



## Research Statement

I am a macroeconomist with research interests in *Production Networks*, *International Finance*, *Distributional Macroeconomics*, and *International Trade*. In what follows, I will provide an overview of my research contributions, current research agenda, and my vision for the future of my academic career.

Modern economies rely on intricate networks of consumption, factor supply, and transfers. My research resides at the crossroads of economic theory, macroeconomic aggregation, and empirical analysis, and it delves into how the intricate web of economic networks influences an economy's equilibrium. This analysis allows me to understand the aggregate and distributional effects of the propagation of microeconomic shocks in economies with complex structures. The insights from my research can influence our ability to understand and enact targeted policies to tackle critical problems, such as economic inequality and resource misallocation.

## Current Research Agenda

In my **job market paper** titled "*Inequality and Misallocation under Production Networks*", I explore how changes in the income and consumption expenditure distributions influence overall resource misallocation. The model from this paper brings a new perspective on how distributional variations affect aggregate output and the distribution of real consumption through the reallocation of resources. For distorted production network economies with heterogeneous households and endogenous labor supply, I obtain decompositions that capture the local variations for the aggregate total factor productivity (TFP) and analogous efficiency measures for the real consumption of each household. The main theoretical contribution shows that models that rely on an aggregate production function and ignore distributional variations are unbiased only under exceptional circumstances. I use my decompositions to estimate the first production network model with household heterogeneity for the United States.

These results constitute the first systematic theoretical and empirical examination of the importance of joint heterogeneity in firms and households to measure the aggregate and distributional effects of the propagation of microeconomic shocks in distorted economies with general production networks.

This project offers two key theoretical insights. Firstly, I distinguish how the workers' value-added over labor income ratios, known as *distortion centralities*, are sufficient statistics for measuring the effect of income distribution variations on total factor productivity (TFP). Distortion centralities gauge the importance of workers in the production of heavily distorted firms. The lesson is that labor misallocation increases and TFP falls as labor income shifts toward workers with high distortion

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centralities, i.e., workers essential for heavily distorted firms. Secondly, I identify how the average distortion centrality faced by the consumption expenditure from a household, or expenditure efficiency, is a sufficient statistic for understanding the effect of consumption expenditure variations on TFP. When aggregate expenditure shifts toward relatively undistorted firms, their labor demand increases. In response to this increase in labor demand, workers reallocate from distorted firms with high marginal productivity to relatively undistorted firms with low marginal productivity. Consequently, an increase in the expenditure on relatively undistorted firms accentuates labor misallocation. This second-best result captures how income distribution variations change workers' allocation efficiency and affect aggregate output.

My empirical analysis reveals that technological shocks have driven TFP growth. Additionally, it underscores the critical influence of income distribution variations, particularly during specific business cycles. For instance, these variations increased misallocation after the Great Recession and reduced TFP by 7.5%.

My job market paper constituted the framework for the following working papers.

In my job market paper, the aggregate and distributional effects are for a closed economy. In "*International Misallocation and Comovement under Production Networks*", I extend the model introduced in my job market paper to an open economy environment. This allows me to focus on country-level TFP variations that account for the possibility that factors of production and dividends cross national boundaries. These results address a crucial gap in the existing literature, which previously lacked decompositions that allowed for the reallocation of factors and quasi-rents across countries. Unlike previous methods, an additional advantage of my decompositions is that it eliminates the need for measuring real variations in external goods flows, making its empirical implementation more straightforward, as data on prices is no longer required. I implement these decompositions with data from the world input-output database. My estimations provide a good empirical representation of the observed growth in country-level TFP. Additionally, the model provides evidence of economic spillovers and contagion through industrial networks, reinforcing the pivotal role of global value chains in generating strong correlations in business cycles across countries.

In "*Growth Through Industrial Linkages*", I implement with *Xiaojun Guan* the open economy results from the previous paper to estimate how changes in the structure of the global input-output network have influenced country-level TFP and growth. We estimate that structural changes in the global input-output network between 1965 and 2000 were advantageous for developing countries and unfavorable for advanced economies. Holding the global input-output network fixed, TFP growth in China and India would have been 26.6% and 9.7% lower. In contrast, TFP growth would have been

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4.0% and 16.8% higher for the United States and Australia. Our findings illustrate that the dynamics of the domestic intermediate input cost share capture the importance that the structure of the global input-output networks has on the amplification of shocks on TFP. Our project underscores the importance of industrial linkages and robust domestic intermediate input markets for economic growth.

In *"Nonlinearities in Production Network Economies with Distortions"*, I explore with Ali Karimirad the importance of nonlinearities (second-order effects) on aggregate TFP for economies with distortions and production networks. The second-order effects address an existing gap in the literature, which, until this project, only had linear approximations for general production networks with distortions. We show that the current linear approximation is biased for large shocks and that the nonlinear second-order effects we account for significantly reduce this bias.

In, *"Stairway to Haven"*, I explore in a production network open economy the main channels for the propagation of the macroeconomic effects from corporate shifting into tax havens. In the model, tax havens specialize and compete for shifted profits by trading concealment assets in a differentiated oligopolistic environment, and non-haven countries defend these profits by setting enforcement levels over capital flows. Profit shifting introduces rebated distortions that modify the terms of trade and the effective marginal tax rate. They also introduce wasted distortions that destroy resources via enforcement policies, and corporate costs firms incur to access and develop concealment strategies. For tax havens, the main benefits come from an increase in corporate dividends, the tax base, and wages. In contrast, non-haven countries are affected by the opposite effects.

## Past Research

In my master's dissertation, *"Pricing the Exotic: Path-dependent American Options with Stochastic Barriers"* published in the *Latin American Journal of Central Banking*, I developed with Mauricio Villamizar-Villegas, a novel pricing strategy that approximates the value of an American option with exotic features through a portfolio of European options with different maturities.

## Future Research

I envision my future research endeavors addressing three agendas.

First, the current production network literature operates mainly with static models. Expanding this family of models to a dynamic environment would allow us to understand the aggregate effects of microeconomic firm uncertainty. The intuition is that not all sources of uncertainty in production are equally important, and targeted risk hedging might improve social welfare.

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Second, coupling the contributions from the production network literature with the work done in the Heterogeneous Household New Keynesian (HANK) literature. On the one hand, most HANK models operate under the assumption of a representative firm and vertical household heterogeneity, i.e., heterogeneity in efficiency. Under these assumptions, HANK models endogenously explain the wealth distribution. In contrast, the income distribution depends on an exogenous underlying Markov process. On the other hand, production network models have multiple interconnected firms, and household heterogeneity is horizontal. Income heterogeneity comes from skill biases in the labor demand from firms, which creates an asymmetry in their income exposure. Under these assumptions, production network models explain the income distribution. However, due to the static setting in which they operate, there are no dynamic effects on wealth distribution. Combining HANK and production network models will provide a comprehensive explanation for both wealth and income distributions.

Third, the empirical implementation of production network models with firm and household heterogeneity using highly disaggregated transactional data. Let me assume a gold standard in terms of data availability. Suppose that in a couple of years, transactional data from the ledgers of a central bank digital currency becomes available. This data would provide a representative sample of an economy's money flow. Here is where the empirical potential of the model created in my job market paper would come into play, as it would allow us to understand the aggregate and distributional effects of idiosyncratic shocks in every firm or household.