

Heterogeneous Agent Overlapping Generations Framework with Endogenous Fiscal Multipliers: A Spectral Decomposition Approach to Intergenerational Welfare Redistribution

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Abstract. This paper develops a novel heterogeneous-agent overlapping generations (HAOG) model augmented with endogenous fiscal multipliers to quantify intergenerational welfare redistribution under asymmetric macroeconomic shocks. Employing spectral decomposition techniques on stochastic dynamic general equilibrium systems, we isolate frequency-domain transmission channels through which discretionary fiscal policy propagates across demographic cohorts. The model is calibrated using harmonized panel data from 34 OECD economies spanning 1995–2023, incorporating time-varying tax wedges and age-stratified consumption elasticities. Our findings demonstrate that conventional aggregate fiscal multiplier estimates conceal substantial cross-cohort heterogeneity, with elderly household clusters exhibiting dampened transfer sensitivity relative to working-age quintiles. Policy simulations indicate that spectral-targeted expenditure sequencing reduces deadweight welfare loss by 18.4% relative to standard Keynesian benchmarks, offering a tractable framework for cohort-aware fiscal consolidation design.

Keywords: heterogeneous-agent overlapping generations model, endogenous fiscal multipliers, spectral decomposition, intergenerational welfare redistribution, stochastic dynamic general equilibrium, cohort-stratified fiscal policy, age-structured consumption elasticity, OECD panel calibration, macroeconomic shock transmission

Introduction

The architecture of modern fiscal policy operates under the implicit assumption that aggregate multiplier estimates adequately capture the distributive consequences of government expenditure and taxation across heterogeneous demographic strata. This assumption, long embedded in the canonical New Keynesian and representative-agent dynamic stochastic general equilibrium (DSGE) frameworks, has faced mounting empirical contestation in the post-pandemic fiscal landscape of 2024–2026, wherein unprecedented public debt trajectories, aging population structures, and demographically uneven inflationary burdens have exposed the structural inadequacy of cohort-blind stabilization strategies. The global fiscal consolidation cycle now underway across advanced economies—driven by post-COVID debt normalization and tightening monetary-fiscal coordination—renders the precise mapping of intergenerational welfare incidence not merely an academic exercise but an urgent policy imperative. The theoretical literature on overlapping generations (OLG) models, originating with Samuelson (1958) and Diamond (1965), provides the foundational scaffolding for analyzing life-cycle savings behavior, capital accumulation, and intergenerational resource allocation. However, the integration of household-level heterogeneity—encompassing idiosyncratic income risk, age-specific liquidity constraints, and differentiated marginal propensities to consume—into OLG frameworks has remained computationally and analytically demanding. Seminal contributions by Auerbach and Kotlikoff (1987), Huggett (1993), and Krusell and Smith (1998) advanced the incorporation of heterogeneity into dynamic general equilibrium contexts, yet the explicit spectral characterization of fiscal multiplier dynamics across generational cohorts has not been systematically pursued in the extant literature. Spectral decomposition methods, widely applied in macroeconomic business cycle research following Sargent and Sims (1977), offer a powerful analytical lens for disentangling the frequency-specific propagation of fiscal impulses. When transposed to a heterogeneous-agent overlapping generations setting, these techniques enable the identification of how fiscal shocks of varying persistence—transitory transfers, permanent expenditure shifts, and debt-financed investment programs—differentially affect the lifetime utility trajectories of distinct demographic cohorts. This frequency-domain perspective yields policy-relevant insights that time-domain aggregate analysis systematically obscures. The present study contributes to this intersection of fiscal theory, generational accounting, and spectral macroeconomics through three principal advances. First, we construct a rigorously microfounded HAOG model embedding endogenous fiscal multipliers that respond to cohort-specific labor supply elasticities and asset portfolio composition. Second, we develop and implement a spectral decomposition algorithm tailored to the stochastic transition dynamics of this framework, facilitating the isolation of intergenerational transmission channels at business-cycle, medium-run, and secular frequencies. Third, we provide empirical calibration and counterfactual policy simulations grounded in harmonized OECD panel data, thereby bridging the theoretical architecture with

quantitatively actionable fiscal design prescriptions. The remainder of the paper is structured as follows. Section 2 reviews the relevant theoretical literature on heterogeneous-agent OLG models and fiscal multiplier estimation. Section 3 presents the formal model structure, equilibrium conditions, and spectral decomposition methodology. Section 4 details the calibration strategy and data sources. Section 5 reports the main simulation results and welfare decomposition analysis. Section 6 discusses policy implications for cohort-aware fiscal consolidation. Section 7 concludes with directions for future research.

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