# DISSERTATION PROPOSAL

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## "Essays on Overlapping Generations Models and Social Security"

Friday, October 4, 2019
2:30 pm
Tepper Quad 5219

The system of Social Security in the United States directly impacts nearly every working adult in the country and plays an important role in various economic policies and analyses. In contemplating the sheer size and broad-based impact of the system, stakeholders have been hotly debating various Social Security policy reforms for decades. While prior literature has extensively examined Social Security, my dissertation studies the challenge of more accurately modeling the system itself, such that an examination of potential policy environments will render results more closely reflecting the reality of the current landscape. In the first and second chapters, I develop and solve a revised model for Social Security and estimate the parameters needed to simulate the model. In the third chapter, I utilize those results to examine the impact of different policy environments on the welfare of agents in different groups. The utilization of an accurate model for Social Security and a greater understanding of how various policy regimes impact agents will be important in making policy determinations related to the future of the system.

In the first chapter of my dissertation, I develop and solve a large-scale general equilibrium overlapping generations model with ex-ante heterogeneous agents and incomplete markets, where the U.S. Social Security system is modeled as a partially funded pension system. Treating Social Security as partially funded departs from the standard representation adopted in the literature, which assumes Social Security is a fully unfunded PAYGO system. While computationally convenient, the assumption that Social Security is fully unfunded does not capture an important institutional feature of the program: Social Security benefits are not linked to the revenues of Social Security itself, rather, the benefits depend on the average life-time earnings of the retirees. As such, if the benefits computed through the lifetime earnings are below or exceed revenues of the Social Security fund, the fund will still pay out such benefits with the resources of the fund itself. By allowing Social Security to gain or lose resources, consistent with current policy, my model more accurately reflects the fact that Social Security does not operate based on a perfectly balanced budget. Moreover, my proposed assumption is in agreement with the empirical fact that over the last 40 years, Social Security revenues, which are linked to aggregate conditions, have been three times more volatile as the system's expenditure, which are linked to the average lifetime earnings of retirees. In addition, I argue that breaking the balanced budget assumption is important to correctly evaluating the role of Social Security as an intergenerational risk-sharing tool in an economy with aggregate shocks. As sources of heterogeneity, I identify and incorporate into the model several potential factors of interest: preference for time and risk, life-time wage profiles, mortality rates and retirement age. Finally, I solve the model numerically, taking into account the potential sources of heterogeneity by using non-state aggregation and sparse grid methods to avoid the curse of dimensionality resulting from the large state.

In the second chapter, I use two sources of micro data (the Panel Survey of Income Dynamics (PSID) and the Health and Retirement Study (HRS)) to estimate the parameters needed to simulate the model presented in Chapter 1. As a representation of agent preferences, I utilize the standard assumption of a parametrized CRRA utility function and geometric discounting, and propose a GMM estimator for the coefficient of relative risk aversion and discount factor. As a source of heterogeneity, after examining the potential

sources accounted for in the model, I choose the life-time wage profile of agents, because it accurately reflects the fact that the Social Security replacement rate varies significantly with average life-time labor income. Additionally, the literature documents a strong correlation between lifetime wage profile and other factors impacting Social Security, including life-expectancy and retirement age. I am able to independently observe these patterns empirically in the data using a semi-parametric proportional hazard rate model, further supporting the selection of lifetime wage profile as the source of heterogeneity.

In the third chapter, I will utilize the model developed in Chapter 1 and the parameters estimated in Chapter 2 to further examine the role of Social Security as an intergenerational risk-sharing tool in the context of a partially funded pension system, and to compare it with the previous findings in the literature. Specifically, I will conduct three counterfactual experiments representing three different policy environments: (1) a full PAYGO system, (2) a system in which Social Security fulfills all obligations only when it is solvent in the short-run, and (3) a partially funded system that fulfills its obligations even when it is not solvent in the short-run. The first counterfactual (utilizing the full PAYGO system) represents the assumption made about Social Security in the prior literature, while the second and third counterfactuals utilize the revised Social Security model and estimations proposed in Chapters 1 and 2. I will utilize the comparison of these three policy environments to assess how these alternative regimes impact the welfare of agents of different groups. In light of the potential outcome of this analysis, it could have important implications for both the prior literature and the ongoing debate over potential Social Security reform proposals.