Research Statement

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I am an applied macroeconomist primarily interested in growth, development, and human capital. My research combines reduced-form estimates from microdata with quantitative macroeconomic models to better understand the empirical findings and gain insights into the aggregate implications of various policies. My current work can be broadly divided into three categories: quantifying the long-run macroeconomic effects of eradicating malaria, exploring the interaction between financial constraint and on-the-job human capital accumulation, and understanding the heterogeneous macroeconomic impacts of the COVID-19 pandemic across countries.

Long-Run Macroeconomic Effects of Malaria Eradication in sub-Saharan Africa

In my job market paper, **"How Will a New Malaria Vaccine Shape Africa's Economic Future? A Macroeconomic Analysis"**, I study the long-run aggregate effects of Malaria eradication in sub-Saharan Africa. Malaria is a leading cause of death and a barrier to children's human capital accumulation in sub-Saharan Africa, despite the existence of preventive technologies and treatment. However, the macroeconomics literature thus far concludes that removing Malaria would only increase populations without doing much in raising living standards. I reassess this conclusion by modeling and quantifying the long-run macroeconomic effects of a successful malaria vaccine and argue that the increase in long-run output per capita from eliminating Malaria is much larger than existing estimates.

I focus on several new features that have been absent from previous macroeconomic studies of disease eradication. The first is a quantity-quality tradeoff that parents face when making fertility and investment decisions in children. The second is a richer choice of investment in human capital than just years of schooling, since eradicating malaria allows children to accumulate more human capital with the same years of schooling. The third is the intergenerational dynamics, as healthier children may subsequently adjust their fertility and invest more in their own children's education.

I incorporate these features into a general equilibrium, heterogeneous-agent, overlapping generations model of endogenous fertility and childhood human capital accumulation. I introduce Malaria as a health shock that increases mortality and lowers children's learning ability in school. The aggregate effects of eradicating Malaria depend on how fertility and parental investment in children respond to a reduced risk of Malaria, which needs to be quantified empirically. To this end, I exploit a recent large-scale antimalarial campaign in Tanzania, the Roll Back Malaria (RBM) campaign. I estimate the effects of a reduced malaria risk on women's fertility and children's years of schooling through a difference-in-differences design and find that the reduced prevalence of Malaria due to the campaign led to an average of 0.56 more years of schooling for the treated children.

I use these estimates to calibrate the model's short-run impacts of Malaria reduction and use the calibrated model to compute the short- and long-run general equilibrium impacts of Malaria vaccines. The model implies that eradicating Malaria would raise GDP per capita by 30 percent in the long run, which is nearly ten times larger than the literature's current best estimates. The model implies that eliminating Malaria will cause parents and children to undertake much more investment in human capital than they did previously, and such effects are amplified over generations. Cost-benefit analysis under various assumptions on vaccine effectiveness suggests that universal vaccination is a cost-effective policy as long as the vaccine's efficacy exceeds 40 percent, which is lower than the current threshold of 75 percent set by the World Health Organization.

Financial Constraint and On-the-Job Human Capital Accumulation

In my another paper, **"Debt, Human Capital, and the Allocation of Talent"** (with Titan Alon, Natalie Cox, and Arlene Wong), we study the long-term labor market consequences of rising student debt and how debt affects human capital accumulation and occupational choice. Using panel microdata on the early career development of recent college graduates, we document the relationship between assets, debt, occupation choice, and the earnings lifecycle. Exploiting exogenous variation in student debt burdens following changes in the generosity of university tuition grants, we find that those with more initial debt chose careers with higher initial earnings but lower returns to experience over the next 10-15 years. Initial occupation choice mediates a substantial part of the measured effect of debt on the earnings lifecycle.

To understand the data and its implications, we develop a quantitative model in which credit constraints interact with occupation choice and on-the-job human capital accumulation decisions. High debt burdens lead workers to distort labor market choices toward careers that offer more front-loaded compensation. The adjustment process occurs both on the intensive margin, by reducing on-the-job investment, and through an extensive margin adjustment in occupation choice. Calibrating the model to replicate key features of the microdata, we investigate the consequences of extended repayment and student debt forgiveness programs on lifecycle earnings, occupation choice, welfare, and aggregate productivity. The calibrated model implies that the occupation switching channel is important for understanding the aggregate labor productivity effects of the policies. As the policies reduce the shadow price of human capital investment, they induce people to switch to occupations that offer more scope for human capital accumulation, raising the aggregate labor productivity.

Macroeconomic Effects of the COVID-19 Pandemic Across Countries

During the COVID-19 pandemic, I conducted a timely research focused on how and why the pandemic's macroeconomic consequences have differed across the world income distribution and how policy responses to the pandemic should differ in developing countries. In a paper **"How Should Policy Responses to the COVID-19 Pandemic Differ in the Developing World?"** (with Titan Alon, David Lagakos, and Mitchell VanVuren, *NBER Working Paper* No.27273), we conducted a quantitative analysis on how policy responses to the pandemic in developing countries should differ from those of the advanced economy. We noted that developing counties have sharply different characteristics compared to advanced economies, younger populations, larger informal sectors, weaker healthcare systems, lower fiscal capacity, more frequent day-to-day contacts between individuals, and a greater prevalence of intergenerational households. Our quantitative model predicted the policies adopted in advanced economies are generally less effective in developing countries. Instead, our analysis suggests that age-targeted policies are more effective in saving lives and protecting livelihoods. Our study became highly influential in the policy space, and our methodology was used in the Inter-American Development Bank's policy simulation for Latin American countries.

In a follow-up paper, **"Macroeconomic Effects of COVID-19 Across the World Income Distribution"** (with Titan Alon, David Lagakos, and Mitchell VanVuren, forthcoming at the *IMF Economic Review*), we assess the extent to which variation in policy or preexisting economic and demographic characteristics can explain the cross-country GDP and mortality outcomes observed in the data. Using a heterogeneous-agent incomplete-market model combined with the SICR dynamics, we find that the size of public transfer programs, age demographics, and the sectoral composition of employment are the most quantitatively important in accounting for cross-country GDP and mortality outcomes.