The Inequality Multiplier:
Portfolio Allocation Frictions and Wealth Inequality

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Abstract

How do frictions in financial intermediation shape wealth inequality? We study portfolio allocation frictions that limit intermediaries' substitution between equity and debt, while household saving and borrowing adjust endogenously. In a model with heterogeneous households, a penalty for departing from a target equity share links equity revaluation to expanding debt, increasing the wealth concentration generated by asset demand. Calibrated to the U.S. economy, the model better accounts jointly for rising wealth concentration, expanding household borrowing and falling interest rates than a flexible benchmark. Wealthy income and dividend growth sustain saving that finances additional borrowing, while portfolio restrictions reinforce concentration. The inequality multiplier measures the top wealth share's conditional sensitivity to equity appreciation and is almost twice as large under portfolio allocation frictions. Even with identical equity price paths, portfolio allocation frictions produce a cumulative top wealth share response about one third larger through additional lending.

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A supplemental appendix to the paper can be accessed at this link. An earlier version of this paper was circulated under the title 'The Inequality Multiplier: Market Inelasticity and the Persistence of Wealth Inequality.

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1 Introduction

In the United States, rising wealth concentration has coincided with increasing asset valuations and expanding debt.[1] Existing explanations place different emphasis on the saving, asset accumulation and capital gains of wealthy households (Kuhn et al., 2020; Hubmer et al., 2021) and on indebtedness elsewhere in the distribution (Kumhof et al., 2015; Mian et al., 2025). Financial intermediaries stand between the two: they allocate household savings across equity and debt, which helps determine asset prices and who holds the resulting assets and liabilities. Although intermediaries have become increasingly important in directing these savings (Haddad and Muir, 2025; Haddad et al., 2025), less is known about how frictions in their allocation decisions shape wealth inequality.

This paper asks how portfolio allocation frictions shape the effect of asset demand on wealth inequality. Asset demand originates in income-driven changes in saving and borrowing and in shifts in investors' desired portfolios. Portfolio mandates restrict intermediaries' ability to substitute between equity and debt, so their demand for equity responds little to prices, a property known as market inelasticity (Gabaix and Koijen, 2021). We show that these restrictions change how lending adjusts when demand for equity rises and can increase the cumulative effect of that demand on wealth concentration. A benchmark with flexible portfolios can therefore understate the effect on wealth concentration, even when it matches the equity price path of an economy with mandates.

We present motivating empirical estimates alongside a quantitative model of household saving, borrowing and asset pricing. We first examine how wealth shares respond to equity returns associated with mutual fund and exchange-traded fund (ETF) flows. Our model then links wealthy households' investment through an intermediary to housing and borrowing decisions elsewhere in the distribution. The main quantitative exercise traces U.S. wealth dynamics from 1989 to 2023 using observed income, dividend and borrowing conditions. We compare an economy with portfolio allocation frictions, which we call the constrained economy, with a flexible benchmark, examining wealth shares, debt and interest rates. We derive the inequality multiplier, which measures the top wealth share's sensitivity to equity prices under each form of allocation. Experiments that shift asset demand show how differences in lending contribute to the change in wealth concentration.

Empirically, fund flow-associated equity returns are followed by an increase in the top wealth share, and the estimates suggest that this response is more persistent than the response to equity returns from other sources. Our main quantitative result is that, under perfect foresight, the economy with portfolio allocation frictions provides

[1] Figure 12 in Appendix B documents these aggregate trends.

a better joint account of historical wealth inequality, borrowing and interest rates than the flexible benchmark. It generates greater wealth concentration alongside expanding credit and a larger decline in rates, which brings its predictions closer to the data. The conditional inequality multiplier is almost twice as large in the constrained economy as in the flexible benchmark, and the portfolio restriction becomes relatively more important as wealth becomes more concentrated. Even with identical equity price paths, portfolio frictions generate a cumulative top wealth share response about one third larger, reflecting the additional lending. Together, our results show that the organization of financial intermediation shapes how asset demand translates into wealth concentration, and therefore matters for the distributional consequences of changes in household saving, credit conditions and financial market structure.

We begin with a Financial Accounts measure of net issuance of mutual fund and ETF shares, scaled by lagged equity market capitalization, to examine the relationship between intermediated funding, equity returns and wealth concentration. Using quarterly U.S. data, we first residualize fund flows against their recent history, past market returns and proxies for fundamentals, including dividend growth, valuation ratios, interest rates and volatility. This step removes flow variation associated with predictable dynamics and measured economic conditions. We then project equity returns on these residualized flows and the same controls. After accounting for the controls, we divide return variation into the component associated with residualized flows, the *fund flow-associated return*, and the regression residual, the *remaining return*. Following the return-to-wealth local-projection approach of Gomez (2025), we use Distributional Financial Accounts data to estimate the response of the top decile's wealth share to each component over three years, measuring both responses per percentage point of equity return.

Figure 1 shows that both components are followed by an initial increase in the top wealth share, consistent with wealthy households' greater exposure to equity. The distinction emerges in the subsequent adjustment. The response to remaining returns gradually fades, while the flow-associated response rises again and is larger around two years later. Both the full sample and the sample excluding windows that overlap the 2008–2009 financial crisis display this contrast.[2] The economic question is therefore how the wealth distribution adjusts after the initial capital gain. Our model studies how household saving, borrowing and intermediary portfolio allocation shape this subsequent adjustment.

Motivated by these estimates, we develop a quantitative consumption–saving model

[2]The decomposition identifies conditional associations rather than an exogenous demand shock. The relative-persistence estimate is less precise outside crisis windows and is sensitive both to inference that allows for serial dependence and to how wealth is measured. Appendix A provides estimation details and robustness results.

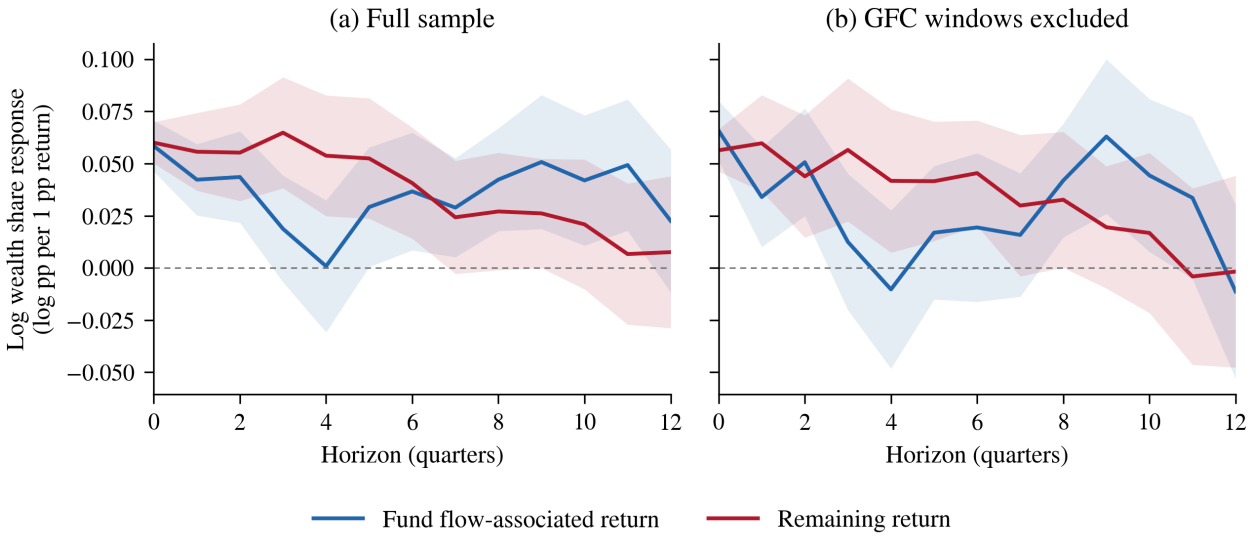


Figure 1: Top-decile wealth-share responses to fund flow-associated and remaining equity returns.

Note: Local projections of cumulative log wealth-share changes from $t-1$ to $t+h$, for $h = 0, \ldots, 12$ quarters. Responses are measured in log percentage points per one percentage point of log equity return. Panel (a) uses 125 shock quarters, 1990Q4–2021Q4. Panel (b) excludes every window $[t-1, t+12]$ overlapping 2008Q1–2009Q4, leaving 104 shock quarters. Net worth is from the Distributional Financial Accounts. Blue denotes fund flow-associated returns and red denotes remaining returns. Shading shows 90% pointwise normal confidence intervals from a full-stage heteroskedasticity-consistent covariance estimator with the local-projection finite-sample correction. Construction and estimation are described in Appendix A.

with three household groups corresponding to the top 10%, middle 40% and bottom 50% of the wealth distribution. Wealthy households choose consumption and investment in a fund holding equity and debt. Their non-homothetic bequest preferences strengthen the incentive to accumulate wealth as resources grow (Straub, 2019; Mian et al., 2021). Middle-class and non-wealthy households hold housing and borrow, so the three groups differ in their exposure to asset revaluation and credit conditions. Equity is a fixed-supply claim to dividends, while household debt responds endogenously to saving, borrowing and housing decisions.

The central friction is a quadratic penalty on the fund manager for departing from a target equity share. We focus on this friction because prescribed allocation strategies such as target-date funds are increasingly common (Holden et al., 2025), and because other investors only partially offset the resulting fall in demand responsiveness (Haddad et al., 2025). The penalty restricts the fund's composition rather than its size: it limits substitution from debt into equity when the expected equity premium rises, but the fund can still expand or contract with household saving. We compare this economy with a flexible benchmark without the target allocation penalty, in which the fund implements

the wealthy household's optimal portfolio choice.[3] We compute the inequality multiplier in each economy, holding allocation fixed in the constrained economy and bond holdings fixed in the flexible benchmark, and express it in percentage points of the top wealth share per one percent increase in the equity price.

A simple balance sheet illustrates the distributional mechanism. Suppose a fund holds \$80 of equity and \$20 of debt. If an additional dollar of net investment finances lending, its debt holdings rise to \$21. Maintaining the 80% equity share requires equity holdings to rise in value to \$84, which occurs through appreciation when the number of shares is fixed. The wealthy investors' fund position therefore rises from \$100 to \$105: \$1 of new claims against borrowers and \$4 of capital gains. These private claims have matching liabilities elsewhere in the distribution, so the additional lending raises concentration without itself adding to aggregate household net worth. This lending channel is what raises the constrained inequality multiplier above its flexible counterpart.

Our main quantitative exercise examines whether portfolio allocation frictions help explain the evolution of U.S. wealth inequality from 1989 to 2023. We calibrate both economies to a common initial allocation and feed in observed histories of household income, dividends, housing rents and borrowing conditions, without targeting subsequent wealth shares. When households anticipate these histories, the constrained economy reduces the average gap between simulated and observed wealth shares by 34% for the top decile and 37% for the bottom half, relative to the flexible benchmark.[4] Wealthy labor income and dividend growth account for much of the rise in concentration, including its acceleration after the financial crisis. The resulting saving finances lending, which under the portfolio restriction also supports equity valuation.

The constrained economy also generates expanding household borrowing and a larger decline in the safe rate, whereas borrowing contracts in the flexible benchmark. The corresponding household liabilities help reproduce the decline in the bottom wealth share around the financial crisis. Allowing households to learn about shocks only as they occur further improves the constrained economy's historical fit, reducing the average gap between simulated and observed wealth shares by 56% at the top and 34% at the bottom relative to perfect foresight. Unexpected income deterioration induces borrowing to smooth consumption, and successive adverse shocks prolong the adjustment, which helps the model capture more of the post-crisis increase in concentration. The flexible

[3] Appendix G introduces an arbitrageur who can trade outside the mandate. Its trading narrows the gap between the two economies' historical equity prices, but their wealth-share paths remain distinct.

[4] The fit measure is the average absolute difference between simulated and observed wealth share changes over January 1989–March 2023, with each series measured relative to its 1989 reference. Percentage improvements compare these average gaps over the same sample.

benchmark also improves, so the two economies' aggregate paths move closer together. Wealthy labor income and dividends generate greater concentration in the constrained economy, while responses to income elsewhere partly offset that difference. Experiments that activate each group of drivers separately distinguish these sources of transmission.

To isolate the mechanism behind these historical results, we compare an increase in demand for equity with an increase in demand for the whole fund portfolio. When demand for equity rises, the flexible fund substitutes away from bonds, while portfolio allocation frictions generate additional lending and a more prolonged increase in wealth concentration. Higher demand for the whole fund instead expands equity and bond investment in both economies, so the distributional responses are more similar. Portfolio restrictions therefore matter most when accommodating demand requires a change in the composition of financial investment. Their distributional importance also extends beyond their effect on asset prices: when we choose demand shocks that generate identical equity price paths in the two economies, the constrained economy produces a cumulative increase in the top wealth share approximately one third larger than in the flexible benchmark (Figure 3). The difference reflects the accompanying lending and household liabilities, which is why matching equity valuations alone can understate the distributional consequences of asset demand.

These results connect two prominent explanations of wealth inequality: wealthy asset accumulation and indebtedness elsewhere in the distribution. The inequality multiplier shows how their interaction changes the distributional consequences of asset appreciation. When wealth is already concentrated, capital gains alone have less scope to increase the top share because they also raise aggregate wealth. Lending instead expands wealthy households' claims alongside liabilities elsewhere, which makes the portfolio restriction relatively more consequential. Along the historical path, the constrained multiplier is approximately twice its flexible counterpart, and their ratio rises from 1.9 to 2.1. For quantitative studies of wealth inequality, these results show that intermediary portfolio allocation matters alongside household saving and asset ownership. They also imply that assessments of policies affecting investment mandates or access to equity markets should consider the accompanying adjustment in household credit, since valuation gains alone do not capture the full distributional effect.

Related literature. This paper contributes to the market macrostructure literature reviewed by Haddad and Muir (2025), which studies how financial institutions shape asset prices. Gabaix and Koijen (2021) establish the importance of flows when asset demand is inelastic, while Haddad et al. (2025) examine how other investors compensate for changes

in demand responsiveness. Limited risk transfer across investors (Gabaix et al., 2025) and marketwide price pressure from dividend reinvestment (Hartzmark and Solomon, 2025) provide further evidence that portfolio adjustment matters for pricing. We study the distributional consequences of these price effects by jointly determining the household saving and borrowing that generate flows and the financial claims and liabilities that result.

Within this literature, we focus on restrictions on portfolio composition. Kashyap et al. (2023) show how benchmarking arises from delegation contracts, while Parker et al. (2023) demonstrate how prescribed equity and bond allocations transmit shocks across markets. These studies establish why allocation rules affect equilibrium prices; we examine how those rules transmit household saving into wealth concentration. Abadi (2026) studies mandates together with gradual household reallocation across funds, while Gopalakrishna et al. (2026) examine the distributional consequences of financial institutions and participation constraints. Duarte et al. (2026) show why aggregate elasticity depends on interest rate adjustment and risk allocation, rather than on individual demand sensitivities alone. Our comparison isolates substitution between equity and lending and its distributional consequences, including when equity price paths are held equal.

Our analysis complements research explaining wealth inequality through saving, portfolio heterogeneity and asset returns (Kuhn et al., 2020; Hubmer et al., 2021). Falling required returns can raise concentration through heterogeneous portfolio duration (Greenwald et al., 2026) and cheaper financing for entrepreneurial accumulation (Gomez and Gouin-Bonenfant, 2024). Asset prices also redistribute resources across households (Fagereng et al., 2025a), while the wealth distribution feeds back into equilibrium prices (Gomez, 2025). We examine how restrictions on intermediary allocation change the lending that accompanies revaluation. The inequality multiplier isolates this additional distributional margin beyond the unequal incidence of capital gains.

Finally, the paper connects wealthy saving to household indebtedness through the allocation of financial investment. Mian et al. (2021) explain how heterogeneous saving propensities generate debt accumulation and depressed demand, while their *Saving Glut of the Rich* (Mian et al., 2025) traces wealthy saving to household and government borrowing. Auclert et al. (2025) place inequality among the forces shifting aggregate asset demand. We add portfolio allocation as a determinant of this transmission: saving absorbed through lending also affects equity valuation when intermediaries maintain their asset mix.

Outline. Section 2 presents the model and derives the inequality multiplier. Section 3 describes the calibration. Section 4 uses demand experiments to explain the transmission mechanism, and Section 5 evaluates the model against historical wealth inequality,

borrowing and interest rates. Section 6 concludes.

2 Model and Theoretical Results

We set up a model to study how portfolio allocation affects the transmission of asset demand into wealth inequality. Wealthy households save through a fund that holds equity and debt, while other households hold housing and borrow. When the fund maintains a stable allocation, additional lending must be accompanied by a higher value of its equity holdings. This requirement links wealthy asset accumulation to liabilities elsewhere in the distribution. We compare that economy with a benchmark in which the fund's allocation is freely chosen. Under a fixed portfolio allocation, the inequality multiplier includes the additional lending required to maintain that allocation. The theoretical results derive this multiplier and compare it with its value in the flexible benchmark. The subsequent numerical exercises trace the full adjustment to demand and income disturbances.

2.1 Model

2.1.1 Environment and Asset Markets

The model is set in discrete time, with three representative household groups, indexed by $i \in \{R, M, P\}$, where R denotes wealthy households (top 10% of the wealth distribution), M denotes middle-class households (middle 40%, i.e., the 50th–90th wealth percentiles), and P denotes non-wealthy households (bottom 50%). Households remain in their initial groups, so the model traces changes in group wealth through saving, borrowing and asset valuation.

Markets. There are two long-lived assets. The first is a Lucas tree equity claim in fixed supply $\bar{Q}$. It pays a risky dividend D_t and trades at the ex-dividend price p_t. The second is owner-occupied housing in fixed aggregate supply $\bar{H}$. Housing pays a risky housing-service dividend D_t^H and trades at the price p_t^H. Household borrowers and the government also issue one-period risk-free bonds. B_t^M, B_t^P and B_t^G denote the positive quantities of debt issued by middle-class households, non-wealthy households and the government, respectively.

Positions chosen at the end of period t pay gross returns at the beginning of period $t+1$.

Define the gross risk-free return, the gross equity return and the gross housing return as

$$R_t \equiv 1 + r_t, \qquad R_t^E \equiv \frac{D_{t+1} + p_{t+1}}{p_t}, \qquad R_t^H \equiv \frac{D_{t+1}^H + p_{t+1}^H}{p_t^H}. \tag{1}$$

To keep the model tractable and isolate portfolio allocation, we treat equity as a claim to an exogenous dividend stream in fixed supply. We abstract from firms' investment decisions and the associated responses of productive capital, R&D and wages.

Segmentation. We approximate the concentration of equity ownership by allowing only wealthy households to hold equity. Middle-class and non-wealthy households cannot participate in equity markets,[5] but they may hold housing and borrow in debt markets. By contrast, wealthy households may invest in both equity and bonds indirectly through the financial intermediary.[6]

The relevant concept for aggregate wealth revaluation is the value of holdings rather than binary equity market participation. Households below the top decile do hold equity in the data, but their aggregate positions are small relative to those at the top, while housing dominates middle-class portfolios (Kuhn et al., 2020). Figure 11 in Appendix B.1 shows these differences in aggregate holdings. Concentrating equity ownership in the wealthy group captures the main exposure to equity revaluation while retaining housing and debt as the principal positions of the other groups.

Intermediary. The financial intermediary ("mutual fund") receives investment from the wealthy household and holds equity and risk-free bonds. In the *constrained economy*, a cost of deviating from a target equity share limits substitution between these assets. In the *flexible benchmark*, the fund allocates optimally on behalf of the wealthy investor. Appendix G introduces an arbitrageur who can trade outside the portfolio mandate.

Define the gross return on the mutual fund as

$$R_t^{MF} \equiv \theta_t R_t^E + (1 - \theta_t) R_t, \tag{2}$$

where θ_t is the equity value share in the mutual fund portfolio.

[5] See Campbell (2006) and Vissing-Jørgensen (2002) on limited equity participation.

[6] We assume that wealthy households do not invest in housing, which is a relatively small component of their portfolios. Our model also does not feature private equity. Although private equity now constitutes a quantitatively significant share of wealthy portfolios, and the rise of private capital markets has amplified inequality, the results of Göcmen et al. (2025, Figure 10) show that accounting for private capital is most relevant for studying inequalities *within* the top 10 percent (especially the top 1 or 0.1 percent), rather than between the top 10 and bottom 50, which is our focus.

Households. Households face perpetual youth mortality with death probability δ each period (Yaari, 1965; Blanchard, 1985; Farhi and Werning, 2019). We use the effective discount factor $\beta^i = \frac{1}{1+\rho^i+\delta}$, where ρ^i is the household discount rate. This additive-rate convention incorporates mortality into discounting, while δ also weights the bequest motive. The calibration makes wealthy households the most patient group and non-wealthy households the least patient group. To match empirical evidence on heterogeneous marginal propensities to save, we incorporate non-homothetic preferences for the wealthy household (Straub, 2019; Mian et al., 2021).

Shocks. Seven fundamental processes govern the three groups' labor endowments, equity dividends, housing rents, government debt and the middle-class loan-to-value ratio. We also introduce two demand disturbances, which shift the incentives to hold equity and to expand the fund portfolio. A wealthy income gain adds resources, whereas these demand disturbances change investment incentives. The processes are specified in Appendices D.2 and D.7.

2.1.2 Financial Intermediary

The mutual fund buys the bonds issued by (that is, lends to) middle-class households, non-wealthy households and the government, and holds the entire supply of equity. At the beginning of each period, its inherited portfolio delivers capital gains and flow income in the form of dividends and interest. The wealthy household chooses consumption and the new stock of fund investment from this gross payoff and current income. Net subscriptions are the addition to fund investment after inherited holdings and distributions are accounted for. The mutual fund balance sheet is

$$X_t^{MF} = p_t Q_t + B_t^{MF}. \tag{3}$$

Here X_t^{MF} is the stock of assets under management at the end of the period, and B_t^{MF} is the fund's bond position.[7] Investment flows change these positions alongside asset

[7] A collection of intermediaries can have different equity shares and mandate rigidities. Their conditional demand elasticities aggregate with weights equal to their shares of equity holdings, as in Gabaix and Koijen (2021) and its heterogeneous-fund extension. The consolidated portfolio's equity share instead weights individual equity shares by assets under management. Our representative fund provides a tractable description of aggregate portfolio responsiveness; heterogeneity can also affect its evolution through changes in the composition of holdings and flows.

revaluation. The portfolio share of equity is

$$\theta_t \equiv \frac{p_t Q_t}{X_t^{MF}}. \tag{4}$$

Equivalently, equity and bond holding values can be written as

$$p_t Q_t = \theta_t X_t^{MF}, \qquad B_t^{MF} = (1-\theta_t) X_t^{MF}. \tag{5}$$

The intermediary chooses its equity share to maximize expected portfolio returns subject to a quadratic cost of deviating from a target share θ^*. This cost captures limited portfolio responsiveness, motivated by the evidence on infrequent adjustment in Bacchetta et al. (2023) and Giglio et al. (2021). The cost depends on the distance from the target, rather than on the change in the share between dates.[8] A reduced-form representation of the fund's problem is

$$\max_{\theta_t} \; \mathbb{E}_t \left[\beta^{MF} \{ \theta_t R_t^E + (1-\theta_t) R_t \} - \frac{\chi^{MF}}{2} \left(\frac{\theta_t - \theta^*}{\theta^*} \right)^2 \theta^* \right]. \tag{6}$$

The manager is risk neutral over portfolio returns and evaluates them using the fixed discount factor β^{MF}, rather than the wealthy household's consumption-based stochastic discount factor. The mandate penalty enters this delegated objective rather than the household resource constraint; household holding costs are specified separately. This formulation captures limited allocation discretion without modeling a full contracting problem; χ^{MF} governs the cost of departing from the target. As χ^{MF} rises, the mutual fund becomes less willing to move away from its target equity share, holding the market closer to its inelastic limit. In the limiting case $\chi^{MF} \to \infty$, the equity share is fixed at θ^*.

The mutual fund's optimal equity share satisfies

$$\theta_t = \theta^* \left[1 + \frac{\beta^{MF}}{\chi^{MF}} \mathbb{E}_t (R_t^E - R_t) \right]. \tag{7}$$

The target share θ^* and rigidity χ^{MF} play different economic roles. The target determines the mix of assets the fund seeks to maintain. At a higher equity weight, a given expansion of

[8] Institutional portfolios often combine allocation targets with limits on discretion. Norges Bank Investment Management uses a strategic benchmark of 70% equity and 30% fixed income, with benchmark rebalancing triggered by equity-weight deviations exceeding two percentage points (Norges Bank Investment Management, n.d.). Vanguard's Balanced Index Fund tracks a 60% stock and 40% bond allocation (Vanguard, n.d.). Japan's Government Pension Investment Fund manages its policy asset mix within specified deviation limits (Government Pension Investment Fund, n.d.). The quadratic penalty provides a tractable representation of such limits to allocation discretion.

lending requires a larger increase in equity value to preserve that mix. Rigidity determines how readily the manager departs from the target when expected relative returns change. A higher expected equity premium induces a larger equity allocation, but the mandate limits the extent of that substitution.

In the fixed-allocation limit, equity demand has a conditional quantity elasticity of $1-\theta^*$ when net new funding is fixed and inherited equity wealth is allowed to revalue. Finite rigidity adds a response through allocation. The mandate thus restricts the manager's ability to absorb demand by changing the portfolio mix, leaving more adjustment to prices and total fund investment. Appendix C.1 derives the conditional elasticity.

2.1.3 Wealthy Households

Wealthy households (top 10% of the wealth distribution) hold all of their wealth in the mutual fund. This wealth generates bequest utility in addition to consumption utility, and these bequest preferences are non-homothetic. Bequests play a quantitatively significant role in the aggregate economy and are central to explaining wealth inequality (De Nardi and Fella, 2017).[9]

The wealthy household receives risky income, denominated in the numeraire consumption good, and flow returns from the mutual fund. It chooses consumption and mutual fund holdings to maximize lifetime utility (consumption utility plus the expected utility of bequests conditional on death):

$$\max_{\{c_t^R, X_t^{MF}\}_{t\geq 0}} \mathbb{E}_0 \sum_{t=0}^{\infty} (\beta^R)^t \left[u_R(c_t^R) + \delta \nu_R(a_t^R) \right] \tag{8}$$

subject to

$$a_t^R = X_t^{MF}, \tag{9}$$

$$c_t^R + X_t^{MF} + \Gamma^{MF}(X_t^{MF}) = e_t^R + R_{t-1}^{MF} X_{t-1}^{MF} + S_t^R. \tag{10}$$

Here $\Gamma^{MF}(\cdot)$ is the cost of holding the fund position, e_t^R is labor endowment income and S_t^R is the wealthy household's share of net government transfers.

[9] We model bequests in line with the seminal frameworks of De Nardi (2004) and Straub (2019), treating them as a luxury good. These preferences allow a stronger accumulation motive at higher wealth, for bequests or for future expenditures such as education, medical care or charitable giving (Benhabib and Bisin, 2018). Our concern is gross saving, including retained capital gains. Fagereng et al. (2025b) find that gross saving rates rise with wealth, whereas net saving rates, excluding capital gains, are approximately flat. This distinction makes portfolio revaluation central to wealth accumulation; the evidence does not by itself identify a bequest motive.

The baseline Euler equation for fund investment is

$$1 + \Gamma^{MF\prime}(X_t^{MF}) = \delta\zeta_t^R + \beta^R \mathbb{E}_t\left[R_t^{MF}\frac{u_R'(c_{t+1}^R)}{u_R'(c_t^R)}\right], \qquad \zeta_t^R \equiv \frac{v_R'(a_t^R)}{u_R'(c_t^R)}. \tag{11}$$

Investment balances its current resource and holding costs against the utility of bequests and the discounted return available for future consumption. Non-homothetic bequest preferences make saving more attractive as permanent income rises, which supports the larger financial positions of wealthy households. The bequest motive determines desired accumulation, while the mandate governs its allocation between equity and debt.

We also consider exogenous shocks to asset demand. For the demand experiments, let $w_t^E = kz_t^E$ and $w_t^F = kz_t^F$ be the marginal incentives to hold equity exposure and the whole financial portfolio, respectively, with a common coefficient k. At first order in the demand incentives, the investment condition is

$$1 + \Gamma^{MF\prime}(X_t^{MF}) - \bar{\theta}w_t^E - w_t^F = \delta\zeta_t^R + \beta^R \mathbb{E}_t\left[R_t^{MF}\frac{u_R'(c_{t+1}^R)}{u_R'(c_t^R)}\right]. \tag{12}$$

Equity demand is weighted by the fund's reference equity exposure, whereas fund demand values both assets. The manager's mandate rule is unchanged. These incentives differ from realized subscriptions, which depend on household investment and fund distributions. Section 4 compares their transmission; Appendix D.5 relates this condition to the first-order system.

2.1.4 Borrowing Households

Non-wealthy households. The representative non-wealthy household (bottom 50% of the wealth distribution) receives risky income and housing service returns. It chooses consumption, housing and debt to solve

$$\max_{\{c_t^P, X_t^{H,P}, B_t^P\}_{t\geq 0}} \mathbb{E}_0 \sum_{t=0}^{\infty} (\beta^P)^t u_P(c_t^P) \tag{13}$$

subject to

$$c_t^P + X_t^{H,P} + \Gamma_H^P(X_t^{H,P}) + \Gamma_B^P(B_t^P) + R_{t-1}B_{t-1}^P = e_t^P + (D_t^H + p_t^H)H_{t-1}^P + B_t^P + S_t^P, \tag{14}$$

where $X_t^{H,P} \equiv p_t^H H_t^P$ is the value of its housing position, $\Gamma_B^P(\cdot)$ and $\Gamma_H^P(\cdot)$ are the debt and housing holding costs, respectively, e_t^P is risky income and S_t^P denotes its share of

government transfers. Both borrowing groups have consumption utility $u_i(c_t^i)$ without a separate bequest motive.[10] The non-wealthy household can adjust debt subject to its marginal holding cost.

Non-wealthy borrowing is determined by

$$1 - \Gamma_B^{P\prime}(B_t^P) = \beta^P \mathbb{E}_t \left[\frac{u_P'(c_{t+1}^P)}{u_P'(c_t^P)} R_t \right]. \tag{15}$$

Housing demand satisfies

$$1 + \Gamma_H^{P\prime}(X_t^{H,P}) = \beta^P \mathbb{E}_t \left[\frac{u_P'(c_{t+1}^P)}{u_P'(c_t^P)} \frac{D_{t+1}^H + p_{t+1}^H}{p_t^H} \right]. \tag{16}$$

Borrowing allows the household to smooth consumption when income changes, at the cost of future repayments and the marginal borrowing cost. Housing provides services and exposes net worth to house prices. Its Euler equation balances the cost of the current position against future services and resale value. The household's wealth consequently depends on both the housing asset and the debt used to finance spending.

Middle-class households. The representative middle-class household (the middle 40%) also chooses consumption, housing and debt, with homothetic consumption utility:

$$\max_{\{c_t^M, X_t^{H,M}, B_t^M\}_{t\geq 0}} \mathbb{E}_0 \sum_{t=0}^{\infty} (\beta^M)^t u_M(c_t^M) \tag{17}$$

Its budget constraint is

$$c_t^M + X_t^{H,M} + \Gamma_H^M(X_t^{H,M}) + R_{t-1} B_{t-1}^M = e_t^M + (D_t^H + p_t^H) H_{t-1}^M + B_t^M + S_t^M, \tag{18}$$

where $X_t^{H,M} \equiv p_t^H H_t^M$ is the value of its housing position, $\Gamma_H^M(\cdot)$ is the housing holding cost, e_t^M is risky income and S_t^M denotes its share of government transfers. The collateral constraint, in the spirit of Justiniano et al. (2019), is

$$B_t^M \leq \tau_t^M X_t^{H,M}, \tag{19}$$

[10] For both non-wealthy and middle-class households, we abstract from non-homothetic preferences for tractability. Their smaller aggregate saving positions make wealth accumulation for bequests less central to the exercise than for wealthy households. This motivates concentrating the bequest motive at the top while retaining consumption smoothing and borrowing decisions elsewhere in the distribution.

where $\tau_t^M \in \mathbb{R}_+$ is the loan-to-value ratio. We solve the model locally in the regime in which this constraint binds in every period. Housing values and the loan-to-value ratio therefore determine middle-class debt.

The collateral constraint captures a housing mortgage margin for the middle class. For the non-wealthy, convex debt costs allow borrowing to respond to rates and consumption needs without tying all credit adjustment to housing collateral, reflecting the outsized importance of non-housing debt for the non-wealthy (Kuhn et al., 2020). This asymmetric treatment is a tractable closure, but it abstracts from episodes in which poorer households face binding credit limits. Supplemental Appendix **??** switches these borrowing arrangements, so that the non-wealthy are at their borrowing constraint while the middle class can respond to rates. The historical top wealth share then changes little and the simulated decline in bottom wealth is substantially smaller, but the model better matches the decline in middle-class wealth. Our modeling choice therefore reflects a preference for matching the top and bottom of the wealth distribution.

Let μ_t^M be the collateral multiplier and $\psi_t^M = \mu_t^M / u_M'(c_t^M)$ its value in consumption units. The bond Euler equation is

$$1 = \beta^M \mathbb{E}_t \left[\frac{u_M'(c_{t+1}^M)}{u_M'(c_t^M)} R_t \right] + \psi_t^M, \tag{20}$$

and the housing Euler equation is

$$1 + \Gamma_H^{M\prime}(X_t^{H,M}) = \beta^M \mathbb{E}_t \left[\frac{u_M'(c_{t+1}^M)}{u_M'(c_t^M)} \frac{D_{t+1}^H + p_{t+1}^H}{p_t^H} \right] + \tau_t^M \psi_t^M. \tag{21}$$

The collateral multiplier is positive in this binding regime. Housing has a collateral value in addition to its services and resale value: an additional unit of housing wealth permits τ_t^M units of borrowing. Appreciation can therefore expand borrowing capacity alongside its direct contribution to net worth. This gives the middle class a different exposure to asset prices from both wealthy equity holders and non-wealthy borrowers.

2.1.5 Flexible Allocation Benchmark

In the flexible benchmark, the wealthy household chooses total investment X_t^{flex} and the fund chooses its equity share θ_t^{flex} on the investor's behalf. The fund implements the wealthy household's optimal portfolio allocation, so its conditions use the investor's stochastic discount factor and exposure costs. In other words, the fund acts as a veil, with no separate risk-neutral return objective. Preferences, asset supplies and the borrowing

structure are unchanged. The fund has no target allocation penalty, while its underlying equity and bond positions remain subject to holding costs. Write these positions as

$$E_t^{\text{flex}} = \theta_t^{\text{flex}} X_t^{\text{flex}}, \qquad B_t^{\text{flex}} = (1 - \theta_t^{\text{flex}}) X_t^{\text{flex}}, \qquad a_t^R = X_t^{\text{flex}}. \tag{22}$$

Total portfolio costs depend on the chosen exposures:

$$C^{\text{flex}}(X, \theta) = \Gamma_E(\theta X) + \Gamma_B((1 - \theta)X). \tag{23}$$

Thus allocation affects marginal holding costs even though there is no penalty for departing from a target. Appendix D.4 specifies the underlying quadratic costs. The budget constraint is

$$c_t^R + X_t^{\text{flex}} + C^{\text{flex}}(X_t^{\text{flex}}, \theta_t^{\text{flex}}) = e_t^R + (D_t + p_t)\bar{Q} + R_{t-1} B_{t-1}^{\text{flex}} + S_t^R. \tag{24}$$

The corresponding equity and bond Euler conditions are

$$1 + \Gamma_E'(E_t^{\text{flex}}) - w_t^E - w_t^F = \delta \zeta_t^R + \beta^R \mathbb{E}_t \left[R_t^E \frac{u_R'(c_{t+1}^R)}{u_R'(c_t^R)} \right], \tag{25}$$

$$1 + \Gamma_B'(B_t^{\text{flex}}) - w_t^F = \delta \zeta_t^R + \beta^R \mathbb{E}_t \left[R_t \frac{u_R'(c_{t+1}^R)}{u_R'(c_t^R)} \right]. \tag{26}$$

The difference between the two conditions determines the allocation, given relative discounted returns and marginal exposure costs. Equity demand enters only the equity condition; fund demand enters both equally. The fund can consequently reduce lending to acquire equity, or expand both positions when desired financial saving rises.

The benchmark's costs apply to positions held, so they change the marginal attractiveness of equity and bonds as the fund reallocates. The difference in marginal costs supports an interior portfolio with a positive reference equity premium: the higher expected equity return compensates for its higher marginal exposure cost. An investor can substitute between assets, taking these changing costs into account. The costs make demand finitely elastic, but at the calibration its elasticity remains above one under the conditional comparison in Appendix C.1. Both economies share the reference allocation and marginal investment cost; their portfolio cost schedules differ as allocation changes (Section 3.2). Appendix D.4 shows that this fund representation reproduces the first-order equilibrium conditions of a benchmark in which the wealthy household holds equity and debt directly. The comparison therefore separates a target allocation from a portfolio chosen in response to returns and exposure costs.

2.1.6 Government, Market Clearing and Equilibrium

The government issues an exogenous quantity of bonds and distributes net proceeds according to fixed transfer shares. Its financing identity is

$$T_t = B_t^G - R_{t-1} B_{t-1}^G. \tag{27}$$

Government and household debt carry the same safe return and are held by the fund. Their distributional consequences can nevertheless differ, because the proceeds of government borrowing are distributed as transfers.

Transfers are allocated across the three household groups according to fixed exogenous shares s^i:

$$S_t^i = s^i T_t, \qquad i \in \{R, M, P\}, \qquad \sum_i s^i = 1. \tag{28}$$

Equilibrium. Equity and housing supplies are fixed, and the fund holds the debt issued by households and the government. With the fund's bond holdings written as B_t^{MF} in the constrained economy and B_t^{flex} in the flexible benchmark, market clearing requires

$$Q_t = \bar{Q}, \qquad H_t^M + H_t^P = \bar{H}, \qquad B_t^{MF} = B_t^M + B_t^P + B_t^G \quad \text{or} \quad B_t^{\text{flex}} = B_t^M + B_t^P + B_t^G. \tag{29}$$

Definition 2.1. *Given initial asset positions and the exogenous paths of group labor endowments, dividends, housing rents, government debt, the middle-class loan-to-value ratio and demand incentives, an equilibrium is a sequence of household consumption and asset positions, fund investment and allocation, prices, transfers and collateral multipliers such that households optimize, the fund satisfies its balance sheet and the applicable allocation condition, the government financing identity holds, and markets clear. The allocation condition is the manager's mandate rule in the constrained economy and the investor's optimal portfolio condition, implemented by the fund, in the flexible benchmark.*

The quantitative exercises use a first-order system. Its reference equity return incorporates expected dividend growth, as set out in Appendix D.1, rather than the payout return of a stationary dividend stream. Appendix D gives the reference allocation, complete first-order system and implementation of the demand incentives. Section 3 describes the calibration, including the reference-return and timing conventions.

2.2 Theoretical Results

We first show how stable portfolio allocation links equity valuations to lending.[11] We then derive the inequality multiplier under specified portfolio restrictions. Maintaining the equity share requires bond holdings to adjust alongside equity value, which adds a distributional effect through lending. Finally, we show why this contribution becomes relatively more important as wealth becomes more concentrated. The propositions describe these conditional relationships; the numerical exercises establish how prices, portfolios and wealth shares respond jointly to particular disturbances.

2.2.1 Equity Prices and Portfolio Allocation

Equity market clearing and the fund's balance sheet imply the following relationship.

Proposition 2.1 (Lending requires higher equity value at a fixed allocation)**.** *With equity supply fixed at $\bar{Q}$ and equity share $\theta_t \in (0,1)$, the constrained fund's bond position B_t^{MF} and the equity price satisfy*

$$p_t = \frac{\theta_t}{1-\theta_t}\frac{B_t^{MF}}{\bar{Q}}. \tag{30}$$

At a fixed allocation, each additional unit of lending requires an increase of $\theta_t/(1-\theta_t)$ in equity market value.

This follows by eliminating total investment from Equation (5). The flexible fund satisfies the same identity with its chosen allocation θ_t^{flex}. The mandate supplies the economic restriction: when the equity share is stable, lending and equity values must move together. Flexible investors can instead change the mix of assets, so an expansion of lending need not require a proportionate equity revaluation.

The bond position includes household and government debt, as in Equation (29). Its equilibrium response depends on both borrowers' choices and wealthy saving. A persistent increase in desired equity exposure can therefore expand credit under the mandate, whereas it can reduce lending when the wealthy are free to substitute out of bonds. This is why the allocation rule matters for the joint response of asset values and household balance sheets.

Both economies also satisfy Euler pricing conditions: in the flexible benchmark, borrowing affects prices through consumption, wealth and returns. Appendix C.2 gives the balance-sheet and forward-price representations, and Appendix C.3 derives the equilibrium price recursions. Appendix C.6 considers how equity issuance changes the price adjustment implied by a given funding increase.

[11] Supplemental Appendix **??** illustrates the mechanism in a three-period model.

2.2.2 The Inequality Multiplier

Equity appreciation changes wealth concentration through both the wealthy household's assets and aggregate net worth. Let $\bar{\mathcal{W}} = \bar{p}\bar{Q} + \bar{X}^H + \bar{B}^G$ denote reference aggregate net worth, where $\bar{X}^H$ is housing wealth. Private household debt cancels on consolidation. Define the top wealth share as $\bar{\eta}_R = \bar{a}^R/\bar{\mathcal{W}}$ and aggregate asset weights as $\omega_E = \bar{p}\bar{Q}/\bar{\mathcal{W}}$, $\omega_H = \bar{X}^H/\bar{\mathcal{W}}$ and $\omega_G = \bar{B}^G/\bar{\mathcal{W}}$. To first order,

$$\eta_R^{dev} = \bar{\eta}_R\Big[\widehat{a}^R - \Big(\omega_E\widehat{p} + \omega_H\widehat{p}^H + \omega_G\widehat{B}^G\Big)\Big]. \tag{31}$$

Here η_R^{dev} is the change in the wealth share measured as a fraction, and hats denote proportional deviations from the reference. Housing appreciation can dilute the top share because the wealthy own no housing; changes in their lending also affect the numerator. Appendix C.5 gives the full wealth share response to a disturbance, including these adjustments.

To isolate the contribution of equity prices, we hold housing values and government debt fixed and specify how the financial portfolio adjusts. Write η_R for the reference share in this conditional calculation and define

$$M \equiv \frac{\partial\eta_R^{dev}}{\partial\widehat{p}} = \eta_R\Big(\beta_R^E - \omega_E\Big), \qquad \beta_R^E \equiv \frac{\partial\widehat{a}^R}{\partial\widehat{p}}. \tag{32}$$

We call M the *inequality multiplier*. A one percent increase in the equity price changes the top wealth share by approximately M percentage points under the stated portfolio restriction. The multiplier compares the sensitivity of wealthy households' assets with that of aggregate wealth. For fixed holdings, Gomez (2025), Fagereng et al. (2020) and Cioffi (2021) emphasize the distributional role of heterogeneous asset exposure. The mandate changes this comparison by linking equity valuation to lending.

Proposition 2.2 (Fixed allocation raises the inequality multiplier)**.** *At a common reference with top wealth share $\eta_R \in (0,1)$ and wealthy equity weight $\bar{\theta} \in (0,1)$, hold equity supply, housing values and government debt fixed. Holding bond holdings fixed in the flexible benchmark gives $\beta_R^{E,\text{flex}} = \bar{\theta}$. Holding allocation fixed in the constrained economy gives $\beta_R^{E,\text{con}} = 1$. Since $\omega_E = \bar{\theta}\eta_R$, the conditional multipliers are*

$$M^{\text{flex}} = \bar{\theta}\eta_R(1-\eta_R), \qquad M^{\text{con}} = \eta_R(1-\bar{\theta}\eta_R). \tag{33}$$

The constrained coefficient exceeds the flexible coefficient by $\eta_R(1-\bar{\theta})$, the wealthy household's bond holdings as a share of aggregate net worth.

The economic difference is lending. At fixed bond holdings, appreciation raises the wealthy household's assets only through equity. At fixed allocation, bond holdings must rise proportionately with equity value to preserve the portfolio share. The wealthy acquire additional claims while other households acquire matching liabilities. These private claims do not add to aggregate net worth, so they raise concentration beyond the contribution of equity valuation alone. Appendix C.4 provides the derivation.

The two restrictions give the ratio

$$\frac{M^{\text{con}}}{M^{\text{flex}}} = \frac{1 - \bar{\theta}\eta_R}{\bar{\theta}(1 - \eta_R)}. \tag{34}$$

At the calibrated reference, the constrained coefficient is about 1.9 times the flexible coefficient. A larger bond weight (lower $\bar{\theta}$) raises this ratio because more of the wealthy household's portfolio participates in the lending adjustment. This comparison concerns a given price change under the two portfolio restrictions. With finite mandate costs, allocation can also respond; an actual demand or income disturbance also determines prices, saving, borrowing and housing values. Its complete wealth share response is consequently determined by the full equilibrium.

Next, consider how a given net investment in the constrained fund changes wealth concentration.

Proposition 2.3 (Inelastic demand amplifies the concentration effect of investment)**.** *Let F be a small net cash investment available to the constrained fund after distributions and household holding costs. Hold its interior equity share $\bar{\theta} \in (0, 1)$, equity supply, housing values and government debt fixed, with the bond price normalized to one. Write $\bar{\mathcal{W}}$ for initial aggregate net worth and $\epsilon = 1 - \bar{\theta}$ for the conditional elasticity of equity demand. To first order,*

$$\Delta\eta_R = \left[\eta_R + \frac{1 - \eta_R}{\epsilon}\right] \frac{F}{\bar{\mathcal{W}}}. \tag{35}$$

For a given positive $F/\bar{\mathcal{W}}$ and initial wealth share, a lower ϵ implies a larger increase in wealth concentration.

Additional fund cash is lent to borrowers, while the fixed allocation requires equity value to rise alongside lending. A lower demand elasticity strengthens this valuation effect. The proposition links market inelasticity directly to the distributional effect of a given investment; the full model determines how much investment an income or demand disturbance generates. Appendix C.4 derives the result.

2.2.3 Wealth Concentration and Relative Amplification

The same lending contribution has a further implication for how the two coefficients vary with the distribution of wealth.

Proposition 2.4 (Concentration raises the relative importance of the mandate)**.** *For a fixed common equity weight $\bar{\theta} \in (0,1)$, the ratio of the conditional multipliers in Equation (34) increases with the top wealth share $\eta_R \in (0,1)$:*

$$\frac{\partial (M^{\text{con}}/M^{\text{flex}})}{\partial \eta_R} = \frac{1-\bar{\theta}}{\bar{\theta}(1-\eta_R)^2} > 0.$$

When wealth is already highly concentrated, equity appreciation increases both the wealthy household's assets and much of aggregate wealth. The flexible valuation effect therefore has less scope to raise the wealthy household's share. The mandate adds lending against liabilities elsewhere in the distribution, which preserves a distributional margin that equity valuation alone misses. Greater concentration consequently increases the relative importance of the allocation constraint.

A rising ratio does not require a rising constrained coefficient. Both coefficients can fall as concentration increases, with the flexible coefficient falling faster. Appendix C.4 gives their separate comparative statics, and Section 5.4 evaluates them along the historical path. The proposition compares conditional sensitivities at common states; responses to subsequent shocks also depend on the equilibrium adjustment of prices and portfolios.

These results explain why portfolio allocation matters beyond who initially owns equity. A mandate ties the accumulation of private claims to equity valuation, which changes the consequences of asset demand for both lenders and borrowers. The magnitude and duration of that adjustment depend on the disturbance.

3 Calibration

We specify preferences and holding costs, then calibrate the two economies to a common 1989 reference allocation.

3.1 Functional Forms

Following Straub (2019), each household type has CRRA felicity over consumption, with type-specific consumption curvature, and the wealthy also value bequests.

Assumption 3.1 (Household-specific utility)**.** *For $i \in \{R, M, P\}$, felicity over consumption is*

$$u_i(c) = \frac{c^{1-\sigma_i}}{1-\sigma_i}, \tag{36}$$

and the wealthy household alone derives utility from bequests,

$$\nu_R(a) = \frac{a^{1-\Sigma_R}}{1-\Sigma_R}, \qquad \Sigma_R < \sigma_R. \tag{37}$$

The wealthy have the highest consumption curvature σ_R and an operative bequest motive; the middle class and the non-wealthy share a common lower value $\sigma_M = \sigma_P < \sigma_R$ and do not value bequests.

The elasticity of intertemporal substitution is $1/\sigma_i$. The restriction $\Sigma_R < \sigma_R$ makes bequests a luxury good for the wealthy: the marginal utility of wealth decays more slowly than that of consumption, so their saving rate rises with permanent income and they accumulate wealth disproportionately. Appendix D.7 formalizes this non-homotheticity. Labor endowments of all three groups, together with equity and housing dividends, follow AR(1) processes whose steady-state levels, persistences and innovation variances are specified in Appendix D.7.

3.2 Holding Costs

The wealthy household pays a cost on its total fund position in the constrained economy and on the underlying equity and bond exposures in the flexible benchmark. Housing and borrowing costs are common to both economies. These costs are quadratic in the positions held at each date. They are distinct from the intermediary's penalty for departing from its target allocation, governed by χ^{MF} and specified in Section 2.

Wealthy household (constrained economy). The wealthy pay a convex cost of holding mutual fund shares, quadratic in the position X_t^{MF} and scaled by its reference value $\bar{X}^{MF}$:

$$\Gamma^{MF}\left(X_t^{MF}\right) = \frac{\phi_{MF}}{2\,\bar{X}^{MF}}\left(X_t^{MF}\right)^2. \tag{38}$$

This cost enters the wealthy household's Euler equation. As discussed below, ϕ_{MF} is not a free parameter: it is pinned down residually by that equation, given the equity premium.

Housing and non-wealthy borrowing. Both the middle class and the non-wealthy pay a convex cost of holding housing, quadratic in the value of the position $X_t^{H,i} = p_t^H H_t^i$ and

scaled by its reference value $\bar{X}^{H,i}$:

$$\Gamma_H^i\left(X_t^{H,i}\right) = \frac{\phi_H^i}{2\,\bar{X}^{H,i}}\left(X_t^{H,i}\right)^2, \qquad i \in \{M, P\}. \tag{39}$$

These costs make each group's housing demand smoothly downward-sloping and, through the steady-state housing Euler equations, help pin down the house price. We set them to modest values, $\phi_H^M = 0.21$ and $\phi_H^P = 0.20$. They are distinct from the mortgage loan-to-value ratio τ_t^M, which governs collateralized borrowing and is calibrated separately. The non-wealthy, who are not collateral constrained, instead face a convex borrowing cost, quadratic in the level of debt B_t^P:

$$\Gamma_B^P\left(B_t^P\right) = \frac{\phi_B^P}{2}\left(B_t^P\right)^2. \tag{40}$$

The parameter ϕ_B^P has no external counterpart, so we calibrate it internally, jointly with τ_t^M and the equity premium, to match the bottom-50% debt-to-income ratio of 0.5 from Bartscher et al. (2025).

Wealthy household (flexible benchmark). In the flexible benchmark, the wealthy choose total fund investment X_t^{flex} and the fund chooses its equity allocation θ_t^{flex} on their behalf. The underlying equity and bond exposures, $E_t^{\text{flex}} = \theta_t^{\text{flex}} X_t^{\text{flex}}$ and $B_t^{\text{flex}} = (1 - \theta_t^{\text{flex}}) X_t^{\text{flex}}$, each bear a convex holding cost:

$$\Gamma_E\left(E_t^{\text{flex}}\right) = \frac{\phi_E}{2\,\bar{E}}\left(E_t^{\text{flex}}\right)^2, \qquad \Gamma_B\left(B_t^{\text{flex}}\right) = \frac{\phi_B}{2\,\bar{B}^{\text{flex}}}\left(B_t^{\text{flex}}\right)^2, \tag{41}$$

where ϕ_B is the wealthy household's bond-holding cost in the benchmark, distinct from the non-wealthy borrowing cost ϕ_B^P. Total costs are therefore $C^{\text{flex}}(X, \theta) = \Gamma_E(\theta X) + \Gamma_B((1-\theta)X)$ and change with allocation even without a mandate penalty. Appendix D.4 establishes the equivalence to direct holdings in the first-order system. The two coefficients satisfy

$$\phi_E - \phi_B = \beta^R(\bar{R}^E - \bar{R}), \qquad \bar{\theta}\phi_E + (1-\bar{\theta})\phi_B = \phi_{MF}. \tag{42}$$

The first condition reproduces the reference equity premium; the second matches the marginal cost of total investment. Together they determine ϕ_E and ϕ_B.

The curvature of exposure costs makes portfolio demand finitely elastic, while the difference in marginal costs supports the positive reference equity premium. The mandate penalty separately restricts reallocation in the constrained economy. At our calibration, the conditional equity demand elasticity derived in Appendix C.1 exceeds one in the flexible benchmark and is below one in the constrained economy when funding is fixed

and inherited equity is revalued. Finite portfolio responsiveness therefore does not itself imply inelastic demand.

3.3 Parameters

Table 1 collects the parameter values and their sources. We group the parameters by how each is disciplined. A first group consists of normalizations, calibration assumptions and inputs from the microeconomic and asset pricing literature. A second group is matched to observed data levels: the income, dividend, rental and government debt shares. A third group has no direct external counterpart; we solve for these jointly, so that the 1989 reference steady state reproduces a small set of target moments (Table 2).

The external rate inputs and reference targets are expressed in annual units. We recover the internally calibrated parameters jointly from the implemented equilibrium conditions to match Table 2. Historical simulations use a monthly grid from January 1989 to March 2023, retaining these annual rate inputs. Source series are aligned to this grid; they are not all observed monthly. The perfect-foresight exercise uses a terminal steady state implied by the final driver values, while the unanticipated-shock exercise feeds in successive innovations and assumes future innovations are zero. Section 5 describes these information and continuation assumptions. The two economies use the same time convention and initial reference allocation.

Externally fixed parameters. The mortality rate δ matches the 2022 U.S. crude death rate of 984.1 per 100,000 (CDC National Vital Statistics System). We set $\rho^R + \delta = 0.09$, giving $\rho^R \simeq 0.080$, and set $\rho^P = 0.140$, making the non-wealthy the least patient group. The 9% discount anchor is distinct from the 9.5% reference safe rate. We recover the middle-class discount rate jointly with the other internally calibrated parameters to match that rate. The joint calibration uses the middle-class housing and bond conditions, as described below.

We set wealthy consumption curvature to $\sigma_R = 4.1$, the simple average of the three age-group curvatures reported in Table 5 of Straub (2019). This benchmark is close to the consumption curvature of 3.7 estimated by De Nardi et al. (2025). We set $\Sigma_R = 0.699\sigma_R$, making bequests a luxury good and strengthening accumulation as permanent income rises, and assume $\sigma_M = \sigma_P = 1.43$. The assignment of these values across wealth groups is a calibration assumption. Supplemental Appendix S3.3 examines alternative curvature levels and reverses the EIS ordering.

We set $\theta^* = 0.78$ using the fixed-allocation mapping between the price multiplier m and the equity share, $m = \theta/(1-\theta)$, or $\theta = m/(1+m)$. A price multiplier of 5.3 in Gabaix and Koijen (2021) gives 0.84, and the 2.5 illustration in Haddad et al. (2025) gives 0.71;

Table 1: Calibration of the quantitative model.

Parameter	Description	Value	Source / target
Fixed inputs and calibration assumptions			
δ	Mortality rate	0.0098	CDC NVSS (984 per 100,000, 2022)
ρ^R	Wealthy discount rate	0.080	$\rho^R + \delta = 0.09$ (see text)
ρ^P	Non-wealthy discount rate	0.140	Least-patient household
σ_R	Wealthy consumption curvature	4.10	Average of age-group values in Straub (2019)
$\sigma_M = \sigma_P$	Middle/non-wealthy consumption curvature	1.43	Assumed (see text)
Σ_R	Wealthy bequest curvature	2.87	$0.699\,\sigma_R$, Straub (2019)
θ^*	Fund mandate target	0.78	Avg. of Gabaix and Koijen (2021) and Haddad et al. (2025)
χ^{MF}	Fund mandate-deviation cost	171	Rigidity calibration (see text)
β^{MF}	Fund discount factor	0.98	Assumed
$\bar{Q}, \bar{H}$	Equity / housing supply	10, 10	Normalization
ϕ_H^M, ϕ_H^P	Housing holding cost (middle, non-wealthy)	0.21, 0.20	Set (see text)
g_D	Reference dividend-growth assumption	0.05	Set; dividend data: Shiller (2023)
ρ_x	Persistence, all processes	0.90	Set
$\{s_T^R, s_T^M, s_T^P\}$	Transfer shares	0.01, 0.31, 0.68	Assumption (see text)
Matched to data levels			
$\bar{D}$	Steady-state equity dividend	0.34	Div. = 7.9% of top 10% income, SCF+ (Kuhn et al., 2020)
$\bar{D}^H$	Steady-state housing services	1.69	Bottom 90% housing wealth, SCF+ (Kuhn et al., 2020)
$\{\bar{Y}^P, \bar{Y}^M, \bar{Y}^R\}/\bar{Y}$	1989 group income shares	0.101, 0.463, 0.435	Blanchet et al. (2022)
$\{Y^P, Y^M, Y^R\}/Y$	2023 group income shares	0.079, 0.390, 0.530	Blanchet et al. (2022)
$\{\sigma^P, \sigma^M, \sigma^R\}$	Income innovation standard deviations	0.0141, 0.0097, 0.0049	Recovered driver innovations
$\bar{\alpha}^{1989}, \bar{\alpha}^{2023}$	Government-borrowing share	0.512, 0.609	Fed Z.1 Nonfinancial Debt
Solved to match target moments			
ρ^M	Middle-class discount rate	0.134	Reference rate $\bar{R} = 1.095$
r_x	Equity premium ($\bar{R}^E - \bar{R}$)	0.012	Top 10% wealth share η^R
τ^M	Middle-class LTV	0.088	Middle 40% wealth share η^M; SCF (+57%)
ϕ_B^P	Non-wealthy borrowing cost	0.010	Bottom 50% DTI
ϕ_{MF}	Wealthy fund-holding cost	0.146	Wealthy Euler (residual)

their average is approximately 0.78. These studies concern aggregate market flows and demand for individual stocks, respectively, so the mapping disciplines the calibration rather than equating their estimands. We set $\chi^{MF} = 171$ to represent limited allocation adjustment.[12] Supplemental Appendix **??** shows that the historical wealth-share paths are close for $\chi^{MF} \in \{20, 171, 500\}$. The target share matters more for the distribution outside the top decile. We normalize equity and housing supplies to $\bar{Q} = \bar{H} = 10$ and set the persistence of all exogenous processes to 0.9. We set transfer shares to $\{s_T^R, s_T^M, s_T^P\} = \{0.01, 0.31, 0.68\}$, which allocates most transfers to the non-wealthy.

Data-matched levels. We set the steady-state equity dividend $\bar{D}$ so that equity dividends equal 7.9% of top-10% income, a share we compute from equity holdings in the SCF+ (Kuhn et al., 2020), imputing dividends at an aggregate dividend yield and expressing the result relative to top-10% income. The housing-service flow $\bar{D}^H$ is the gross imputed rent on owner-occupied housing. Symmetrically with the equity dividend, we normalize it so that bottom-90% housing enters the balance sheet at its empirical size, which disciplines the implied housing-wealth-to-income ratio against the SCF+ (Kuhn et al., 2020), in which

[12] An exploratory regression of Financial Accounts portfolio shares on excess returns motivated this calibration.

bottom-90% housing wealth is roughly 1.9 times bottom-90% income in 1989. The model's price–rent multiple is pinned down by the non-wealthy's discount rate and holding cost and lies below its empirical counterpart, so it is the housing-*wealth* stock, rather than the rent flow, that we match; the resulting normalization leaves the model's bottom-90% housing wealth below its data value (Table 2). The reference price uses the assumed growth rate $g_D = 5\%$ in Equation (70); historical dividend changes are constructed separately from Shiller data (Shiller, 2023). Labor-income endowments $\bar{e}^P, \bar{e}^M, \bar{e}^R$ match the 1989 and 2023 income shares of the bottom 50%, middle 40% and top 10% from Blanchet et al. (2022), net of these asset-income flows; innovation standard deviations are the sample standard deviations of the AR(1) innovations recovered from these paths. The government-borrowing share $\bar{\alpha}_t$, defined by $B_t^G = \alpha_t(B_t^P + B_t^M + B_t^G)$, matches the Federal Reserve Z.1 Nonfinancial Debt series at both endpoints.

Internally calibrated parameters and target moments. The remaining parameters have no direct external counterpart, so we solve for them jointly such that the 1989 reference steady state reproduces the moments in Table 2. The middle-class discount rate ρ^M is pinned down by the steady-state gross interest rate $\bar{R} = 1.095$ (the reference safe-rate target), subject to the requirement that the middle-class collateral constraint bind: the consumption-normalized multiplier is positive, $\bar{\psi}^M = 1 - \beta^M \bar{R} > 0$ (Equation 73), which holds whenever $\bar{r} < \rho^M + \delta$;[13] the steady-state equity premium $r_x \equiv \bar{R}^E - \bar{R}$ (equivalently the price–dividend ratio) is disciplined by the top-10% wealth share $\eta^R = 0.682$; the middle-class loan-to-value ratio τ_t^M by the middle-40% wealth share $\eta^M = 0.310$, with its +57% rise over the transition taken from the SCF; and the non-wealthy borrowing cost ϕ_B^P by the bottom-50% debt-to-income ratio of 0.5 from Bartscher et al. (2025) (wealth shares from Blanchet et al. (2022)). Because ρ^M enters the wealth shares through the interest-rate block, we solve for the four parameters $\{\rho^M, r_x, \tau_t^M, \phi_B^P\}$ simultaneously, given the four targets $\{\bar{R}, \eta^R, \eta^M, \text{DTI}^P\}$; the wealthy fund-holding cost ϕ_{MF} is then pinned down residually by the wealthy household's Euler equation. The price–dividend ratio is not itself a target: it floats and emerges somewhat above its pre-1989 average of 15 (Shiller, 2023).

Table 2 reports the fit. The four moments in the upper panel are calibration targets, with the debt-to-income ratio matched approximately. The lower panel reports the implied bottom-50% wealth share, the price–dividend ratio and the bottom-90% housing-wealth-to-income ratio. The bottom wealth share is the residual $1 - \eta^R - \eta^M$ and supplies no independent check of the fit. The remaining two moments are not targeted directly. The

[13] This is the only regularity restriction the implemented model imposes on ρ^M. If middle-class households also valued bequests, a more general condition involving their bequest curvature would apply.

bottom-90% housing-wealth ratio comes out below its empirical value, reflecting the compressed structural price–rent multiple.

Table 2: Targeted and untargeted moments, 1989 reference steady state.

Moment	Description	Target/data	Model	Source
Targeted				
$\bar{R}$	Gross risk-free rate	1.095	1.095	Reference rate target
η^R	Top 10% wealth share	0.682	0.682	Blanchet et al. (2022)
η^M	Middle 40% wealth share	0.310	0.310	Blanchet et al. (2022)
DTI^P	Bottom 50% debt-to-income	0.5	0.49	Bartscher et al. (2025)
Implied and untargeted				
η^P	Bottom 50% wealth share	≈ 0.01	0.008	Blanchet et al. (2022)
$p/\bar{D}$	Price–dividend ratio	≈ 15	17.6	Shiller; floats with η^R
$p_h\bar{H}/Y^{b90}$	Bottom 90% housing wealth / income	≈ 1.9	0.79	SCF+ (Kuhn et al., 2020)

The flexible benchmark shares the 1989 steady state. We calibrate the flexible benchmark to the same 1989 reference allocation, prices and wealth shares as the constrained economy. The reference conditions in Equation (42) reproduce the wealthy household's marginal investment cost and the equity premium at the same underlying holdings. Both economies therefore begin the transition from the same wealth distribution and asset prices. Away from this reference, their allocation rules and portfolio cost schedules differ, so saving, borrowing and prices can respond differently.

Shock series for the quantitative exercise. The perfect-foresight exercise starts from the 1989 reference and follows the constructed driver paths through March 2023, with the terminal convention described in Section 5. Seven fundamental processes drive this exercise: the three group labor endowments e_t^R, e_t^M, e_t^P, the equity dividend D_t, the housing rent D_t^H, the government-borrowing quantity B_t^G and the middle-class loan-to-value ratio τ_t^M. Each empirical series is expressed as a proportional deviation from its 1989 steady-state value and fed through its AR(1) law of motion (persistence $\rho_x = 0.9$) to recover the innovation sequence that reproduces it. Concretely: the endowment paths equal group income shares from Blanchet et al. (2022), scaled to an aggregate income normalization of 100, less equity dividend income for the wealthy and imputed rental income for the other groups; the dividend path is cumulated from the Shiller dividend-growth series and the housing-rent path from the growth of owner-occupied rents (FRED, the CPI for Owners'

Equivalent Rent of Residences); the government-debt path is built from the government share of nonfinancial debt in the Federal Reserve Z.1 accounts; and the loan-to-value path is a smooth ramp reproducing the +57% rise in middle-class mortgage leverage in the SCF. Equity demand and broad fund demand disturbances are both held at zero throughout the historical transition; demand disturbances enter only the separate impulse-response experiments.

4 Demand Shocks and Wealth Inequality

The motivating estimates in the Introduction show a positive top wealth share response to fund flow-associated returns and suggest greater relative persistence than for remaining returns. We ask whether portfolio allocation frictions can generate this pattern, and what a flexible benchmark would miss as saving and borrowing adjust after the initial revaluation.

The equity and fund demand shocks introduced in Section 2 distinguish desired portfolio reallocation from increased financial saving. An investor seeking more equity exposure may sell bonds, while an investor seeking a larger financial portfolio may expand both positions. Comparing the shocks reveals when restricting portfolio composition changes their transmission. We first apply the same demand incentive in the two economies, then compare their responses along a common equity price path using different demand sequences. Settings are given in the figure notes and Appendices D.7 and D.2.

4.1 Equity Demand

Figure 2 shows that stronger equity demand raises the equity price and the top wealth share in both economies. In the flexible benchmark, the wealthy substitute away from bonds, which reduces credit supply and borrowing and raises the safe rate. Equity appreciation initially raises their wealth share, but the reduction in bond holdings offsets part of that gain. The wealth share response peaks on impact and then dissipates quickly.

In the constrained economy, stronger equity demand increases investment in a bundle that also contains bonds. Credit supply and borrowing expand, and the safe rate falls. The mandate links the fund's equity value to its bond position, which sustains equity valuations alongside the wealthy household's lending. Higher wealth encourages further saving through the bequest motive. The adjustment of fund investment and borrowing produces a delayed wealth share peak and a more prolonged response.

The flexible benchmark has the larger initial revaluation, but the constrained economy has the larger cumulative wealth share response. The accounting decomposition in

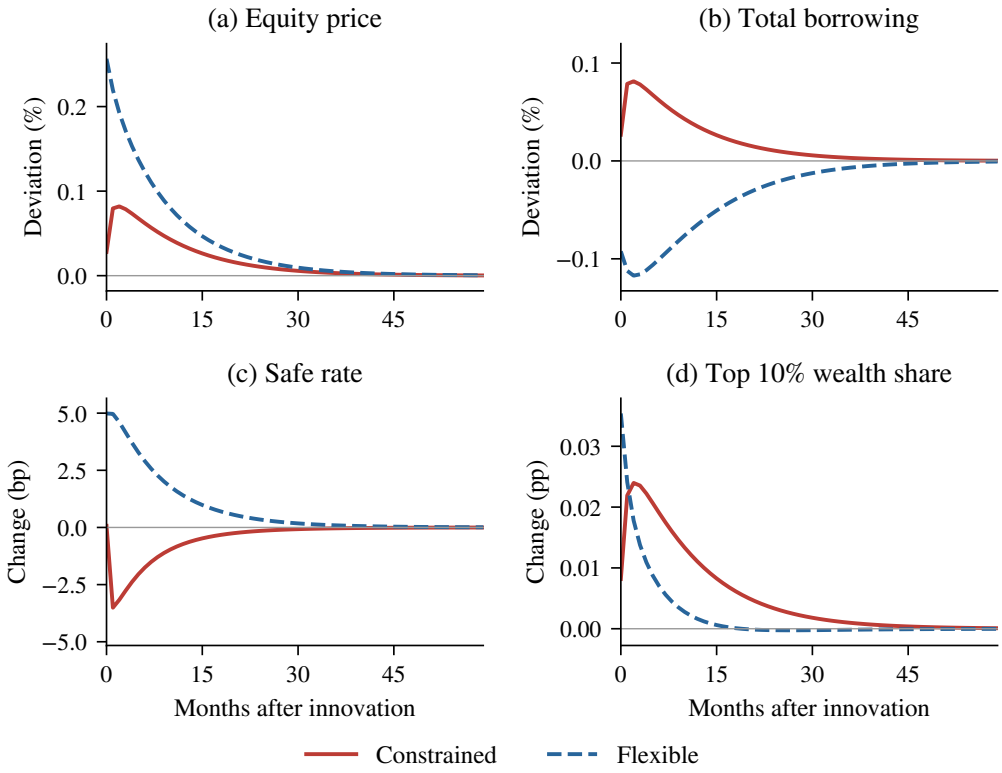


Figure 2: Responses to equity demand

Response to an innovation of 0.01 to z_t^E, with persistence 0.9 and common marginal incentive coefficient $k = \phi_{MF}$. Fund demand is zero. Solid red: constrained economy; dashed blue: flexible benchmark. Month zero is the innovation month. Equity prices and total borrowing, including government debt, change in percent; the safe rate changes in basis points; the top 10% wealth share changes in percentage points.

Appendix E.4 shows how additional bond holdings sustain the constrained response despite its smaller equity valuation contribution. A flexible benchmark therefore understates the cumulative distributional effect of equity demand at this calibration. The constrained equity price response nevertheless halves within nine months of its peak. The cumulative ordering depends on demand remaining elevated: Appendix E.2 shows that shorter-lived disturbances reduce the duration advantage and can reverse the ordering of cumulative responses.

4.2 Fund Demand

Demand for the whole financial portfolio expands both equity and bonds, so borrowing rises and the safe rate falls in both economies. Both wealth share responses peak with a delay. Restricting portfolio composition has less effect when desired investment already

expands both assets, and the responses are closer than after equity demand (Appendix E.1, Figure 13). Rising borrowing and falling rates can therefore also arise with flexible allocation.

4.3 Wealth Concentration under Identical Equity Price Paths

Differences in wealth concentration can reflect differences in equity appreciation or in the accompanying balance sheets. We compare the economies along the same complete equity price path, choosing demand innovations separately in each. Other endogenous variables follow the equilibrium conditions, and households learn each innovation when it arrives. Appendix E.3 gives the construction.

Figure 3 shows that the constrained economy supports more lending at common equity prices: borrowing rises rather than falls under equity demand, and remains elevated for longer under fund demand. The cumulative top wealth share response is approximately 32% larger for equity demand and 34% larger for fund demand. The lending margin captured by the inequality multiplier in Section 2.2.2 therefore remains quantitatively important when equity appreciation is held equal. A flexible benchmark can reproduce the equity price path while understating the accompanying wealth concentration.

The contrast highlights why portfolio allocation frictions, and other intermediation frictions that make aggregate asset demand less elastic, matter for wealth inequality. A model that captures demand for financial saving but lets portfolios adjust freely can miss the expansion of lending and the prolonged wealth share response generated by equity demand. The resulting wealth share dynamics resemble the pattern in the motivating estimates; their magnitude and duration depend on the composition and persistence of demand.

5 Dynamics of Wealth Inequality

Rising income at the top can increase aggregate saving and wealth concentration (Straub, 2019), while wealthy saving can finance borrowing elsewhere in the economy (Mian et al., 2025). These accounts leave open how the allocation of that saving between assets affects its distributional consequences. We ask whether constraining this allocation helps explain the joint evolution of wealth concentration, borrowing and interest rates. Both economies receive the same observed drivers of income, dividends, housing rents and borrowing conditions, with the demand disturbances of Section 4 set to zero. We compare fully anticipated histories with histories in which innovations arrive as surprises, and

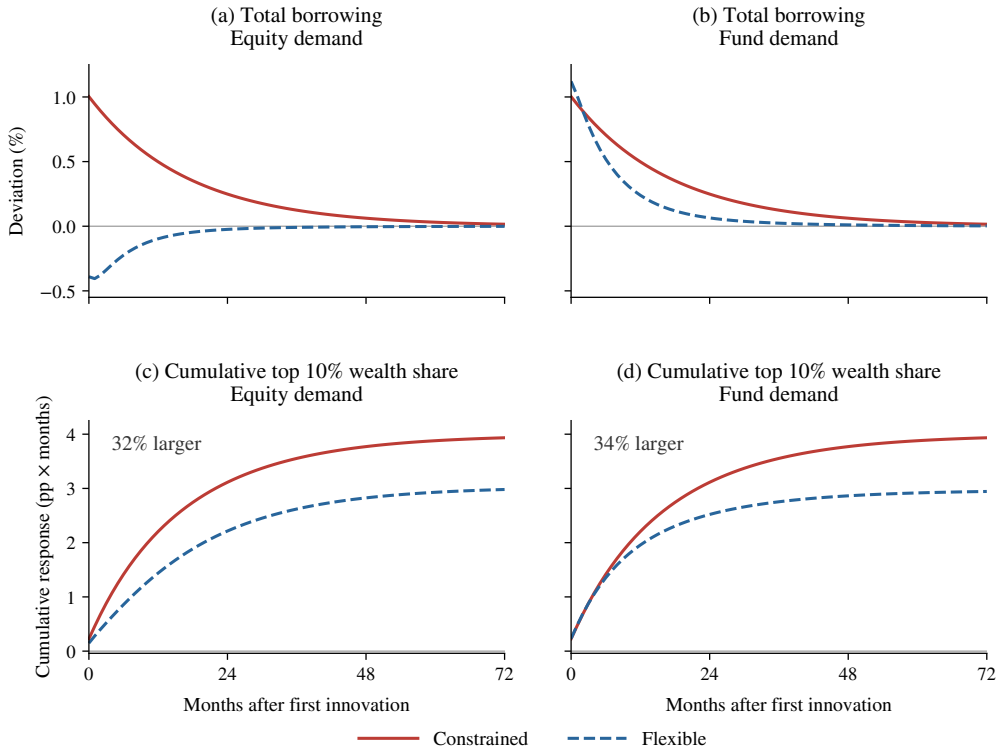


Figure 3: Borrowing and cumulative wealth share responses under identical equity price paths

The equity price initially rises 1% and decays geometrically with a half-life of 12 months in both economies and for both disturbances. Demand innovations are chosen separately in each economy to reproduce this common path; each arrives unexpectedly and future innovations are expected to be zero. Solid red: constrained economy; dashed blue: flexible benchmark. Panels (a)–(b) show total borrowing as a percentage of its reference level, including unchanged government debt. Panels (c)–(d) sum monthly top 10% wealth share deviations through the plotted date, in percentage point months. The plot shows months 0–72; percentage annotations compare the complete responses summed over 2,000 months. The baseline calibration is unchanged.

then examine the contributions of different drivers and relate the results to the inequality multiplier.

5.1 Counterfactual Simulations under Perfect Foresight

We initialize the economies at the calibrated 1989 reference and feed in the driver paths described in Section 3.3 through March 2023. Under perfect foresight, households anticipate the entire path. We calibrate the initial wealth distribution but do not target its subsequent changes. Model types remain fixed; empirical wealth groups can change membership as households move through the distribution. Figure 4 compares these changes with the

data.[14]

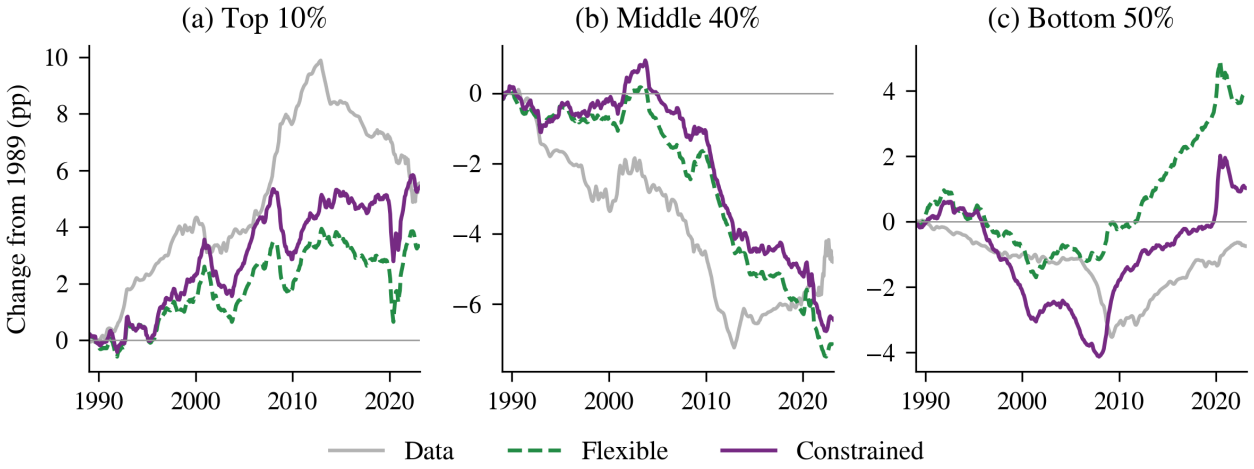


Figure 4: Change in wealth shares from 1989: perfect foresight

Note: Wealth share changes in percentage points relative to the 1989 reference. Households anticipate the driver paths from January 1989 to March 2023. Gray: data; purple: constrained economy; green: flexible benchmark. The initial wealth distribution is calibrated; the subsequent paths are not directly targeted. Data are from Realtime Inequality (Blanchet et al., 2022).

The constrained economy brings the top wealth share closer to the data for much of the sample and generates a larger decline in the bottom share around the financial crisis. Across the sample, the constrained economy reduces the average absolute gap between simulated and observed wealth share changes by 34% for the top decile and 37% for the bottom half, relative to the flexible benchmark. The borrowing and rate responses help explain why. Wealthy saving supports more lending under the mandate, and a lower safe rate induces households to take larger debt positions. The mandate links that lending position to the fund's equity value. Wealthy households consequently accumulate assets through both lending and equity valuation, while the corresponding private liabilities weigh on wealth elsewhere in the distribution.

Under the mandate, saving cannot be absorbed through an unrestricted change in the fund's asset mix. Even when households anticipate income deterioration and adjust their spending in advance, the mandate sustains a link between wealthy asset accumulation and the expansion of credit.

[14]The perfect-foresight simulation uses 411 monthly observations and a terminal steady state implied by the final driver values. The terminal condition closes the simulated path; the last plotted observation need not itself be a steady state. The two economies share the reference allocation but differ in their allocation

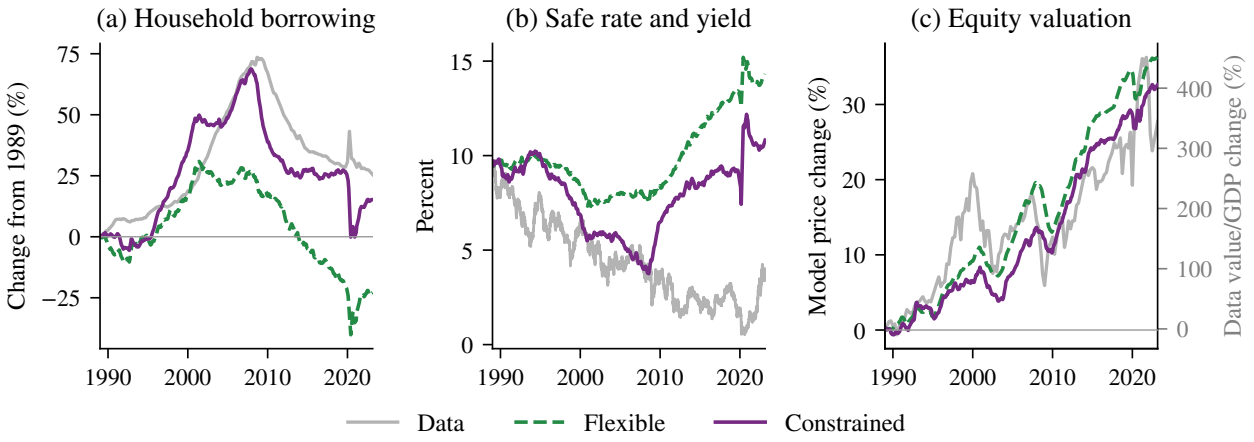


Figure 5: Historical borrowing, rates and equity valuation under perfect foresight

Note: Purple: constrained economy; green: flexible benchmark; gray: data. Panel (a) compares changes in model household debt with changes in data household debt/GDP, each relative to its initial observation. Panel (b) compares the model one-period safe rate with the ten-year Treasury yield, in percent. Panel (c) plots model equity-price changes on the left axis and data equity market value/GDP changes on the right, both relative to 1989.

Figure 5 shows a borrowing expansion in the constrained economy and a contraction in the flexible benchmark. The constrained economy's larger rate decline also moves it toward the historical pattern of falling yields. Together with the wealth share paths, these responses favor the constrained economy: the mandate connects greater wealthy asset accumulation to expanding credit and a lower return on safe saving. The comparison concerns broad patterns, since the model quantities and rates differ from their data counterparts as detailed in the figure note.

The fit remains incomplete. Both economies understate the post-crisis rise in the top share and generate negative bottom-group net worth during part of the sample; the constrained economy overstates the bottom share's decline and later recovery. Both also miss the sustained low Treasury yields after the crisis and much of the equity valuation increase. Public debt contributes substantially to the later rebound in the model rate: holding that driver at its reference leaves a lower rate. Appendix G.5 shows that introducing the arbitrageur narrows the historical price gap, but the wealth share paths remain distinct. The historical comparison survives reversing the assumed EIS ordering, although its fit and the magnitude of demand-driven amplification are sensitive to wealthy consumption curvature (Supplemental Appendix S3.3).

rules and portfolio cost schedules, as described in Section 3.2.

5.2 Unanticipated Shocks and the Post-Crisis Surge

Households now observe each innovation when it arrives and expect subsequent innovations to be zero. Their forecasts follow the specified autoregressive laws, so they initially expect departures from the reference to decay. They revise consumption, saving and borrowing plans as further innovations arrive.[15]

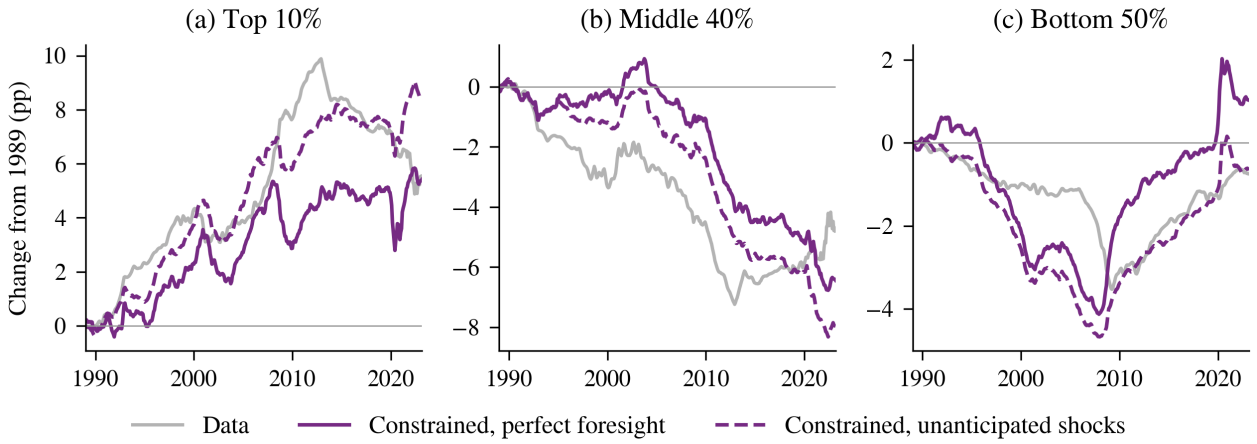


Figure 6: Change in wealth shares from 1989: unanticipated shocks

Note: Wealth share changes in percentage points. Gray: data; solid purple: constrained economy under perfect foresight; dashed purple: constrained economy with innovations learned as they arrive. Future innovations are expected to be zero. Both histories use the same observed driver paths. Data are from Realtime Inequality (Blanchet et al., 2022).

The surprise simulation produces a sharper post-crisis rise in the top wealth share and sustains a lower bottom share later in the sample. Relative to perfect foresight, the average absolute gap falls by 56% for the top share and 34% for the bottom share in the constrained economy. With full foresight, households can reduce spending before their income deteriorates. An unexpected decline that households initially expect to reverse instead encourages borrowing to smooth consumption, while repeated adverse news prolongs the adjustment. Wealthy households revise their saving and lending as news about their own income and dividends arrives. This combination helps the constrained

[15]The simulation uses Dynare's perfect-foresight solver with expectation errors; innovations are learned separately over the historical sample, and the computational horizon is 1,000 periods. Future innovations are zero, so the drivers subsequently revert according to their autoregressive laws. This continuation differs from the terminal steady-state convention of the fully anticipated exercise. The computational approach is related to extended-path methods (Fair and Taylor, 1983; Afrouzi et al., 2024) and sequences of MIT-style shocks (Boppart et al., 2018).

economy capture more of the post-crisis increase in concentration, although it still misses the top share's peak and subsequent decline and overstates some bottom share fluctuations.

The flexible benchmark produces very similar wealth share paths under these information assumptions (Figure 18), and the borrowing, rate and price paths also become closer (Figure 19). Similar aggregate histories nevertheless conceal different responses to the underlying drivers. By the end of the sample, wealthy income and dividends have generated a larger increase in concentration in the constrained economy. Non-wealthy income innovations contribute more to concentration in the flexible benchmark and support more borrowing, which offsets part of that difference; the other drivers also contribute to closing the gap. The aggregate similarity thus reflects offsetting effects of the portfolio rules across income sources.

The historical comparison is sensitive both to the information assumption and to the continuation of the drivers, so these histories alone do not sharply distinguish the portfolio rules. The demand experiments in Section 4 and the income experiments in Appendix E.5 clarify why the distinction still matters: constraining allocation changes how a given source of demand or income is transmitted into lending and wealth concentration.

5.3 Income, Dividends and Borrowing Conditions

We compare two groups of drivers under unanticipated shocks. The first contains wealthy labor income and equity dividends, which directly affect the wealthy household's resources. We call these the equity investment drivers. The second contains middle-class and non-wealthy labor income, housing rents and public debt, which we call the borrowing-related drivers. Each group changes saving, borrowing and asset prices in general equilibrium; the exercises describe their joint transmission through the model.[16]

Figure 7 activates each group separately, holding the other drivers at their reference values. The middle-class mortgage LTV driver is excluded from both groups. In the linear model, its contribution is exactly the gap between their sum and the full response, up to numerical precision. Appendix F.2 shows this contribution separately.

The equity investment drivers account for much of the top share's rise, including its acceleration after the crisis. They produce a gradual decline in the other groups' shares as the wealthy accumulate financial assets. These drivers also induce borrowing, as additional wealthy resources are partly lent to other households. Under the mandate, that lending

[16]These groups connect investment-based accounts of wealth inequality (Piketty, 2014; Saez and Zucman, 2016; De Nardi and Fella, 2017; Kuhn et al., 2020) with accounts emphasizing income and debt (Rajan, 2011; Kumhof et al., 2015; Mian and Sufi, 2015; Mian et al., 2025). The group labels identify their exogenous inputs, rather than an isolated price or borrowing intervention.

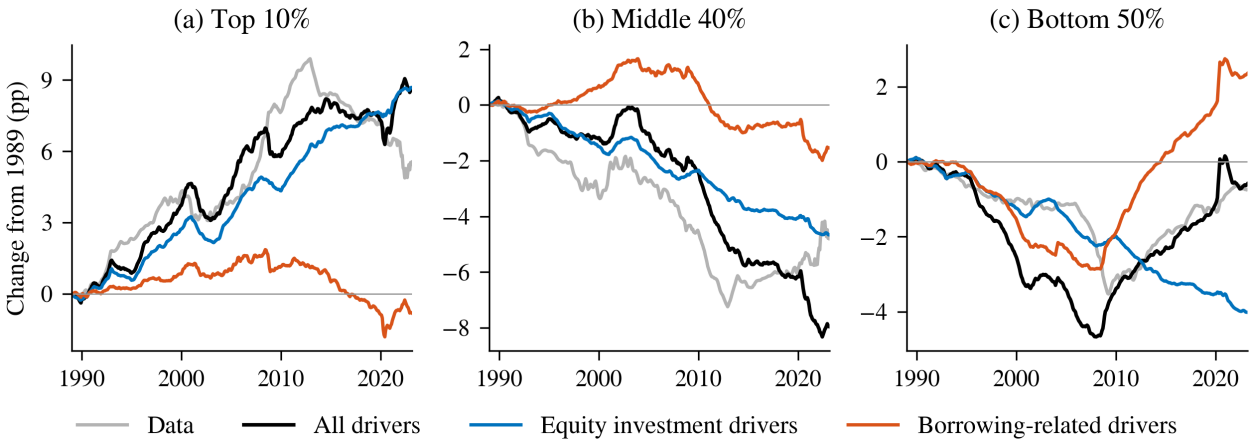


Figure 7: Wealth share responses to groups of historical drivers

Note: Percentage-point changes from the 1989 reference in the constrained economy with unanticipated shocks. Gray: data; black: all drivers; blue: wealthy labor income and equity dividends, e_t^R, D_t; orange: other labor income, housing rents and public debt, $e_t^M, e_t^P, D_t^H, B_t^G$. The mortgage-LTV driver τ_t^M is excluded from both groups. Its contribution, shown in Appendix F.2, completes their sum to the full response.

remains linked to equity holdings, which connects the accumulation of private claims to asset valuation. Borrowing therefore helps transmit the effects of wealthy income and dividends, even though neither driver originates with borrowers.

The borrowing-related drivers contribute more strongly to the bottom share's fluctuations. They lower that share toward the crisis but later raise it, which partially offsets the decline generated by the equity investment drivers. Their effect on the top share turns negative later in the sample. The mortgage-LTV contribution is also material, particularly for the middle and bottom groups. Together, these results show why a single attribution of the post-crisis rise to borrowing is incomplete: the effects depend on which income, rent and debt drivers change and on the part of the wealth distribution being considered.

The two driver groups consequently offer complementary explanations of the historical paths, with different timing and distributional incidence. Their transmission involves both asset valuation and quantities of lending and borrowing.

5.4 Wealth Concentration and the Inequality Multiplier

Section 2.2.2 derived the inequality multiplier in Equation (32) and showed that the ratio of the constrained and flexible multipliers rises with wealth concentration, as in Equation (34). Figure 8 evaluates that prediction along the historical path. Both coefficients use the same wealth share and equity weight from the constrained perfect-foresight simulation, so the

figure compares the two portfolio restrictions at each distribution of wealth.

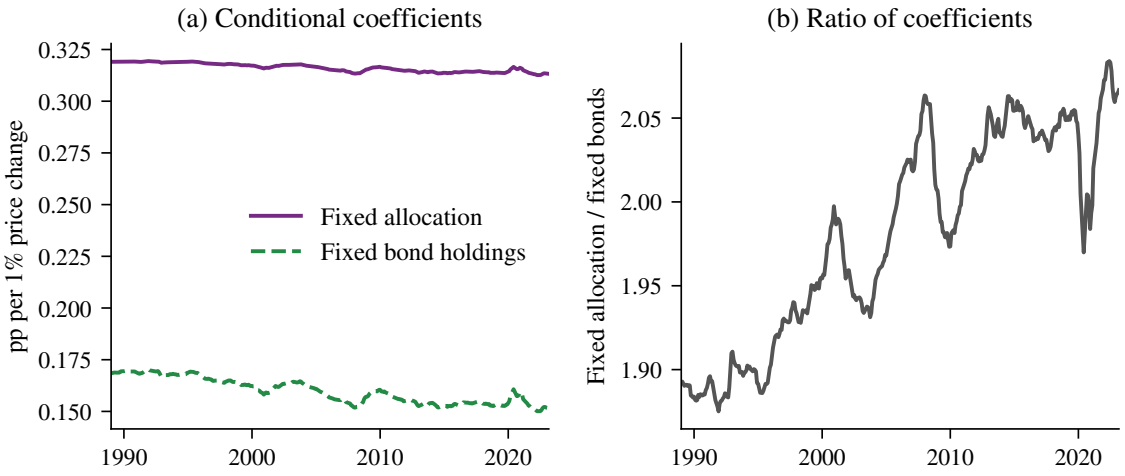


Figure 8: Wealth concentration and conditional wealth share sensitivities

Note: Both formulas are evaluated using the same top wealth share η_t and equity weight θ_t from the constrained perfect-foresight history. Panel (a) plots $M^{\text{con}} = \eta_t(1 - \theta_t\eta_t)$, holding allocation fixed, and $M^{\text{flex}} = \theta_t\eta_t(1 - \eta_t)$, holding bond holdings fixed. Units are percentage points of wealth share per one percent equity-price change. Housing values and government debt are fixed in these conditional calculations. Panel (b) plots their ratio. The figure evaluates the formulas at changing common states; it does not recompute the dynamic equilibrium at each date.

The constrained multiplier changes little over the sample, while the flexible multiplier declines more. Their ratio consequently rises from about 1.9 to 2.1. At an already high top wealth share, equity appreciation has limited scope to change concentration because it also increases aggregate wealth. The mandate adds exposure through lending: wealthy claims rise alongside liabilities elsewhere in the distribution. Panel (b) quantifies the resulting prediction that this portfolio constraint becomes relatively more important as wealth becomes more concentrated. The difference is already substantial at the initial distribution, and the subsequent increase is smaller but economically significant.

The historical rise in the top share therefore occurs with a nearly unchanged constrained multiplier. Higher wealthy income and dividends support continued saving and lending, and the mandate links that lending to equity valuations. The income experiments in Appendix E.5 show this directly: both income sources generate more cumulative lending in the constrained economy and a larger cumulative increase in the wealthy share. Continued saving and lending can sustain rising concentration while the multiplier remains almost constant.

Taken together, the historical exercises show why portfolio allocation matters for the

transmission of income inequality. The mandate links wealthy accumulation to lending and equity valuation, which helps the model account jointly for rising concentration, expanding debt and falling rates. The inequality multiplier expresses the distributional implication: for a given equity appreciation, the accompanying lending adjustment raises concentration further and becomes relatively more important as wealth becomes more concentrated. The closer results under unanticipated shocks show that aggregate wealth paths alone do not identify this restriction; the demand experiments distinguish its effect on the transmission of asset demand.

6 Conclusion

We show that frictions in financial intermediation shape wealth inequality through the allocation of household savings between equity and debt. Portfolio allocation restrictions connect equity valuation to lending, which changes how asset demand affects household balance sheets across the distribution. Wealthy households accumulate both capital gains and claims against borrowers, whose corresponding liabilities affect wealth concentration. Studying these adjustments jointly reveals a distributional role for portfolio allocation that cannot be understood from asset ownership alone.

The historical simulations show how income differences generate asset demand and how intermediation shapes its distributional consequences. Rising wealthy labor income and dividends support saving and accumulation, while income developments elsewhere in the distribution influence borrowing needs. Portfolio restrictions connect these decisions: wealthy saving finances additional lending, and maintaining the fund's equity share supports equity valuation as its balance sheet expands. When households anticipate the historical paths, the constrained economy reduces the average wealth share prediction error by approximately 34% for the top decile and 37% for the bottom half relative to the flexible benchmark, while also producing borrowing and interest rate movements closer to the data. Learning about innovations as they arrive further improves the constrained economy's wealth share fit and brings the two economies closer, partly because their different responses to income sources offset. The transmission experiments reveal differences that these aggregate histories can conceal. The inequality multiplier is almost twice as large under portfolio allocation frictions, and even with identical equity price paths, these frictions produce a cumulative wealth share response approximately one third larger.

These findings have implications for how researchers and policymakers assess the distributional effects of financial markets. For research, matching equity valuations alone

can therefore understate wealth concentration when the accompanying lending is omitted. Models of wealth inequality should therefore account for how institutions allocate household savings alongside differences in saving behavior and portfolio ownership. For policy, changes in retirement investment arrangements, portfolio mandates or credit conditions can affect both valuations and liabilities, with distributional consequences beyond their immediate effects on investors or borrowers. The results motivate evaluating these margins jointly; they do not establish that relaxing portfolio restrictions necessarily improves welfare. Future work could identify allocation restrictions and demand disturbances more directly, allow households to change participation and intermediaries, and incorporate responsive equity supply.

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Appendix

The appendices provide the empirical methods and robustness (A), supporting portfolio and aggregate facts (B), theoretical derivations (C), quantitative model and calibration details (D), further transmission experiments (E), historical results (F) and the arbitrageur extension (G).

A. Fund flows, equity returns and wealth inequality

B. Household portfolios and aggregate trends

C. Theoretical derivations and proofs

D. Quantitative model and calibration details

E. Demand and income transmission

F. Historical wealth dynamics

G. Model with arbitrageur

A Fund Flows, Equity Returns and Wealth Inequality

This appendix describes the conditional return decomposition and local projections underlying Figure 1. It then reports sensitivity to return and flow definitions, period-specific estimates, alternative inference and wealth measurement. The exercise measures associations between return components and subsequent wealth outcomes; it does not identify a structural demand shock.

A.1 Data and the fund flow measure

We measure quarterly fund flows using net share issuance by mutual funds and exchange-traded funds (ETFs) in the Federal Reserve's *Financial Accounts of the United States*. Let I_t^{MF} and I_t^{ETF} denote their quarterly issuance transactions, not seasonally adjusted (series FU653164205 and FU564090005), and let V_{t-1}^E denote the lagged market value of corporate equity across all sectors (series LM893064105). The scaled flow is

$$f_t = 100 \frac{I_t^{MF} + I_t^{ETF}}{V_{t-1}^E}. \tag{43}$$

A unit of f_t is one percent of lagged equity market capitalization. ETF issuance is set to zero before 1993Q1. The measure excludes hedge funds and includes reinvested distributions

and ETF creations in kind. It therefore measures net issuance of fund shares, rather than cash subscriptions alone. Issuance and fund equity purchases are distinct: funds can allocate new funding across assets, and equity transactions can reflect portfolio rebalancing. Section A.5 considers Financial Accounts alternatives.

The baseline equity return is the broad market total return from the Fama–French data library. We add the monthly market excess return and risk-free return in simple return units, compound within each quarter, and take the logarithm. Denote this quarterly log return by r_t^m. The quarterly risk-free log return r_t^f is the sum of the monthly log risk-free returns from the same source. Market predictors come from the Goyal–Welch data set (Welch and Goyal, 2008); the series for dividend growth and the ten-year yield described below come from the Shiller data (Shiller, 2023). Real GDP and household wealth come from the national accounts and the Distributional Financial Accounts (DFA), respectively.

Response windows lie within 1990Q1–2024Q4. Complete outcomes and controls at every horizon $h = 0, \ldots, 12$ yield a common sample of 125 shock quarters, 1990Q4–2021Q4. The sample that excludes the global financial crisis (GFC) removes every window $[t-1, t+12]$ that overlaps 2008Q1–2009Q4. This removes shock quarters 2005Q1–2010Q1 and leaves 104 observations. Lags and changes are constructed on the full calendar before imposing sample exclusions. All stages are re-estimated on the selected shock dates.

A.2 Flow residualization and return decomposition

We first regress fund flows on an intercept and a vector X_t of 29 controls:

$$f_t = \alpha_f + \gamma' X_t + u_t, \qquad z_t = \widehat{u_t}. \tag{44}$$

The controls capture funding and market history, economic and distributional conditions, and financial conditions. Funding and market history enter through four quarterly lags each of flows and market returns. Economic and distributional controls are lagged real GDP growth, lagged mutual fund and ETF equity ownership as a share of corporate equity across all sectors, and lagged top decile and top 1% DFA wealth shares.

Financial controls are the lagged log ratio of dividends to prices, term spread, default spread and market volatility; dividend growth at t, $t-1$ and $t-2$; the lagged Treasury bill yield; the ten-year Treasury yield at t and its changes at t and $t-1$; and changes in volatility at t and $t-1$. Three quarter indicators and a standardized linear trend complete the 29 controls. Lagged variables are dated $t-1$ unless multiple lags are specified.

Real GDP growth is 100 times its quarterly log change. Dividend growth is 100 times the quarterly log change in Shiller's trailing annual dividend series. The term spread is

the long-term yield less the bill yield, and the default spread is the BAA yield less the AAA yield. Volatility is 100 times the sample standard deviation of four quarterly broad market total log returns. Distributional shares and institutional ownership are measured in percent, and yields retain the source units.

These controls account for predictable flow and return dynamics, initial economic and distributional conditions, and measured cash flow, valuation, interest rate and risk information (Welch and Goyal, 2008). The quarter indicators capture seasonality in issuance, and the trend captures linear secular variation. Current yields and volatility may themselves respond to flows, so conditioning on them can absorb part of the transmission of flows to returns.

We next estimate

$$r_t^m = \alpha_r + \pi' X_t + b z_t + v_t. \tag{45}$$

Let $\widetilde{r}_t^m = r_t^m - \widehat{\alpha}_r - \widehat{\pi}' X_t$. Define the *fund flow-associated* and *remaining* returns as

$$r_t^F = \widehat{b} z_t, \qquad r_t^O = \widetilde{r}_t^m - r_t^F = \widehat{v}_t. \tag{46}$$

Thus $\widetilde{r}_t^m = r_t^F + r_t^O$, with sample orthogonality between the two components. The decomposition is conditional on X_t: r_t^F is the return component associated with flows unexplained by those controls. Unobserved fundamentals or simultaneous responses to news can remain in this component. Remaining returns can also contain fundamental news, unmeasured demand variation and measurement error.

A.3 Wealth outcomes and local projections

For group g, let $W_{g,t}$ denote DFA net worth. We aggregate the top 0.1%, next 0.9% and next 9% bins into the top decile, and the next 40% and bottom 50% into the bottom 90%. Let $W_t = W_{\text{Top }10,t} + W_{\text{Bottom }90,t}$ and $\eta_{g,t} = W_{g,t}/W_t$. These are groups defined by wealth rank each quarter, so their household composition can change. The two shares sum to one.

The Introduction uses cumulative log wealth share changes:

$$\Upsilon_{g,t}^S(h) = 100\Big[\log \eta_{g,t+h} - \log \eta_{g,t-1}\Big]. \tag{47}$$

For comparison, following the excess wealth growth outcome in Gomez (2025), we use

$$\Upsilon_{g,t}^W(h) = 100\left[\log\left(\frac{W_{g,t+h}}{W_{g,t-1}}\right) - \sum_{j=0}^{h} r_{t+j}^f\right]. \tag{48}$$

Both are measured in log percentage points. A log wealth share change differs from a percentage point change in the share, $100(\eta_{g,t+h} - \eta_{g,t-1})$. Since $\Delta \log \eta_g = \Delta \log W_g - \Delta \log W$, wealth share growth measures group growth relative to aggregate household net worth, while (48) measures group growth relative to the cumulative risk-free return. Net worth growth includes saving, revaluation and changes in group composition.

For each outcome and horizon $h = 0, \ldots, 12$, we estimate a local projection (Jordà, 2005):

$$Y_{g,t}(h) = \alpha_{g,h} + \beta^{F}_{g,h}(100 r^{F}_{t}) + \beta^{O}_{g,h}(100 r^{O}_{t}) + \Lambda'_{g,h} C_t + \varepsilon_{g,t+h}. \tag{49}$$

The vector C_t contains the 29 controls in X_t and four lagged quarterly percentage point changes in the top decile DFA wealth share, giving 33 controls. The same distributional histories enter each group equation. Each coefficient is expressed per one percentage point of log equity return, so the two components are compared at a common return scale.

A.4 Inference

We report 90% pointwise normal confidence intervals using a joint covariance estimator robust to heteroskedasticity, following the empirical presentation in Gomez (2025) and drawing on White (1980). The estimator accounts for uncertainty across flow residualization, the return projection and the local projections, including the estimated return normalization and covariances across stages (Pagan, 1984). We apply an HC1 correction for the number of estimated regression parameters.[17]

The primary procedure does not adjust for serial dependence. Overlapping response windows and persistent variables motivate a bootstrap check that resamples consecutive calendar quarters and re-estimates every stage (Künsch, 1989). We use 999 draws with blocks of four quarters and assess sensitivity to blocks of eight quarters. Blocks are sampled within contiguous calendar runs to preserve the gap created by excluding the GFC.[18]

[17] The joint HC0 covariance is multiplied by $n/(n-36)$, where 36 counts the local projection intercept, 33 controls and two contemporaneous regressors. Intervals use the normal critical value 1.645. Coverage is pointwise at each horizon. Comparisons across components and horizons use their joint covariance.

[18] We use circular blocks and preserve each run's sample size. Intervals are symmetric around the estimate, using quantiles of absolute centered bootstrap errors. Two-sided tests use the corresponding centered errors with a finite-draw correction. Local projection results supporting inference robust to heteroskedasticity rely on particular lag-augmentation and innovation conditions (Montiel Olea and Plagborg-Møller, 2021), which we have not established for this return decomposition.

A.5 Selected robustness and wealth measurement

To summarize relative persistence, define $d_h = \beta^F_{\text{Top 10},h} - \beta^O_{\text{Top 10},h}$ for the log wealth share outcome. The late component gap and differential persistence contrast are

$$L = \frac{1}{5}\sum_{h=8}^{12} d_h, \qquad D = L - \frac{1}{4}\sum_{h=0}^{3} d_h. \tag{50}$$

A positive D indicates that the gap between the two responses is larger at later horizons. The level of that later gap is measured separately by L.

Table 3 presents three sets of sensitivity estimates. Panel A replaces the broad market total return with its excess return counterpart or S&P 500 returns, keeping dates, flows and baseline controls fixed. The S&P total return proxy assigns one quarter of trailing annual dividends to the quarterly holding period, $\log[(P_t + D_t^{(4)}/4)/P_{t-1}]$; the price return is $\Delta \log P_t$. The positive impact association and differential persistence estimates change little across these measures. The pattern therefore appears insensitive to the treatment of dividends, the subtraction of the risk-free return or the choice between the broad market and the S&P 500.

Panel B compares issuance with net corporate equity purchases and with issuance weighted by each fund sector's lagged corporate equity share of total financial assets. The purchase numerator is FU653064100+FU563064100; all measures use the denominator in (43). Each specification uses its own four flow lags and is re-estimated on the same 120 dates. Availability of the equity weights and their lags removes five quarters around ETF entry. Weighting issuance by equity exposure preserves the pattern, but using equity purchases reduces the persistence contrast from 0.053 to 0.005, with a wide interval. The estimated persistence pattern is therefore clearer for fund-share issuance than for fund equity purchases. Portfolio rebalancing and allocation across assets distinguish these measures but do not establish why their estimated responses differ.

Panel C estimates the specification separately for windows entirely within 1990–2006 and 2007–2024. The full $t-1$ through $t+12$ window must lie inside the named period; controls may use earlier history. The resulting shock dates are 1990Q4–2003Q4 ($n = 53$) and 2007Q2–2021Q4 ($n = 59$). Both periods show a positive impact association, but greater relative persistence appears only in the earlier period. The smaller samples leave substantial uncertainty; nevertheless, these estimates qualify the claim that the persistence pattern holds uniformly over time.

Table 4 compares inference for D. The full-sample estimate is 0.042, with a primary 90% interval of $[0.008, 0.076]$ and $p = 0.044$. Blocks of four quarters widen the interval

Table 3: Sensitivity to return definitions, fund flow measures and periods.

Specification	n	Impact: β_0^F	Late gap: L	Persistence: D
A. Return definitions				
Broad market total return	125	0.058 [0.046, 0.071]	0.024 [-0.006, 0.054]	0.042 [0.008, 0.076]
Broad market excess return	125	0.058 [0.046, 0.071]	0.024 [-0.006, 0.054]	0.042 [0.007, 0.076]
S&P 500 total return proxy	125	0.061 [0.047, 0.074]	0.021 [-0.011, 0.052]	0.038 [0.003, 0.074]
S&P 500 price return	125	0.060 [0.047, 0.074]	0.020 [-0.011, 0.052]	0.038 [0.003, 0.073]
B. Financial Accounts flow measures (matched sample)				
Fund share issuance	120	0.055 [0.042, 0.067]	0.035 [0.004, 0.066]	0.053 [0.016, 0.090]
Fund equity purchases	120	0.048 [0.029, 0.066]	-0.037 [-0.099, 0.025]	0.005 [-0.063, 0.074]
Equity-weighted issuance	120	0.055 [0.043, 0.067]	0.040 [0.010, 0.071]	0.064 [0.027, 0.101]
C. Estimates by period				
1990–2006	53	0.042 [0.020, 0.065]	-0.003 [-0.038, 0.032]	0.049 [0.000, 0.097]
2007–2024	59	0.060 [0.040, 0.081]	-0.017 [-0.068, 0.035]	-0.008 [-0.052, 0.036]

Note: Estimates [90% intervals] for the top decile log wealth share outcome, in log percentage points per one percentage point of log equity return. L and D are defined in (50). All rows use 29 controls in flow residualization and the return projection, and 33 in the local projections; intervals use the joint HC1 covariance. Panel A holds baseline financial histories and volatility controls fixed. Panel B uses common dates and each measure's own flow lags. Panel C requires the complete response window to lie within the period and re-estimates all stages separately. The 90% interval for the return loading excludes zero in every row.

to approximately $[0.000, 0.084]$, giving $p = 0.100$; blocks of eight quarters give $p = 0.141$. Excluding GFC windows produces a similar point estimate of 0.035, with $p = 0.244$ under primary inference and $p = 0.257$ with blocks of four quarters. Accounting for dependence weakens the statistical evidence without changing the point estimates. We therefore treat greater relative persistence as suggestive, with less precise evidence outside crisis windows.

Figure 9 shows excess net worth growth for both the top decile and the bottom 90%. Both return components are associated with larger initial gains in top decile net worth than in bottom 90% net worth. In the full sample, the initial growth advantage is similar for the two components. At quarters 8–12, the point estimates show a larger growth advantage for fund flow-associated returns than for remaining returns, although the responses are imprecise. With GFC windows excluded, the differences between groups are less consistent at later horizons. The relevant distributional comparison is how much faster one group's wealth grows than the other's. A lasting increase in the top share can therefore coexist with a decline in the top group's net worth response from its impact value. The panels illustrate the accounting behind the wealth share response; they do not identify the source of the different growth paths.

Figure 10 compares DFA with Realtime Inequality (RTI; Blanchet et al., 2022), changing

Table 4: Inference for the differential persistence contrast.

Sample	Inference	Estimate	90% interval	p
Full sample	Joint HC1	0.042	[0.008, 0.076]	0.044
Full sample	Bootstrap: 4 quarters	0.042	[0.000, 0.084]	0.100
Full sample	Bootstrap: 8 quarters	0.042	[-0.004, 0.087]	0.141
GFC excluded	Joint HC1	0.035	[-0.014, 0.085]	0.244
GFC excluded	Bootstrap: 4 quarters	0.035	[-0.017, 0.087]	0.257
GFC excluded	Bootstrap: 8 quarters	0.035	[-0.018, 0.089]	0.261

Note: The contrast D is defined in (50), in log wealth share percentage points per one percentage point of log return. Samples contain 125 and 104 shock quarters. Primary intervals are pointwise normal intervals; bootstrap intervals use absolute centered errors from 999 draws of calendar blocks, re-estimating all stages in each draw. All tests are two-sided. The full-sample lower bound with blocks of four quarters is 0.000074 before rounding; the displayed $p = 0.100$ reflects finite-draw resolution.

only the wealth share outcome on matched shock dates. RTI gives a smaller flow-associated top decile impact response and weaker support for a positive response at later horizons. We prefer DFA for this exercise because its household portfolio stocks are grounded in the Survey of Consumer Finances and reconciled to quarterly Financial Accounts totals (Batty et al., 2019). RTI updates quarterly totals while holding within-component distributions largely fixed, apart from its Forbes adjustment at the very top (Blanchet et al., 2022, Appendix B). DFA's allocations between survey waves also rely on modeling. The smaller RTI response shows that the result is sensitive to quarterly wealth measurement. DFA's portfolio stocks suit the balance-sheet question studied here, but the comparison limits confidence that the estimated pattern is common across wealth measures.

Table 5 uses the published annual baseline and equal-return wealth series of Smith et al. (2023). The sample contains 22 shock years, 1992–2013, with outcomes through 2016 and horizons zero to three years. We retain the 29 controls in the quarterly flow and return stages, sum residualized flows and log returns within each year, and use four controls in the annual local projections. These are lagged top decile and top 1% shares from each source, GDP growth in the prior calendar year and fund equity ownership at the end of the prior year. Table entries are percentage point wealth share responses per one standard deviation of annual residualized flows. Intervals use 999 bootstrap draws with blocks of three calendar years. The table notes give further estimation details.

The annual top decile impact estimates are negative and imprecise, and the estimates at three years are small and positive. These results provide no clear corroboration of the quarterly top decile pattern. The short sample and wide intervals make them inconclusive, while differences in frequency, controls and response scale prevent a direct comparison of magnitudes. The baseline top 1% estimate at three years has $p = 0.089$, although its 95%

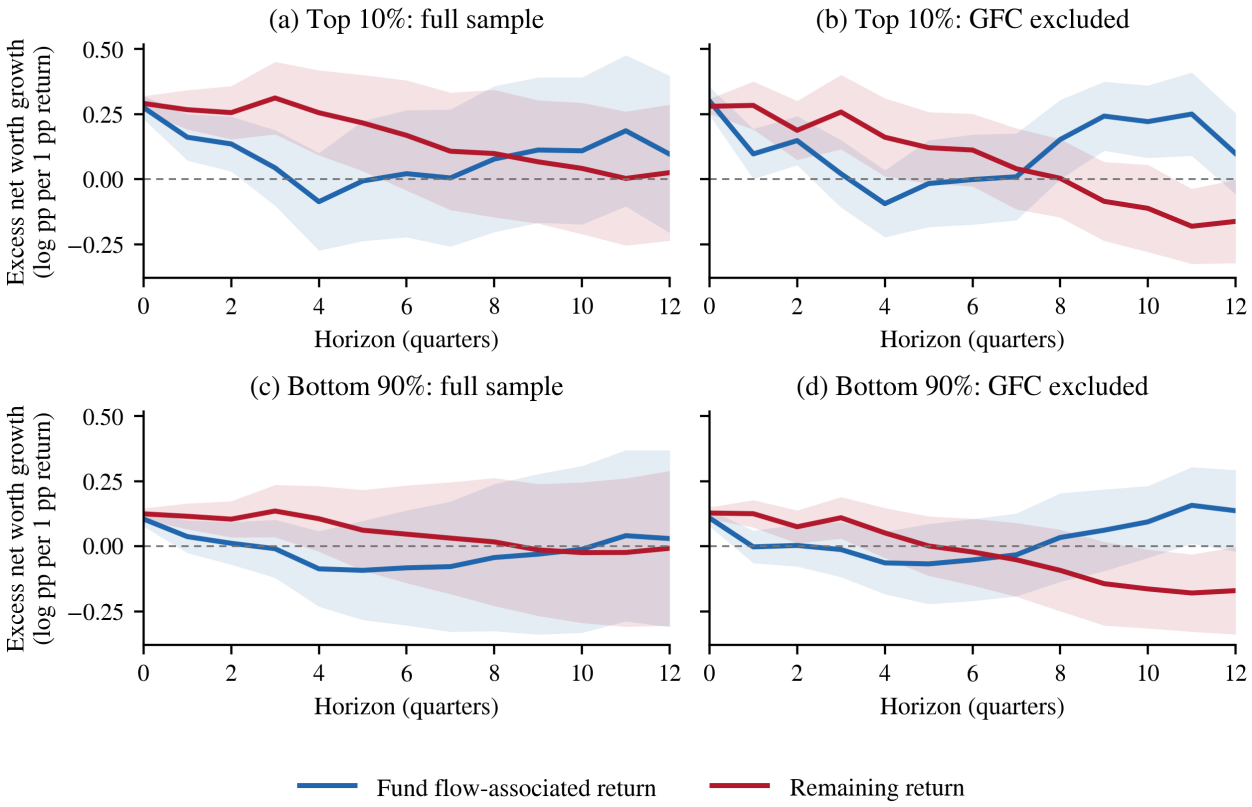


Figure 9: Excess net worth growth responses for the top 10% and bottom 90%.

Note: The outcome is cumulative log net worth growth from $t-1$ to $t+h$ less the cumulative risk-free log return, as defined in (48). Responses are measured in log percentage points per one percentage point of log equity return. Rows show the top 10% and bottom 90%; columns show the full sample and the sample excluding GFC windows. The samples contain 125 and 104 shock quarters, as in Figure 1. All panels use a common vertical scale. Blue denotes fund flow-associated returns and red denotes remaining returns. Shading shows 90% pointwise normal intervals that account for uncertainty across all estimation stages and are robust to heteroskedasticity.

interval includes zero. The equal-return series is an alternative wealth measure that also gives imprecise top decile responses.

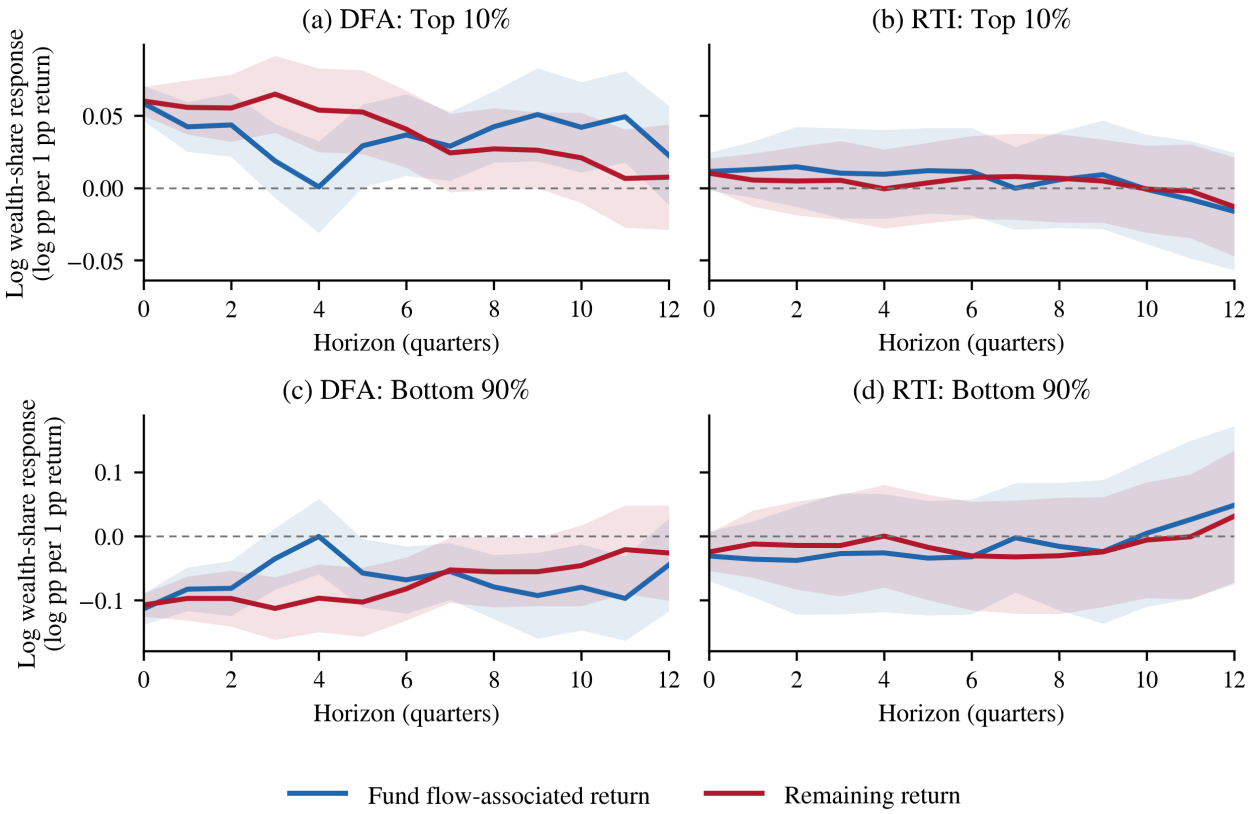


Figure 10: Wealth-share responses measured using the Distributional Financial Accounts and Realtime Inequality.

Note: The DFA and RTI estimates use the same 125 shock quarters, 1990Q4–2021Q4, and identical fund flows, returns and controls. Only the wealth share outcome changes. RTI uses the adult-household definition and observations from the final month of each quarter. The distributional controls are the DFA-based histories used in the main specification. Responses are cumulative log wealth share changes from $t-1$ to $t+h$, measured in log percentage points per one percentage point of log return. Blue denotes fund flow-associated returns and red denotes remaining returns. Shading shows 90% pointwise normal intervals that account for uncertainty across all estimation stages and are robust to heteroskedasticity. The data sources differ in wealth measurement and population conventions.

Table 5: Annual wealth share responses using Smith, Zidar and Zwick data.

Wealth series	Group	Horizon	Response	95% interval	p
Baseline	Top 10%	0	-0.104	[-0.377, 0.169]	0.468
Baseline	Top 10%	3	0.021	[-0.287, 0.328]	0.888
Baseline	Top 1%	0	-0.025	[-0.329, 0.279]	0.836
Baseline	Top 1%	3	0.206	[-0.052, 0.465]	0.089
Equal returns	Top 10%	0	-0.128	[-0.427, 0.172]	0.485
Equal returns	Top 10%	3	0.078	[-0.295, 0.451]	0.628
Equal returns	Top 1%	0	-0.110	[-0.480, 0.260]	0.589
Equal returns	Top 1%	3	0.238	[-0.087, 0.562]	0.125

Note: Responses are cumulative wealth share changes in percentage points per one standard deviation of the annual sum of residualized mutual fund and ETF issuance. Published annual wealth shares are from Smith et al. (2023); they are not interpolated. The common sample is 22 shock years, 1992–2013, with outcomes through 2016. Quarterly flow residualization and the return projection use the 29 controls of the main specification, re-estimated on complete quarterly cohorts for these shock years. Annual local projections include lagged top decile and top 1% shares from each source, GDP growth in the prior calendar year and institutional ownership at the end of the prior year. Intervals and two-sided p-values use 999 draws of blocks spanning three calendar years, re-estimating all stages in each draw. Each year's multiplicity weights both quarterly stages. The intervals are pointwise.

B Household Portfolios and Aggregate Trends

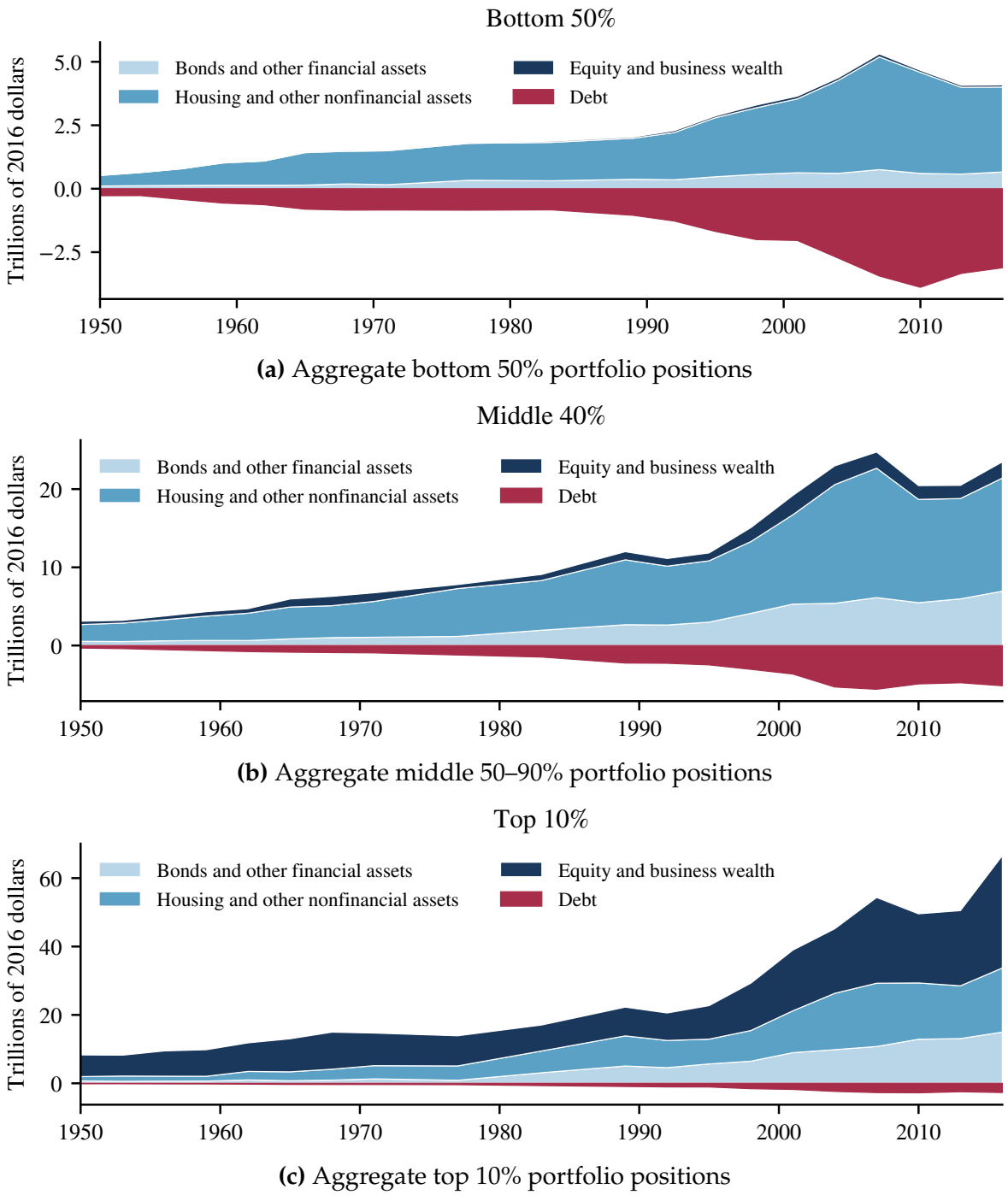
Two sets of empirical facts motivate our analysis: the heterogeneity of household portfolios across the wealth distribution and the coincident aggregate trends in asset values, debt and inequality since 1989. We describe each in turn.

B.1 Portfolio Heterogeneity

Portfolio heterogeneity determines the incidence of asset revaluation. Figure 11 shows aggregate dollar positions by wealth group. Equity holdings are concentrated at the top, housing is the principal asset of the middle group, and debt is consequential for bottom-group net worth (Kuhn et al., 2020). These positions motivate the model's participation restrictions: a given equity appreciation has unequal wealth effects. They do not by themselves measure demand elasticity.

B.2 Aggregate Trends

Figure 12 brings together four U.S. trends since 1989: higher equity market value and nonfinancial debt relative to GDP, different growth in wealth and income across the distribution, and a larger passive ownership share. The difference between top and bottom wealth growth exceeds the corresponding difference in income growth in the plotted series. These are descriptive comparisons of distinct distributional measures. They motivate examining how household resources, borrowing and portfolio allocation interact; passive ownership itself is not equivalent to a fixed allocation between equity and bonds.



(a) Aggregate bottom 50% portfolio positions

(b) Aggregate middle 50–90% portfolio positions

(c) Aggregate top 10% portfolio positions

Figure 11: Aggregate portfolio positions of the bottom 50%, middle 40% and top 10% of the wealth distribution.

Source: Authors' calculations from Kuhn et al. (2020) and group household counts, 1950–2016. Values are in trillions of 2016 dollars. Equity includes business wealth; housing includes other nonfinancial assets; the financial residual includes bonds, liquid assets, pensions and insurance. Debt combines housing and other household debt.

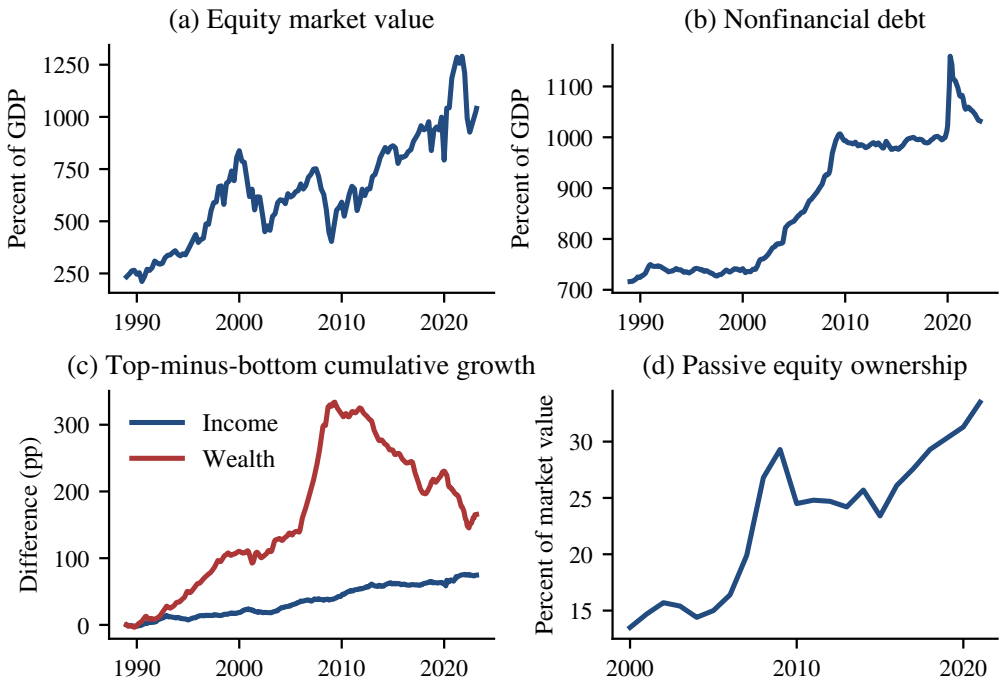


Figure 12: Four coincident trends since 1989: the rise in equity market capitalization and in aggregate debt (both relative to GDP), differences in top-minus-bottom wealth and income growth, and the growth of passive ownership of U.S. equities.

Note: *Market Capitalization* and *Total Debt Outstanding* are expressed as a percentage of GDP; total debt includes federal, household and business debt. In the lower-left panel, the increase in wealth (income) inequality is the difference between the growth rate of average wealth (average factor income) of the top 10 percent and that of the bottom 50 percent, with January 1989 as the base year; both differences are in percentage points of cumulative growth, not changes in wealth or income shares. Income and wealth groups follow their respective source rankings. *Passive Ownership Share* is the passive share of equity-market capitalization.

Source: Corporate-equity market capitalization and debt from the Financial Accounts of the United States (Z.1 Flow of Funds); GDP from FRED. Top-10% and bottom-50% income and wealth growth from Blanchet et al. (2022). Passive ownership share from Chinco and Sammon (2024).

C Theoretical Derivations and Proofs

This appendix derives the demand elasticities, price representations and wealth share multipliers used in Section 2.2. It concludes with extensions concerning equity issuance and allocation without differential exposure costs.

C.1 Elasticity in the Infinite-Period Model

We derive the elasticity of equity demand in each model, allowing a price increase to raise the value of inherited equity holdings. Net new funding, the expected future equity payoff, the safe return and consumption growth are held fixed. Let $\epsilon \equiv -\partial\widehat{q}/\partial\widehat{p}$ denote the positive quantity elasticity, where hats denote proportional deviations from the common reference allocation and q is the desired number of shares before market clearing. In the constrained economy,

$$\epsilon^{\text{con}} = (1-\bar{\theta}) + \frac{\theta^*}{\bar{\theta}}\frac{\beta^{MF}}{\chi^{MF}}\bar{R}^E. \tag{51}$$

Proof. Start with the fund's allocation rule, Equation (A1):

$$\bar{\theta}\widehat{\theta} = \theta^*\frac{\beta^{MF}}{\chi^{MF}}(\bar{R}^E\widehat{R^E} - \bar{R}\widehat{R}).$$

With the future equity payoff fixed, a higher current price lowers the expected return: $\widehat{R^E} = -\widehat{p}$. Holding the safe return fixed therefore gives

$$\widehat{\theta} = -\frac{\theta^*}{\bar{\theta}}\frac{\beta^{MF}}{\chi^{MF}}\bar{R}^E\widehat{p}.$$

Next, the quantity demanded is $q = \theta X/p$. At first order,

$$\begin{aligned}
\widehat{q} &= \widehat{\theta} + \widehat{X} - \widehat{p}, \\
\widehat{X} &= \bar{\theta}\widehat{p}, \\
\widehat{q} &= -\left[(1-\bar{\theta}) + \frac{\theta^*}{\bar{\theta}}\frac{\beta^{MF}}{\chi^{MF}}\bar{R}^E\right]\widehat{p}.
\end{aligned}$$

The second line allows inherited equity to appreciate while new funding is fixed. Taking $-\partial\widehat{q}/\partial\widehat{p}$ yields the result. □

The first term is the elasticity of a fund with a fixed equity share. The second captures the manager's reduction in that share when a higher price lowers the expected equity

premium. A tighter mandate reduces this additional response. As $\chi^{MF} \to \infty$, the elasticity approaches $1 - \bar{\theta}$, approximately 0.220 at the calibration.

In the flexible benchmark, the fund chooses allocation on the wealthy household's behalf, subject to the exposure costs in Appendix D.4. Under the same conditions, its elasticity is

$$\epsilon^{\text{flex}} = \frac{\phi_E + \beta^R \bar{R}^E}{\phi_E + \phi_B \bar{\theta}/(1-\bar{\theta})}. \tag{52}$$

Proof. Subtracting the equity and bond Euler conditions, holding consumption growth and the safe return fixed, gives

$$\phi_E \widehat{E} - \phi_B \widehat{B} = \beta^R \bar{R}^E \widehat{R^E} = -\beta^R \bar{R}^E \widehat{p}.$$

Equity value is $E = pq$, and total investment is $X = E + B$. Consequently,

$$\begin{aligned}
\widehat{E} &= \widehat{p} + \widehat{q}, \\
\widehat{X} &= \bar{\theta}\widehat{E} + (1-\bar{\theta})\widehat{B} = \bar{\theta}\widehat{p}, \\
\widehat{B} &= -\frac{\bar{\theta}}{1-\bar{\theta}}\widehat{q}.
\end{aligned}$$

Substituting into the allocation condition gives

$$\left(\phi_E + \phi_B \frac{\bar{\theta}}{1-\bar{\theta}}\right)\widehat{q} = -(\phi_E + \beta^R \bar{R}^E)\widehat{p}.$$

Taking $-\partial\widehat{q}/\partial\widehat{p}$ yields the benchmark elasticity. □

At the baseline calibration, $\epsilon^{\text{con}} \simeq 0.226$ and $\epsilon^{\text{flex}} \simeq 1.832$. The exposure costs limit the flexible fund's response, but its equity demand elasticity remains above one. The mandate makes constrained demand substantially less responsive. Both calculations allow inherited wealth to revalue, as in Gabaix and Koijen (2021); they describe portfolio demand conditional on funding rather than the full saving response in equilibrium.[19]

[19] Holding total invested value fixed instead gives elasticities of approximately 1.006 and 2.599, respectively. Funding here means funds available for investment after consumption, distributions and costs paid outside the portfolio.

C.2 Balance Sheet and Forward Representations of Price

With fixed equity supply, write bond holdings as their initial level plus accumulated changes. The fund balance sheet gives

$$p_t = \frac{\theta_t}{1-\theta_t}\frac{1}{\bar{Q}}\left(B_{-1} + \sum_{j=0}^{t} \Delta B_j\right), \qquad \Delta B_j = B_j - B_{j-1}. \tag{53}$$

Bond market clearing equates these holdings to the debt of the other households and the government. Their accumulated changes are endogenous borrowing outcomes. The allocation rule determines how that debt stock maps into equity value in each regime.

A forward representation follows from the return identity. Along a deterministic path, let $R^E_t = (D_{t+1} + p_{t+1})/p_t$. Iterating and imposing $\lim_{T\to\infty} p_{t+T}/\prod_{j=0}^{T-1} R^E_{t+j} = 0$ gives

$$p_t = \sum_{k=1}^{\infty} \frac{D_{t+k}}{\prod_{j=0}^{k-1} R^E_{t+j}}. \tag{54}$$

Under uncertainty, the analogous pathwise identity uses realized returns, whereas valuation with conditional expected payoffs uses the appropriate stochastic discount factor. The first-order quantitative return convention is given in (A2).

Both regimes satisfy the balance-sheet and return identities. Their equilibrium conditions determine the return path. In the constrained fund, the linear manager condition implies

$$\bar{R}^E \widehat{R}^E_t - \bar{R}\widehat{R}_t = \frac{\chi^{MF}}{\beta^{MF}}\frac{s}{\theta^*}\widehat{\theta}_t. \tag{55}$$

In the flexible fund, marginal exposure costs and the wealthy household's Euler conditions jointly determine required returns. Consequently, borrowing and future dividends affect prices through allocation and the rest of the equilibrium in both regimes.

C.3 Equilibrium Price Responses

A conditional demand elasticity describes desired quantities as price varies. An equilibrium price response describes how a particular disturbance moves the price after all markets adjust. To derive the latter, use the shared return equation (A2). Define $\rho_p = \bar{p}/(\bar{D} + \bar{p})$ and $\rho_D = 1 - \rho_p$. Then

$$\widehat{p}_t = \rho_p \mathbb{E}_t \widehat{p}_{t+1} + \rho_D \mathbb{E}_t \widehat{D}_{t+1} - \widehat{R}^E_t. \tag{$\star$}$$

The recursions below allow for the fundamental and demand disturbances in Appendix D.4. Define $w_t = w_t^E + w_t^F$, the added marginal incentive in the flexible equity condition. Let $\mathcal{S}_t$ and g_t be the marginal bequest and consumption growth terms defined in (89).

Flexible benchmark The underlying equity Euler condition gives

$$(1 + b_E)\widehat{p}_t = \rho_p \mathbb{E}_t \widehat{p}_{t+1} + \rho_D \mathbb{E}_t \widehat{D}_{t+1} - g_t + \frac{\mathcal{S}_t + w_t}{\beta^R \bar{R}^E}, \qquad b_E = \frac{\phi_E}{\beta^R \bar{R}^E}.$$

Under the corresponding terminal condition, a disturbance ε has the price response

$$\frac{\partial \widehat{p}_t^{\text{flex}}}{\partial \varepsilon} = \frac{1}{1 + b_E} \sum_{j=0}^{\infty} \left(\frac{\rho_p}{1 + b_E} \right)^j \frac{\partial}{\partial \varepsilon} \mathbb{E}_t \left[\rho_D \widehat{D}_{t+j+1} - g_{t+j} + \frac{\mathcal{S}_{t+j} + w_{t+j}}{\beta^R \bar{R}^E} \right]. \tag{56}$$

At the calibration, $b_E \simeq 0.146$ and $\rho_p/(1 + b_E) \simeq 0.826$. The holding cost therefore matters for the recursion's weights. Borrowing affects the price through equilibrium consumption, wealth and returns, which enter the Euler conditions.

Constrained economy Combine the manager rule with $\widehat{p}_t = \widehat{B}_t^{MF} + \widehat{\theta}_t/(1 - s)$. Define

$$A = \frac{\theta^*}{s(1 - s)} \frac{\beta^{MF}}{\chi^{MF}} \bar{R}^E. \tag{57}$$

Substituting ($\star$) gives

$$(1 + A)\widehat{p}_t = \widehat{B}_t^{MF} + A\rho_D \mathbb{E}_t \widehat{D}_{t+1} + A\rho_p \mathbb{E}_t \widehat{p}_{t+1} - A \frac{\bar{R}}{\bar{R}^E} \widehat{R}_t.$$

Hence

$$\frac{\partial \widehat{p}_t^{\text{con}}}{\partial \varepsilon} = \frac{1}{1 + A} \sum_{j=0}^{\infty} \left(\frac{A\rho_p}{1 + A} \right)^j \frac{\partial}{\partial \varepsilon} \mathbb{E}_t \left[\widehat{B}_{t+j}^{MF} + A\rho_D \widehat{D}_{t+j+1} - A \frac{\bar{R}}{\bar{R}^E} \widehat{R}_{t+j} \right]. \tag{58}$$

Here $A \simeq 0.0288$ and $A\rho_p/(1 + A) \simeq 0.0265$. For a tight mandate and bounded input responses,

$$\frac{\partial \widehat{p}_t^{\text{con}}}{\partial \varepsilon} = \frac{\partial \widehat{B}_t^{MF}}{\partial \varepsilon} + O(1/\chi^{MF}). \tag{59}$$

Bond market clearing determines $\widehat{B}_t^{MF}$ from household and government borrowing. Demand disturbances affect this recursion through equilibrium borrowing and returns; they do not directly shift the manager's rule. Fundamentals can move prices substantially through that borrowing response even when the direct forward weights are small. The

economic distinction is how portfolio allocation accommodates changes in saving and borrowing. A tight mandate requires equity value to move almost proportionately with the fund's bond holdings. The flexible fund can instead change its allocation, with the price jointly determined by expected payouts, consumption, wealth and exposure costs. Borrowing disturbances can therefore create substantial price movements under the mandate, while the flexible fund has an additional allocation margin through which to absorb them. Conversely, dividend news can induce the flexible fund to change its allocation substantially, while constrained prices also depend on how the news changes borrowing. The magnitude and ordering of the resulting price responses depend on the shock.

For the inequality results, these price responses complement the conditional multipliers in Section C.4: a larger wealth share response can reflect a larger price movement, a larger share response to that movement, or both. The forward weights 0.826 and 0.0265 describe the displayed recursions, while the persistence of equilibrium prices also depends on the endogenous paths entering them.

C.4 Conditional Inequality Multipliers

This subsection derives the conditional wealth share multipliers in Proposition 2.2 and their concentration comparison in Proposition 2.4. The multiplier describes a wealth share change per proportional equity price change under stated portfolio restrictions. If the share is measured as a fraction, a one percent price increase changes the share by approximately M percentage points. Let total reference net worth be

$$\bar{\mathcal{W}} = \bar{p}\bar{Q} + \bar{X}^H + \bar{B}^G, \qquad \bar{X}^H = \bar{X}^{H,M} + \bar{X}^{H,P},$$

and define $\eta = \bar{a}^R/\bar{\mathcal{W}}$, $\omega_E = \bar{p}\bar{Q}/\bar{\mathcal{W}}$, $\omega_H = \bar{X}^H/\bar{\mathcal{W}}$ and $\omega_G = \bar{B}^G/\bar{\mathcal{W}}$. The first-order share identity is

$$\eta_R^{dev} = \eta\left[\widehat{a^R} - \omega_E\widehat{p} - \omega_H\widehat{p^H} - \omega_G\widehat{B^G}\right],$$

which is (31). For a conditional wealth sensitivity $\beta_R^E = \partial\widehat{a^R}/\partial\widehat{p}$, holding housing and government debt fixed gives $M = \eta(\beta_R^E - \omega_E)$.

In the flexible fund, $a^R = X^{\text{flex}} = p\bar{Q} + B^{\text{flex}}$. Holding its bond position fixed gives

$$\beta_R^{E,\text{flex}} = \frac{\bar{p}\bar{Q}}{\bar{a}^R} = s. \tag{60}$$

In the constrained fund, $a^R = X^{MF} = p\bar{Q}/\theta$. Along any differentiable portfolio response,

$$\beta_R^{E,\text{con}} = 1 - \frac{\partial\widehat{\theta}}{\partial\widehat{p}}. \tag{61}$$

Holding allocation fixed makes this sensitivity one. With a fixed equity quantity, bonds must then increase proportionately with the equity price to maintain the portfolio share. This conditional derivative includes that increase in bond holdings. For a finite mandate penalty, equilibrium allocation can also respond.

Using $\omega_E = s\eta$ at the common reference, the two conditional multipliers are

$$M^{\text{flex}} = s\eta(1-\eta), \tag{62}$$

$$M^{\text{con}} = \eta(1-s\eta). \tag{63}$$

The flexible expression holds bonds fixed; the constrained expression holds allocation fixed. Their ratio is

$$\mathcal{R} = \frac{M^{\text{con}}}{M^{\text{flex}}} = \frac{1-s\eta}{s(1-\eta)},$$

corresponding to (34). Its comparative statics are

$$\frac{\partial\mathcal{R}}{\partial s} = -\frac{1}{s^2(1-\eta)}, \qquad \frac{\partial\mathcal{R}}{\partial\eta} = \frac{1-s}{s(1-\eta)^2}.$$

A larger bond share or greater wealth concentration raises the ratio. The absolute coefficients have different comparative statics:

$$\frac{\partial M^{\text{flex}}}{\partial\eta} = s(1-2\eta), \qquad \frac{\partial M^{\text{con}}}{\partial\eta} = 1-2s\eta.$$

Thus an increasing ratio can coexist with a decreasing constrained multiplier. Responses to later disturbances also depend on the price, allocation and other asset responses. The first-order solution evaluates these coefficients at the common reference.

Net fund investment and inelasticity. A complementary calculation separates the lending and valuation effects of a small net cash investment F available to the fund after distributions and household holding costs. Hold allocation s and the equity quantity fixed, with a bond price of one. There is no equity issuance, and government debt and housing values are unchanged. Net investment is therefore absorbed by additional household debt:

$\Delta B = F$. Differentiating $p\bar{Q} = sB/(1-s)$ gives

$$\Delta(p\bar{Q}) = \frac{s}{1-s}F.$$

The wealthy household's assets increase by $\Delta a^R = F + \Delta(p\bar{Q})$, while aggregate wealth increases by $\Delta\mathcal{W} = \Delta(p\bar{Q})$ because private debt cancels on consolidation. The share quotient then gives, to first order,

$$\begin{aligned}\Delta\eta &= \frac{\Delta a^R - \eta\Delta\mathcal{W}}{\mathcal{W}} \\ &= \underbrace{\frac{F}{\mathcal{W}}}_{\text{additional lending}} + \underbrace{\frac{s}{1-s}(1-\eta)\frac{F}{\mathcal{W}}}_{\text{equity valuation}}.\end{aligned} \tag{64}$$

Using $\epsilon = 1 - s$, the coefficient in (64) is

$$1 + \frac{s}{1-s}(1-\eta) = \eta + \frac{1-\eta}{\epsilon}, \qquad \frac{\partial[\Delta\eta/(F/\mathcal{W})]}{\partial\epsilon} = -\frac{1-\eta}{\epsilon^2} < 0.$$

This proves Proposition 2.3. A higher fixed equity weight lowers the conditional demand elasticity and raises the share response to a given investment, although $\partial M^{\text{con}}/\partial s = -\eta^2 < 0$. The distinction reflects what is held fixed: net cash investment here, and the price change in the definition of M.

C.5 Wealth Share Responses in General Equilibrium

The common accounting identity separates the equilibrium changes in equity value, bond holdings and other components of net worth. Define $\omega_B = \bar{B}^{\text{flex}}/\bar{\mathcal{W}} = \eta - \omega_E$ at the common reference. In either regime,

$$\eta_R^{dev} = \omega_E(1-\eta)\widehat{p} + \omega_B\widehat{B} - \eta\omega_H\widehat{p^H} - \eta\omega_G\widehat{B^G}.$$

The bond price is normalized to one, so $\widehat{B}$ records a change in the quantity held. For a disturbance ε, the total response is

$$\frac{d\eta_R^{dev}}{d\varepsilon} = \omega_E(1-\eta)\frac{d\widehat{p}}{d\varepsilon} + \omega_B\frac{d\widehat{B}}{d\varepsilon} - \eta\omega_H\frac{d\widehat{p^H}}{d\varepsilon} - \eta\omega_G\frac{d\widehat{B^G}}{d\varepsilon}. \tag{65}$$

A housing price increase dilutes the wealthy household's share because the household owns no housing. Its total wealth share response also includes changes in its equity and

bond positions.

For the constrained fund, substitute $\widehat{B}^{MF} = \widehat{p}^{\text{con}} - \widehat{\theta}^{\text{con}}/(1-s)$, using $\omega_B = \eta(1-s)$:

$$\eta_R^{dev,\text{con}} = \eta(1-\omega_E)\widehat{p}^{\text{con}} - \eta\widehat{\theta}^{\text{con}} - \eta\omega_H\widehat{p}^{H,\text{con}} - \eta\omega_G\widehat{B}^G.$$

For the flexible fund, retain the independently chosen bond position:

$$\eta_R^{dev,\text{flex}} = \omega_E(1-\eta)\widehat{p}^{\text{flex}} + \omega_B\widehat{B}^{\text{flex}} - \eta\omega_H\widehat{p}^{H,\text{flex}} - \eta\omega_G\widehat{B}^G.$$

The constrained expression incorporates the bond adjustment into the price and allocation terms. Comparing responses to a common disturbance with the same exogenous government debt path therefore gives

$$\begin{aligned}\eta_R^{dev,\text{con}} - \eta_R^{dev,\text{flex}} = \eta(1-\omega_E)\widehat{p}^{\text{con}} - \omega_E(1-\eta)\widehat{p}^{\text{flex}} - \omega_B\widehat{B}^{\text{flex}} \\ - \eta\omega_H(\widehat{p}^{H,\text{con}} - \widehat{p}^{H,\text{flex}}) - \eta\widehat{\theta}^{\text{con}}.\end{aligned} \tag{66}$$

At the same positive equity price change and with the constrained fund's equity share held fixed, the constrained price coefficient exceeds the flexible one by ω_B. Actual wealth share differences also reflect unequal equity price responses, flexible bond accumulation, housing values and changes in the constrained fund's equity share. Equation (66) accounts for those jointly determined responses. Experiments that isolate a causal contribution require additional restrictions on the equilibrium adjustment.

C.6 Changes in Equity Supply

The quantitative model fixes equity supply at $\bar{Q}$. The following accounting comparison describes how a change in supply enters the relation between equity value, bonds and allocation.

Proposition C.1. *For $Q_t = \bar{Q}(1+\delta_q) > 0$ and an interior portfolio share, the fund balance sheet implies*

$$p_t = \frac{1}{1+\delta_q}\frac{\theta_t}{1-\theta_t}\frac{B_t}{\bar{Q}}. \tag{67}$$

Proof. The position identities $p_tQ_t = \theta_tX_t$ and $B_t = (1-\theta_t)X_t$ imply $p_tQ_t = \theta_tB_t/(1-\theta_t)$. Substituting for supply gives the result. □

This identity holds for both fund representations. At fixed allocation and bond holdings, more shares lower the price per share. The equilibrium response also depends on how

allocation, saving and borrowing adjust. Writing $s = \bar{\theta}$, in proportional deviations,

$$\widehat{p_t} = \widehat{B_t} + \frac{\widehat{\theta_t}}{1-s} - \widehat{Q_t}. \tag{68}$$

To distinguish new funding from asset growth, consider a conditional portfolio accounting exercise. Begin with equity holdings $\bar{Q}$, invested value $\bar{X}$ and equity share $s = \bar{\theta} = \bar{p}\bar{Q}/\bar{X}$. Let $F = f\bar{X}$ be net funding available for investment, after other receipts and expenditures, and let $u = (p - \bar{p})/\bar{p}$. Inherited equity revaluation and net funding give $X/\bar{X} = 1 + su + f$. If the equity share stays at s and the fund holds the new supply, its equity position must satisfy

$$(1+u)(1+\delta_q) = 1 + su + f, \qquad u = \frac{f - \delta_q}{1 - s + \delta_q}.$$

Prices therefore rise if and only if $f > \delta_q$, provided $1 - s + \delta_q > 0$. Issuance absorbs some of the demand generated by new funding, while appreciation of inherited equity raises the fund's wealth and sustains additional equity demand.

For a numerical illustration, take quarterly net funding of $f = 2\%$ of initial fund assets and issuance of $\delta_q = 0.2\%$ of initial shares. At $s \simeq 0.78$, the price change is approximately 8.1%, compared with 9.1% under fixed supply. Issuance reduces this conditional price response by about 11%, while leaving most of it intact. Thus issuance at one tenth of the funding rate attenuates the valuation effect without eliminating it. These values illustrate the calculation rather than estimate an equilibrium quarterly return.

A supply schedule that increases with the price illustrates the resulting attenuation. Write

$$\delta_q = \varphi u, \qquad \varphi \geq 0. \tag{69}$$

Then $\varphi u^2 + (1 - s + \varphi)u - f = 0$. Around $f = 0$, the branch through $u = 0$ satisfies

$$u \simeq \frac{f}{1 - s + \varphi}.$$

Relative to fixed supply, issuance reduces this conditional price response by $(1-s)/(1-s+\varphi)$. Halving the response requires $\varphi = 1 - s$, approximately 0.22 at the calibration. For any finite φ, a small positive funding shock still raises the price; the response vanishes as supply becomes perfectly elastic. The finding of Sammon and Shim (2026) that firms supply shares in response to passive demand makes this supply response economically relevant.

For our results, equity issuance can therefore reduce the size of the price response and the associated wealth revaluation. The mechanism survives when supply is insufficiently responsive to absorb the additional demand at unchanged prices. The numerical illustration shows that modest issuance need not change that conclusion, but average issuance alone does not establish its responsiveness to a particular shock. Quantifying the change in our general equilibrium results would also require specifying the recipients and uses of issuance proceeds and their effect on dividends.

C.7 Allocation without Differential Exposure Costs

The implemented flexible benchmark is the flexible fund in Appendix D.4. The fund chooses allocation on behalf of the wealthy household, and the marginal costs of its equity and bond exposures affect that choice. Their difference supports the positive reference equity premium through (85).

A useful limiting allocation condition removes both the mandate penalty and the difference in marginal exposure costs. With a common stochastic discount factor $m_{t,t+1}$, an interior allocation then requires

$$\mathbb{E}_t\left[m_{t,t+1}(R_t^E - R_t)\right] = 0.$$

This is the familiar asset pricing condition underlying present-value representations such as Lucas (1978). In a deterministic reference, it requires equal asset returns. If expected discounted returns differ and the allocation objective is linear, the optimum can instead lie at a portfolio boundary. Thus eliminating differential exposure costs would change the reference conditions supporting the implemented benchmark's positive premium. Economically, these costs allow the household to hold both assets despite their unequal reference returns: the equity premium compensates for the higher marginal cost of equity exposure. The flexible benchmark therefore allows portfolio substitution while its exposure costs support a positive premium. Removing those costs as well would change the pricing and allocation conditions.

D Quantitative Model: Equilibrium and Calibration Details

This appendix states the common reference allocation, the constrained equilibrium system and reporting identities, and the flexible allocation benchmark. It then gives the implementation of demand incentives, the preference scaling argument and the calibration of exogenous processes. Both economies use the same household preferences, housing and borrowing structure, asset supplies and reference allocation.

D.1 Reference Allocation

Bars denote the 1989 reference values used in the linear system. Equity prices are calibrated using the expected dividend growth rate g_D:

$$\bar{R}^E = \bar{R} + r_x, \qquad \bar{p} = \frac{\bar{D}}{\bar{R}^E - 1 - g_D}, \qquad \bar{R}^{MF} = \bar{\theta}\bar{R}^E + (1 - \bar{\theta})\bar{R}. \tag{70}$$

Thus the equity return coefficient $\bar{R}^E$ exceeds the stationary payout ratio $1 + \bar{D}/\bar{p}$ by g_D. The linear return and budget equations below retain this reference convention in both regimes. The mutual fund balance sheet implies

$$\bar{X}^{MF} = \bar{p}\bar{Q} + \bar{B}^{MF}, \qquad \bar{\theta} = \frac{\bar{p}\bar{Q}}{\bar{X}^{MF}}, \qquad \bar{B}^{MF} = \bar{B}^P + \bar{B}^M + \bar{B}^G. \tag{71}$$

The wealthy household's Euler equation, with both demand disturbances set to zero, implies

$$1 + \phi_{MF} = \delta\bar{\zeta}^R + \beta^R\bar{R}^{MF}, \qquad \bar{\zeta}^R = (\bar{a}^R)^{-\Sigma_R}(\bar{c}^R)^{\sigma_R}. \tag{72}$$

For the middle class,

$$\bar{\psi}^M = 1 - \beta^M\bar{R}, \qquad 1 + \phi_H^M = \beta^M\frac{\bar{D}^H + \bar{p}^H}{\bar{p}^H} + \bar{\tau}^M\bar{\psi}^M, \tag{73}$$

and the binding collateral constraint gives

$$\bar{B}^M = \bar{\tau}^M\bar{X}^{H,M}. \tag{74}$$

For non-wealthy households,

$$1 - \phi_B^P\bar{B}^P = \beta^P\bar{R}, \qquad 1 + \phi_H^P = \beta^P\frac{\bar{D}^H + \bar{p}^H}{\bar{p}^H}. \tag{75}$$

Housing-market clearing in steady state is

$$\bar{X}^{H,M} + \bar{X}^{H,P} = \bar{p}^H \bar{H} \equiv \bar{X}^H. \tag{76}$$

D.2 Log-Linearized Equilibrium System

This subsection gives the log-linearized system corresponding to the constrained economy. All variables are proportional deviations from the 1989 reference allocation unless otherwise noted. Transfer deviations $\widetilde{T}_t$ are level deviations. The notation $\widehat{\mu}_t^M$ denotes the proportional deviation of the level collateral multiplier μ_t^M; its steady-state consumption-normalized value is $\bar{\psi}^M \equiv \bar{\mu}^M / u'_M(\bar{c}^M)$. In the stochastic version, all variables dated $t+1$ inside Euler equations are conditional expectations; in the perfect-foresight implementation, the expectations operator is suppressed.

A. Mutual Fund and Wealthy Household

The mutual fund mandate rule is

$$\bar{\theta}\widehat{\theta}_t = \theta^* \frac{\beta^{MF}}{\chi^{MF}} \left(\bar{R}^E \widehat{R}_t^E - \bar{R}\widehat{R}_t \right). \tag{A1}$$

The equity-return identity is

$$(\bar{D} + \bar{p})\widehat{R}_t^E = \bar{D}\widehat{D}_{t+1} + \bar{p}\widehat{p}_{t+1} - (\bar{D} + \bar{p})\widehat{p}_t. \tag{A2}$$

The mutual fund portfolio return is

$$\bar{R}^{MF}\widehat{R}_t^{MF} = \bar{\theta}\bar{R}^E\widehat{R}_t^E + (1-\bar{\theta})\bar{R}\widehat{R}_t + \bar{\theta}(\bar{R}^E - \bar{R})\widehat{\theta}_t. \tag{A3}$$

The value of the mutual fund position satisfies

$$\widehat{X}_t^{MF} = \bar{\theta}\widehat{p}_t + (1-\bar{\theta})\widehat{B}_t^{MF}. \tag{A4}$$

The wealthy household's assets are

$$\bar{a}^R \widehat{a}_t^R = \bar{X}^{MF}\widehat{X}_t^{MF}. \tag{A5}$$

The wealthy household's budget constraint is

$$\bar{c}^R\widehat{c}_t^R + (1+\phi_{MF})\bar{X}^{MF}\widehat{X}_t^{MF} = \bar{e}^R\widehat{e}_t^R + \bar{R}^{MF}\bar{X}^{MF}\left(\widehat{R}_{t-1}^{MF} + \widehat{X}_{t-1}^{MF}\right) + s_T^R\widetilde{T}_t. \tag{A6}$$

Write $w_t^E = kz_t^E$ and $w_t^F = kz_t^F$ for the marginal demand incentives defined in Section 4. The wealthy household's mutual fund Euler equation is

$$\begin{aligned}\phi_{MF}\widehat{X}_t^{MF} = \delta\bar{\zeta}^R\left(\sigma_R\widehat{c}_t^R - \Sigma_R\widehat{a}_t^R\right) + \bar{\theta}w_t^E + w_t^F \\ + \beta^R\bar{R}^{MF}\left[\widehat{R}_t^{MF} - \sigma_R\left(\widehat{c}_{t+1}^R - \widehat{c}_t^R\right)\right].\end{aligned} \tag{A7}$$

The mutual fund balance sheet implies

$$\widehat{p}_t = \widehat{B}_t^{MF} + \frac{1}{1-\bar{\theta}}\widehat{\theta}_t. \tag{A9}$$

Equation (A9) is the linear form of the balance-sheet identity (30). When allocation changes little, equity prices move approximately in proportion to the fund's bond holdings. The allocation rule (A1) determines how tightly this relation holds.

B. Middle-Class Households

The middle-class budget constraint is

$$\begin{aligned}\bar{c}^M\widehat{c}_t^M + (1+\phi_H^M)\bar{X}^{H,M}\widehat{X}_t^{H,M} + \bar{R}\bar{B}^M\left(\widehat{R}_{t-1} + \widehat{B}_{t-1}^M\right) \\ = \bar{e}^M\widehat{e}_t^M + \bar{D}^H\bar{H}^M\widehat{D}_t^H + \bar{X}^{H,M}\widehat{p}_t^H \\ + (\bar{D}^H + \bar{p}^H)\bar{H}^M\left(\widehat{X}_{t-1}^{H,M} - \widehat{p}_{t-1}^H\right) + \bar{B}^M\widehat{B}_t^M + s_T^M\widetilde{T}_t.\end{aligned} \tag{B1}$$

The middle-class bond Euler equation is

$$\bar{\psi}^M\widehat{\mu}_t^M = -\beta^M\bar{R}\left[\widehat{R}_t - \sigma_M\left(\widehat{c}_{t+1}^M - \widehat{c}_t^M\right)\right] - \bar{\psi}^M\sigma_M\widehat{c}_t^M. \tag{B2}$$

The middle-class housing Euler equation is

$$\begin{aligned}\phi_H^M\bar{p}^H\widehat{X}_t^{H,M} = \beta^M\Big[\bar{D}^H\widehat{D}_{t+1}^H + \bar{p}^H\widehat{p}_{t+1}^H - (\bar{D}^H + \bar{p}^H)\widehat{p}_t^H \\ - \sigma_M(\bar{D}^H + \bar{p}^H)\left(\widehat{c}_{t+1}^M - \widehat{c}_t^M\right)\Big] \\ + \bar{\tau}^M\bar{p}^H\bar{\psi}^M\left(\widehat{\mu}_t^M + \sigma_M\widehat{c}_t^M + \widehat{\tau}_t^M\right).\end{aligned} \tag{B3}$$

The binding collateral constraint is

$$\widehat{B}_t^M = \widehat{\tau}_t^M + \widehat{X}_t^{H,M}. \tag{B4}$$

C. Non-Wealthy Households

The non-wealthy budget constraint is

$$\begin{aligned}\bar{c}^P\widehat{c}_t^P + (1+\phi_H^P)\bar{X}^{H,P}\widehat{X}_t^{H,P} + \bar{R}\bar{B}^P\left(\widehat{R}_{t-1} + \widehat{B}_{t-1}^P\right) + \phi_B^P(\bar{B}^P)^2\widehat{B}_t^P \\ = \bar{e}^P\widehat{e}_t^P + \bar{D}^H\bar{H}^P\widehat{D}_t^H + \bar{X}^{H,P}\widehat{p}_t^H \\ + (\bar{D}^H + \bar{p}^H)\bar{H}^P\left(\widehat{X}_{t-1}^{H,P} - \widehat{p}_{t-1}^H\right) + \bar{B}^P\widehat{B}_t^P + s_T^P\widetilde{T}_t. \end{aligned} \tag{C1}$$

The unconstrained debt Euler equation is

$$0 = -\beta^P\bar{R}\left[\widehat{R}_t - \sigma_P\left(\widehat{c}_{t+1}^P - \widehat{c}_t^P\right)\right] - \phi_B^P\bar{B}^P\widehat{B}_t^P. \tag{C2}$$

The non-wealthy housing Euler equation is

$$\phi_H^P\bar{p}^H\widehat{X}_t^{H,P} = \beta^P\Big[\bar{D}^H\widehat{D}_{t+1}^H + \bar{p}^H\widehat{p}_{t+1}^H - (\bar{D}^H + \bar{p}^H)\widehat{p}_t^H - \sigma_P(\bar{D}^H + \bar{p}^H)\left(\widehat{c}_{t+1}^P - \widehat{c}_t^P\right)\Big]. \tag{C3}$$

D. Government and Market Clearing

The government budget constraint is

$$\widetilde{T}_t = \bar{B}^G\widehat{B}_t^G - \bar{R}\bar{B}^G\widehat{B}_{t-1}^G - \bar{R}\bar{B}^G\widehat{R}_{t-1}. \tag{D1}$$

Bond-market clearing is

$$\bar{B}^{MF}\widehat{B}_t^{MF} = \bar{B}^P\widehat{B}_t^P + \bar{B}^M\widehat{B}_t^M + \bar{B}^G\widehat{B}_t^G. \tag{D2}$$

Housing-market clearing is

$$\bar{X}^{H,M}\widehat{X}_t^{H,M} + \bar{X}^{H,P}\widehat{X}_t^{H,P} = \bar{X}^H\widehat{p}_t^H. \tag{D3}$$

E. Exogenous Processes

The exogenous processes follow AR(1) laws of motion:

$$\widehat{e_t^R} = \rho_{e^R}\widehat{e_{t-1}^R} + \varepsilon_t^{e^R}, \tag{E1}$$
$$\widehat{e_t^M} = \rho_{e^M}\widehat{e_{t-1}^M} + \varepsilon_t^{e^M}, \tag{E2}$$
$$\widehat{e_t^P} = \rho_{e^P}\widehat{e_{t-1}^P} + \varepsilon_t^{e^P}, \tag{E3}$$
$$\widehat{D_t} = \rho_D\widehat{D_{t-1}} + \varepsilon_t^D, \tag{E4}$$
$$\widehat{D_t^H} = \rho_{D^H}\widehat{D_{t-1}^H} + \varepsilon_t^{D^H}, \tag{E5}$$
$$\widehat{B_t^G} = \rho_{B^G}\widehat{B_{t-1}^G} + \varepsilon_t^{B^G}, \tag{E6}$$
$$\widehat{\tau_t^M} = \rho_{\tau^M}\widehat{\tau_{t-1}^M} + \varepsilon_t^{\tau^M}, \tag{E7}$$
$$z_t^E = \rho_E z_{t-1}^E + \varepsilon_t^E, \tag{E8}$$
$$z_t^F = \rho_F z_{t-1}^F + \varepsilon_t^F. \tag{E9}$$

D.3 Auxiliary Reporting Identities

The following identities report total debt, wealth shares and income shares. They are written for the constrained fund. They also apply to the flexible benchmark after substituting its fund and bond positions as described in Section D.4. They do not add independent equilibrium restrictions.

Total bonds are reported as

$$\bar{B}^{tot}\widehat{B_t^{tot}} = \bar{B}^{MF}\widehat{B_t^{MF}}. \tag{AUX1}$$

Define aggregate measured wealth as

$$\bar{\mathcal{W}} = \bar{p}\bar{Q} + \bar{X}^H + \bar{B}^G, \qquad \bar{X}^H \equiv \bar{X}^{H,M} + \bar{X}^{H,P}. \tag{77}$$

The wealthy household's wealth share deviation is

$$\eta_{R,t}^{dev} = \frac{\bar{a}^R}{\bar{\mathcal{W}}}\widehat{a_t^R} - \bar{\eta}_R\frac{\bar{p}\bar{Q}\widehat{p_t} + \bar{X}^H\widehat{p_t^H} + \bar{B}^G\widehat{B_t^G}}{\bar{\mathcal{W}}}. \tag{AUX2}$$

The middle-class wealth share deviation is

$$\eta_{M,t}^{dev} = \frac{\bar{X}^{H,M}\widehat{X_t^{H,M}} - \bar{B}^M\widehat{B_t^M}}{\bar{\mathcal{W}}} - \bar{\eta}_M\frac{\bar{p}\bar{Q}\widehat{p_t} + \bar{X}^H\widehat{p_t^H} + \bar{B}^G\widehat{B_t^G}}{\bar{\mathcal{W}}}. \tag{AUX3}$$

The non-wealthy wealth share deviation is

$$\eta_{P,t}^{dev} = \frac{\bar{X}^{H,P}\widehat{X}_t^{H,P} - \bar{B}^P\widehat{B}_t^P}{\bar{\mathcal{W}}} - \bar{\eta}_P \frac{\bar{p}\bar{Q}\widehat{p}_t + \bar{X}^H\widehat{p}_t^H + \bar{B}^G\widehat{B}_t^G}{\bar{\mathcal{W}}}. \tag{AUX4}$$

Let $\bar{Y}^R = \bar{e}^R + \bar{D}\bar{Q}$, $\bar{Y}^M = \bar{e}^M + \bar{D}^H\bar{H}^M$, $\bar{Y}^P = \bar{e}^P + \bar{D}^H\bar{H}^P$ and $\bar{Y} = \sum_i \bar{Y}^i$. The aggregate income deviation is

$$\begin{aligned}\Delta Y_t = {} & \bar{e}^R\widehat{e}_t^R + \bar{D}\bar{Q}\widehat{D}_t + \bar{e}^M\widehat{e}_t^M + \bar{D}^H\bar{H}^M\left(\widehat{D}_t^H + \widehat{X}_{t-1}^{H,M} - \widehat{p}_{t-1}^H\right) \\ & + \bar{e}^P\widehat{e}_t^P + \bar{D}^H\bar{H}^P\left(\widehat{D}_t^H + \widehat{X}_{t-1}^{H,P} - \widehat{p}_{t-1}^H\right).\end{aligned} \tag{78}$$

Then the wealthy household's income-share deviation is

$$\widehat{inc}_{R,t} = \frac{\bar{e}^R}{\bar{Y}^R}\widehat{e}_t^R + \frac{\bar{D}\bar{Q}}{\bar{Y}^R}\widehat{D}_t - \frac{\Delta Y_t}{\bar{Y}}. \tag{AUX5}$$

The middle-class income-share deviation is

$$\widehat{inc}_{M,t} = \frac{\bar{e}^M}{\bar{Y}^M}\widehat{e}_t^M + \frac{\bar{D}^H\bar{H}^M}{\bar{Y}^M}\left(\widehat{D}_t^H + \widehat{X}_{t-1}^{H,M} - \widehat{p}_{t-1}^H\right) - \frac{\Delta Y_t}{\bar{Y}}. \tag{AUX6}$$

The non-wealthy income-share deviation is

$$\widehat{inc}_{P,t} = \frac{\bar{e}^P}{\bar{Y}^P}\widehat{e}_t^P + \frac{\bar{D}^H\bar{H}^P}{\bar{Y}^P}\left(\widehat{D}_t^H + \widehat{X}_{t-1}^{H,P} - \widehat{p}_{t-1}^H\right) - \frac{\Delta Y_t}{\bar{Y}}. \tag{AUX7}$$

The equilibrium system used in the constrained simulations consists of Equations (A1)–(A7), (A9), (B1)–(B4), (C1)–(C3), (D1)–(D3), and the exogenous processes (E1)–(E9). The auxiliary identities are used only for reporting simulated debt, wealth-share and income-share series. Aggregate borrowing enters the fund's balance sheet through bond market clearing. The allocation rule determines the corresponding adjustment of the equity price and portfolio share.

D.4 Flexible Allocation Benchmark

In the flexible benchmark, the wealthy household chooses total fund investment X_t^{flex} and the fund implements its optimal equity allocation θ_t^{flex}. This delegates the investor's portfolio choice without introducing a separate manager objective. The fund has no target allocation penalty. Its underlying equity and bond positions are subject to convex holding costs to generate a positive equity premium, so reallocating between assets changes their marginal costs. The benchmark equations below allow for both the fundamental processes

(E1)–(E7) and the two demand disturbances (E8)–(E9).

Portfolio positions and costs

Let E_t^{flex} denote the value of the fund's equity position and B_t^{flex} its bond holdings. Then

$$E_t^{\text{flex}} = \theta_t^{\text{flex}} X_t^{\text{flex}}, \qquad B_t^{\text{flex}} = (1 - \theta_t^{\text{flex}}) X_t^{\text{flex}}, \qquad a_t^R = X_t^{\text{flex}}. \tag{79}$$

Equity market clearing gives $E_t^{\text{flex}} = p_t \bar{Q}$, and bond market clearing gives $B_t^{\text{flex}} = B_t^P + B_t^M + B_t^G$. Write the underlying costs as

$$\Gamma_E(E) = \frac{\phi_E}{2\bar{E}} E^2, \qquad \Gamma_B(B) = \frac{\phi_B}{2\bar{B}^{\text{flex}}} B^2, \qquad \bar{E} = \bar{p}\bar{Q}. \tag{80}$$

Here ϕ_B is the wealthy investor's bond-holding cost coefficient, distinct from the non-wealthy's borrowing cost ϕ_B^P. These quadratics give the local marginal costs in the linear system. Total portfolio costs are

$$C^{\text{flex}}(X, \theta) = \Gamma_E(\theta X) + \Gamma_B((1 - \theta)X). \tag{81}$$

They depend on the positions held at each date. In particular, C^{flex} depends on allocation even though there is no separate mandate penalty or cost of changing θ_t^{flex} between dates.

Define the reference equity share and weighted cost coefficient by

$$\bar{\theta}^{\text{flex}} = \frac{\bar{E}}{\bar{X}^{\text{flex}}}, \qquad \phi_X = \bar{\theta}^{\text{flex}} \phi_E + (1 - \bar{\theta}^{\text{flex}}) \phi_B. \tag{82}$$

The reference asset Euler conditions are

$$1 + \phi_E = \delta \bar{\zeta}^R + \beta^R \bar{R}^E, \tag{83}$$

$$1 + \phi_B = \delta \bar{\zeta}^R + \beta^R \bar{R}. \tag{84}$$

Consequently,

$$\phi_E - \phi_B = \beta^R (\bar{R}^E - \bar{R}), \qquad 1 + \phi_X = \delta \bar{\zeta}^R + \beta^R \bar{R}^{\text{flex}}, \tag{85}$$

where $\bar{R}^{\text{flex}} = \bar{\theta}^{\text{flex}} \bar{R}^E + (1 - \bar{\theta}^{\text{flex}}) \bar{R}$. At the common reference, $\bar{X}^{\text{flex}} = \bar{X}^{MF}$, $\bar{B}^{\text{flex}} = \bar{B}^{MF}$, $\bar{\theta}^{\text{flex}} = \bar{\theta}$ and $\phi_X = \phi_{MF}$. These equalities match the reference marginal cost and return conditions. Costs respond differently as portfolio composition changes. The costs both generate a positive reference equity premium and regulate portfolio demand.

Investment and allocation

At first order, the position identities are

$$\widehat{p_t} = \widehat{X_t^{\text{flex}}} + \widehat{\theta_t^{\text{flex}}}, \tag{86}$$

$$\widehat{B_t^{\text{flex}}} = \widehat{X_t^{\text{flex}}} - \frac{\bar{\theta}^{\text{flex}}}{1-\bar{\theta}^{\text{flex}}}\widehat{\theta_t^{\text{flex}}}, \tag{87}$$

$$\bar{a}^R\widehat{a_t^R} = \bar{X}^{\text{flex}}\widehat{X_t^{\text{flex}}}. \tag{88}$$

For compactness, define the marginal bequest term and the consumption growth term as

$$\mathcal{S}_t = \delta\bar{\zeta}^R(\sigma_R\widehat{c_t^R} - \Sigma_R\widehat{a_t^R}), \qquad g_t = \sigma_R(\widehat{c_{t+1}^R} - \widehat{c_t^R}). \tag{89}$$

Future variables in the Euler conditions are conditional expectations in the stochastic model. The Euler equation for total investment is

$$\begin{aligned}\phi_X\widehat{X_t^{\text{flex}}} + \bar{\theta}^{\text{flex}}(\phi_E - \phi_B)\widehat{\theta_t^{\text{flex}}} = \mathcal{S}_t + \bar{\theta}^{\text{flex}}w_t^E + w_t^F \\ + \beta^R\Big[\bar{\theta}^{\text{flex}}\bar{R}^E(\widehat{R_t^E} - g_t) + (1-\bar{\theta}^{\text{flex}})\bar{R}(\widehat{R_t} - g_t)\Big].\end{aligned} \tag{90}$$

Optimal allocation satisfies

$$\begin{aligned}(\phi_E - \phi_B)\widehat{X_t^{\text{flex}}} + \left(\phi_E + \phi_B\frac{\bar{\theta}^{\text{flex}}}{1-\bar{\theta}^{\text{flex}}}\right)\widehat{\theta_t^{\text{flex}}} = \beta^R\Big[\bar{R}^E\widehat{R_t^E} - \bar{R}\widehat{R_t} \\ - (\bar{R}^E - \bar{R})g_t\Big] + w_t^E.\end{aligned} \tag{91}$$

This condition equates the change in marginal exposure costs to the change in discounted relative returns and the equity demand incentive. Broad fund demand cancels from the allocation condition because it values both exposures equally. It allows allocation to respond to returns without tying it to a target share. Positive exposure costs still limit the response of desired positions.

Budget, market clearing and reporting

The wealthy household's linear budget is

$$\begin{aligned}\bar{c}^R\widehat{c_t^R} + \bar{X}^{\text{flex}}\Big[(1+\phi_X)\widehat{X_t^{\text{flex}}} + \bar{\theta}^{\text{flex}}(\phi_E - \phi_B)\widehat{\theta_t^{\text{flex}}}\Big] = \bar{e}^R\widehat{e_t^R} + \bar{Q}(\bar{D}\widehat{D_t} + \bar{p}\widehat{p_t}) \\ + \bar{R}\bar{B}^{\text{flex}}(\widehat{R_{t-1}} + \widehat{B_{t-1}^{\text{flex}}}) + s_T^R\widetilde{T_t}.\end{aligned} \tag{92}$$

The allocation term on the left records the change in exposure costs when the fund changes its composition. The equity payoff on the right includes dividends and the current value of the fixed equity position. The expression retains the reference convention of (70) and the equity return equation (A2).

Bond market clearing becomes

$$\bar{B}^{\text{flex}}\widehat{B}_t^{\text{flex}} = \bar{B}^P\widehat{B}_t^P + \bar{B}^M\widehat{B}_t^M + \bar{B}^G\widehat{B}_t^G. \tag{93}$$

The middle-class, non-wealthy household, government and housing equations are shared with the constrained economy. Equations (86)–(88), (90), (91) and (92) replace its fund and wealthy household equations, together with the shared equity return identity (A2).

The reporting identities in Section D.3 apply with the benchmark positions substituted. In particular,

$$\eta_{R,t}^{dev} = \frac{\bar{X}^{\text{flex}}}{\bar{\mathcal{W}}}\widehat{X}_t^{\text{flex}} - \bar{\eta}_R\frac{\bar{p}\bar{Q}\widehat{p}_t + \bar{X}^H\widehat{p}_t^H + \bar{B}^G\widehat{B}_t^G}{\bar{\mathcal{W}}}. \tag{94}$$

The fund and its underlying positions are alternative representations of the same wealthy household's assets.

Combining (86) and (87) gives

$$\widehat{p}_t = \widehat{B}_t^{\text{flex}} + \frac{\widehat{\theta}_t^{\text{flex}}}{1-\bar{\theta}^{\text{flex}}}, \tag{95}$$

which has the same balance-sheet form as (A9). In the benchmark, (91) determines the allocation adjustment. In the constrained economy, (A1) keeps it close to its target. This distinction determines how borrowing and equity prices adjust jointly.

Equivalence to direct asset holding

Let $\mathcal{F}_{E,t}$ and $\mathcal{F}_{B,t}$ denote the residuals of the underlying asset Euler conditions:

$$\mathcal{F}_{E,t} = \phi_E\widehat{E}_t^{\text{flex}} - \mathcal{S}_t - \beta^R\bar{R}^E(\widehat{R}_t^E - g_t) - w_t^E - w_t^F, \tag{96}$$

$$\mathcal{F}_{B,t} = \phi_B\widehat{B}_t^{\text{flex}} - \mathcal{S}_t - \beta^R\bar{R}(\widehat{R}_t - g_t) - w_t^F. \tag{97}$$

Here $\widehat{E}_t^{\text{flex}} = \widehat{p}_t$ under equity market clearing. Define

$$\mathcal{F}_{X,t} = \bar{\theta}^{\text{flex}}\mathcal{F}_{E,t} + (1-\bar{\theta}^{\text{flex}})\mathcal{F}_{B,t}, \qquad \mathcal{F}_{\theta,t} = \mathcal{F}_{E,t} - \mathcal{F}_{B,t}. \tag{98}$$

Setting these residuals to zero gives (90) and (91). Conversely,

$$\mathcal{F}_{E,t} = \mathcal{F}_{X,t} + (1 - \bar{\theta}^{\text{flex}})\mathcal{F}_{\theta,t}, \qquad \mathcal{F}_{B,t} = \mathcal{F}_{X,t} - \bar{\theta}^{\text{flex}}\mathcal{F}_{\theta,t}. \tag{99}$$

The portfolio identities are also invertible for an interior allocation. Substituting them into the direct asset budget gives (92). The fund and direct holding formulations therefore have the same first-order equilibrium system, including the same wealthy household wealth and market clearing conditions. This equivalence concerns the linear system and its impulse responses and historical paths at the calibration used here.

D.5 Investment with Demand Incentives

The baseline household problems and optimality conditions are stated in Section 2.1. For the demand experiments, let $w_t^E = kz_t^E$ and $w_t^F = kz_t^F$. Their local contribution to the constrained fund investment condition is $\bar{\theta}w_t^E + w_t^F$, as displayed in Equation (12).

Equity demand values the equity part of the fund, while broad fund demand values both exposures. These incentives leave the manager's allocation condition unchanged. Their first-order implementation appears in the constrained system and in the flexible investment and allocation conditions, Equations (90) and (91).

D.6 Non-Homothetic Preferences

Section 3.1 specifies CRRA felicity and, for wealthy households, a bequest function with $\Sigma_R < \sigma_R$. The ratio of marginal bequest utility to marginal consumption utility is

$$\zeta(c, a) = \frac{\nu_R'(a)}{u_R'(c)} = a^{-\Sigma_R} c^{\sigma_R}. \tag{100}$$

Scaling consumption and assets by a common factor $\lambda > 0$ gives

$$\zeta(\lambda c, \lambda a) = \lambda^{\sigma_R - \Sigma_R} \zeta(c, a).$$

When the curvatures coincide, this relative incentive is invariant to scale. With $\Sigma_R < \sigma_R$, it rises with scale: bequests are a luxury good, which strengthens the wealthy household's incentive to accumulate assets as resources grow (Straub, 2019; Mian et al., 2025). This preference margin contributes to unequal accumulation; the equilibrium response also depends on returns, borrowing and portfolio allocation.

Middle-class and non-wealthy households have CRRA felicity without this additional

bequest margin. Their preferences are homothetic, but their equilibrium saving policies need not be: collateral constraints, holding costs and asset supplies also shape the response to income. The common curvature $\sigma_M = \sigma_P$ controls intertemporal substitution without introducing an explicit luxury bequest motive for these groups.

D.7 Exogenous Processes

The fundamental drivers are the labor endowments of the three household groups, equity dividends, housing rents, government debt and the middle-class loan-to-value ratio. Each follows an AR(1) process in proportional deviations from its 1989 reference value,

$$\widehat{z}_t = \rho_z \widehat{z}_{t-1} + \varepsilon_t^z, \qquad z \in \{e^R, e^M, e^P, D, D^H, B^G, \tau^M\}.$$

The equity and fund demand disturbances z_t^E and z_t^F are zero-centered incentives, with laws of motion (E8)–(E9) in Appendix D.2. In the single-innovation experiments, each receives an innovation of 0.01, with $\rho_E = \rho_F = 0.9$ and $w_t^j = k z_t^j$, where $k = \phi_{MF} \simeq 0.146$. These settings define the single-innovation experiments; they are not estimated from the empirical flow series. Figure 3 instead uses separately chosen innovations with zero persistence of the demand disturbance to match the common price path (Appendix E.3). Both disturbances are zero in the historical transitions. For historical simulations, innovations are recovered as $\varepsilon_t^z = \widehat{z}_t - 0.9\widehat{z}_{t-1}$ from the constructed paths in Section 3.3. Their sample standard deviations set the scales of the fundamental impulse responses.

E Demand and Income Transmission: Additional Results

This appendix reports the ordinary fund-demand responses, examines demand persistence and gives additional details of the identical-price comparison in Section 4. It then studies wealth share accounting and compares wealthy labor income, dividends and redistribution as sources of wealth concentration.

E.1 Responses to Broad Fund Demand

Figure 13 reports the single-innovation fund-demand experiment discussed in Section 4. The common incentive expands both equity and lending, producing closer wealth share responses across the two economies than an equity-specific incentive.

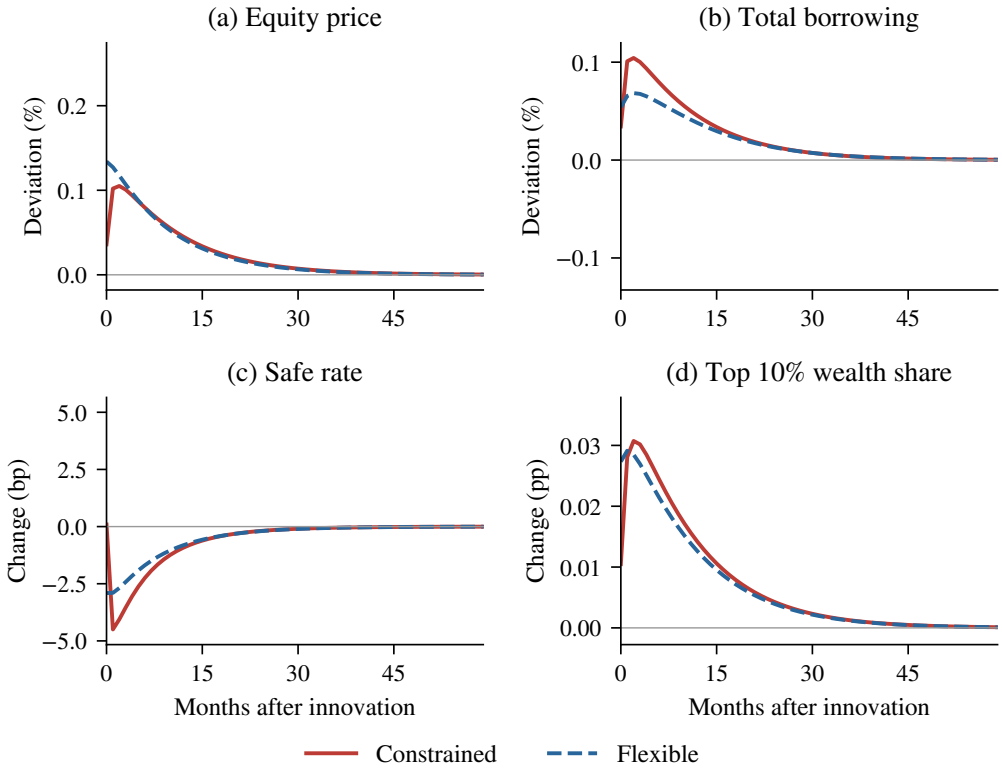


Figure 13: Responses to broad fund demand

Response to an innovation of 0.01 to z_t^F, with persistence 0.9 and common marginal incentive coefficient $k = \phi_{MF}$ in both economies. Equity demand is zero. Solid red: constrained economy; dashed blue: flexible benchmark. Month zero is the innovation month. Equity prices and total borrowing, including government debt, change in percent; the safe rate changes in basis points; the top 10% wealth share changes in percentage points. The incentive applies to the entire financial portfolio.

E.2 Demand Persistence

We vary the persistence of each demand disturbance over $\rho \in \{0, 0.5, 0.75, 0.9\}$ in the baseline monthly specification. In every case, the initial innovation is 0.01, the marginal incentive coefficient is unchanged, and all subsequent innovations are zero. Preferences, costs and the reference allocation are held fixed. Greater persistence therefore increases the cumulative demand incentive as well as its duration. Figure 14 reports the signed sum of monthly top wealth share responses and the time required for the response to halve after its peak.

The larger cumulative constrained response to equity demand emerges when demand is sufficiently persistent. For short-lived demand, its cumulative response is smaller than the flexible response. Following a one-period disturbance, both wealth share responses halve within one month of their peaks. The prolonged baseline response consequently reflects the interaction of persistent demand with portfolio constraints and balance-sheet adjustment. Broad fund demand produces closer cumulative responses and no uniform duration advantage for the constrained economy. These results qualify the baseline comparison: portfolio allocation frictions do not increase the cumulative inequality effect of every demand disturbance.

In the baseline equity demand experiment, the price response halves six months after its peak in the flexible benchmark and nine months after its peak in the constrained economy. The constrained price peaks two months after the innovation. When only demand persistence varies, the boundary for a price half-life of at most 24 months after the peak is approximately $\rho = 0.966$ in the constrained economy and 0.976 in the flexible benchmark. The baseline $\rho = 0.9$ therefore satisfies this criterion.

E.3 Wealth Responses to Identical Equity Price Paths

The comparison in Figure 3 chooses demand innovations separately in each economy to generate the same complete equity price path. At each date, the innovation closes the gap between the price implied by inherited positions and the common target. Other endogenous variables adjust according to the equilibrium conditions. We use the monthly solutions with zero persistence of the demand disturbance. Each innovation arrives unexpectedly and households expect future innovations to be zero; the target sequence is not announced. All other innovations are zero, and preferences, portfolio costs and the reference allocation are unchanged. The initial equity appreciation is 1%, with a price half-life of 12 months. Cumulative effects sum signed monthly wealth share deviations over 2,000 months.

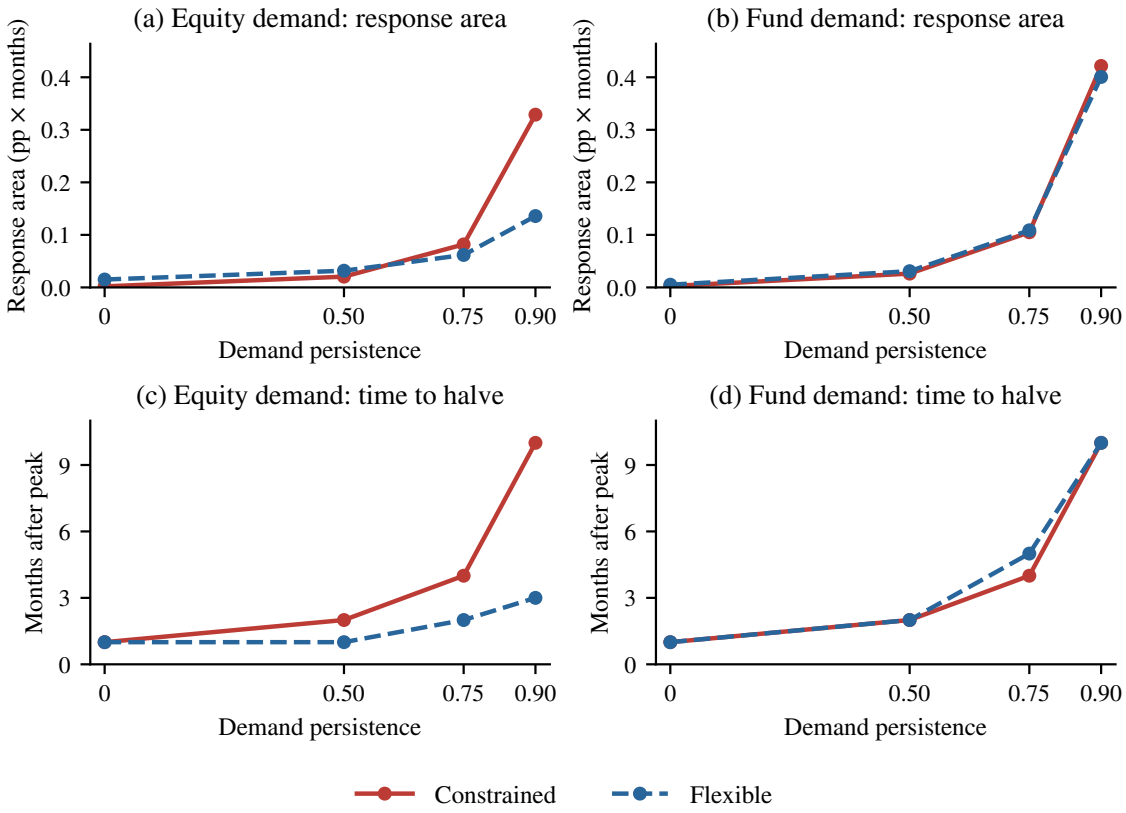


Figure 14: Demand persistence and the wealth share response

Separate monthly model solutions for each persistence setting, with the same initial demand innovation and no recalibration. Solid red: constrained economy; dashed blue: flexible benchmark. Panels (a)–(b) sum the signed top 10% wealth share deviations over the infinite response horizon, in percentage point months. Panels (c)–(d) report months after the largest absolute response until the response enters and remains below half its peak magnitude within the 600-month reporting horizon. Demand persistence is varied at four settings; joining lines connect those settings. The initial incentive is fixed, so its sum over time rises with persistence.

Figure 15 reports the pointwise wealth share and safe-rate responses underlying the main cumulative comparison. The cumulative advantage does not imply a uniformly longer pointwise response: after equity demand, the flexible response takes longer to halve after its peak. All pointwise responses eventually return to the reference allocation, while their cumulative sums approach constants.

In the linear model, matching the cumulative price response fixes the ratio of cumulative wealth share responses through each economy's lending and valuation responses. Price half-lives of six and 24 months therefore give the same percentage differences as the baseline 12-month path, although the absolute cumulative responses are smaller when prices decay faster.

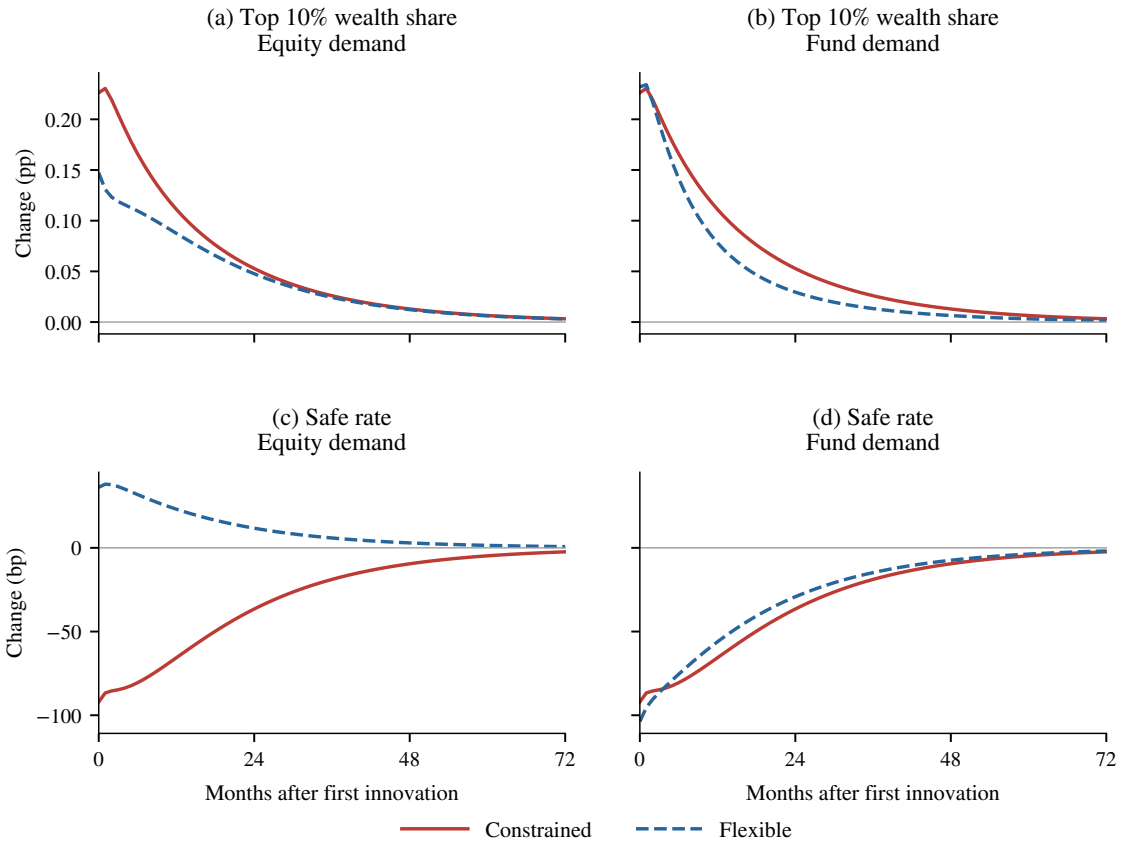


Figure 15: Pointwise wealth share and safe-rate responses under identical equity price paths

The common equity price initially rises 1% and decays with a half-life of 12 months. Demand innovations are chosen separately in each economy to reproduce the complete common price path; future innovations are expected to be zero. Solid red: constrained economy; dashed blue: flexible benchmark. Panels (a)–(b) show top 10% wealth share changes in percentage points; panels (c)–(d) show safe-rate changes in basis points. The plot displays months 0–72 of the baseline monthly specification.

E.4 Wealth Share Accounting

Figure 16 separates the baseline cumulative top wealth share response into equity valuation, bond holdings and housing valuation contributions, using the first-order wealth identity in Equation (31). Government debt is unchanged in these demand experiments. The components add to the total within each equilibrium; they are accounting contributions rather than experiments that remove individual channels.

After equity demand, the flexible benchmark's larger equity valuation contribution is partly offset by a reduction in the wealthy household's bond holdings. In the constrained economy, bond holdings instead rise. This additional lending more than offsets the smaller equity valuation contribution, which explains the larger cumulative wealth share response.

After broad fund demand, bond holdings rise in both economies and the cumulative responses are closer. Housing appreciation reduces the top share through aggregate wealth in both fund demand experiments, while its contribution after equity demand differs across economies. The decomposition therefore supports interpreting the inequality response through the whole balance sheet rather than the equity price alone.

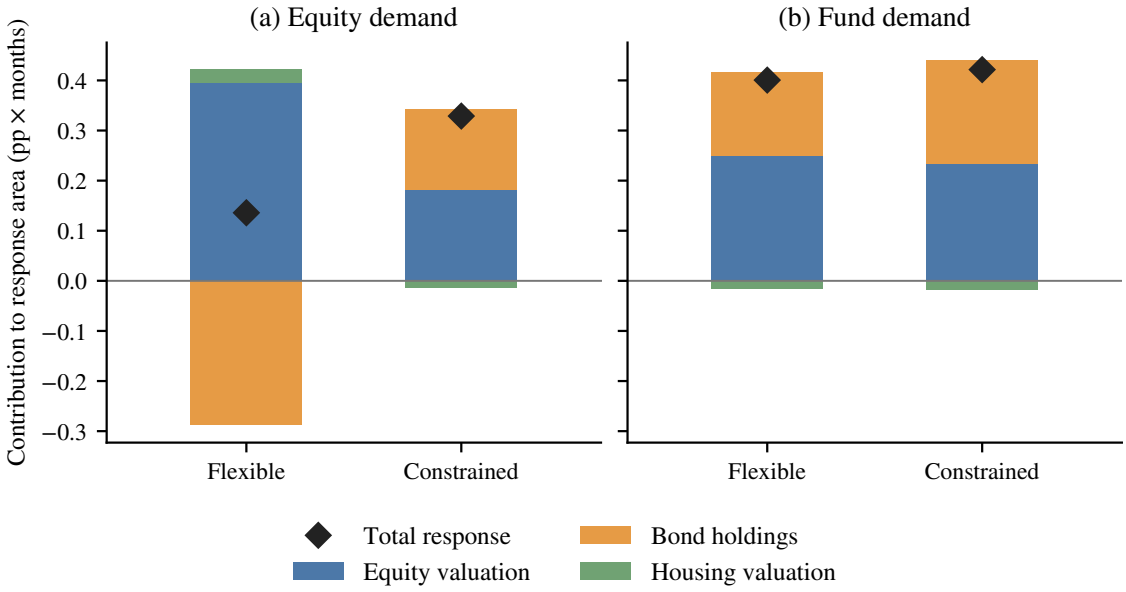


Figure 16: Accounting for the cumulative wealth share response

Baseline demand experiments of Section 4. Bars report the signed infinite-horizon sums of the equity valuation, wealthy bond holdings and housing valuation contributions to the top 10% wealth share response, in percentage point months. Diamonds mark their sum. Positive and negative contributions are stacked separately. The government debt contribution is zero. Housing enters through the aggregate wealth denominator because the wealthy household holds no housing.

E.5 Income Sources and Wealth Concentration

The historical results identify wealthy labor income and dividends as important drivers of concentration. We compare their transmission with a redistribution of exogenous income from poor to rich. We scale the first-order responses so that each experiment initially adds the same total cash income to the wealthy, equal to one percent of reference aggregate exogenous income, $\bar{e}^R + \bar{e}^M + \bar{e}^P$. The labor income experiment raises e_t^R; the dividend experiment raises $\bar{Q}D_t$ by the same amount. The redistribution raises e_t^R and reduces e_t^P equally. All changes decay with persistence 0.9, with no subsequent innovations and all

other exogenous drivers held at their reference. Redistribution keeps aggregate exogenous income fixed at every date, while the other experiments add aggregate resources. Asset income and government transfers adjust endogenously.

Table 6: Cumulative responses to alternative income sources

	Wealth share area		Relative	Lending area	
	Flexible	Constrained	response	Flexible	Constrained
Wealthy labour income	5.30	5.59	1.05	2.50	3.11
Equity dividends	6.36	8.23	1.29	-0.05	4.51
Income redistribution	11.05	9.52	0.86	8.30	4.53

Signed response areas over the full adjustment to the experiments in Figure 17. Wealth share areas are percentage points times model months; lending areas are reference currency units times model months. Relative response is the constrained wealth share area divided by its flexible counterpart. The initial total wealthy income increment is identical across experiments and economies. Areas measure the magnitude and duration of deviations, not permanently accumulated wealth.

Following a wealthy labor income gain, lending expands in both economies and the safe rate falls over the adjustment. The constrained economy generates more cumulative lending, as additional wealthy saving finances debt elsewhere in the distribution. The constrained economy's smaller initial wealth share response builds to a slightly higher peak, with a cumulative effect about five percent larger than in the flexible benchmark. Portfolio restrictions strengthen the credit transmission of this income gain, while the additional concentration effect is modest.

Dividend income produces a sharper distinction. The flexible benchmark capitalizes higher payouts into an immediate equity revaluation with little change in lending. In the constrained economy, the response builds as lending expands and rates fall after the initial adjustment. The cumulative wealth share effect is about 29% larger despite a smaller peak. Additional bond accumulation outweighs a smaller direct equity valuation contribution in the wealth accounting of Appendix C.5. The constraint therefore changes how higher cash flows are transmitted, which sustains concentration through credit as well as valuation. Dividends are a fundamental income source, distinct from the demand disturbances in Section 4.

Redistribution also increases concentration in both economies, but its cumulative effect is about 14% smaller in the constrained economy. The poor-income loss raises borrowing demand alongside the wealthy household's additional resources. The flexible benchmark accommodates substantially more lending; the constrained safe rate rises

more over the adjustment and poor consumption falls more initially. Smaller bond accumulation outweighs a larger equity valuation contribution. The poor-income leg offsets the rich-income leg in the difference between economies, while both increase the wealthy share. The historical dominance of rich income and dividends is consistent with this result: those histories contain the observed magnitudes and timing of both sources, whereas the redistribution imposes equal income changes and no dividend shock. The transmission of income concentration consequently depends on its source, alongside the portfolio restriction.

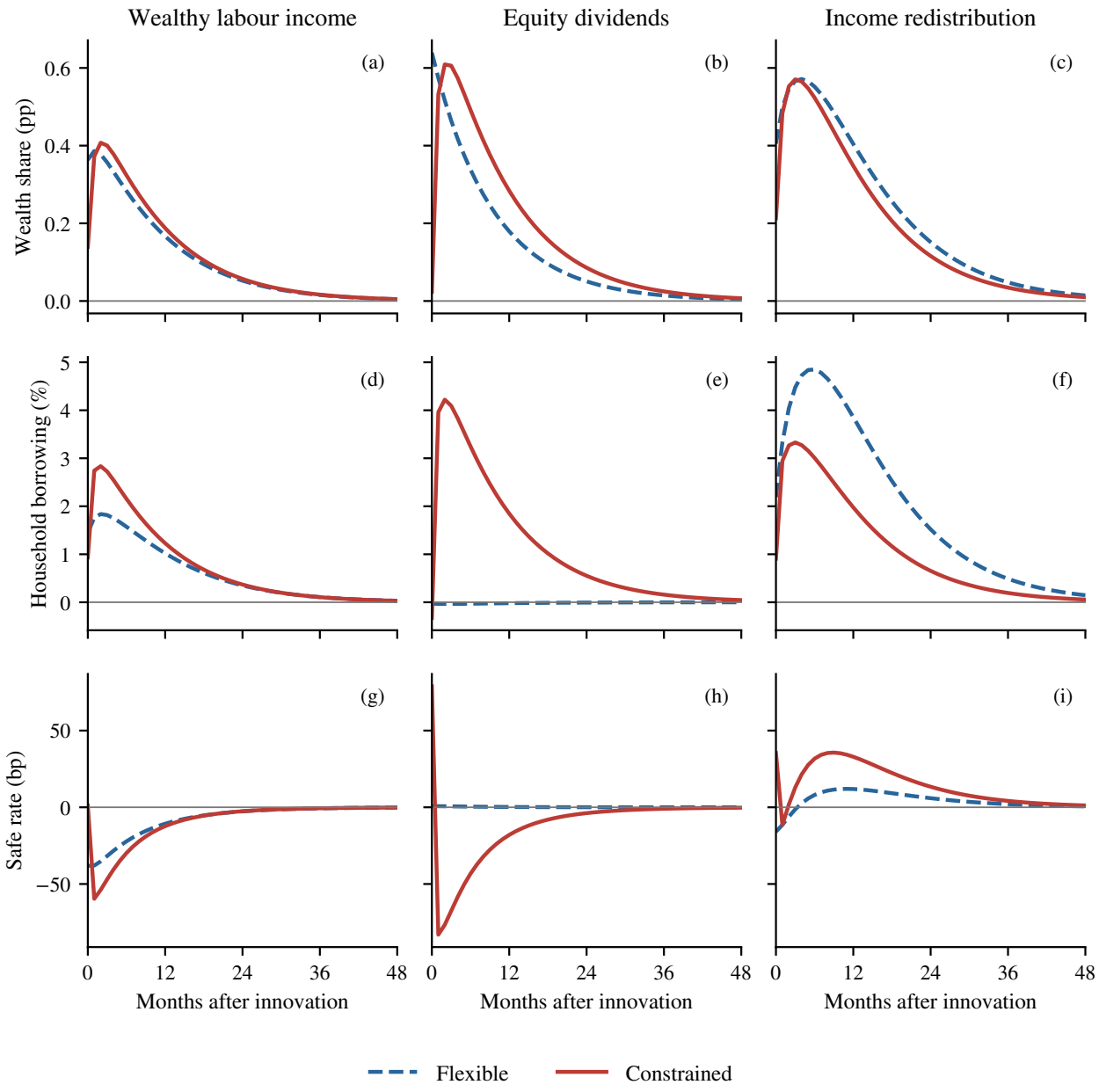


Figure 17: Income sources, lending and wealth concentration

First-order responses around the common reference allocation. Columns show a wealthy labor income gain, a dividend income gain and a redistribution from poor to rich. Each initially adds the same total income to the wealthy, one percent of baseline aggregate exogenous income, with persistence 0.9. Since dividends are paid per equity unit, the dividend innovation is scaled by $\bar{Q}\bar{D}$. Solid red: constrained economy; dashed blue: flexible benchmark. Rows show the top wealth share in percentage points, household borrowing relative to reference household debt in percent, and the model safe rate in basis points. Government debt is unchanged. Calibration and the time convention follow Section 3.

F Historical Wealth Dynamics: Additional Results

This appendix supplements Section 5 with comparisons under unanticipated shocks and the mortgage-LTV contribution to the historical decomposition. Income-source experiments are reported in Appendix E.5, and the arbitrageur extension is in Appendix G.

F.1 Simulations under Unanticipated Shocks: Comparison with the Flexible Benchmark

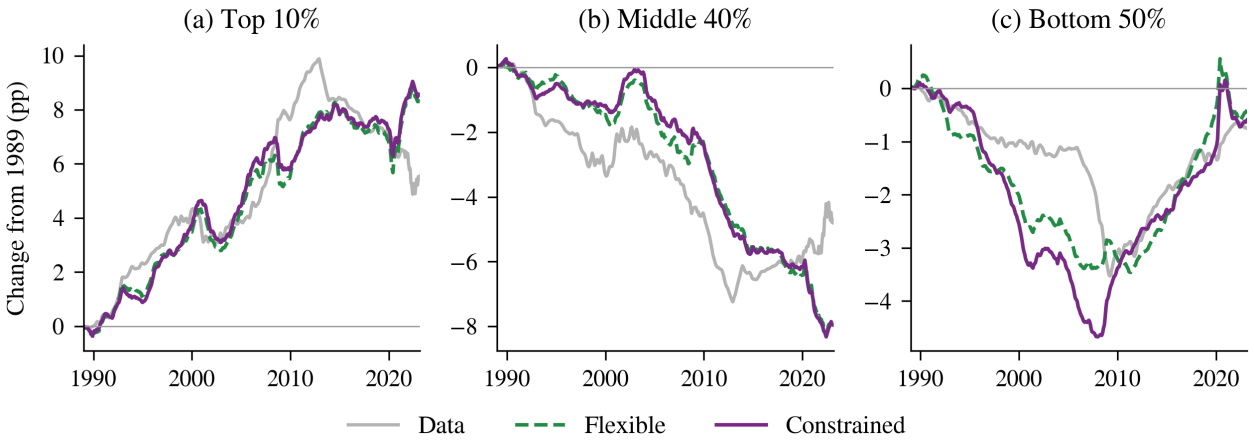


Figure 18: Unanticipated shocks: constrained and flexible wealth shares

Note: Wealth shares under the unanticipated-shock simulation for the constrained (solid purple) and flexible (dashed green) models, against the data (gray), for the top 10%, middle 40% and bottom 50%. The figure plots the percentage-point change in wealth shares relative to their 1989 level.

The two economies produce similar wealth share paths when innovations are unanticipated. Both generate a larger post-crisis rise in the top share than under perfect foresight, but neither reproduces the full empirical path. The difference between the economies is much smaller than in the fully anticipated exercise. These historical paths are therefore less informative about the allocation rule under the surprise information structure.

Unanticipated shocks produce more household borrowing than perfect foresight, and the market paths become closer across allocation rules. The safe-rate rebound and the shortfall in equity valuation remain.

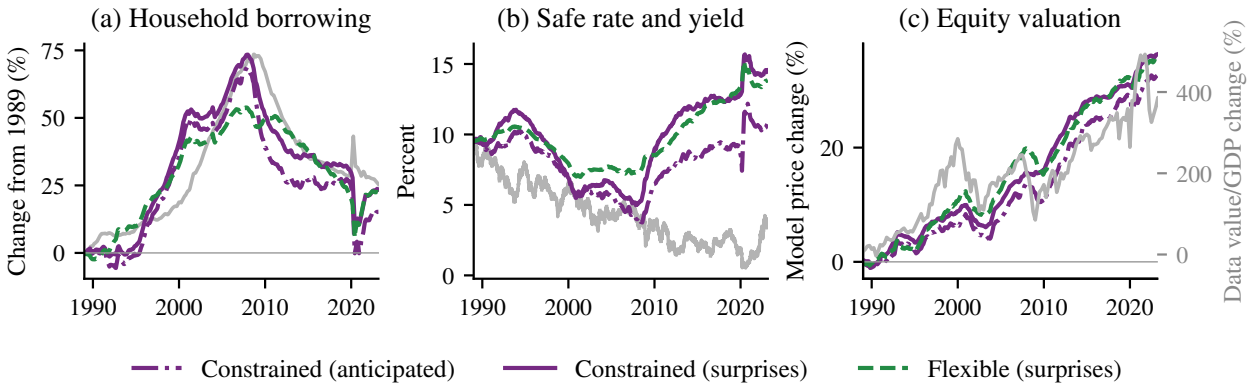


Figure 19: Historical borrowing, rates and equity valuation with unanticipated shocks

Note: Constrained economy under perfect foresight (dash-dot purple) and with unanticipated shocks (solid purple), flexible benchmark with unanticipated shocks (dashed green), and data (gray). Panel (a) model household debt changes and data household debt/GDP changes; panel (b) model one-period safe rate and ten-year Treasury yield; panel (c) model equity-price changes on the left axis and data equity market value/GDP changes on the right. Definitions follow Figure 5.

F.2 Mortgage-LTV Contribution to the Historical Driver Groups

The two groups in Figure 7 omit the mortgage-LTV driver. Figure 20 shows its wealth share contribution under unanticipated shocks, holding the other drivers at their reference values. Adding this contribution to the two displayed groups reconstructs the full first-order response. The LTV driver raises the top and bottom shares and lowers the middle share later in the sample, so its omission is consequential for interpreting the gap between the grouped responses and the total.

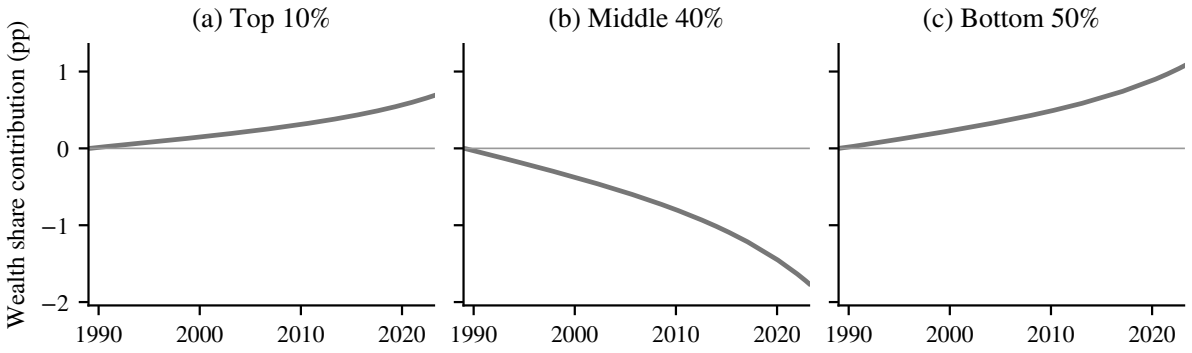


Figure 20: Wealth share contribution of the mortgage-LTV driver

Constrained economy with unanticipated shocks. Each panel reports the wealth share change in percentage points when only the middle-class mortgage-LTV path varies. All other drivers remain at their reference values. This is the omitted contribution in Figure 7; the linear responses add across all seven historical drivers.

G Model with Arbitrageur

An investor who trades against valuation differences can absorb some of the demand reaching a constrained fund. This appendix introduces such a trader and examines how its capacity changes equity prices and wealth shares. The trader uses the flexible benchmark in Appendix D.4 as its valuation reference. We set trading capacity using a risk aversion choice from the literature. Trading brings the constrained price closer to the flexible reference, while the borrowing and wealth responses continue to differ across the two economies.

G.1 Arbitrageur Demand and the Reference Price

Let q_t^A be the trader's equity position and $\kappa_t = q_t^A/\bar{Q}$ its share of the equity float. A positive position is a purchase, and a negative position is a short sale. The implemented trading rule is

$$\kappa_t = a(\widehat{p}_t^{\text{flex}} - \widehat{p}_t), \qquad a \geq 0. \tag{101}$$

Here a is the response of the position share to a proportional price gap. Section G.3 derives our calibration, $a \simeq 0.837$. At this value, a price one percent below the reference induces a long position equal to about 0.84% of the float. The reference is obtained by solving the flexible benchmark under the same exogenous paths and information assumptions. It includes that economy's exposure costs, consumption and wealth responses. It is therefore a model comparison price, whose difference from the constrained price reflects the different portfolio conditions.

The rule can be motivated by a trader with CARA utility and a conditionally normal equity excess return. Let μ_t and σ_t^2 be the conditional mean and variance of that return. With risk aversion γ, the portfolio problem is

$$\max_{q_t^A} \; q_t^A p_t \mu_t - \frac{\gamma}{2}(q_t^A)^2 p_t^2 \sigma_t^2, \qquad q_t^A = \frac{\mu_t}{\gamma p_t \sigma_t^2}.$$

An investor trading on the level premium would hold equity at the positive reference premium. The zero reference position instead corresponds to an active sleeve whose return signal is measured relative to the normal premium. Its local objective is $q_t^{A,\text{active}} \bar{p}(\mu_t - \bar{\mu}) - \gamma(q_t^{A,\text{active}})^2 \bar{p}^2 \bar{\sigma}^2/2$, giving

$$q_t^{A,\text{active}} = \frac{\mu_t - \bar{\mu}}{\gamma \bar{p} \bar{\sigma}^2}.$$

If the excess-return signal is approximated by $\mu_t - \bar{\mu} = \lambda_A(\widehat{p}_t^{\text{flex}} - \widehat{p}_t)$, with $\lambda_A > 0$, dividing

by $\bar{Q}$ gives (101) with $a = \lambda_A/(\gamma \bar{p} \bar{Q} \bar{\sigma}^2)$. This motivates a finite response to the current valuation gap. The simulations impose the gap rule directly; they do not solve a separate dynamic portfolio problem or require a constant equity premium along the flexible price path.

The trader has predetermined capacity and cannot receive contemporaneous discretionary funding from the wealthy household. Its position is financed externally at the domestic safe rate, so its financing leg does not enter domestic bond market clearing. This keeps the fund's bond holdings equal to household and government debt. Its equity trades nevertheless affect prices and can change saving and borrowing through equilibrium feedback.

G.2 Price Adjustment in the Constrained Economy and Flexible Benchmark

In the constrained economy, equity market clearing and the fund's positions imply

$$\bar{Q} = q_t^{MF} + q_t^A, \qquad p_t \bar{Q}(1 - \kappa_t) = \theta_t X_t^{MF}, \qquad B_t^{MF} = (1 - \theta_t) X_t^{MF}.$$

Thus the price satisfies

$$p_t = \frac{\theta_t}{1 - \theta_t} \frac{B_t^{MF}}{\bar{Q}} \frac{1}{1 - \kappa_t}.$$

Around the zero reference position, $\bar{\kappa} = 0$, its first-order counterpart is

$$\widehat{p_t} = \widehat{B_t^{MF}} + \frac{\widehat{\theta_t}}{1 - \bar{\theta}} + \kappa_t. \tag{102}$$

Substituting the trading rule gives

$$\widehat{p_t} = \frac{\widehat{B_t^{MF}} + \widehat{\theta_t}/(1 - \bar{\theta}) + a\widehat{p_t^{\text{flex}}}}{1 + a}. \tag{103}$$

Holding the fund's bond position and allocation fixed, the trader closes a fraction $a/(1 + a)$ of the gap between the balance-sheet valuation and the reference. At $a \simeq 0.837$, this fraction is about 46%. The trader sells when the price exceeds the reference and buys when it is below it. The allocation and bond positions in (103) are themselves equilibrium outcomes, so this conditional calculation need not equal the change between two fully solved simulations.

As $a \to 0$, the price relation returns to the baseline constrained identity. As a grows, the price approaches the reference if the other terms remain bounded. Even equal equity prices

would not impose the flexible benchmark's saving, allocation and borrowing conditions on the constrained economy.

In the flexible benchmark, the rule uses its own price as the reference, so $\widehat{p}_t^{\text{flex}} = \widehat{p}_t$ and $\kappa_t = 0$. This leaves the benchmark equilibrium unchanged at any capacity. The inactivity follows from the reference choice. The flexible fund still has the finite demand elasticity derived in Appendix C.1.

G.3 Capacity and Wealth Reporting

We choose relative risk aversion $\rho_A = 2$, following the arbitrageur calibration of Gourinchas et al. (2025). This value is also used in the hedge fund portfolio analysis of Argyropoulos et al. (2022). To translate it into the CARA coefficient, fix trading capital at $\bar{W}^A = 0.05\bar{p}\bar{Q}$ and set $\gamma = \rho_A/\bar{W}^A$. The capital scale is a calibration assumption. The trader's active holdings are determined by the valuation gap in (101).

For the risk input, we use the sample variance of annual market excess returns over 1989–2022, $\sigma_A^2 = 0.0331$, corresponding to a volatility of 18.2%. We set the return-signal coefficient to the reference gross equity return, $\lambda_A = \bar{R}^E = 1.1068$. The resulting capacity is

$$a = \frac{\lambda_A}{\gamma \bar{p}\bar{Q}\sigma_A^2} = \frac{0.05\bar{R}^E}{\rho_A \sigma_A^2} \simeq 0.837. \tag{104}$$

The implied absolute risk aversion is $\gamma \simeq 0.660$ in model wealth units.[20]

At this capacity, the mean absolute position in the historical transition is 1.37% of the float and the largest absolute position is 2.98%. These are simulated outcomes. The capital assumption sets the resources supporting active trading and does not impose a five percent average equity holding.

The reported wealth shares attribute the trader's equity position to the wealthy household. With $\omega_E = \bar{p}\bar{Q}/\bar{W}$ and the other weights as in Appendix C.4, the reporting equation is

$$\eta_{R,t}^{dev} = \bar{\eta}_R \widehat{a}_t^R + \omega_E \kappa_t - \bar{\eta}_R \left(\omega_E \widehat{p}_t + \omega_H \widehat{p}_t^H + \omega_G \widehat{B}_t^G \right). \tag{105}$$

Here a_t^R is the wealthy household's fund investment, or its own portfolio in the flexible representation. The term $\omega_E \kappa_t$ credits the equity position outside that portfolio and keeps the reported domestic wealth shares adding up.[21] The wealth share results below use this

[20] Annual market and safe returns are compounded from the monthly Fama–French market and Treasury bill series. Their difference gives annual excess returns for 34 complete calendar years. Annual return units are used for this auxiliary capacity calculation; the resulting dimensionless coefficient is held fixed at the simulation dates. This externally specified risk measure sets the strength of the active trading rule.

[21] The reporting attribution does not consolidate the vehicle's external financing liability or a separate

reporting convention.

G.4 Quantitative Effect of the Arbitrageur

Figure 21 considers a desired position disturbance with persistence 0.9 and an innovation of 0.10. In the constrained economy, the disturbance shifts desired total fund investment, whereas in the flexible benchmark it shifts desired equity exposure. Specifically, the left sides of the respective investment Euler equations become $\phi_{MF}(\widehat{X}_t^{MF} - \zeta_t^d)$ and $\phi_E(\widehat{E}_t^{\text{flex}} - \zeta_t^d)$. The disturbance is a portfolio incentive, and its size does not equal realized subscriptions. This comparison describes these two specified loadings. It is a separate experiment from the matched equity and fund demand comparisons in Section 4.

In this experiment, the constrained price is below the flexible reference after the positive disturbance, so the trader buys equity. Its initial position is approximately 1.02% of the float. The constrained price rises by 1.39% on impact, compared with 0.36% without the trader and 2.61% in the flexible benchmark. Trading therefore substantially narrows the initial valuation gap. It also moderates the peak borrowing response.

The reported top share response reaches approximately 0.283 percentage points, compared with 0.307 without the trader, a reduction of about 8%. Its impact response increases as the trader raises the equity price, while its later peak is lower. The constrained response remains above the flexible response later in the plotted horizon. Finite trading capacity therefore changes both the size and timing of the response while preserving its greater persistence in this experiment.

G.5 Historical Simulations with Arbitrageur

We repeat the perfect-foresight transition of Section 5 with $a \simeq 0.837$. The trader uses the flexible price path under the same fundamental drivers as its reference; portfolio demand disturbances are zero. Figures 22 and 23 show the reported wealth shares and market aggregates.

The reported top share rises by 5.63 percentage points at the end of the transition with the trader, compared with 5.42 without it and 3.38 in the flexible benchmark. The gap between the constrained and flexible top shares increases from 2.04 to 2.25 percentage points. A narrower price gap does not necessarily imply convergence of wealth shares: bond positions, housing and ownership of the trader's equity position also enter wealth

profit transfer into the household budget. A complete household net worth interpretation would require those accounts.

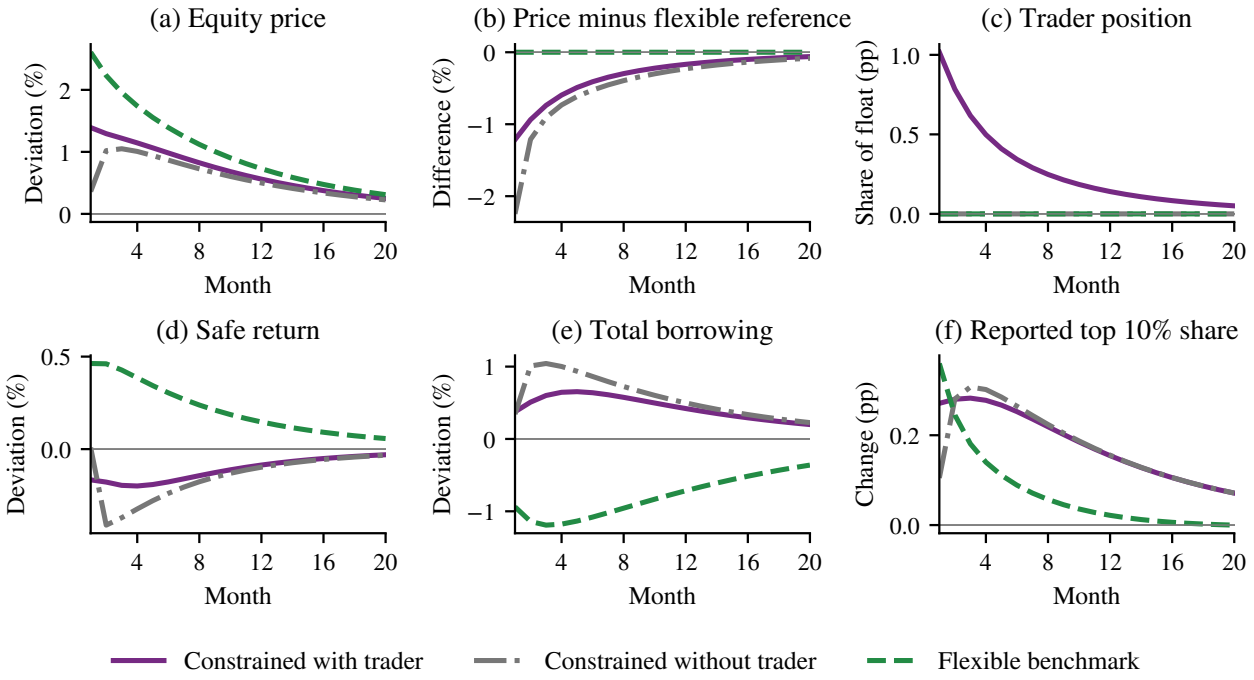


Figure 21: Desired position disturbance with the arbitrageur

Response to an innovation of 0.10 to ζ_t^d, with persistence 0.9, over 20 months. The disturbance shifts total fund investment in the constrained economy and equity exposure in the flexible benchmark, as described in the text. Solid: constrained economy with $a \simeq 0.837$; gray dash-dot: constrained economy with $a = 0$; dashed: flexible benchmark, whose trader position is zero by construction. Top row: (a) equity price; (b) price minus the flexible reference; (c) trader position share. Bottom row: (d) safe rate; (e) total borrowing, including government debt; (f) reported top 10% wealth share. Panels (a), (b), (d) and (e) are proportional deviations multiplied by 100; panel (d) refers to the gross safe return, not a percentage-point rate change; panel (c) is in percentage points of the float and panel (f) is in percentage points under (105).

accounting. The historical difference in reported wealth shares therefore survives at this capacity, although its magnitude changes.

At the end of the transition, the equity price is 34.12% above its reference level with the trader, compared with 32.60% without it and 36.27% in the flexible benchmark. Trading closes approximately 41% of the terminal price gap. Household borrowing and the safe rate also respond but remain much closer to their constrained paths without the trader than to the flexible paths. The exercise therefore shows meaningful adjustment of equity prices alongside persistent differences in credit allocation and reported wealth shares.

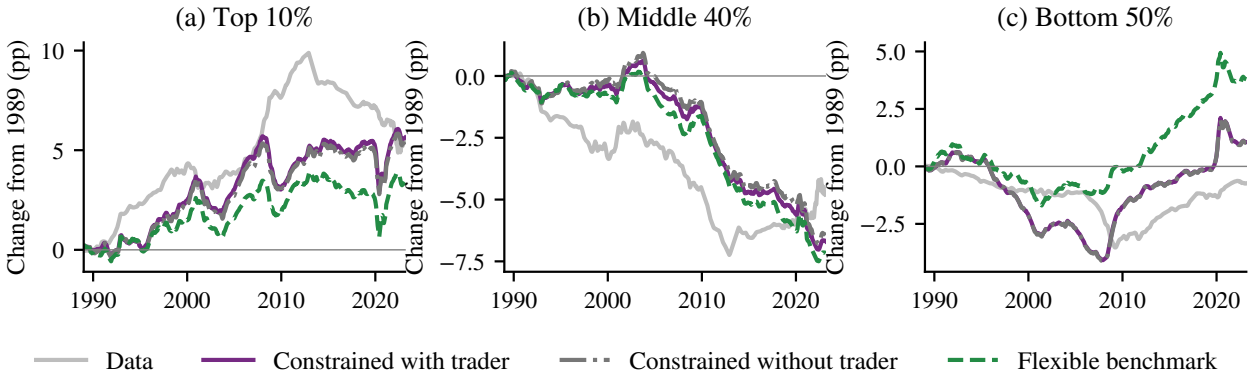


Figure 22: Change in reported wealth shares from 1989: perfect foresight with arbitrageur

Note: Perfect-foresight transition with $a \simeq 0.837$, with the ownership attribution in (105). Wealth share changes are in percentage points from 1989. Gray: data; purple: constrained economy with trader; gray dash-dot: constrained economy without trader; green: flexible benchmark. The trader is inactive in the flexible benchmark by construction. Wealth share data are from Realtime Inequality (Blanchet et al., 2022).

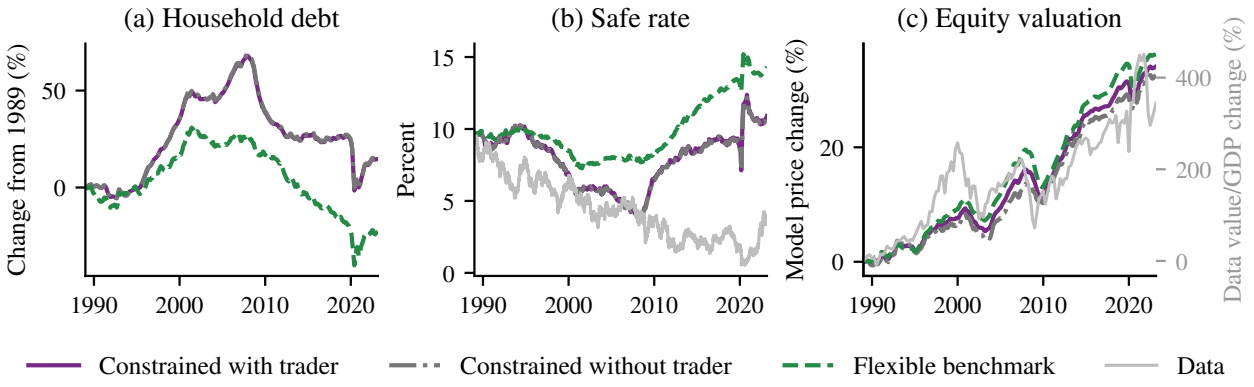


Figure 23: Borrowing, safe rate and equity price under perfect foresight with arbitrageur

Note: Perfect-foresight transition at $a \simeq 0.837$. Lines as in Figure 22. Panel (a) model household borrowing as a percentage change from 1989; panel (b) model safe rate and the observed ten-year Treasury yield, in percent; panel (c) model equity price as a percentage deviation from 1989, with observed equity market capitalization relative to GDP on the right axis. The two valuation series have separate scales.