My research provides macroeconomic perspectives on topics of labor economics, with a particular focus on health as human capital, and entrepreneurship. I complement quantitative models with micro-evidence to answer questions around the allocation of resources as sources of inequalities within and across countries and to answer questions about optimal policy. In the sections below, I will describe my current and future research in the two themes: Macroeconomic Perspectives on Health and Macroeconomic Perspectives on Entrepreneurship.

Macroeconomic perspectives on Health and Human Capital

Why are rich people expected to live longer compared to the poor?
The US spends $3.8 Trillion or 17.7% of GDP on healthcare, of which more than a third go towards public provisions. The country also has a huge disparity in health outcomes across income groups in the US. Richest 1% are expected to live for 12.3 more years compared to the poorest 1%. The huge inequality in health outcomes in the US and its worsening over time is quite puzzling, given that rich and poor have comparable total health investments in any given year, in part due to the public provisions such as Medicaid and Medicare. In my paper titled **"Health Inequality: Role of Insurance and Technological Progress"**, I look at the role of insurance and technological progress on the rising health inequality across income groups. Upon decomposing the changes in life-expectancy using data from the U.S. Census Bureau, I find that over the past few decades: (a) heart related reduction in mortality has resulted in the largest improvements in life-expectancy for all income groups; (b) cancer related reduction in mortality has led to differential impact on rich and poor and is one of the highest contributors towards increased gap in life-expectancy. I develop a dynamic stochastic life-cycle model of an economy where individuals decide consumption-savings, whether to take up health insurance, when to visit a doctor and how much to invest in their health capital. The estimated model shows that the timing of the health investments explains a substantial part of health inequality across wealth/income groups. I find that while the rich and the poor have comparable health investments, there are substantial differences in the timing of the investments. The estimated model is able to explain about 50 percent of the gap in life expectancy across income groups observed in data. I show that different types of technological innovation interact with the timing of the investment and have a first order effect on disparities. On one hand, a non-uniform increase in the productivity of the medical sector – one where there are improvements in treating early stages of cancer for example, but none for stage 4 – can lead to an increase in inequality in life expectancy. In contrast, a uniform increase in the productivity of the healthcare sector leads to a reduction in disparities. While Medicaid alleviates the health inequality, private insurance exacerbates inequality by almost twice as much. Finally, I find that a policy of "Medicare-for-all" not only reduces the health inequality, it could also lower existing income inequality.

In ongoing work, I am extending the model to incorporate the general equilibrium effects

of the health insurance markets. This extension will allow us to think about an optimal health insurance policy.

In future work, I want to understand how the outcomes differ across geographies: counties and countries. The type of technologies and distance individuals have to travel varies substantially across counties in the US - potentially affecting the timing of their investments and the technology they have access to. Recent literature finds that the outcomes are more equal (and getting better over time) in countries such as Canada and France. The model augmented with the details of the healthcare systems of different countries can be used to think about cross-country differences in outcomes across the level of development.

What does optimal lockdown and vaccine policy look like during an Epidemic?
When the pandemic hit in early 2020, one of the pressing questions was what should an optimal lockdown and vaccine policy look like in a trade-off between output and "curve-flattening". In joint work with my co-authors Carlos Garriga and Rody Manuelli, titled **"Optimal Management of an Epidemic: Lockdown, Vaccine and Value of Life"**, we study a dynamic macro model to determine the optimal choice of stay-at-home and vaccination policies. We find that optimal lockdown policies initially significantly restrict employment but allow for partial loosening before the peak of the epidemic. The model illustrates interesting trade-offs as it implies that lower hospital capacity requires flattening the infection curve and hence a more stringent lockdown, but lower vaccination possibilities (both the likelihood of a vaccine and the vaccination rate) push the optimal lockdown policy in the opposite direction, even before the arrival of vaccine. The value that society assigns to averting deaths is a major determinant of the optimal policy.

While the paper described above is quantitative and uses a representative agent, there is a substantial heterogeneity across age, occupation, gender and race in covid deaths which could affect policy. Thus, in an *interdisciplinary empirical work including economists, healthcare professionals and public policy scholars*, my co-authors and I use the restricted CDC data on covid diagnosis and subsequent mortality to understand the strongest demographic, geographic, socio-economic and occupational risk factors for dying from COVID and find that non-white, elderly male were at the highest risk of dying from COVID and and interestingly, after controlling for demographic and socio-economic factors, occupational risk factors were relatively less important, specially after the first wave of the pandemic.

Macroeconomic perspectives on Entrepreneurship

Why do poor countries feature smaller firms compared to rich countries?

In joint work with Francisco Buera and Yongesok Shin, titled**"Limits to Firm Growth: All in the Family?"** we ask the question as to what explains the substantial differences in income and the firm-size across India and the US? How does a weak rule of law and enforcement affect

the organization of production and what is the role of Family Firms in potentially mitigating the contract enforcement friction? Our quantitative model based on Indian micro data shows that India's income per capital would be 7 to 16 percent higher if contracts in India were enforced as well as in the US. If family firms are not allowed in the model, this income gap increases by 14 to 20 percent, since family firms are a way of mitigating the contractual frictions. Finally, a policy reducing family sizes undermines the role of family firms in mitigating the impact of contractual frictions and hence reduces income per capita, which contrasts with the conventional wisdom on fertility and economic development.

In future work, I want to understand the role of dynamic issues such as the issues of succession for the life-cycle of a family firm along with the incentive problem between the family and firm, and its aggregate implications for the economy.

Why are there so few black entrepreneurs?

In joint work with my co-authors Bart Hamilton, Andrés Hincapié and Prasanthi Ramakrishnan, titled **"Entrepreneurship in Black and White"** we look at the causes and consequences of the fact that blacks are two and a half times less likely to be entrepreneurs throughout their life. Using a dynamic life-cycle occupational choice model, we find that the lower returns to capital for black businesses, which governs the scale of a business, can explain up to half of the differences in the profitability of black-white businesses and more than half of the gap in self-employment rates in blacks and whites. While both whites and blacks face collateral constraints, lower assets explain a little more than 60 percent of the differences in business profitability but a modest 11 percent of self-employment differences between blacks and whites, in presence of large differences in returns to capital.

In ongoing and future work, I want to delve into how the entrepreneurial decisions are made at the household level? If a person is an entrepreneur, is the spouse more likely to be an entrepreneur due to complementarities in the production or less likely due to risk sharing within the household? How does this differ with the social system, for example, in Scandinavian countries compared to the US? This can be crucial in designing optimal policies to promote entrepreneurship, especially female entrepreneurship, and growth in an economy.