Wealth Inequality in Korea:

Limited Participation and Idiosyncratic Returns*

Ilhwan Song†

September 2025

Abstract

This paper develops a general equilibrium model with limited asset market participation and idiosyncratic returns to study wealth inequality in Korea. Calibrated to Korean data, the model replicates the highly skewed wealth distribution. Policy experiments uncover a key trade-off: expanding market access is effective at reducing wealth inequality without distorting the macroeconomy, whereas traditional tax-and-transfer policies, while ineffective for wealth inequality, are superior for achieving aggregate welfare gains through redistribution.

Keywords: wealth inequality, limited market participation, idiosyncratic returns

JEL Classification: D14, D31, E21, G11

*The author acknowledges support from the 2025 Research Fund of the University of Seoul, South Korea. Additionally, the author acknowledges the Urban Big Data and AI Institute of the University of Seoul supercomputing resources made available for conducting the research reported in this paper.

†Assistant Professor, Business School, University of Seoul, email: ilhwansong@gmail.com

1 Introduction

The concentration of wealth at the top has become a defining feature of many economies. In the United States, the richest 10 percent of households hold over 75 percent of total wealth, with the top 1 percent alone controlling more than 35 percent (Xavier, 2021). Similar patterns are found in Korea, where widening gaps between homeowners and non-homeowners have further amplified inequality (Park et al., 2024). Understanding the mechanisms behind these skewed wealth distributions remains a central challenge in macroeconomics.

Classic quantitative models of inequality, such as Aiyagari (1994), Huggett (1993), and Krusell and Smith (1998), emphasize uninsurable idiosyncratic income risk, but they fail to reproduce the extreme concentration observed in the data. Recent work, such as Benhabib et al. (2019), Hubmer et al. (2021), Fagereng et al. (2020) highlights the importance of return heterogeneity—persistent differences in returns across households. These studies show that return heterogeneity plays a more significant role than heterogeneity in patience, earnings, or tax progressivity. Yet, they typically impose reduced-form return processes or abstract from participation frictions in asset markets.

Table 1: Distribution of Wealth: Data and Model

	Top 1%	Top 5%	Top 10%	Gini Coefficient
US Data [a]	37	65	76	0.85
Krusell and Smith (1998)	3	11	19	0.25
Korean Data [b]	..	..	44	0.61

Note: [a] Xavier (2021) [b] 2024 Survey of Household Finances and Living Conditions

Another strand of research emphasizes limited participation in financial markets. Guvenen (2009) shows that differences between stockholders and non-stockholders help explain inequality, but his framework abstracts from idiosyncratic returns. Similarly, studies of the housing market highlight that homeownership is a key margin shaping cross-country differences in wealth inequality, as housing remains the dominant risky asset for many households. According to Causa et al. (2019), there is a strong negative relationship between homeownership rates and wealth inequality. They emphasize that participation in the housing market plays a crucial role in explaining cross-country differences in wealth inequality, using micro-level household data from OECD countries. In the context of the Korean economy, Park et al. (2024) argue that the recent increase in wealth inequality can largely be attributed to the widening gap between homeowners and non-homeowners. Therefore, participation in the housing market is a key channel through which housing price dynamics impact wealth inequality.

While the household's decision to participate in risky asset markets is in itself an important research question, this paper takes the participation margin as given. This allows us to focus specifically on the quantitative importance of idiosyncratic returns and the existing division between participants and non-participants in shaping wealth inequality.

This paper integrates these two strands by developing a parsimonious general equilibrium model that incorporates both (i) limited participation in risky asset markets and (ii) persistent idiosyncratic returns to wealth. Calibrating the model to Korean data, I show that these features are essential to replicate the observed concentration of wealth. I then use the model to evaluate redistributive policies, comparing the effects of labor income taxation, wealth taxation, and policies expanding risky asset participation.

This paper makes three contributions:

1. Modeling framework: I extend the Aiyagari-Bewley-Huggett tradition by combining limited participation in risky asset markets (Guvenen, 2009) with persistent idiosyncratic returns (Fagereng

et al., 2020). This joint framework captures both access frictions and heterogeneity in returns.

2. Quantitative application to Korea: I calibrate the model to Korean micro data, highlighting the central role of housing and risky asset participation margins in shaping wealth inequality.

3. Policy implications: I compare the effects of labor income taxes, taxes on returns to wealth, and promoting risky market participation policies. The results show that increasing access to risky asset markets can alleviate wealth inequality. In contrast, while labor and wealth taxes are more effective in enhancing overall welfare, they have a limited effect on wealth equality.

Related literature First of all, this paper relates to previous studies about wealth distribution by using quantitative macroeconomic models with uninsurable idiosyncratic income risks. Aiyagari (1994), Bewley (1977), and Huggett (1993) provide the fundamental theory and workhorse models of wealth inequality. Krusell and Smith (1998) extend the workhorse models with aggregate productivity risks. However, the workhorse models of wealth inequality failed to match the highly skewed wealth distribution from the data.

In addition, many recent studies focus on return heterogeneity in order to explain the highly concentrated wealth in the top wealth groups. In empirical studies, Fagereng et al. (2020) find that return heterogeneity is mainly caused by differences in the allocation of wealth between safe and risky assets, the positive correlation of returns with wealth, and persistent individual returns to wealth from Norway's administrative data. Bach et al. (2020) argue that return heterogeneity heavily depends on the different portfolio selections of individuals from Swedish administrative data. Also, they state that return heterogeneity mostly explains the historical increase in top wealth shares.

In quantitative studies about return heterogeneity, Benhabib et al. (2019) develop a quantitative life-cycle model with return heterogeneity to explain both the highly skewed U.S. wealth distribution and the observed degree of social mobility. Since, however, it is a partial equilibrium model, it does not analyze the general equilibrium effects of taxation on wealth inequality. Also, it does not incorporate limited market participation or heterogeneity in asset allocation choices. Hubmer et al. (2021) build on a Bewley-Huggett-Aiyagari model with portfolio heterogeneity and examine the roles of tax progressivity, asset returns, and wage inequality. However, the model does not feature limited participation in risky asset markets. By incorporating limited market participation and general equilibrium taxation effects, this paper can capture how wealth inequality is shaped not only by return heterogeneity or taxation policy, but also by risky asset participation margins.

Lastly, this paper connects to studies about individuals' limited participation in risky asset markets like Basak and Cuoco (1998) and Guvenen (2009). Guvenen (2009) studies the large wealth inequality among households by using a two-agent macroeconomic model with limited participation in stock markets. There are two types of individuals: non-stockholders and stockholders. The former only accesses risk-free bond markets and the latter accesses both risk-free bond and stock markets. Guvenen (2009) finds that the high elasticity of inter-temporal substitution is the key factor to generate return heterogeneity and hugely concentrated wealth distribution. However, since Guvenen (2009) focuses on the asset pricing puzzle, it results in a trivial wealth distribution due to the absence of idiosyncratic uninsurable income risks and return shocks to wealth.

2 Model

My model aims to generate a realistic wealth distribution by using the heterogeneity of returns to wealth and the limited participation in the risky asset market. The work most similar to mine is by Hubmer et al. (2021); however, my approach differs primarily by incorporating the concept of limited participation in the risky asset market. My approach of incorporating limited participation follows a tradition in macroeconomics (Guvenen, 2009) that separates households into stockholders and non-stockholders to explain key macroeconomic phenomena.

By employing the frameworks, I can incorporate heterogeneous portfolio allocation between risk-free and risky assets into the workhorse macroeconomic model. One type of household allocates its wealth to risky assets, while another type invests its savings in risk-free assets. This approach allows for an evaluation of how the differing decisions of households to participate in the risky asset market influence the shape of wealth distribution. However, the model does have limitations. Portfolio selection is not determined endogenously; rather, it is assigned exogenously based on household type. I model the share of participants exogenously, set to 60.7% based on the homeownership rate. This simplification is motivated by the strong empirical regularity in Korea, where the homeownership rate has remained remarkably stable for the past eight years. Given this stability, modeling the participation rate as a fixed parameter provides a reasonable and tractable approximation to analyze its long-run consequences for the wealth distribution.

Fagereng et al. (2020) find that persistent idiosyncratic return heterogeneity is a key factor in generating a highly skewed wealth distribution by examining Norway's administration data. Since the workhorse macroeconomic models failed to match wealth shares of the top wealth groups in the wealth distribution, I include persistent idiosyncratic return components for risky asset holdings in the model in order to resolve the problem of the workhorse model.

In this model, there are four economic agents: households, representative firms, mutual funds, and the government.

Environment There is a stochastic shock to idiosyncratic labor productivity, $e_{i,t}$, which follows a first-order Markov process with the transition probabilities, $\pi_{e_t,e_{t+1}}$. The idiosyncratic labor productivity satisfies the law of large numbers.

$$\log e_{i,t} = \rho_e \log e_{i,t-1} + \epsilon_{e,i,t}, \quad \epsilon_{e,i,t} \sim N(0, \sigma_e) \tag{1}$$

where ρ_e is the persistence of labor productivity shock, ϵ_e is a transitory shock, and σ_e is the standard deviation of shocks to the individual labor productivity.

There is an additional stochastic shock to an idiosyncratic return component, $r_{i,t}$, which follows a first-order Markov process given by the transition probabilities, $\pi_{r_t,r_{t+1}}$:

$$r_{i,t} = \rho_r r_{i,t-1} + \epsilon_{r,i,t}, \quad \epsilon_{r,i,t} \sim N(0, \sigma_r) \tag{2}$$

where ρ_r is the persistence of previous shock for returns, ϵ_r is a transitory shock for returns, and σ_r is the standard deviation of shocks to the individual returns to risky assets. I assume that the individual asset returns to risky assets are the sum of a common return component, $\underline{r}_t$, and an individual specific return component, $r_{i,t}$.

For convenience in notation, let us define $s_{i,t}$ as the pair of idiosyncratic shocks $(e_{i,t}, r_{i,t})$. Let $\pi_{s_t,s_{t+1}}$ denote the transition matrix of a pair of idiosyncratic shocks.

Household There is a continuum of infinitely lived individuals who fall into two categories: participants in the risky asset market and non-participants. The population share of participants is represented by λ, while the share of non-participants is denoted as $1 - \lambda$. Each individual, i, in both types maximizes her lifetime utility using a subjective discount factor, β, through her consumption choices, $c_{i,t}$, and labor, $l_{i,t}$.

$$\max \sum_{t=0}^{\infty} \mathbb{E}_0 \beta^t [u(c_{i,t}, l_{i,t})] \tag{3}$$

I use the period utility derived from the GHH preference framework, as described by Greenwood et al. (1988), which exhibits no income effect on hours worked.

$$u(c_{i,t}, l_{i,t}) = \frac{1}{1-\gamma} \left(c_{i,t} - \psi \frac{l_{i,t}^{1+\theta}}{1+\theta} \right)^{1-\gamma} \tag{4}$$

where γ is constant relative risk aversion, θ is inverse of Frisch elasticity, ψ is labor disutility weight.

The participants in the risky asset market face idiosyncratic risks associated with the returns on their asset holdings. As a result, they need to make decisions about how much to invest in risky assets based on their expectations of future wealth returns. Since each participant is small in scale, they take wages and common return components as given. Each participant must decide how to allocate their resources between risky asset savings, $a_{i,t+1}$, and consumption, $c_{i,t}$, as well as how many hours to dedicate to labor, $l_{i,t}$. They have to pay labor income taxes on their earnings and wealth taxes on asset returns. Each participant is subject to the following budget constraint.

$$c_{i,t} + a_{i,t+1} = [1 + (1-\tau_w)(\underline{r}_t + r_{i,t})]a_{i,t} + (1-\tau_l)w_t e_{i,t} l_{i,t} + T_t \tag{5}$$

where $a_{i,t}$ is risky asset holdings, w_t represents wage per efficient unit, $\underline{r}_t$ is common return component to risky asset holdings, $r_{i,t}$ is idiosyncratic part of returns to risky asset holdings, τ_w is wealth tax rate on returns to wealth, τ_l is labor income tax rate, $e_{i,t}$ is individual labor productivity, T_t is a lump-sum transfer from the government.

In this model, the 'wealth tax' is modeled as a tax on returns to wealth rather than a levy on asset holdings, thereby directly reducing the effective return on capital income. Similarly, the 'labor tax' in the model should be understood as a labor income tax imposed on earnings from employment.

In recursive form, let V^p represent the value for the participants.

$$
\begin{aligned}
V^p(s,a) &= \max_{c,a',l}\ u(c,l) + \beta \mathbb{E}_{s'|s}[V^p(s',a')] \qquad (6)\\
\textbf{s.t. } c + a' &= [1 + (1-\tau_w)(\underline{r} + r)]a + (1-\tau_l)wel + T\\
c &\geq 0,\ a' \geq 0,\ l \in [0,1]
\end{aligned}
$$

$\mathcal{C}^p(s,a)$ is associated policy function for consumption, $\mathcal{A}(s,a)$ is associated policy function for saving a', and $\mathcal{L}^p(s,a)$ is associated policy function for labor supply.

Let μ_p be the distribution of participants.

$$
\mu_p'(s',a') = \sum_{s\in S} \Pi(s',s)\ \mathbb{I}_{[\mathcal{A}(s,a)=a']}\ \mu_p(s,a) \qquad (7)
$$

where μ_p' is the next period distribution, $\Pi(s',s)$ is transition matrix over idiosyncratic labor productivity and return shocks, $\mathbb{I}$ is an index function where $\mathbb{I}$ equals one if and only if the condition, $\mathcal{A}(s,a) = a'$, holds.

The non-participants in the risky asset market can only save in a risk-free asset and do not face any uncertainty regarding returns on their wealth. Since each non-participant is small in scale, they take wage rates and risk-free rates as given. Every period, each non-participant decides how to allocate their resources between risk-free savings, denoted as $b_{i,t+1}$, and consumption, $c_{i,t}$, given cash on hand. They also need to determine how many hours to dedicate to labor $l_{i,t}$. Like participants, they need to pay labor taxes on their labor incomes and wealth taxes on risk-free asset returns. Each non-participant is subject to the following budget constraint.

$$c_{i,t} + b_{i,t+1} = [1 + (1 - \tau_w) r_f] b_{i,t} + (1 - \tau_l) w_t e_{i,t} l_{i,t} + T_t \tag{8}$$

where $b_{i,t}$ is risk-free asset holdings, w_t represents wage per efficient unit, r_f is risk-free rate, τ_w is wealth tax rate on returns to asset holdings, τ_l is labor income tax rate, $e_{i,t}$ is individual labor productivity, T_t is a lump-sum transfer.

In recursive form, let V^n symbolize the value for the non-participants.

$$V^n(s,b) = \max_{c,b',l} \; u(c,l) + \beta \mathbb{E}_{s'|s}[V^n(s',b')] \tag{9}$$

$$\textbf{s.t. } c + b' = [1 + (1-\tau_w) r_f] b + (1-\tau_l) wel + T$$

$$c \geq 0, \; b' \geq 0, \; l \in [0,1]$$

$\mathcal{C}^n(s,b)$ is associated policy function for consumption, $\mathcal{B}(s,b)$ is associated policy function for saving b', and $\mathcal{L}^n(s,b)$ is associated policy function for labor supply.

Let μ_n be the distribution of non-participants.

$$\mu_n'(s',b') = \sum_{s \in S} \Pi(s',s) \; \mathbb{I}_{[\mathcal{B}(s,b)=b']} \; \mu_n(s,b) \tag{10}$$

where μ_n' is the next period distribution, $\mathbb{I}$ is an index function where $\mathbb{I}$ equals one if and only if the condition, $\mathcal{B}(s,b) = b'$, holds.

Representative firms Representative firms borrow capital from mutual funds and hire labor from both types of households for production. These firms pay a rental rate for the capital, compensate for the amount of depreciated capital, and cover the wage bill for hired labor. The production function adopted by the firms is a Cobb-Douglas function, which incorporates capital stock, K_t, and labor hired, L_t. The firms maximize their profit, Π_t, while deciding on the amounts of capital and labor to hire. Since each representative firm is relatively small in scale, they take the rental rates r_t^* and wages w_t as given. The profit maximization problem can be expressed as follows:

$$\Pi_t = \max_{K_t, L_t} \; K_t^{\alpha} L_t^{1-\alpha} - (r_t^* + \delta) K_t - w_t L_t \tag{11}$$

where α represents income share of capital stock, δ is the depreciation rate.

The optimal conditions for the profit maximization problem satisfy two equations:

$$r_t^* = \alpha K_t^{\alpha-1} L_t^{1-\alpha} - \delta \tag{12}$$

$$w_t = (1-\alpha) K_t^{\alpha} L_t^{-\alpha} \tag{13}$$

These equations help determine the optimal levels of capital and labor that firms should employ to maximize their profits.

Mutual funds Risk-neutral mutual funds issue two types of financial instruments: risky assets, a_t, and risk-free assets, b_t. These mutual funds collect contributions from households through these instruments. They pool all savings into new capital stock, K_{t+1}, for the next period and then rent this capital stock to representative firms. The firms pay rents, r_t^*, to the mutual funds for borrowing capital. In turn, the mutual funds distribute all earnings from renting out capital stock to both types of households. Households that invest in risk-free assets receive fixed and risk-free interest rates, r_f, while those who invest in risky assets receive both common returns, $\underline{r}_t$, and an idiosyncratic return component, $r_{i,t}$.

$$K_{t+1} = \lambda \int a_{i,t+1} d\mu_p + (1-\lambda) \int b_{i,t+1} d\mu_n \tag{14}$$

$$r_t^* K_t = \lambda \int (\underline{r}_t + r_{i,t}) a_{i,t} d\mu_p + (1-\lambda) \int r_f b_{i,t} d\mu_n \tag{15}$$

In this framework, the common return component of the risky asset, $\underline{r}_t$, is not exogenously given but is endogenously determined to satisfy equation (15), which ensures that the mutual fund's aggregate return is consistently allocated across all participants. This highlights the model's core mechanism of heterogeneous claims on a single capital pool.

Government The government collects labor and wealth taxes from both types of households and transfers the tax revenue to them in a lump-sum fashion. The government ensures that it satisfies the balanced budget condition each period.

$$\begin{aligned} &\lambda \int T_t d\mu_p + (1-\lambda) \int T_t d\mu_n \\ &\qquad = \lambda \int [\tau_w (\underline{r}_t + r_{i,t}) a_{i,t} + \tau_l w_t e_{i,t} l_{i,t}] d\mu_p + (1-\lambda) \int [\tau_w r_f b_{i,t} + \tau_l w_t e_{i,t} l_{i,t}] d\mu_n \end{aligned} \tag{16}$$

Market clearing There are two markets to clear: the capital market and labor market. To clear all markets, I need conditions for capital and labor market clearance.

$$\text{(capital markets) } K_t = \lambda \int \; a_{i,t} \; d\mu_p + (1-\lambda) \int \; b_{i,t} \; d\mu_n \tag{17}$$

$$\text{(labor markets) } L_t = \lambda \int \; e_{i,t} l_{i,t} \; d\mu_p + (1-\lambda) \int \; e_{i,t} l_{i,t} \; d\mu_n \tag{18}$$

Recursive Equilibrium A recursive competitive equilibrium is a set of functions, $V^p(s,a)$, $V^n(s,b)$, $\mathcal{C}^p(s,a)$, $\mathcal{C}^n(s,b)$, $\mathcal{L}^p(s,a)$, $\mathcal{L}^n(s,b)$, $\mathcal{A}(s,a)$, $\mathcal{B}(s,b)$, distributions, $\mu_p(s,a)$, $\mu_n(s,b)$ prices, $r^*, \underline{r}, w$, aggregate capital K, aggregate labor L.

- Given the prices, the value functions, $V^p(s,a)$, $V^n(s,b)$, and decision rules $\mathcal{C}^p(s,a)$, $\mathcal{C}^n(s,b)$, $\mathcal{L}^p(s,a)$, $\mathcal{L}^n(s,b)$, $\mathcal{A}(s,a)$, $\mathcal{B}(s,b)$, solve each agent's dynamic problem Eq. (6) and Eq. (9)

- $\mu_p(s,a)$, $\mu_n(s,b)$ are fixed points of Eq. (7) and Eq. (10)

- Factor prices are competitively determined:

$$w = \frac{\partial F(K,L)}{\partial L} \tag{19}$$

$$r^* = \frac{\partial F(K,L)}{\partial K} - \delta \tag{20}$$

- Government balanced budget and mutual funds rules are satisfied:

$$\begin{aligned} &\lambda \int T d\mu_p(s,a) + (1-\lambda) \int T d\mu_n(s,b) \qquad (21) \\ &\quad = \lambda \int [\tau_w(\underline{r}+r)a + \tau_l wel(s,a)] d\mu_p(s,a) + (1-\lambda) \int [\tau_w r_f b + \tau_l wel(s,b)] d\mu_n(s,b) \end{aligned}$$

$$K' = \lambda \int \mathcal{A}(s,a)\ d\mu_p(s,a) + (1-\lambda) \int \mathcal{B}(s,b)\ d\mu_n(s,b) \tag{22}$$

$$r^* K = \lambda \int (\underline{r}+r)a\ d\mu_p(s,a) + (1-\lambda) \int r_f b\ d\mu_n(s,b) \tag{23}$$

- All markets clear:

$$\text{(capital market) } K = \lambda \int a \, d\mu_p(s,a) + (1-\lambda) \int b \, d\mu_n(s,b) \tag{24}$$

$$\text{(labor market) } L = \lambda \int e\, l(s,a) \, d\mu_p(s,a) + (1-\lambda) \int e\, l(s,b) \, d\mu_n(s,b) \tag{25}$$

3 Quantitative Results

3.1 Calibration

I am calibrating the model for Korea by collecting wealth and income distribution data from the 2024 Survey of Household Finances and Living Conditions (SFLC), which was conducted by Statistics Korea, the Financial Supervisory Service, and the Bank of Korea. I categorize the parameters into two groups. The first group consists of parameters that can be set directly, based on estimates derived from the data and values that are commonly found in the literature. Table 2 presents these values along with their interpretations. The second group includes parameters that are specific to my model. These parameters are adjusted to align with the wealth and income inequality moments observed in the data. Table 3 and Table 4 lists these parameters and the corresponding model fit.

The constant relative risk aversion coefficient, denoted as γ, is set at 2.0, while the inverse of Frisch elasticity, θ, is 1.0. The discount factor, β, is 0.96, considering that the model period is annual. These values are commonly used in the literature. The labor disutility weight, ψ, is set at 6.3 to align with the share of working hours relative to available hours for wage workers, which is 0.36. For the factor shares parameter, α, and the depreciation rate, δ, I use typical values found in the literature: 0.36 and 8%, respectively. Tax rates on returns to wealth and labor earnings are set to 0.0% for additional

Table 2: Parameters Set Externally

	Value	Comment
Preference		
γ	2.0	Constant relative risk aversion
β	0.96	Discount factor
θ	1.0	Inverse of Frisch elasticity
ψ	6.3	Labor disutility weight
Production		
α	0.36	Capital income share
δ	0.08	Capital depreciation
Tax rate		
τ_l	0.00	Labor income tax rate
τ_w	0.00	Wealth tax rate
Financial market		
λ	0.607	Share of participants

policy implication analysis, which will be covered in the next section.

The share of participants in risky asset markets is 60.7%, based on the homeownership rate of the 2024 Korea Housing Survey. In Korea, housing is the primary risky asset for most households, as the share of stock holdings is relatively low. According to the SFLC 2024, the share of housing assets is 70%, while the share of financial assets is 18%. Among financial assets, deposits are the most preferred investment method at 87.3%, whereas households show a preference for stocks at only 9.8%. Therefore, the homeownership rate serves as a good proxy for participation rate in risky assets in Korea.

Although this proxy captures the key participation margin, it is admittedly a simplification. The model abstracts housing-specific characteristics, such as illiquidity, mortgage leverage, and collateral constraints that can play an important role in shaping wealth dynamics. Thus, the results should be interpreted as a first step toward incorporating housing into a broader analysis of wealth inequality.

Table 3: Parameters Set Internally

	Value	Comment
ρ_e	0.93	persistence, labor productivity
ρ_r	0.96	persistence, returns to wealth
σ_e	0.10	shock innovations, labor productivity
σ_r	0.003	shock innovations, returns to wealth
r_f	0.01	risk-free rate

Table 4: Wealth and Income Distribution

	Top 10%	Top 20%	Top 30%	Top 40%	Top 50%	Gini Index
Wealth Share (%)						
Data	44	63	75	84	90	0.61
Model	43	63	76	85	91	0.61
Income Share (%)						
Data	24	39	52	63	72	0.32
Model	24	40	53	63	72	0.32

Five parameters have been jointly selected to target moments related to wealth and income distribution. These moments include the wealth Gini coefficient, the income Gini coefficient, and the wealth shares for the top 10%, 20%, 30%, 40%, and 50% of the population, as well as the income shares for the same groups. The persistence of labor productivity shocks, ρ_e, is set at 0.93, and the persistence of return shocks, ρ_r, is also set at 0.96. The volatility of shock innovations for labor productivity, σ_e, and returns to risky assets, σ_r, are 0.10 and 0.003, respectively. Furthermore, the risk-free rate, r_f, is 0.01. Overall, the model performs well in the moment-matching exercise. For wealth inequality metrics, the model shows a top 10% wealth share of 43% and a wealth Gini index of 0.61, both of which are close to the actual data, 44% and 0.61. In terms of income inequality, the model presents a top 10% income share of 24% and an income Gini index of 0.32, closely aligned with the data of 24% and 0.32.

In the steady state, the baseline model economy accumulates a capital stock of 3.51. The aggregate

Table 5: Model Moments

K	L	w	r^*	$\underline{r}$
3.51	0.36	1.90	2.81%	2.88%

labor supply is 0.36. The wage rate per efficient unit of labor is 1.90, and the capital rental rate is 2.81%. The common return component for risky assets is 2.88%.

3.2 Counterfactual Analysis of Policy Instruments

I will examine the impact of various policy instruments on wealth inequality, using the distribution derived from the model. I will consider three policy scenarios. First, I propose introducing a 10% labor income tax on income from labor earnings. Second, I suggest implementing a 10% wealth tax on returns from asset holdings. Lastly, I propose a policy aimed at increasing participation in the risky asset market, with the assumption that the participation rate will rise by five percentage points. For each scenario, I will find a new steady state and compare it to the baseline economy. This analysis will reveal the general equilibrium effects of the new policy instruments on wealth and income inequality.

I believe that a ten percent increase in tax rates and a five percentage point rise in participation rates are unrealistic; however, they effectively illustrate the potential impact of policy changes. For a more robust analysis and to reflect realistic scenarios, the Appendix C examines marginal adjustments in policy instruments, specifically a one percent increase in tax rates and a one percentage point rise in participation rates. As confirmed in the robustness checks (Appendix C), these qualitative findings are not sensitive to the size of the policy shock: even under marginal adjustments, the main implications remain virtually unchanged.

3.2.1 Labor Income Tax

In this scenario, the government collects a 10% tax on labor earnings and then distributes the tax revenues equally to individuals in a lump-sum manner. With this constant labor income tax, households will face different budget constraints compared to the baseline model. In addition, this labor income tax introduces a labor tax wedge into the households' labor-leisure condition. This wedge discourages individuals from supplying labor.

$$\frac{u_2(c,l)}{u_1(c,l)} = -(1-\tau_l)we \tag{26}$$

As a result of this taxation, aggregate labor decreases by 0.05 due to the labor tax wedge. Additionally, households save less because their labor earnings decline, especially impacting those with high incomes from labor but low levels of wealth. This is a crucial consideration when formulating new policies, particularly for the younger generation, who have higher productivity levels but lack opportunities to accumulate wealth. In this context, labor income taxes hinder this high-productivity younger generation from building wealth effectively. Consequently, the overall capital stock is reduced, which leads to an increase in rental rates. These higher rental rates raise the common return on risky assets, exacerbating wealth inequality compared to the baseline economy.

Table 6: Model Moments under Labor Income Tax

	K	L	w	r^*	$\underline{r}$	T
Baseline	3.51	0.36	1.90	2.81%	2.88%	0.00
Labor tax	2.92	0.31	1.86	3.21%	3.17%	0.06

However, the labor income tax alleviates income inequality by directly decreasing the earnings of high-productivity workers and increasing income for low-productivity workers through the redistri-

Table 7: Wealth and Income Distribution under Labor Tax

	Top 10%	Top 20%	Top 30%	Top 40%	Top 50%	Gini Index
Wealth Share (%)						
Baseline	43	63	76	85	91	0.61
Labor tax	50	70	82	90	95	0.68
Income Share (%)						
Baseline	24	40	53	63	72	0.32
Labor tax	23	39	51	62	71	0.30

bution of tax revenues. In summary, by increasing returns for existing asset holders, the introduction of a constant labor tax rate ultimately worsens wealth inequality.

3.2.2 Tax on Returns to Wealth

In this scenario, the government collects a 10% tax on earnings from asset holdings and then distributes the tax revenues equally to individuals in a lump-sum fashion. This tax on returns to wealth introduces a wealth tax wedge into the Euler equation. This wedge discourages individuals from saving due to the lower marginal benefits of savings.

$$\text{participants: } u_1(c,l) = \beta \mathbb{E}_{s'|s}[u_1(c',l')\{1+(1-\tau_w)(\underline{r}+r')\}] \tag{27}$$

$$\text{non-participants: } u_1(c,l) = \beta \mathbb{E}_{s'|s}[u_1(c',l')\{1+(1-\tau_w)r_f\}] \tag{28}$$

The implementation of tax on returns to wealth leads to a decrease in the aggregate capital stock by 6% in a new steady state. Households tend to save less because the marginal benefits from saving decline. As a result, the overall capital stock is reduced, which causes an increase in rental rates and a decrease in wages due to the higher marginal productivity of capital and the lower marginal productivity of labor. The increase in common return components to risky assets (0.39 percentage points) by the general equilibrium effect slightly outweighs the subjective return loss caused by the 10% tax on returns to wealth. Additionally, a lower capital stock results in decreased marginal productivity of labor and wages. As a result, wealth inequality is slightly exacerbated compared to the period before the introduction of the wealth tax rates. In addition, a tax on returns to wealth has a negligible impact on income inequality. In summary, the introduction of tax on returns to wealth slightly aggravates wealth inequality, while it has a marginal effect on income inequality.

Table 8: Model Moments under Wealth Tax

	K	L	w	r^*	$\underline{r}$	T
Baseline	3.51	0.36	1.90	2.81%	2.88%	0.00
Wealth tax	3.28	0.35	1.86	3.16%	3.27%	0.01

Table 9: Wealth and Income Distribution under Wealth Tax

	Top 10%	Top 20%	Top 30%	Top 40%	Top 50%	Gini Index
Wealth Share (%)						
Baseline	43	63	76	85	91	0.61
Wealth tax	43	63	76	85	92	0.62
Income Share (%)						
Baseline	24	40	53	63	72	0.32
Wealth tax	24	39	52	63	72	0.32

Surprisingly, wealth taxation may be ineffective at alleviating wealth inequality due to general equilibrium effects. However, if a progressive wealth tax is introduced instead of constant tax rates, the outcomes would differ. Still, these results caution policymakers that wealth taxes on returns could discourage capital accumulation in the economy.

3.2.3 Participation in Risky Asset Markets

I assume that government policy can effectively increase the market participation rate from 60.7% to 65.7%. This increase in participation in housing markets may be achieved through policies that allow newly built houses to be sold exclusively to households that have not yet participated in the market. Additionally, introducing new mortgage programs aimed at improving affordability for new participants in the housing market could also help boost participation.

Increased participation in risky asset markets has a minimal impact on aggregate economic moments. While aggregate capital accumulation slightly increases, total labor, wages, and rental rates remain nearly unchanged.

Wealth Gini index has declined from 0.61 to 0.60. Some newly entered households have successfully accumulated significant wealth under a higher participation rate. The new entrants accumulate assets more rapidly, thickening the middle class and thereby lowering the Gini coefficient. At the same time, when participation expands, competition for risky capital intensifies and the common return $\underline{r}$ declines, which weakens the marginal saving incentives of the top segment. Consequently, the combination of a diminished common return and a stronger middle class helps alleviate wealth inequality compared to the previous economy that lacked the new market participation policy. Additionally, the income Gini index has remained at 0.32.

In summary, the implementation of a policy encouraging higher market participation has successfully led to improved wealth inequality without disturbance in economic conditions.

Table 10: Model Moments with Higher Market Participation

	K	L	w	r^*	$\underline{r}$
Baseline	3.51	0.36	1.90	2.81%	2.88%
Participation	3.51	0.36	1.90	2.81%	2.82%

Table 11: Wealth and Income Distribution with Higher Market Participation

	Top 10%	Top 20%	Top 30%	Top 40%	Top 50%	Gini Index
Wealth Share (%)						
Baseline	43	63	76	85	91	0.61
Participation	42	62	75	84	91	0.60
Income Share (%)						
Baseline	24	40	53	63	72	0.32
Participation	24	40	52	63	72	0.32

3.2.4 Welfare Analysis

To evaluate the welfare implications of each policy, I compute the consumption-equivalent measure of welfare gain. This section focuses on the ex-ante welfare effects[1], which measures the desirability of a policy change from the perspective of the initial steady state, before any transitions occur.

For each agent type (participants and non-participants), I first compute the consumption equivalent, $C_{eq} = u^{-1}((1-\beta)V)$, from their respective value functions, V. I then calculate the aggregated welfare gains between the baseline rules, $V0$, and the new policy rules, $V1$, using the baseline stationary distribution as weights. The aggregate and group-level welfare changes are the average percentage changes between these two values.

Table 12: Consumption Equivalent Welfare Gains (%)

	Labor Tax (10%)	Wealth Tax (10%)	Participation (+5pp)
Total population	+0.48	+0.15	-0.01
Participants	+0.39	+0.13	-0.03
Non-participants	+0.64	+0.18	+0.01
Top 10% (by wealth)	+0.13	+0.04	-0.04
Bottom 50% (by wealth)	+0.91	+0.26	0.00

[1] The ex-ante consumption-equivalent variation answers the question: "What percentage of consumption would agents in the baseline economy be willing to give up (or need to receive) to be indifferent to a permanent switch to the new policy regime?"

In Table 12, the results highlight a clear trade-off. Both the labor income tax and the tax on returns to wealth generate positive welfare gains for the overall economy, with gains of 0.48% and 0.15%, respectively. These gains are driven by redistribution. The lump-sum transfers of tax revenue disproportionately benefit non-participants and the bottom 50% of the wealth distribution, whose welfare increases by 0.91% (labor tax) and 0.26% (wealth tax).

In contrast, the policy of expanding market participation has a negligible effect on aggregate welfare (-0.01%). While new entrants benefit from access to risky assets, the increased capital supply slightly lowers the return on assets, which adversely affects existing asset holders (participants and the top 10%). In an ex-ante sense, these effects almost perfectly offset each other. From a purely utilitarian perspective, direct tax-and-transfer schemes appear more effective at improving social welfare than simply expanding market access.

3.2.5 Policy Implications

Table 13 summarizes the effects of various policy instruments. The policy experiments reveal three key findings: First, labor and wealth taxes are not effective policies for alleviating wealth inequality in the economy. A tax on returns to wealth slightly worsens wealth inequality, while a labor income tax only reduces income inequality and exacerbates wealth inequality. This is primarily due to the general equilibrium effects of introducing a wedge in optimal conditions. Second, expanding access to risky asset markets can help mitigate wealth inequality without disrupting macroeconomic conditions. Lastly, for redistribution and welfare gains, labor and wealth taxes are more beneficial than policies aimed at increasing participation in risky markets.

As shown in the Appendix C, the results are robust to the size of policy shocks: when the tax

Table 13: Model Moments by Policy Instruments

	Model Moments					Gini Index		
	K	L	w	r^*	$\underline{r}$	Wealth	Income	Welfare (%)
Baseline	3.51	0.36	1.90	2.81%	2.88%	0.61	0.32	-
Labor tax (10%)	2.92	0.31	1.86	3.21%	3.17%	0.68	0.30	+0.48
Wealth tax (10%)	3.28	0.35	1.86	3.16%	3.27%	0.62	0.32	+0.15
Participation (+5pp)	3.51	0.36	1.90	2.81%	2.82%	0.60	0.32	-0.01

rates or participation rates are changed by only 1 percent point, the qualitative implications remain virtually unchanged. This indicates that my findings are not sensitive to the magnitude of the policy experiment.

4 Conclusion

This paper has developed a parsimonious heterogeneous-agent general equilibrium model to study the drivers of wealth inequality in Korea. By combining limited participation in risky asset markets with persistent idiosyncratic returns to wealth, the model successfully replicates the highly skewed wealth and income distribution observed in Korean data. In particular, using the homeownership rate as a proxy for risky asset participation captures the central role of housing in shaping Korea's wealth inequality.

Policy experiments provide several key insights. First, labor and wealth taxes are ineffective policies for addressing wealth inequality in the economy. Introducing a constant rate on labor income and returns to wealth worsens wealth inequality. While a labor income tax reduces income inequality, a tax on returns from wealth has minimal effect on income inequality. This is mainly due to the general equilibrium effects, which discourage accumulating capital stock. Second, promoting participation in risky asset markets effectively alleviates wealth inequality without distortion in macroeconomic stability. Lastly, when it comes to redistribution and welfare gains, labor and wealth taxes are more beneficial than policies regarding risky asset market participation.

While these findings are encouraging, several limitations remain. Most importantly, the baseline model interprets risky asset participation as homeownership, without explicitly modeling the illiquidity, leverage, or collateral constraints specific to housing. Incorporating housing as a distinct illiquid asset would allow a richer analysis of wealth dynamics in Korea. In addition, participation is modeled exogenously, whereas in reality households endogenously choose whether to participate in risky asset markets depending on costs and incentives.

Extending the model to include endogenous participation decisions would provide more precise insights into how policy measures can alter households' incentives to invest. Similarly, while this paper assumes an exogenous idiosyncratic return process, future work could incorporate endogenous return heterogeneity arising from portfolio choice, entrepreneurial investment, or heterogeneous access to financial intermediaries. Such extensions would generate richer implications for both inequality and aggregate dynamics. I leave these important extensions for future research.

Overall, this paper highlights the importance of financial market participation margins and return heterogeneity in understanding the Korean wealth distribution. The results underscore that policies that expand participation in risky asset markets can improve equity, while tax-and-transfer schemes are more effective for enhancing efficiency in terms of aggregate welfare.

A Numerical Solution

I solve the model following the standard approach of heterogeneous-agent Aiyagari-type models. The household problems are solved by value function iteration under discretized state spaces for assets, labor productivity, and idiosyncratic returns. The idiosyncratic shocks to labor productivity and returns are approximated by finite-state Markov chains constructed from the underlying AR(1) processes by following Tauchen (1986). Since the household's optimal savings choice is generally not located exactly on the asset grid, I employ off-grid search using the Golden Section Search method with cubic spline interpolation.

I use a log-spaced grid with 1000 points for risky-asset holdings with an upper bound of 1000 (about one hundred fifty times aggregate capital stock) to minimize truncation errors. A log-spaced grid with 200 points for the risk-free asset with an upper bound of 10 is used in the model. In addition, five thousand equally spaced points are used for the distribution of asset holdings. Both labor productivity and return shocks take 13 states, respectively. Changes in the number and bounds of grids do not have a significant impact on the results of models.

Convergence of the value function iteration is determined by the sup norm with a tolerance of 10^{-6}. The distribution of households is updated using the endogenous policy rules and the Markov transition matrices until a stationary distribution is obtained. General equilibrium is achieved by iterating on factor prices until both the capital and labor markets clear simultaneously. The model is implemented using the Intel Fortran programming language and incorporates OpenMP for parallelization.

This approach follows standard practice in the literature while ensuring numerical precision in solving household decision problems and the aggregate equilibrium.

The detailed computation algorithm of the model follows these steps:

1. Start with an initial guess for the aggregate capital stock and labor.

2. Given the guessed values for aggregate capital stock K and labor L determine the rental rates r^* and wage w using Eq. (20) and Eq. (19). Additionally, make an initial guess for the common return component $\underline{r}$.

   (a) Solve the problems of the two types of individuals (Eq. (6) and Eq. (9)) given the rental rates, wage, and common return component. This can be done using the golden section search method with cubic spline interpolation.

   (b) Simulate the distribution of participants μ_p and non-participants μ_n using their respective decision rules and the transition matrices of labor productivity and return shocks, following the simulation method outlined by Young (2010).

   (c) Using the distributions of participants and non-participants, check if the aggregate returns from risky assets and risk-free assets are sufficiently close to the rental revenue of mutual funds. If not, return to step (a) and make a new guess for the common return component.

   (d) With the distributions of participants and non-participants, calculate the aggregate capital and labor. If the calculated aggregate capital and labor are sufficiently close to the initial guesses, the solution algorithm is complete. If they are not close enough, return to step 1 to make a new guess for aggregate capital and labor.

B Data

I collect data on wealth distribution and income distribution in Korea from the 2024 Survey of Household Finances and Living Conditions (SFLC), conducted by Statistics Korea, the Financial Supervisory Service, and the Bank of Korea. Specifically, I use the 2024 wealth distribution and the 2023 income distribution, as data for 2024 income is not yet available. For income distribution, I use data based on disposable income, including labor income, business income, asset income, private net transfers, and public net transfers.

Table 14: Wealth and Income Distribution in Korea

	Wealth Inequality		Income Inequality	
	Data (2024)	Model	Data (2023)	Model
Top 10%	44	43	24	24
Top 20%	63	63	39	40
Top 30%	75	76	52	53
Top 40%	84	85	63	63
Top 50%	90	91	72	72
Top 60%	95	95	80	80
Top 70%	98	98	87	87
Top 80%	99	99	93	92
Top 90%	100	100	98	97
Top 100%	100	100	1.00	1.00
Gini index	0.61	0.61	0.32	0.32

Data on homeownership rates in Korea are collected from the 2024 Korea Housing Survey. Homeownership rates in Korea have remained stable over the past eight years.

Table 15: Homeownership Rates in Korea (%)

	2016	2017	2018	2019	2020	2021	2022	2023
Homeownership rates	59.9	61.1	61.1	61.2	60.6	60.6	61.3	60.7

C Robustness Checks for Policy Implications

Table 16 and Table 17 present robustness checks based on a one-percentage-point increase in taxes and a one-percentage-point increase in participation rates in risky markets. While the quantitative effects are small in magnitude, the qualitative patterns remain consistent with the main analysis: both labor and wealth taxes are ineffective policies for mitigating wealth inequality. These results confirm that the main conclusions are not influenced by the size of the shock.

Table 16: Model Moments under Marginal Policy Changes

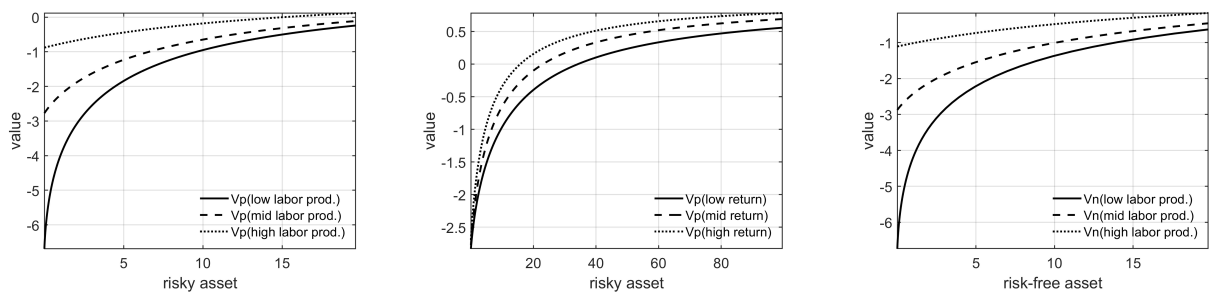
	K	L	w	r^*	$\underline{r}$
Baseline	3.51	0.36	1.90	2.81%	2.88%
Labor tax (1%)	3.44	0.35	1.89	2.86%	2.91%
Wealth tax (1%)	3.49	0.36	1.89	2.84%	2.91%
Participation (+1pp)	3.51	0.36	1.90	2.81%	2.87%

Table 17: Wealth and Income Inequality under Marginal Policy Changes

	Top 10%	Top 20%	Top 30%	Top 40%	Top 50%	Gini Index
Wealth Share (%)						
Baseline	43	63	76	85	91	0.61
Labor tax (1%)	44	64	77	85	92	0.62
Wealth tax (1%)	43	63	76	85	91	0.61
Participation (+1pp)	43	63	76	85	91	0.61
Income Share (%)						
Baseline	24	40	53	63	72	0.32
Labor tax (1%)	24	40	52	63	72	0.32
Wealth tax (1%)	24	40	52	63	72	0.32
Participation (+1pp)	24	40	52	63	72	0.32

D Model Results

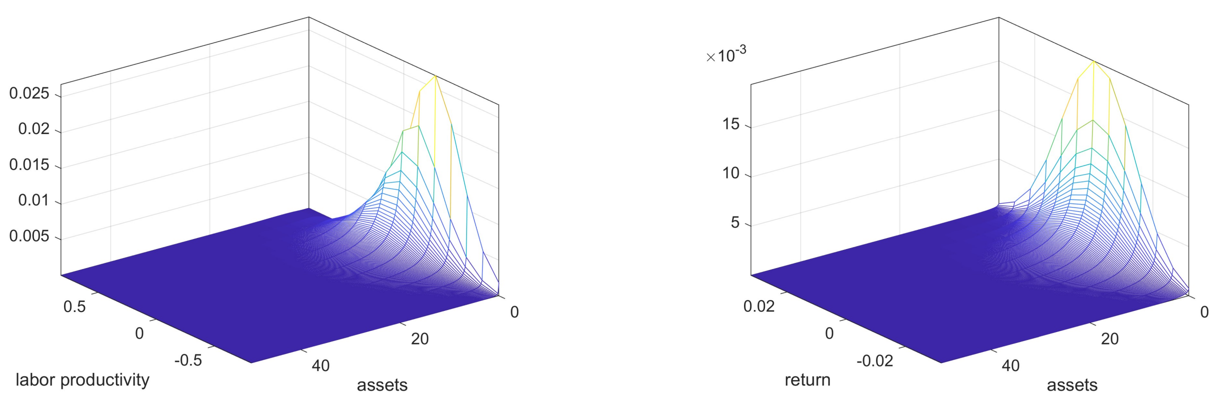
In this section, I will present detailed results of the model and distribution. Figure 1 describes the values of participants and non-participants. Figure 2 describes the distribution of population. Figure 3 describes the wealth and income distribution of the model economy.



(a) Value of Participants (b) Value of Participants (c) Value of Non-participants

Figure 1: Value Functions

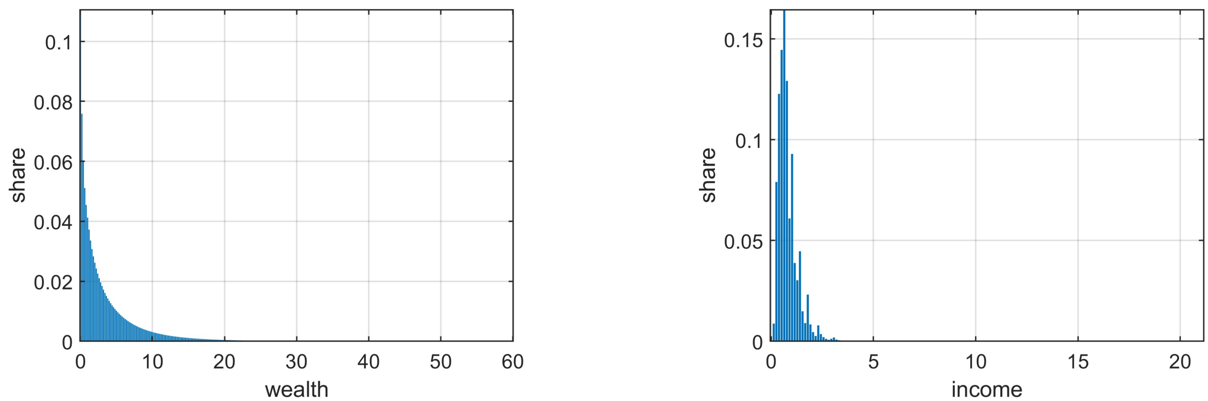
Note: Subfigure (a) illustrates the value of participants across labor productivities with a medium idiosyncratic return shock. Subfigure (b) illustrates the value of participants across idiosyncratic returns with a medium labor productivity shock. I truncate the asset-holding grids for a better appearance because value functions are flat in areas of large asset holdings.



(a) Labor Productivity and Asset Holdings (b) Return and Asset Holdings

Figure 2: Distribution

Note: To improve the appearance of figures, I truncate the asset-holding grids since the population density is very low in the upper tail of the wealth distribution.



(a) Wealth Distribution

(b) Income Distribution

Figure 3: Wealth and Income Distribution

Note: To improve the appearance of figures, I truncate asset holding grids since the population density is very low in the upper tail of the wealth distribution.

.

References

Aiyagari, S. R. (1994), 'Uninsured idiosyncratic risk and aggregate saving', *The Quarterly Journal of Economics* **109**(3), 659–684.

Bach, L., Calvet, L. E. and Sodini, P. (2020), 'Rich pickings? risk, return, and skill in household wealth', *American Economic Review* **110**(9), 2703–2747.

Basak, S. and Cuoco, D. (1998), 'An equilibrium model with restricted stock market participation', *The Review of Financial Studies* **11**(2), 309–341.

Benhabib, J., Bisin, A. and Luo, M. (2019), 'Wealth distribution and social mobility in the us: A quantitative approach', *American Economic Review* **109**(5), 1623–1647.

Bewley, T. (1977), 'The permanent income hypothesis: A theoretical formulation', *Journal of Economic Theory* **16**, 252–292.

Causa, O., Woloszko, N. and Leite, D. (2019), 'Housing, wealth accumulation and wealth distribution: Evidence and stylized facts', *OECD Economics Department Working Papers* (1588).

Fagereng, A., Guiso, L., Malacrino, D. and Pistaferri, L. (2020), 'Heterogeneity and persistence in returns to wealth', *Econometrica* **88**, 115–170.

Greenwood, J., Hercowitz, Z. and Huffman, G. W. (1988), 'Investment, capacity utilization, and the real business cycle', *The American Economic Review* **78**(3), 402–417.

Guvenen, F. (2009), 'A parsimonious macroeconomic model for asset pricing', *Econometrica* **77**(6), 1711–1750.

Hubmer, J., Krusell, P. and Smith., A. A. (2021), 'Sources of us wealth inequality: Past, present, and future', *NBER Macroeconomics Annual* **35**, 391–455.

Huggett, M. (1993), 'The risk-free rate in heterogeneous-agent incomplete-insurance economies', *Journal of Economic Dynamics and Control* **17**, 953–969.

Krusell, P. and Smith, A. A. (1998), 'Income and wealth heterogeneity in the macroeconomy', *Journal of Political Economy* **106**(5), 867–896.

Park, J., Lee, S. and Tak, E. (2024), 'Fluctuations and economic inequality - focusing on asset and income inequality', *The Korean Journal of Economics* **31**(1), 59–90.

Tauchen, G. (1986), 'Finite state markov-chain approximations to univariate and vector autoregressions', *Economics Letters* **20**(2), 177–181.

Xavier, I. (2021), 'Wealth inequality in the us: the role of heterogeneous returns', *Working paper* .

Young, E. R. (2010), 'Solving the incomplete markets model with aggregate uncertainty using the krusell–smith algorithm and non-stochastic simulations', *Journal of Economic Dynamics and Control* **34**, 36–41.