

DISSERTATION PROPOSAL
ESSAYS ON OVERLAPPING GENERATIONS MODELS

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Friday April 29th, 2011
10:00 am
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Chapter 1: Habit formation and sunspots in a three-period overlapping generations model

Habit formation is introduced into an otherwise standard overlapping generations economy with pure exchange populated by three-period-lived agents. Habits are modeled in such a way that current consumption increases the marginal utility of future consumption. With logarithmic utility functions, the monetary steady state is unique, and there exists a non-empty, open set of economies with hump-shaped endowment profiles and reasonably high discount factors in which the steady state is locally stable because of habit persistence. Intuitively, habits imply adjacent complementarity in consumption, which in turn helps explain why income effects are sufficiently strong in spite of logarithmic utility. The longer horizon further strengthens the income effect. Finally, the bootstrapping method originally proposed by Stephen Spear, Sanjay Srivastava and Michael Woodford [1990], is used to construct stationary sunspot equilibria for those economies in which the steady state is locally stable. Hence I show a different source of sunspot equilibria allocations that has not been discussed before in the literature (see Karl Shell [2007]).

Chapter 2: Demography and the long-run trend of interest rates and the price-earnings ratio

During the twentieth century, the U.S. witnessed a cyclical birth rate: 52 million people were born between 1925 to 1944, 79 million from 1945 to 1964, and 69 million in the baby bust from 1965 to 1984. These birth waves have in turn shaped the evolution of the ratio of middle-age to young adults, or MY ratio, which captures the stance of the population pyramid at any given time. In this paper, I study the effects of demographic change, as measured by the MY ratio, on interest rates and the price-earnings ratio.

I construct a deterministic overlapping generations model with pure exchange in the spirit of John Geanakoplos, Michael Magill and Martine Quinzii [2004]. The behavior of the MY ratio gives rise to exogenous cycles that last forty years. Following Felix Kubler and Karl Schmedders [2010], I examine existence and uniqueness of the cyclic equilibrium. The first prediction of the model is that the price-earnings ratio should be in phase with the MY ratio. The second prediction is that real interest rates should move inversely with the MY ratio, except after the peak in the MY ratio. The model matches qualitatively the long-run trends in real interest rates and the price-earnings ratio in the U.S. postwar era. Unlike Geanakoplos, Magill and Quinzii [2004], this model does not predict that the price-earnings ratio should move inversely with real interest rates. On the contrary, this model shows that in a stationary equilibrium there may be independent movements in stock and bond prices, which are necessary to prevent arbitrage opportunities. With production, the results do not change dramatically, provided that capital adjustment costs are allowed for.

Chapter 3: Sequential incompleteness and dynamic suboptimality in stochastic OLG economies with production

I study a stochastic overlapping generations model with production and three-period-lived agents. The economy is subject to aggregate shocks to technology with finite support. For simplicity, the aggregate state is either good or bad. Agents trade bonds and risky capital. Unlike the two-period model, I show that a stationary equilibrium in which prices and allocations depend solely on the aggregate capital stock and the current shock does not exist. The relevant equilibrium concept is the stationary Markov equilibrium based on a minimal state space, also known as recursive equilibrium. Under this concept, the state space is reduced to the exogenous shock, the aggregate state of capital and the lagged distribution of wealth for the agents. Markets become sequentially incomplete because if we fix the state variables today, there do not exist sufficiently many financial instruments for agents to transfer wealth between states of the world tomorrow. This result was first shown by Espen Henriksen and Stephen Spear [2010] in overlapping generation economies with pure exchange.

Perfect risk-sharing in this economy requires consumption claims that only depend on the aggregate capital and the exogenous shock realizations. Hence, for the recursive formulation of the model, I show that there is room for Pareto improvements in terms of intergenerational risk sharing. Finally, I examine whether the introduction of an unfunded social security system improves the allocation of risk.