Market Power and Inequality

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September 2025

Preliminary and Incomplete.
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Abstract

Since the 1980s, the U.S. economy has experienced a sharp increase in both market concentration and markups, alongside a rise in wealth concentration. This paper develops a general equilibrium model of entrepreneurial choice with imperfect competition between firms to quantify the aggregate and distributional impacts of rising market power. I find that changes in the economy's market structure between 1989 and 2016 are associated with significant macroeconomic costs, including declines of 5% in output, 9% in employment, and 18% in investment. On the distributional side, the shift in market structure accounts for up to 18% of the observed rise in income inequality and up to 28% of the rise in wealth inequality. The model predicts a modest decline in the labor income share and little change in the overall wealth share held by entrepreneurs, suggesting that most of the rise in inequality reflects a reallocation of gains among entrepreneurs.

Keywords: income inequality, wealth inequality, market power, markups, entrepreneurship.

JEL codes: D31, D43, E21, L16.

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1 Introduction

Wealth in the United States is highly concentrated and has become increasingly so over the past four decades, with the top 1% now holding over one-third of total wealth. This rise in wealth concentration has coincided with a substantial shift in the competitive structure of the U.S. economy: product markets have become more concentrated (Covarrubias et al., 2020; Akcigit and Ates, 2021), markups have risen (De Loecker et al., 2020; Hall, 2018), and a growing share of economic activity is accounted for by a small number of dominant firms (Autor et al., 2020). To what extent can the observed rise in market power explain the increase in wealth inequality? What are the aggregate and distributional consequences of a decline in firm-level competition?

Understanding the drivers of rising wealth inequality is essential for the design of optimal tax policy. The policy implications may differ depending on whether wealth concentration arises from unproductive rents or the byproduct of productive reallocation. If inequality stems from the accumulation of rents due to increased market power through barriers to entry or price-setting ability, then wealth taxation may improve both equity and efficiency by limiting distortions and reducing misallocation (Saez and Zucman, 2019; Guvenen et al., 2023). Conversely, if rising inequality reflects an efficient reallocation of activity driven by technological change, economies of scale, or returns to fixed factors, then wealth concentration may reflect underlying gains in productivity, and taxing wealth could weaken incentives to accumulate capital or pursue entrepreneurial activity (Boar and Midrigan, 2023; Boar and Knowles, 2024).

Disentangling these forces requires a framework that jointly accounts for firm dynamics, market power, and heterogeneity in income and wealth. In this paper, I develop a general equilibrium model of occupational choice, building on Quadrini (2000) and Cagetti and De Nardi (2006), in which heterogeneous firms operate under imperfect competition. Firms compete monopolistically and accumulate market power as they grow, generating endogenous variation in markups as in Klenow and Willis (2016). Individuals choose whether to become workers or entrepreneurs and decide how much to invest in their business, subject to borrowing constraints, idiosyncratic risk, and the prevailing competitive environment. To capture the fat-tailed outcomes observed in the wealth and markup distributions, the model incorporates a rare, transient state of extremely high entrepreneurial productivity following Castaneda et al. (2003), as well as a size-dependent borrowing constraint, motivated by Gopinath et al. (2017) and Dinlersoz et al. (2019), which relaxes financial frictions for wealthier entrepreneurs. In this setting, the equilibrium distribution of firm sizes, markups, and wealth emerges endogenously from the competitive structure of the economy.

The model is calibrated using microdata from the Survey of Consumer Finances to replicate key features of the U.S. economy in 1989. In particular, the calibration reproduces well the observed degree of income and wealth inequality, as well as the importance of entrepreneurs for economic activity and inequality. To capture the economy's competitive structure, I rely on firm-level markup estimates constructed following the methodology of De Loecker et al. (2020). A key advantage of this approach is that it does not depend on the definition of product markets, assumptions about the nature of competition, or strong parametric restrictions. Although the estimates are based on publicly listed firms, they provide a measure of economy-wide competitive conditions, since publicly and privately held firms often compete in the same markets, and listed firms account for a disproportionate share of economic activity (see, e.g., De Loecker et al., 2020; Autor et al., 2020; Covarrubias et al., 2020; Hall, 2018).

To evaluate the aggregate and distributional impact of changes in the competitive structure of the economy, I conduct a counterfactual experiment in which the model's competition-related parameters are recalibrated to match the empirical distribution of markups observed in 2016, holding all other parameters fixed at their 1989 levels. Between 1989 and 2016, average revenue-weighted markups rose from 35% above marginal cost to about 71%. Over the same period, there was a notable reallocation of economic activity toward large, high-markup firms, consistent with the "superstar firm" effect documented by Autor et al. (2020), with markups at the 90th percentile increasing from 80% to 192% above marginal cost. This exercise asks: what would the aggregate and distributional outcomes have been if the only change between 1989 and 2016 had been the shift in competition between firms, as reflected in the markup distribution?

I find that changes in the economy's market structure between 1989 and 2016 are associated with significant macroeconomic costs. Viewed through the lens of the quantified model, aggregate output is approximately 5% lower, and consumption falls by 4%. Employment declines by 9%, resulting in wages about 5% lower, while the interest rate rises by 18%, accompanying a 19% drop in investment. In terms of the distributional effects, the shift in the economy's competitive structure accounts for 6%–18% of the observed rise in income inequality and 11%–28% of the rise in wealth inequality over the 1989-2016 period, depending on the concentration measure used. For example, roughly 10% of the increase in both the income and wealth shares of the top 1% can be attributed to changes in market power. Nevertheless, the distributional effects are relatively modest when comparing workers and entrepreneurs. The model predicts a small decline in the labor income share and almost no change in the overall wealth share held by entrepreneurs, suggesting that the primary distributional impact of rising market power has been to reallocate income and wealth among entrepreneurs.

This paper contributes to a large macroeconomic literature that builds on the Bewley-Huggett-Aiyagari framework to study the distribution of wealth in general equilibrium. While early contributions such as Huggett (1993) and Aiyagari (1994) focused on precautionary saving and interest rate determination, subsequent extensions introduced richer forms of heterogeneity to better match the empirical wealth distribution, including heterogeneity in discount factors (Krusell and Smith, 1998), earnings processes (Castaneda et al., 2003), occupational choice (Quadrini, 2000; Cagetti and De Nardi, 2006), or idiosyncratic capital returns (Benhabib et al., 2011). This paper is most closely related to work by Kaymak and Poschke (2016), Hubmer et al. (2021), and Aoki and Nirei (2017), who study transitional dynamics in response to structural and policy shifts, aiming to explain the rise in top wealth shares over time. In contrast to these papers, which generally abstract from imperfect competition, my paper emphasizes changes in market structure as a distinct channel contributing to the observed rise in wealth inequality.

The rest of the paper is organized as follows. Section 2 describes the model. Section 3 discusses the calibration strategy and presents the results from the quantitative analysis. Section 4 concludes.

2 Model

This section develops a heterogeneous-agent economy with occupational choice and imperfect competition between firms. The model departs from standard frameworks by allowing firms to endogenously accumulate market power through increasing relative size, which affects their markups and profits. The equilibrium distribution of firm sizes, profits, and wealth is shaped by individual heterogeneity, forward-looking savings decisions, and the economy's competitive structure.

2.1 Demographics

Time is discrete and indexed by $t = 0, 1, 2, \ldots$. The economy is populated by a unit mass of infinitely-lived individuals, each indexed by $i \in [0, 1]$, who are heterogeneous in their asset holdings a_{it}, wage labor productivity z_{it}^w, and entrepreneurial productivity z_{it}^e. There is no aggregate uncertainty in the economy, but individuals are subject to uninsurable idiosyncratic shocks.

Preferences are defined over consumption of a single final good. Each individual derives utility from consumption c_{it} according to a utility function $u(c_{it})$ and discounts future utility flows at a constant factor $\beta \in (0, 1)$. Lifetime utility is given by:

$$\mathbb{E} \sum_{t=0}^{\infty} \beta^t u(c_{it}) \tag{1}$$

Each period, after observing their current asset holdings and productivity draws, individuals choose whether to work for a wage or operate a business, and make consumption and savings decisions to maximize expected utility.

2.2 Market Structure

The production side of the economy features a two-tier market structure: a representative final goods producer operates under perfect competition, while intermediate goods are supplied by entrepreneurs operating in monopolistically competitive markets.

At any point in time, there is a mass $N_t \in (0, 1)$ of entrepreneurs in the economy, each producing a distinct horizontally differentiated intermediate variety. To produce the final consumption good, the representative final goods producer assembles the continuum of differentiated intermediate goods $\{y_{it}\}_{i \in [0, N_t]}$ supplied by entrepreneurs according to the Kimball aggregator:

$$\int_0^{N_t} \Upsilon\left(\frac{y_{it}}{Y_t}\right) di = 1 \tag{2}$$

where Υ is strictly increasing and concave, i.e., $\Upsilon' > 0$ and $\Upsilon'' < 0$, and satisfies $\Upsilon(1) = 1$. Taking prices p_{it} as given, the representative final goods producer chooses how much of each variety y_{it} to purchase in order to maximize profits:

$$Y_t - \int_0^{N_t} p_{it} y_{it}\, di \tag{3}$$

The first-order condition for this problem yields the following demand function for each intermediate good:

$$\frac{p_{it}}{P_t} = \Upsilon'\left(\frac{y_{it}}{Y_t}\right) D_t \tag{4}$$

where P_t is the price index of the final good, and D_t is an endogenous demand index:

$$D_t = \left(\int_0^{N_t} \Upsilon'\left(\frac{y_{it}}{Y_t}\right) \frac{y_{it}}{Y_t}\, di\right)^{-1} \tag{5}$$

2.3 Technology

Entrepreneurs have access to a production technology given by:

$$y_{it} = z_{it}^e \left(k_{it}^{\alpha}\, l_{it}^{1-\alpha}\right)^{\nu} \tag{6}$$

where y_{it} denotes output, z_{it}^e is a stochastic idiosyncratic productivity shock, k_{it} is the capital stock, and l_{it} is labor input. The parameter $\alpha \in (0, 1)$ governs the capital share in the Cobb-Douglas production function, and $\nu \in (0, 1)$ controls the span of control as in Lucas (1978).

Entrepreneurs take the prevailing wage w_t and interest rate r_t as given. Their variety-specific price p_{it} is determined endogenously through the demand system described above. Given these prices, firm i's period-t profit is:

$$\pi_{it} = p_{it}y_{it} - (r_t + \delta)k_{it} - w_t l_{it} \tag{7}$$

where δ is the depreciation rate of capital.

2.4 Occupational Choice

In each period, individuals choose their occupation by comparing the income associated with wage employment and entrepreneurship. If an individual chooses to work, they supply labor inelastically and earn labor income equal to $z^w_{it}w_t$, where z^w_{it} is an idiosyncratic labor productivity shock and w_t is the prevailing wage. If they choose to become an entrepreneur, their income is given by the operating profit of their firm, π_{it}. The individual chooses to become an entrepreneur if and only if:

$$\pi_{it} > z^w_{it}w_t \tag{8}$$

2.5 Borrowing Constraint

Individuals can save in a risk-free asset a_{it}, which earns the prevailing interest rate r_t. All individuals are subject to a non-negativity constraint on asset holdings at all times: $a_{it} \geq 0$.

Workers cannot borrow. Entrepreneurs, by contrast, are allowed to borrow intertemporally to finance capital investments, but are subject to collateral constraints. Specifically, capital investment cannot exceed a fraction of the entrepreneur's wealth:

$$k_{it} \leq \lambda(a_{it})\ a_{it} \tag{9}$$

where $\lambda(a_{it})$ governs the tightness of the borrowing constraint and may be increasing in asset holdings, allowing firms owned by wealthier entrepreneurs proportionately greater access to external finance.

2.6 Budget Constraint

Each period, individuals allocate their resources between consumption and savings, subject to the following budget constraint:

$$c_{it} + a_{it+1} = (1 + r_t)a_{it} + \max\{\pi_{it}(a_{it}, z^e_{it}),\ z^w_{it} w_t\} \tag{10}$$

where c_{it} denotes consumption, a_{it+1} is next period's asset holdings, and $(1 + r_t)a_{it}$ is the return on current savings. Income is given by the maximum of entrepreneurial profits and labor earnings, reflecting the individual's occupational choice. Entrepreneurial profits $\pi_{it}(a_{it}, z^e_{it})$ depend both on the realization of the entrepreneurial productivity shock z^e_{it} and on the individual's asset holdings a_{it}, which determine the amount of capital that can be used due to the borrowing constraint.

2.7 Recursive Representation

Let primes denote next-period variables. The problem of an individual with wealth a, wage productivity z^w, and entrepreneurial productivity z^e can be written in recursive form as:

$$V(a, z_e, z_w) = \max_{c,a' \geq 0}\ u(c) + \beta\, \mathbb{E}\, V(a', z'_e, z'_w) \tag{11}$$

$$\text{s.t.:} \quad c + a' = (1 + r)a + \max\{\pi(a, z_e),\ z_w\, w\} \tag{12}$$

$$\pi(a, z_e) = \max_{l,k \leq \lambda(a)a}\ py - wl - (r + \delta)k \tag{13}$$

$$y = z_e\, (k^\alpha l^{1-\alpha})^\nu \tag{14}$$

$$\frac{p}{P} = \Upsilon' \left(\frac{y}{Y}\right) D \tag{15}$$

2.8 Stationary General Equilibrium

Let $\mathbf{s} = \{a, z_e, z_w\}$ denote the state vector for an individual in this economy. A stationary recursive equilibrium consists of a value function $V(\mathbf{s})$; individual policy functions for consumption $c(\mathbf{s})$, savings $a'(\mathbf{s})$, occupational choice $o(\mathbf{s})$, entrepreneurial capital $k(\mathbf{s})$, labor demand $l(\mathbf{s})$, and variety-specific prices $p(\mathbf{s})$; factor prices w and r; aggregates A, C, N, K, L^d, L^s, Y, P, and D; and an invariant distribution $\mathbf{\Lambda}(\mathbf{s})$

over the state space such that:

(i) given prices and aggregates, the policy functions solve the individual's dynamic optimization problem;

(ii) the mass of entrepreneurs and labor supply is consistent with occupational choices:

$$N = \int_{o(\mathbf{s})=1} 1 \; d\mathbf{\Lambda}(\mathbf{s}) \tag{16}$$

$$L^s = \int_{o(\mathbf{s})=0} z_w \; d\mathbf{\Lambda}(\mathbf{s}) \tag{17}$$

(iii) the labor market clears ($L^d = L^s$), where the total demand for labor by entrepreneurs is given by:

$$L^d = \int_{o(\mathbf{s})=1} l(\mathbf{s}) \; d\mathbf{\Lambda}(\mathbf{s}) \tag{18}$$

(iv) the capital market clears ($K = A$), such that total capital used by entrepreneurs and total assets held in the economy are given by:

$$K = \int_{o(\mathbf{s})=1} k(\mathbf{s}) \; d\mathbf{\Lambda}(\mathbf{s}) \tag{19}$$

$$A = \int a(\mathbf{s}) \; d\mathbf{\Lambda}(\mathbf{s}) \tag{20}$$

(v) the final goods aggregator is satisfied, and the demand index is internally consistent with market shares:

$$\int_{o(\mathbf{s})=1} \Upsilon\left(\frac{y(\mathbf{s})}{Y}\right) \; d\mathbf{\Lambda}(\mathbf{s}) = 1 \tag{21}$$

$$D = \left(\int_{o(\mathbf{s})=1} \Upsilon'\left(\frac{y(\mathbf{s})}{Y}\right) \frac{y(\mathbf{s})}{Y} \; d\mathbf{\Lambda}(\mathbf{s})\right)^{-1} \tag{22}$$

(vi) the aggregate resource constraint, which reflects the fact that the final good is used for both consumption and investment, is satisfied:

$$Y = C + \delta K \tag{23}$$

(vii) the distribution $\boldsymbol{\Lambda}(\mathbf{s})$ is invariant and consistent with the optimal individual decisions and the stochastic processes governing z_e and z_w.

The numerical algorithm used to compute the general stationary equilibrium is described in Appendix Appendix B.

3 Quantitative Exercise

This section presents the quantitative analysis. I begin by specifying the functional forms that govern preferences, market structure, borrowing constraints, and the productivity processes that underlie the agents' decisions. I then describe the calibration strategy and evaluate the model's ability to match key features of the income and wealth distributions, along with the empirical distribution of markups. Finally, I use the calibrated model to conduct a counterfactual experiment that quantifies the aggregate and distributional consequences of the changes in market power that occurred between 1989 and 2016.

3.1 Functional Forms

Preferences Utility over consumption of the final good is represented by a CRRA utility function with coefficient of relative risk aversion γ:

$$u(c) = \frac{c^{1-\gamma} - 1}{1 - \gamma} \tag{24}$$

Final Good Aggregation The Kimball aggregator for the final consumption good takes the Klenow–Willis specification, which provides a parsimonious formulation with two parameters, θ and ε. This specification allows for non-constant elasticities that vary with market share. The aggregator is given by:

$$\Upsilon(x) = 1 + (\theta - 1) \exp\left(\frac{1}{\varepsilon}\right) \varepsilon^{\frac{\theta}{\varepsilon} - 1} \left(\Gamma\left(\frac{\theta}{\varepsilon}, \frac{1}{\varepsilon}\right) - \Gamma\left(\frac{\theta}{\varepsilon}, \frac{x^{\frac{\varepsilon}{\theta}}}{\varepsilon}\right)\right) \tag{25}$$

where $x = y_{it}/Y_t$ denotes the firm's market share, and $\Gamma(s, z) = \int_z^\infty t^{s-1} e^{-t} dt$ is the upper incomplete gamma function.

Productivity Processes Idiosyncratic productivity evolves along two separate dimensions: worker productivity z^w and entrepreneurial productivity z^e, both of which follow log-linear Markov autoregressive processes:

$$\log z_w' = \rho_w \log z_w + \varepsilon_w \qquad \varepsilon_w \sim N(0, \sigma_w^2) \tag{26}$$

$$\log z_e' = \rho_e \log z_e + \varepsilon_e \qquad \varepsilon_e \sim N(0, \sigma_e^2) \tag{27}$$

where ρ_w and ρ_e control the persistence of shocks, and σ_w and σ_e denote their respective standard deviations. These processes are discretized into finite-state Markov chains using the method of Tauchen (1986).

Superstar State Motivated by Castaneda et al. (2003), the entrepreneurial productivity process includes an additional transitory "superstar" state that captures rare but extreme levels of entrepreneurial success, and helps replicate the observed concentration of income and wealth in the data.

Entry into the superstar state occurs with probability p_{ss} and is restricted to entrepreneurs in the highest regular productivity level. Once in the superstar state, entrepreneurs remain with probability ρ_{ss}. With probability $1 - \rho_{ss}$, they exit and transition back into the regular productivity distribution, drawing from the average transition probabilities of the baseline Markov process. The productivity level associated with the superstar state is given by:

$$z_e^{ss} = z_e^{\max} + \Delta_{ss}, \tag{28}$$

where Δ_{ss} is a scale factor that determines how much more productive the superstar state is relative to the highest regular state.

Size-Dependent Borrowing Constraint Motivated by empirical evidence documenting a positive relationship between leverage and firm size (Gopinath et al., 2017; Dinlersoz et al., 2019), I assume that entrepreneurs may borrow against their wealth to finance capital investment, with the borrowing limit governed by a collateral constraint $\lambda(a)$ that depends on the amount of asset holdings. The constraint takes the form:

$$\lambda(a) = \bar{\lambda} + \lambda_a \, a^{\phi_a} \tag{29}$$

where $\bar{\lambda}$ denotes a baseline level of collateralizability, λ_a determines the strength of the asset dependence, and ϕ_a controls the curvature of the relationship. The standard constant-λ case is nested as a special case when $\lambda_a = 0$.

3.2 Data Sources

The model is calibrated at an annual frequency using data from two main sources: the Survey of Consumer Finances (SCF) and Compustat. These datasets are used both to discipline key parameters and to evaluate the model's quantitative fit.

The Survey of Consumer Finances (SCF) is a triennial, nationally representative survey of U.S. households conducted by the Federal Reserve Board. It provides detailed information on household income, assets, liabilities, and demographics, as well as data on occupation and business ownership. Following Cagetti and De Nardi (2006), I define entrepreneurs as households in which the head reports being self-employed or holding an active ownership stake in a business. Using SCF survey weights to ensure the representativeness of the sample, entrepreneurs account for approximately 15% of the population. Wealth is measured as net worth: total household assets minus total liabilities. Figure A4 plots the evolution of top wealth shares constructed from these data.

To study changes in market structure, I rely on data from Compustat, which contains financial statements for publicly traded U.S. firms. I estimate markups using the production-based approach described in De Loecker et al. (2020), which infers markups as the ratio of the output elasticity of a variable input to that input's share in firm revenue. A key advantage of this approach is that it does not depend on the definition of product markets, assumptions about the nature of competition, or strong parametric restrictions. Although the estimates are derived from publicly listed firms, they are informative about the evolution of market power in the broader economy since these firms account for a disproportionate share of economic activity and compete alongside privately held businesses across many industries (De Loecker et al., 2020; Autor et al., 2020; Covarrubias et al., 2020; Hall, 2018). Figure A5 displays the evolution of markups over time using this methodology.

3.3 Calibration

A period in a model is a year. The aggregate price level is normalized to one, $P_t = 1$, so that the final good serves as the numeraire, and all variables are measured in units of the final good.

The model includes a set of externally assigned parameters based on values commonly used in the literature, summarized in Panel A of Table 1. The coefficient of relative risk aversion is set to $\gamma = 1$, implying log utility. The discount factor $\beta = 0.865$ and the span-of-control parameter $\nu = 0.88$ follow Cagetti and De Nardi (2006). The capital share α is set to 0.30, and the annual depreciation rate of capital δ is fixed at 10%, consistent with standard macroeconomic calibrations (e.g., Clementi and Palazzo, 2016).

The remaining parameters are calibrated internally to match key moments in the data, as shown in Panel B of Table 1. The persistence and dispersion of labor and entrepreneurial productivity shocks, (ρ_w, σ_w) and (ρ_e, σ_e), are calibrated to replicate the observed levels of income and wealth inequality. The parameters associated with the superstar state $(p_{\text{ss}}, \rho_{\text{ss}}, \Delta_{\text{ss}})$, together with the borrowing constraint parameters $(\bar{\lambda}, \lambda_a, \phi_a)$, are chosen to capture the concentration of wealth and income in the right tail of the distributions. Finally, the elasticity of demand θ and the superelasticity ε/θ are calibrated to match the empirical distribution of markups.

Once calibrated, the model provides a close fit to the empirical distribution of markups observed in 1989, as shown in Table 3. The model matches the average markup well (1.37 in the model vs. 1.35 in the data) and closely replicates key moments across the distribution, namely the median (1.20 vs. 1.21), the 75th percentile (1.42 vs. 1.43), as well as the 95th (2.18 vs. 2.14) and 99th percentiles (3.36 vs. 3.30). Additionally, the model captures higher-order moments of the distribution, reproducing both the skewness (2.40 vs. 2.42) and the kurtosis (6.90 vs. 7.42).

Crucial to this fit is the inclusion of a rare but transitory state of extremely high productivity, which is essential for reproducing a sufficiently fat right tail, as shown in

Table 1. Model Parameters

Parameter	Value	Description
Panel A: Assigned Parameters		
Parameter	Value	Description
γ	1.00	Risk aversion
β	0.865	Discount factor
δ	0.10	Depreciation rate
α	0.30	Capital share
ν	0.88	Span-of-control
Panel B: Calibrated Parameters		
Parameter	Value	Description
ρ_w	0.48	Labor shocks persistence
σ_w	0.15	Std. dev. of labor shocks
ρ_e	0.80	Entrepreneurial shocks persistence
σ_e	0.42	Std. dev. of entrepreneurial shocks
p_{ss}	0.025	Superstar entry probability
ρ_{ss}	0.20	Superstar stay probability
Δ_{ss}	3.50	Superstar productivity boost
θ	17.0	Demand elasticity
ε/θ	0.80	Superelasticity of demand
$\bar{\lambda}$	1.05	Baseline collateral limit
λ_a	0.02	Leverage sensitivity to assets
ϕ_a	0.81	Leverage curvature

Figure 1. Without this feature, the markup distribution would taper off too quickly, failing to capture the concentration of high-markup firms observed in the data. Moreover, while some firms in the data operate with markups below one, this behavior does not arise in the model. Since individuals can freely switch between occupations, no entrepreneur would choose to operate a business with a markup below one (and thus incur a loss) when they have the alternative of working for a wage.

The model also provides a good fit to the observed distribution of income and wealth inequality in 1989, as shown in Table 2. The model-generated income Gini coefficient is 0.438, compared to 0.540 in the data. It closely matches the income shares of the top 10% (43.3% in the model vs. 44.2% in the data) and the top 5% (28.7% vs. 32.4%), although it understates the concentration of income among the top 1% (8.1% vs. 17.1%). Turning to wealth inequality, the model produces a wealth Gini of 0.830 compared to 0.790 in the data. The wealth share of the top 10% is well matched (69.1% in the model vs. 69.0% in the data), and the model performs reasonably for the top 5% (45.4% vs. 54.2%), though it again underpredicts the level concentration in the top 1% (12.7% vs. 29.9%).

3.4 Counterfactual Analysis

To isolate the aggregate and distributional impact of changes in the competitive structure of the economy, I conduct a counterfactual experiment in which the model's competition-related parameters are recalibrated to match the empirical distribution of markups observed in 2016, while all other parameters are held constant. This exercise asks: what would have been the level of inequality and the evolution of aggregate outcomes if the only change between 1989 and 2016 had been the shift in the competitive environment, as reflected in the markup distribution? The analysis is conducted in general equilibrium, allowing the labor, capital, and goods markets to adjust in response to changes in firm-level competition.

As shown in Figure 2, the markup distribution changed markedly between 1989 and 2016. The average revenue-weighted markup rose from 35% to 71% above marginal cost, driven by a fattening and lengthening of the upper tail, reflecting a greater

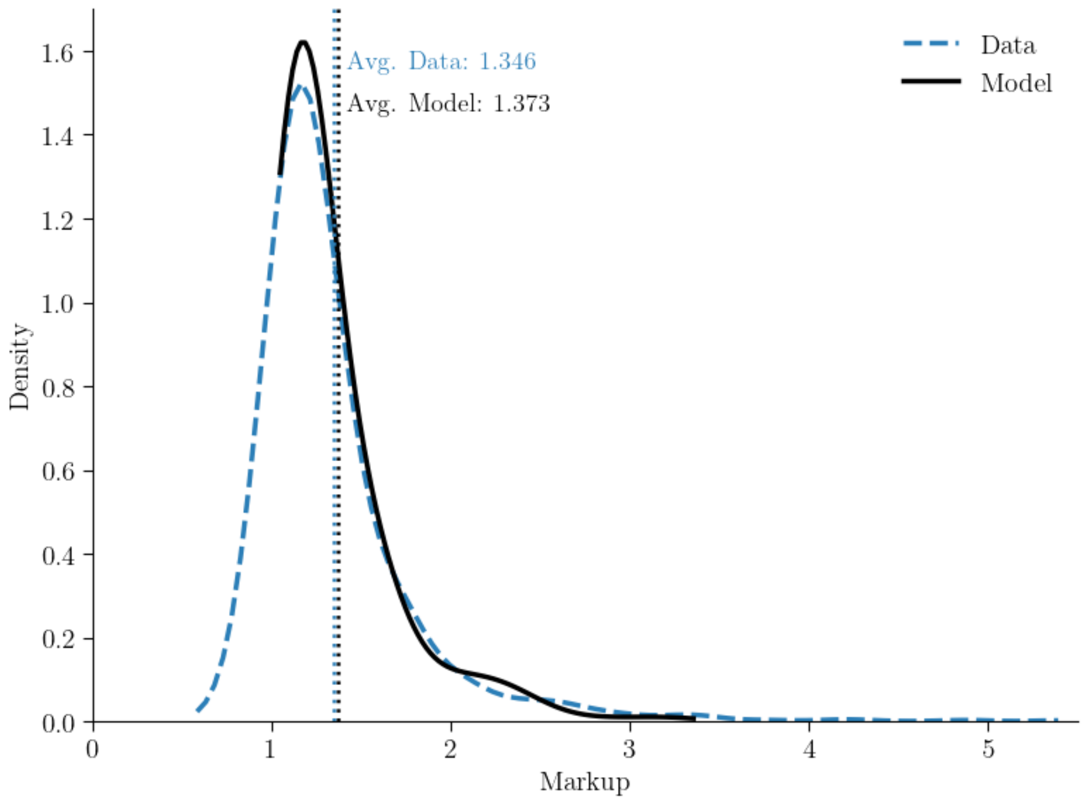
Table 2. Model Fit: Income and Wealth Inequality (1989)

Moments	Data	Model
Income Gini	0.540	0.438
Income Share of Top 20%	0.589	0.570
Income Share of Top 10%	0.442	0.433
Income Share of Top 5%	0.324	0.287
Income Share of Top 1%	0.171	0.081
Wealth Gini	0.790	0.830
Wealth Share of Top 20%	0.817	0.902
Wealth Share of Top 10%	0.690	0.691
Wealth Share of Top 5%	0.542	0.454
Wealth Share of Top 1%	0.299	0.127

Table 3. Model Fit: Markup Distribution (1989)

Moments	Data	Model
Average	1.346	1.373
50th Percentile	1.205	1.203
75th Percentile	1.429	1.419
80th Percentile	1.493	1.501
90th Percentile	1.802	1.741
95th Percentile	2.144	2.184
99th Percentile	3.302	3.355
Skewness	2.423	2.396
Kurtosis	7.423	6.903

Figure 1. Firm-Level Markup Distributions: Model vs. Data (1989)



Notes: This figure displays kernel density estimates of firm-level markups in 1989. The dashed line represents the empirical distribution, constructed from Compustat data using the methodology of De Loecker et al. (2020), weighted by firm revenue and trimmed at the 1st and 99th percentiles. The solid line depicts the model-generated distribution. Both distributions are smoothed using a Gaussian kernel with a bandwidth of 0.5. The vertical dotted lines indicate the average markup in the data and in the model, respectively.

concentration of economic activity among high-markup firms.

In the model, the parameters θ and ε/θ govern the competitive structure of the economy and jointly shape the equilibrium distribution of markups. Recalibrating the model to match the 2016 markup distribution requires increasing θ from 17.0 to 22.0 and the superelasticity ε/θ from 0.80 to 1.41.

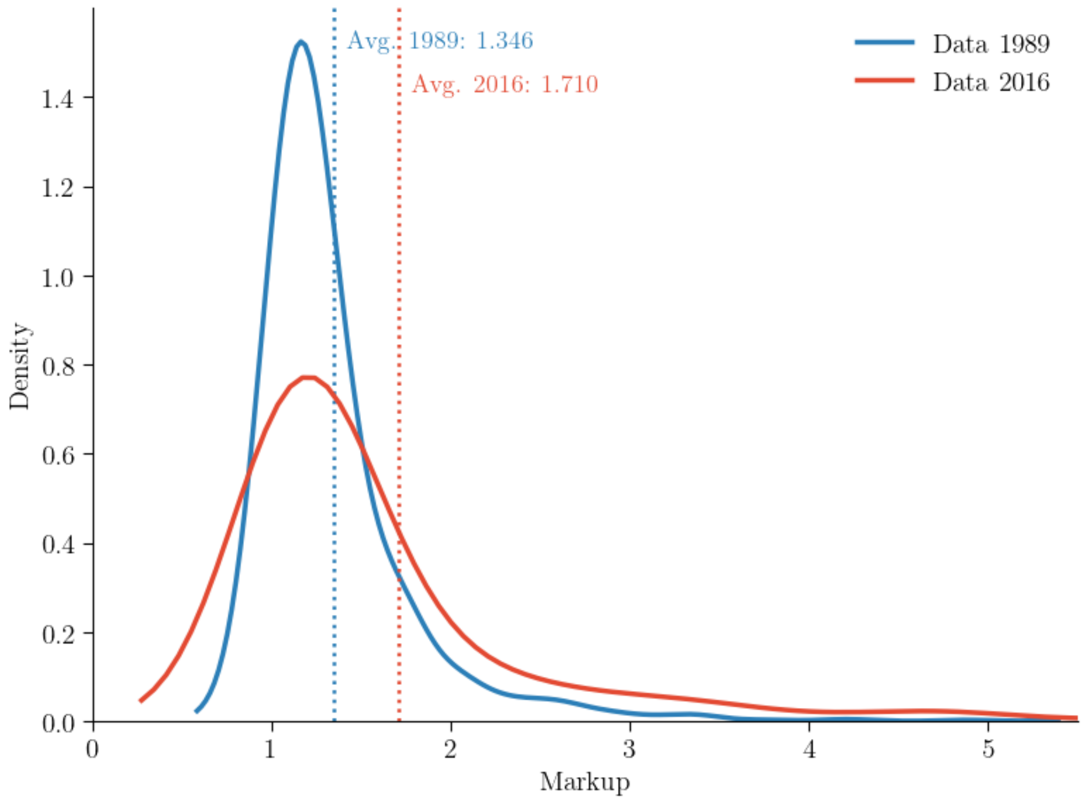
Table 4 shows that the model closely matches the 2016 markup distribution in the new general equilibrium. It reproduces well the average markup (1.73 in the model vs. 1.71 in the data) and key percentiles in the upper tail of the distribution, where most of the change over this period occurred. In particular, the 90th and 95th percentiles are well reproduced (2.34 vs. 2.92 and 3.75 vs. 3.97, respectively), as well as the 99th percentile (7.17 vs. 7.59). The model also replicates the skewness of the distribution (2.74 vs. 2.68) and kurtosis (9.71 vs. 8.05), capturing the increased asymmetry and fattening of the right tail observed in the data.

Table 4. Model Fit: Markup Distribution (2016)

Moments	Data	Model
Average	1.710	1.732
50th Percentile	1.261	1.311
75th Percentile	1.652	1.840
80th Percentile	1.896	2.021
90th Percentile	2.922	2.340
95th Percentile	3.970	3.747
99th Percentile	7.587	7.169
Skewness	2.679	2.737
Kurtosis	8.046	9.706

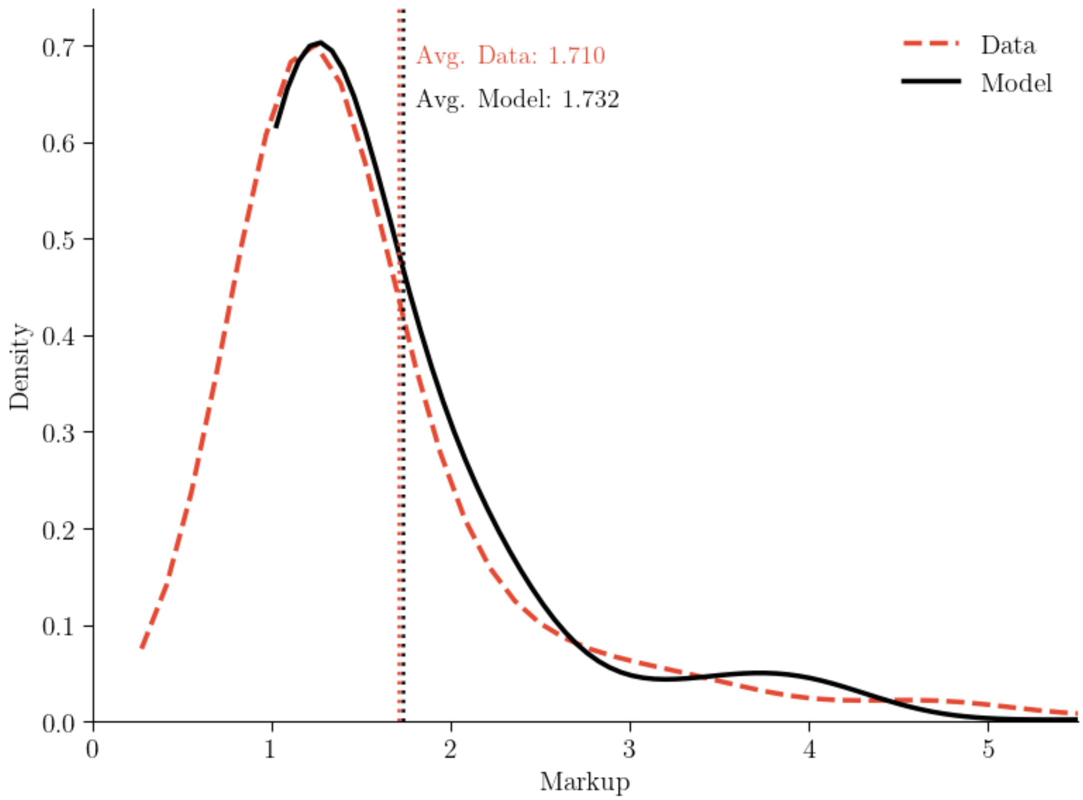
Table 5 summarizes the distributional effects of changes in the competitive structure of the economy from 1989 to 2016. The first two columns report the observed change and level of each inequality measure in the data, while the last two columns show the corresponding change and level predicted by the model when only the parameters governing the market structure are allowed to change.

Figure 2. Empirical Distribution of Firm Markups: 1989 vs. 2016



Notes: This figure displays kernel density estimates of firm-level markups in 1989 and 2016, constructed from Compustat data using the methodology of De Loecker et al. (2020). The distributions are weighted by firm revenue and trimmed at the 1st and 99th percentiles. Both are smoothed using a Gaussian kernel with a bandwidth of 0.5. Vertical dotted lines indicate the average markup for each year.

Figure 3. Firm-Level Markup Distributions: Model vs. Data (2016)



Notes: This figure displays kernel density estimates of firm-level markups in 2016. The dashed line represents the empirical distribution, constructed from Compustat data using the methodology of De Loecker et al. (2020), weighted by firm revenue and trimmed at the 1st and 99th percentiles. The solid line depicts the model-generated distribution. Both distributions are smoothed using a Gaussian kernel with a bandwidth of 0.5. The vertical dotted lines indicate the average markup in the data and in the model, respectively.

Table 5. Distributional Effects of Changes in Competition from 1989-2016

Moment	Data		Model	
	Change (pp)	Level	Change (pp)	Level
Income Gini	+0.057	0.598	+0.004	0.442
Income Share of Top 20%	+0.058	0.647	+0.004	0.574
Income Share of Top 10%	+0.074	0.516	+0.012	0.446
Income Share of Top 5%	+0.073	0.397	+0.013	0.300
Income Share of Top 1%	+0.063	0.234	+0.005	0.086
Wealth Gini	+0.069	0.860	+0.012	0.842
Wealth Share of Top 20%	+0.073	0.890	+0.016	0.918
Wealth Share of Top 10%	+0.097	0.787	+0.027	0.718
Wealth Share of Top 5%	+0.109	0.651	+0.025	0.479
Wealth Share of Top 1%	+0.086	0.386	+0.010	0.137

The results from this counterfactual exercise indicate that changes in market structure, as captured by the shift in the markup distribution, can account for between 6% and 18% of the observed rise in income inequality and between 11% and 28% of the rise in wealth inequality, depending on the specific metric considered. For example, the model predicts that the income share held by the top 10% rises by 1.2 percentage points in response to the observed increase in markups, compared to a 7.4 percentage point rise in the data over the same period. This implies that changes in the competitive structure can account for roughly 17% of the observed increase in the top income decile. Similarly, the model generates a 2.7 percentage point rise in the top 10% wealth share, compared to a 9.7 percentage point increase in the data, suggesting that reduced competition explains approximately 28% of the rise in wealth concentration among the top decile.

These changes in the economy's competitive structure were accompanied by substantial aggregate effects, as summarized in Table 6. The model predicts a 5.2% decline in the wage rate, consistent with a contraction in labor demand, which results in an 8.5% decline in total employment. Most of this adjustment occurs along the intensive margin. In particular, the share of individuals choosing entrepreneurship declines by

Table 6. Aggregate Effects of Changes in Competition from 1989-2016

Variable	Change (%)
Wage Rate (w)	-5.19%
Interest Rate (r)	+18.43%
Output (Y)	-5.09%
Consumption (C)	-3.69%
Investment (I)	-18.79%
Employment (L)	-8.50%
Labor Income Share	-1.95%
Share of Entrepreneurs	-4.44%
Entrepreneurial Income Share	-1.17%
Entrepreneurial Wealth Share	-0.07%

4.4%, indicating that the extensive margin plays a limited role in the overall labor market response.

On the other hand, the interest rate rises by 18.4% in the new equilibrium, accompanied by an 18.8% drop in investment. This increase reflects the combined effect of reduced capital demand and lower aggregate savings, with the latter dominating. As market power increases, firms face less competitive pressure to invest, weakening the demand for capital. At the same time, declining competition compresses wages, reducing households' ability to save. With both the supply and demand for capital decreasing, but supply contracting more sharply, the interest rate increases to restore equilibrium in the capital market.

These general equilibrium forces also result in a 5.1% decline in aggregate output and a 3.6% reduction in consumption. Although the capital stock falls significantly, the accompanying rise in the interest rate offsets this effect, keeping the capital income share largely unchanged. In contrast, falling wages and employment lead to a 2.0% decline in the labor income share. Thus, the overall contraction in income also reflects a modest redistribution of income away from labor and toward capital.

Finally, the distributional effects across occupations are also relatively small. The income share of entrepreneurs falls 1.2% and the share of total wealth held by entrepreneurs declines by 0.07%. Combined with the modest drop in the share of individuals choosing entrepreneurship, this suggests that the model attributes the bulk of the rise in income and wealth inequality to a redistribution of economic gains among entrepreneurs.

4 Conclusion

This paper develops a dynamic quantitative model of entrepreneurial choice augmented with imperfect competition between firms to quantify the aggregate and distributional impacts of rising market power in the United States. The calibrated model indicates that changes in the economy's competitive structure between 1989 and 2016 were associated with significant macroeconomic effects, including a 5% decline in aggregate output, and can account for up to 18% of the rise in income inequality and up to 28% of the rise in wealth inequality. The relatively small changes in the labor income share and in the income and wealth shares of entrepreneurs suggest that most of the rise in inequality stems from a reallocation of gains among entrepreneurs themselves.

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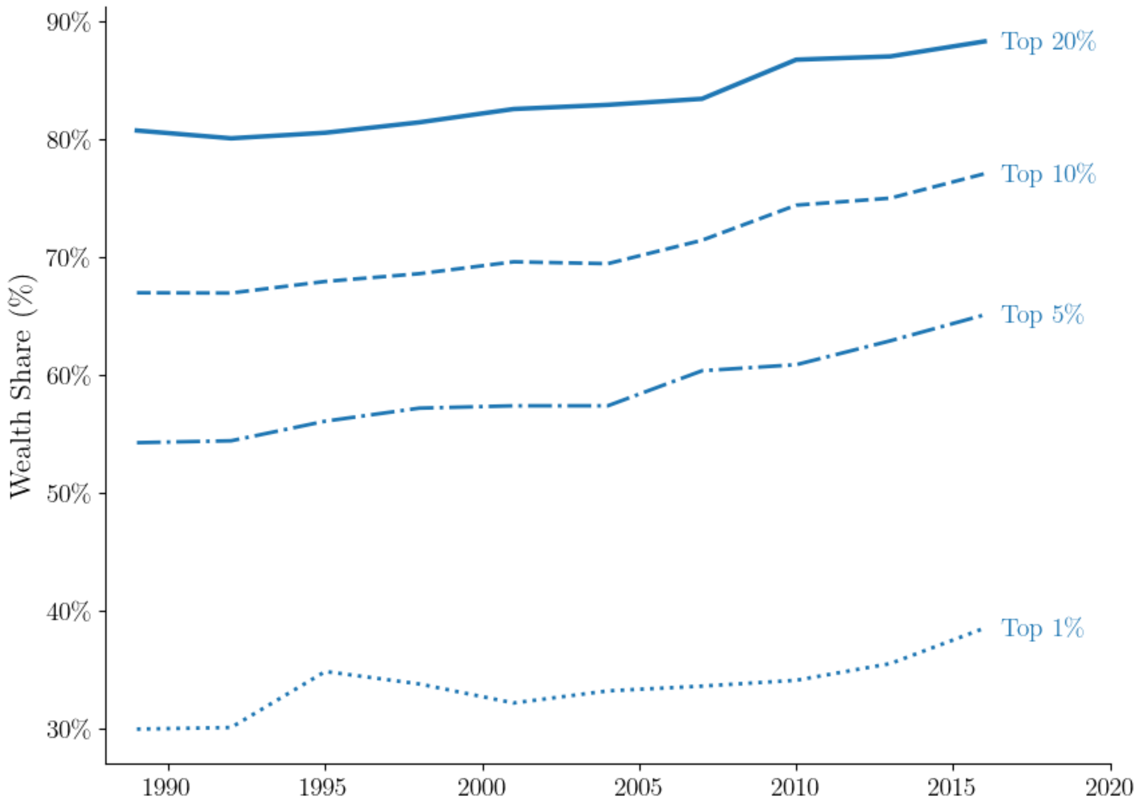
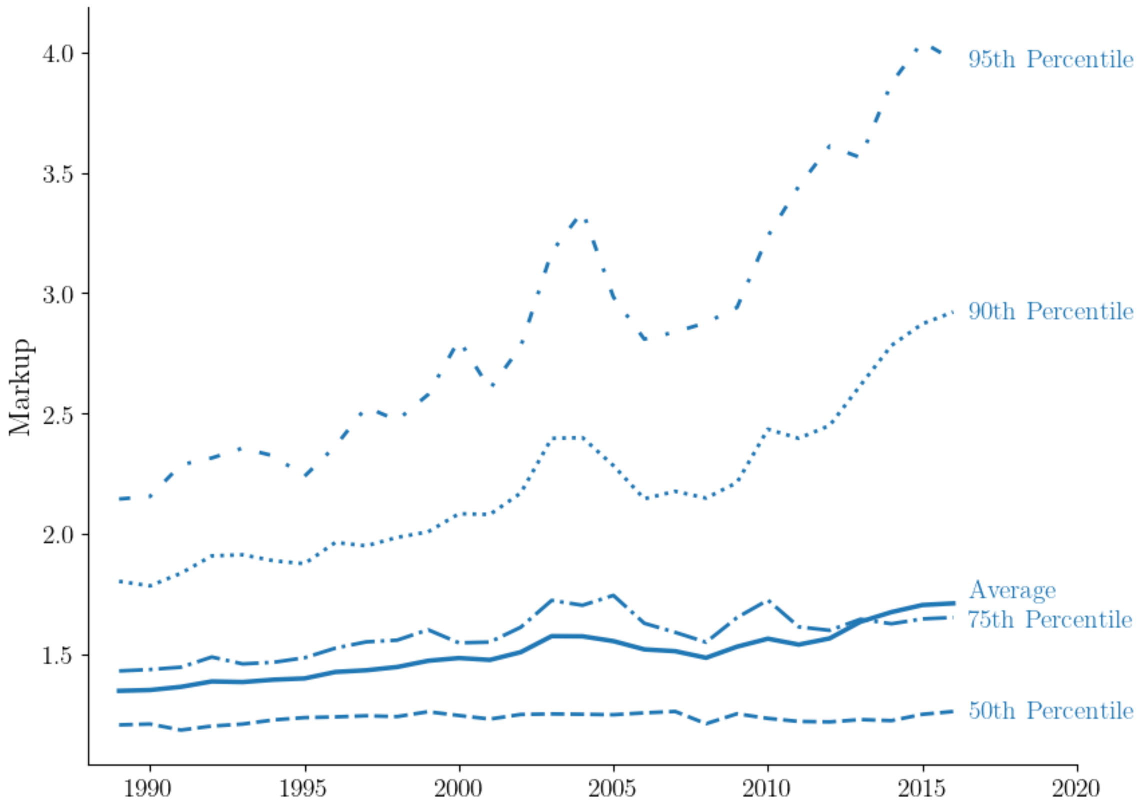
Appendix A Additional Figures

Figure A4. Top Wealth Shares



Notes: This figure shows the evolution of top wealth shares in the United States. Wealth is measured as household net worth, defined as total assets minus total liabilities. All statistics are calculated using survey weights to ensure the representativeness of the sample. The data come from the Survey of Consumer Finances, covering the waves from 1989 to 2016.

Figure A5. Evolution of Markups



Notes: This figure shows the evolution of markups among publicly-listed firms in the United States, using data from Compustat from 1989 to 2016. Markups are defined as the ratio of price relative to the marginal cost, computed using the method of De Loecker et al. (2020). All variables are weighed by total sales.

Appendix B Computational Algorithm

This appendix outlines the numerical procedure used to compute the stationary recursive equilibrium of the model. The model features heterogeneous agents who choose between working and entrepreneurship, subject to financial constraints and idiosyncratic risk, in an environment with imperfect competition and endogenous markups. Solving the model requires computing optimal individual decisions, simulating the stationary distribution, and finding a fixed point in factor prices and aggregates that clears all markets.

The state space includes asset holdings a, wage productivity z^w, and entrepreneurial productivity z^e. The asset grid is constructed to be dense near the lower end. The upper bound of the grid is set sufficiently high to ensure that it is not binding in equilibrium. The idiosyncratic productivity processes are discretized using the Tauchen (1986) method. I use more grid points for the entrepreneurial productivity process than for the worker productivity process. Entrepreneurial productivity states may also include rare "superstar" states that generate fat-tailed outcomes.

Because firm profits depend on market shares, which themselves depend on relative prices and aggregate output, solving for stationary general equilibrium requires not only finding the market-clearing wage w and interest rate r, but also the aggregate output level Y, and the demand index D that is consistent with the stationary distribution.

The algorithm proceeds as follows:

1. *Guess Aggregate Variables:* Start with an initial guess for the aggregate wage w, interest rate r, output Y, and demand index D.

2. *Solve Firm Problem:* Given the aggregate guesses and idiosyncratic states (a, z^w, z^e), solve the entrepreneur's static problem. For each type, find the optimal capital k, labor demand l, output y, and price p. Since no closed-form solution exists, input choices are obtained by maximizing profits numerically using a constrained optimization routine subject to the borrowing constraint.

3. *Occupational Choice:* For each agent, compare the income from entrepreneurship (profits) to the income from working. The agent chooses to be an en-

trepreneur if profits exceed the effective wage.

4. *Solve Dynamic Problem:* Given the static choices, solve the individual's dynamic problem using Value Function Iteration (VFI). Policy functions for consumption and next-period assets are computed over the grid, with linear interpolation used for values off the grid.

5. *Simulate Stationary Distribution:* Using Monte Carlo simulation, generate a large panel of agents whose exogenous states evolve according to the discretized transition matrix. Given policy functions and the stochastic paths, simulate the asset dynamics forward using linear interpolation. The number of agents and time periods is chosen so that the change in aggregate assets between iterations is below a small tolerance value.

6. *Check Equilibrium Conditions:* Using the simulated stationary distribution, compute aggregate quantities and verify:

   - *Labor Market Clearing:* Labor demand equals labor supply.
   - *Capital Market Clearing:* Aggregate assets equal aggregate capital.
   - *Product Market Consistency:* The aggregate output Y is consistent with the implied demand shares in the Kimball aggregator.
   - *Demand Index Consistency:* The guess for D matches the index implied by the firm-level pricing conditions.

7. *Update Guesses and Iterate:* If any of the above conditions are not met, update the aggregate variables using a dampened fixed-point iteration:

$$\begin{aligned} w_{\text{new}} &= w_{\text{old}} - \eta \text{ (excess labor)} \\ r_{\text{new}} &= r_{\text{old}} - \eta \text{ (excess capital)} \\ Y_{\text{new}} &= Y_{\text{old}} - \eta \text{ (excess output)} \\ D_{\text{new}} &= D_{\text{old}} - \eta \text{ (excess demand)} \end{aligned}$$

   where $\eta \in (0, 1)$ is a dampening parameter. This fixed-point iteration is continued until all markets clear and aggregate variables converge within a small tolerance value.