm financing and investment, particularly during financial crises. Using firm-level data from Italy, Spain, Portugal, Ireland, and Greece, we examine how firms adjust their tangible and intangible investments, as well as how they finance these investments, whether through equity or debt. We also plan to study how these adjustments are constrained by firm characteristics and what the implications are for the heterogeneous effects of a crisis on different types of firms.

3 Financial Aspects of Trade

A more recent strand of my research bridges international finance and international trade. In the data, trade tends to decline during or after sovereign default events, suggesting that trade and financial frictions are correlated. In **"Trade Barriers and Sovereign Default Risk" (working paper)** with George Alessandria, Yan Bai, and Chang Liu, we develop a general equilibrium sovereign default model with both trade and financial frictions to study the interaction between sovereign default risk and trade. In this model, an increase in trade cost shock elevates default risk, leading to higher borrowing costs and a further decrease in total trade. The model endogenously generates elevated default risk arising from trade frictions and can capture the trade costs of defaults. It successfully replicates the observed comovement between trade and sovereign default risk in the data. Quantitatively, we find that the financial friction component accounts for nearly half of the variations in total trade costs.

While researchers have studied how global trade shocks affect major economies, their heterogeneous impacts on developing countries remain understudied—particularly in the presence of imperfect international financial markets. **In ongoing work** with Yan Bai, Chang Liu, and Gabriel Mihalache, we examine how global trade shocks influence both the common trend and the time-varying dispersion of sovereign spreads across developing countries. Between 2000 and 2007, global trade integration intensified. During this period, nearly all countries experienced a decline in sovereign spreads, together with a reduction in cross-country dispersion. After 2016, growing political backlash against globalization has led many countries to adopt inward-looking trade policies, contributing to stagnant or declining global trade. This period of "geoeconomic fragmentation" also coincides with rising average sovereign spreads and increasing cross-country dispersion. To analyze these patterns, we build a world general equilibrium model featuring both advanced economies and a continuum of emerging economies facing financial frictions. Each country engages in imports and exports. We find that increases in global trade costs lead to sharper output declines and higher sovereign default risk for large importers. Our results highlight trade frictions as a key driver of both the trend and divergence in sovereign spreads.

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