Production Networks and the Wealth Distribution*

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Abstract

This paper studies how production networks shape household liquid wealth inequality. In a heterogeneous-agent economy with input-output linkages, we characterize the Consumer Leontief Multiplier (CLM) as a sufficient statistic for labor intensity under the model's production and demand assumptions. A higher CLM lowers labor intensity as the real unit profit rises relative to the real wage. In calibrated counterfactuals, network changes that raise the CLM increase liquid wealth inequality under benchmark dividend incidence. The effect depends on households' general equilibrium responses and the distribution of dividends: incidence favoring high-skill households amplifies inequality, whereas equal incidence can reverse the effect. Further, we validate these model predictions on the basis of descriptive empirical evidence. Both country-specific calibrations and panel evidence for European economies are consistent with the relationships between production network structure, income allocation, and the household wealth distribution: higher CLM is associated with lower labor intensity and greater concentration of wealth.

Keywords: Production Networks; Household Heterogeneity; Sectoral Linkages; Wealth Inequality; Consumer Leontief Multiplier

JEL Classification: D31; D57; E25

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Non-Technical Summary

Production networks describe how sectors rely on one another for intermediate inputs. A sector may purchase inputs directly from another sector, which in turn purchases inputs from several other sectors. As a result, the cost of producing a good reflects not only its direct inputs, but also the entire chain of production that lies behind them.

This paper asks whether these production linkages matter for the steady-state distribution of household liquid wealth, measured as household deposits. We combine a heterogeneous-agent model with a multi-sector production network and use data from European input-output tables and household balance sheets.

Our theoretical starting point is a familiar production-network multiplier, which summarizes the distribution of income between wages and profits under the model's assumptions. Specifically, under Cobb-Douglas production and common markups, and final demand coinciding with private consumption, the Consumer Leontief Multiplier (CLM), i.e. the consumption-weighted average of sectoral Leontief multipliers based on the input-output structure, determines labor intensity, i.e. the sales-weighted labor cost share. A higher CLM implies lower labor intensity and a larger aggregate profit share. Along a network change that raises the CLM, real unit profit responds more positively, or less negatively, than the real consumer wage. We use these income responses to study saving and liquid wealth accumulation across heterogeneous households.

This result allows us to construct disciplined production network counterfactuals. Starting from the euro area input-output matrix, we find alternative networks that deliver different values of the CLM while changing the original network as little as possible and preserving each sector's total intermediate-input share. In the calibrated model, networks with higher CLM generate lower labor intensity and, under the benchmark distribution of profit income, greater concentration of liquid wealth. In this specific counterfactual, the lower real consumer wage together with the higher real consumer unit profit explains how the production-side shift changes the income flows faced by households.

Households differ in their income, saving behavior, and asset positions, and profit income is distributed unevenly across them. When dividend income is concentrated among high-productivity households, the network counterfactual increases liquid wealth inequality. With equal dividend income across households, liquid wealth inequality instead declines.

We empirically validate the model predictions with country-specific calibrations and panel evidence for European economies. The empirical analysis uses FIGARO input-output tables to construct the model-consistent domestic CLM and the Household Finance and Consumption Survey to measure the distribution of liquid wealth. The evidence provides external discipline for the relationships highlighted by the model: the link between production network structure and labor intensity, and the link between production network structure and liquid wealth inequality. Both in the cross-country calibrations and in the panel regressions, a higher CLM is associated with lower labor intensity and greater liquid wealth inequality. These associations are descriptive rather than causal, since production networks, technology, demand, and institutions evolve jointly.

1 Introduction

Production networks and the household wealth distribution are jointly at the frontier of macroeconomic analysis. Recent episodes—from pandemic-related restrictions on contact-intensive activities to semiconductor supply bottlenecks and war-triggered energy crises—have made clear that input-output linkages between firms and income and wealth heterogeneity across households are crucial in shaping economic fluctuations and should be studied together. The renewed emphasis on industrial policy—driven by, e.g., the green transition, supply-chain resilience, and geopolitical competition (Juhász et al., 2024)—has further made it important to explore the possible interactions between the structure of production, the allocation of income between wages and profits and, ultimately, household wealth inequality.

Building on these insights, this paper asks whether and how production networks shape the distribution of household wealth. We study this question in a heterogeneous-agent economy with multi-sector input-output linkages, mapping the production network to relative prices and incomes, and ultimately, the distribution of household wealth. We then confront the main relationships highlighted by the model with European data. To the best of our knowledge, this is the first paper that proposes a model to map production networks to the steady-state wealth distribution and empirically tests the predictions of the model.

Recent empirical evidence documents a chain running from the production side of the economy to the wealth distribution: trade integration, global supply chains and firm-to-firm linkages shape wages, earnings and income within countries (Goldberg and Pavcnik, 2007; Helpman et al., 2017; Huneeus et al., 2022; Cardoza et al., 2025); in turn, common price and income movements have very unequal effects on household balance sheets for varying consumption baskets, income exposures, and nominal positions (Cravino et al., 2020; Jaravel, 2021; Kiss and Strasser, 2024; Ferreira et al., 2023).

However, the quantitative macroeconomic literature has so far left the analysis of this chain relatively unexplored. In their seminal contribution, Baqaee and Farhi (2018) provide the general theoretical bridge featuring heterogeneous households supplying factors to a network of producers, but their framework delivers comparative statics rather than an equilibrium wealth distribution. More recently, Schaab and Tan (2023), Rubbo (2025) and Bernon et al. (2022) develop models that combine production networks and household heterogeneity, but they take their configuration as given, to then study the transmission of aggregate shocks.

To fill this gap in the quantitative macroeconomic literature, we ask whether and how production networks shape the distribution of household liquid wealth, proxied by household deposits.[1] Our bridge between production networks and wealth inequality is the distribution of income between wages and profits, proxied by aggregate labor intensity—the sales-weighted labor share. Under common markups, Cobb-Douglas production, and coincident private and public final-demand weights, the production network's implications for labor intensity are summarized by the markup-adjusted consumption-weighted multiplier, which we call the Consumer Leontief Multiplier (CLM). We then characterize how network changes that raise the CLM shift the relative real incomes of workers and profit recipients: real unit profit responds more positively, or less negatively, than the real consumer wage, although the wage's sign is path-dependent. We study how these production-side income changes are reflected in household liquid wealth inequality, measured by its Gini coefficient.

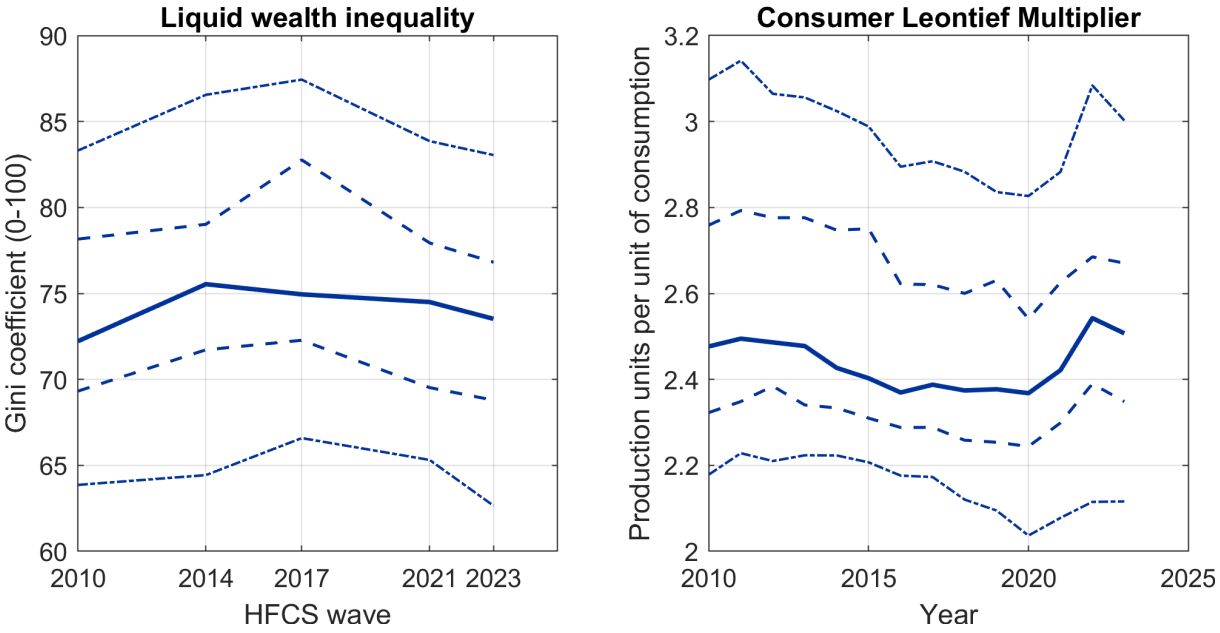
Figure 1 illustrates how the model-consistent domestic CLM—based on the European Commission's Full International and Global Accounts for Research in Input-Output Analysis (FIGARO) input-output tables—and liquid wealth inequality—based on the Eurosystem's Household Finance and Consumption Survey (HFCS)—evolved in a panel of European economies between 2010 and 2023. As shown in the figure, the wide bands of the cross-country distribution suggest that liquid wealth inequality and the CLM differed substantially across countries. The median liquid wealth Gini rises between the first two waves and then gradually declines, while the median CLM falls through much of the period before recovering after 2020. Changes in the bands also point to country-specific dynamics. The figure therefore documents substantial cross-country and temporal heterogeneity.

Figure 2 provides a first look at how these two dimensions of heterogeneity relate to each other. The chart plots liquid wealth inequality against the CLM across country-wave observations, with both variables purged of country and wave fixed effects, so that the remaining variation is within-country and net of common time factors. The correlation is positive and statistically significant at the 1% level:[2] country-wave observations in which the consumption basket embodies larger direct and indirect production requirements tend to display a

[1] We measure liquid wealth as household deposits in the Household Finance and Consumption Survey (HFCS) and in Eurostat's Sector Accounts used to calibrate the model's liquid wealth-to-GDP ratio (measured as the deposit-to-GDP ratio). Deposits are the empirical measure most closely aligned with the risk-free liquid asset in the model.

[2] In the two-way fixed-effects regression underlying the plotted fit, the CLM coefficient is 9.366, with a country-clustered t-statistic of 3.41 and 101 observations.

Figure 1: Evolution of liquid wealth inequality and Consumer Leontief Multiplier across European countries between 2010 and 2023



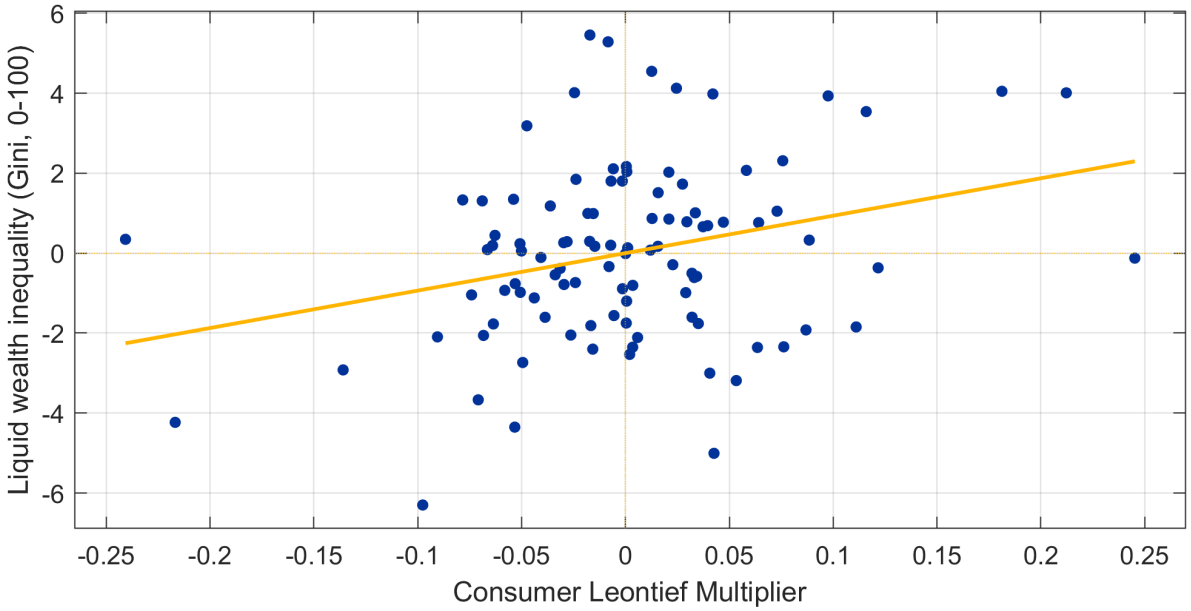
Sources: HFCS, FIGARO, authors' calculations. Notes: The left panel is based on statistics for a varying panel of 23 countries over time, with at most 22 countries in any wave: Germany, France, Italy, Spain, the Netherlands, Austria, Belgium, Ireland, Finland, Portugal, Greece, Slovenia, Slovakia, Croatia, Lithuania, Latvia, Malta, Cyprus, Estonia, Luxembourg, Poland, Czechia, and Hungary. The right panel is based on a balanced panel of all European Union countries. In each panel, the solid line depicts the cross-country median, while the dashed (dotted) lines indicate the 25th and the 75th (5th and 95th) percentiles of the cross-country distribution.

more concentrated distribution of liquid wealth. The dispersion around the fitted line is substantial, and the pattern is a descriptive correlation rather than a causal relationship, since the CLM and the wealth distribution are jointly determined by several concomitant factors, such as technology, demand composition, and institutions. Hence, we take these patterns as suggestive evidence motivating our analysis, rather than as a result.[3]

To explore whether and how production networks affect the distribution of liquid wealth across households, we proceed in two steps. First, we rationalize their relationship in a quantitative general equilibrium model that embeds a production network with input-output link-

[3]Note that the correlation is by itself silent on the direction of the relationship. Our modeling framework deliberately focuses on the direction running from the production structure of the economy to the household distribution, in line with the bulk of the available empirical evidence (Goldberg and Pavcnik, 2007; Huneeus et al., 2022; Cardoza et al., 2025). However, Doerr et al. (2026) show that a higher top income share shifts household savings away from bank deposits, thereby raising the relative funding costs of bank-dependent firms and lowering their job creation. Rojas-Bernal (2026) shows that redistribution across households with different expenditure and factor-income positions changes aggregate efficiency in a distorted production network. Related evidence in Braggion et al. (2021) links local household wealth inequality to lower firm entry and exit and to a smaller share of high-tech businesses. We abstract from this feedback channel throughout.

Figure 2: Correlation between liquid wealth inequality and Consumer Leontief Multiplier across European countries



Source: HFCS, FIGARO, authors' calculations. Notes: See notes to Figure 1 on the panel composition. The chart shows residuals for the CLM and the Gini after removing additive country and year effects.

ages across sectors in an otherwise standard heterogeneous-agent economy. On the production side, each of the sectors consists of monopolistically competitive firms that combine labor and intermediate inputs from all sectors according to a Cobb-Douglas technology and set prices as a constant markup over marginal cost. On the household side, ex-ante identical households face uninsurable idiosyncratic productivity risk, supply labor, consume a Cobb-Douglas basket of sectoral goods, and save in a single liquid asset supplied by the government. The baseline model is calibrated to the euro area based on National Accounts, HFCS, and FIGARO data. In a second step, we validate the model-implied relationships empirically through formal econometric analyses on a panel of European economies, controlling both the overall relationship between the CLM and the Gini coefficient for liquid wealth and its main channel, as well as several robustness checks. On this basis, we obtain four main results.

1. Production networks, labor intensity and real unit profit-to-wage ratio. Under common markups, Cobb-Douglas production, and coincident private consumption and final demand, the CLM summarizes aggregate labor intensity and the aggregate profit share. Specifically, labor intensity falls with the CLM. This is an implication of a standard production-network

multiplier. Under the model assumptions, the CLM equals the sum of revenue-based producer Domar weights (Jones, 2011; Bartelme and Gorodnichenko, 2015; Fadinger et al., 2022; Baqaee and Farhi, 2018). We explain this result on the distribution of income between labor and profits by characterizing analytically how the changes in the production network affect the ratio between the real consumer unit profit and the real consumer wage. Specifically, we show that, when the CLM rises, this ratio responds positively.[4] This result has an intuitive explanation: as firms shift their intermediate expenditures towards sectors with relatively large direct and indirect production requirements (i.e., with high multipliers), the CLM rises, production becomes less labor intensive, and the real unit profit increases relative to the real wage. We then connect these income responses to heterogeneous household saving and liquid wealth accumulation in a quantitative model-based counterfactual.

2. Production networks and liquid wealth inequality in a model-based counterfactual. To explore the effect of the production network on wealth inequality, we conduct a controlled counterfactual exercise, where we vary the intermediate input cost shares, which fully characterize the production network, by minimizing their (Frobenius) distance from the euro area benchmark, subject to the targeted CLM and to unchanged sectoral row sums, so that all non-network parameters are held fixed.

Based on this controlled counterfactual, our second result is that, *ceteris paribus*, a higher CLM increases liquid wealth inequality. The model highlights the role of relative prices and incomes as an important channel. When the CLM rises, labor intensity declines and the real unit profit-to-wage ratio increases as the real wage falls while the real unit profit rises. In turn, the liquid wealth Gini and top 10% share both increase. Crucially, this distributional effect depends on dividend incidence, namely the distribution of profits across households. When profit income is concentrated toward high-productivity households, dividends offset their labor-income losses and the production network counterfactual raises liquid wealth inequality. With equal dividend incidence, both inequality measures instead decline.[5]

[4]While the response of the real unit profit-to-wage ratio to changes in the CLM can be pinned down exactly, the individual responses of the real unit profit and the real wage depend on other structural parameters of the model, notably total factor productivity and the markup.

[5]This reversal stems from heterogeneous saving behavior out of income. A higher CLM lowers labor intensity and, in the controlled counterfactual, lowers the real consumer wage while raising the real consumer unit profit. If labor income accrues more to high-productivity households while profit income is distributed evenly, their labor-income loss is not offset by a disproportionately large dividend gain. The resulting saving responses reduce the Gini and top 10% share, although not every upper quintile's share falls.

This result is related to the general equilibrium frameworks with production networks and household heterogeneity studied by Schaab and Tan (2023), Rubbo (2025), and Bernon et al. (2022), which show that the sectoral structure of the economy can change the exposures of heterogeneous households to income or policy shocks. However, it goes beyond those results by tracing network-induced changes through saving and asset accumulation, and by showing that the sign of the wealth inequality response depends on dividend incidence, offering a complementary explanation for patterns observed in the heterogeneous-agent macroeconomic literature (Kaplan et al., 2018; Broer et al., 2020; Auclert, 2019; Bilbiie, 2008, 2020; Boar and Midrigan, 2025).

3. Production networks and liquid wealth inequality with country calibrations. We next use actual country-specific parameters for the euro area, Germany, France, Italy, and Spain. We first vary only the input-output matrix, rescaled to preserve the euro area sectoral labor shares. We then allow both the network and sectoral labor shares to vary, and finally use the full set of country calibration targets. We compare model outcomes with observed labor intensity and HFCS liquid wealth Ginis, using the full-calibration model CLM for both model and data points to keep the horizontal production statistic identical.

Our third result is that the predicted signs are present in the production-only country calibrations as well as in the corresponding data. Countries with a higher calibrated CLM tend to have lower labor intensity and greater liquid wealth concentration. Differences in the input-output allocation alone generate little dispersion. Observed sectoral labor shares account for most of the production-side dispersion, while household asset supply, final demand, and other country targets add dispersion in liquid wealth inequality. The full calibration only partly reproduces the cross-country ranking and dispersion in terms of inequality. This does not alter the broad qualitative comparison, but it confirms that the CLM is one component of a broader equilibrium mapping from production structure to household wealth accumulation.

4. Empirical validation of the predicted relationships. Finally, we combine fourteen FIGARO input-output tables with five HFCS waves between 2010 and 2023, as well as Eurostat national accounts. To align the empirical production statistic with the quantitative model, we construct a model-consistent domestic CLM. Sectoral intermediate-input cost shares are measured relative to labor compensation plus domestic intermediate expenditures and converted

into model-implied costs-to-revenues coefficients using the same common gross markup as in the model, with household-consumption weights. We prefer this measure because its variation reflects changes in the production network without incorporating differences in markups across countries and time.[6] Our preferred inequality specifications include country and wave fixed effects, absorbing persistent country differences and common movements across survey waves; country-only estimates are reported in the Appendix. Standard errors are clustered by country in all the specifications, and we cross-check finite-sample inference using a country-level wild cluster bootstrap.

Our fourth result is that all three empirical relationships have the signs predicted by the model. Across our preferred specifications, the CLM coefficient in the liquid wealth Gini equation is positive and ranges from 8.2 to 11.0; the labor-intensity coefficient ranges from -0.40 to -0.52; and the CLM coefficient in the labor-intensity equation ranges from -17.5 to -18.1. The positive CLM association with liquid wealth inequality is statistically significant at least at the 5% level in the preferred country and wave fixed-effects specifications. This is also the case when the Gini is replaced with the top 10% liquid wealth share. Importantly, these estimates are descriptive and do not establish causality, because input-output structures may themselves respond to other concomitant factors, such as technology, demand, and institutions. The production-side results are comparable in broad direction to work linking networks to labor shares and earnings (Goldberg and Pavcnik, 2007; Huneeus et al., 2022; Bernon et al., 2022). The link to liquid wealth accumulation is new relative to this literature.

Literature. This paper stands at the crossroads between three strands of the macroeconomic literature. The first strand relates to heterogeneous-agent macroeconomics. The household block builds on the incomplete-markets framework of Aiyagari (1994), with uninsurable idiosyncratic risk, borrowing constraints, and precautionary saving. Matching wealth concentration requires additional discipline on the sources of heterogeneity: Benhabib et al. (2019) emphasize skewed earnings, differential saving rates, and idiosyncratic returns to wealth, while Hubmer et al. (2021) study the roles of tax progressivity and heterogeneous portfolio returns in the evolution of US wealth inequality. Our dividend-incidence parameter sum-

[6] A fully data-based CLM, with intermediate purchases measured relative to observed gross output, yields even stronger statistical significance and yields larger coefficients, also reflecting its lower variability. This measure incorporates markups in the data, but also conflates markup profits with other components of gross operating surplus, which are absent from the model's restricted cost structure. These results are available from the authors upon request.

marizes unequal access to profit income rather than explicitly modeling these mechanisms. Among other related studies, Kaplan et al. (2018) and Auclert et al. (2024) show that, with incomplete markets and heterogeneous marginal propensities to consume, indirect income channels dominate direct intertemporal substitution; this is the force that, in our model, turns network-induced changes in labor and profit income into unequal changes in asset accumulation. Moreover, Auclert (2019), Bilbiie (2008, 2020) and Broer et al. (2020) establish that the aggregate and distributional response depends on how labor and profit income accrue across households, which is the basis of our dividend-incidence exercise. Bilbiie et al. (2022) show how profit incidence interacts with capital accumulation in shaping aggregate-demand amplification in heterogeneous-agent New Keynesian models; in turn, Boar and Midrigan (2025) make the incidence point for markup income in a dynamic economy with wealth accumulation and concentrated firm ownership. Grancini (2025) shows that, with self-insurance, the supply of government bonds—a margin we hold fixed—shapes shock transmission. Other studies (Cravino et al., 2020; Jaravel, 2021; Kiss and Strasser, 2024; Allayioti et al., 2024; Ferreira et al., 2023) incorporate households with different consumption baskets and nominal positions, so that movements in the consumption price index—similar to the object in this paper—have unequal effects. Compared to this strand, this paper enriches the standard production side of the economy with a sectoral input-output structure.

The second strand of the literature investigates production networks. With this strand, we share the Leontief representation of the network and the result that, in the presence of distortions, the entire input-output matrix matters and not only sectoral sales shares. Acemoglu et al. (2012) and Carvalho and Tahbaz-Salehi (2019) establish that input-output linkages transform industry-level disturbances into aggregate fluctuations, while Baqaee and Farhi (2019) and Baqaee and Farhi (2024) show that with markups and other wedges the network has first-order aggregate effects. Baqaee and Farhi (2020) characterize how markups and other distortions interact with network linkages to determine allocative efficiency and the social cost of distortions. We apply this logic to a consumption-weighted, markup-adjusted inverse that determines labor intensity under the maintained assumptions, and use the associated relative response of real wages and unit profits to connect network changes to household saving. On the nominal side, Rubbo (2023) and Pasten et al. (2020) show how linkages interact with price setting, while La'O and Tahbaz-Salehi (2022) characterize optimal monetary policy and its welfare implications in production networks with nominal rigidities. Further, Ghassibe and

Nakov (2025) and Christoffel et al. (2025) show that networks dampen the pricing response to demand shocks while supply shocks trigger repricing cascades, while De Sanctis et al. (2026) show that the effect of financial frictions depends on where in the network constraints are located. Closest to our statistic, Aguilar et al. (2026) find that countries with longer production chains display stronger and more persistent pass-through of imported energy prices to core inflation, applying a Leontief object to inflation persistence rather than to steady-state labor intensity and wealth. Gebauer et al. (2026) synthesize this evidence for the euro area. Compared with this strand, this paper enriches the household side of the economy by tracing the endogenous reaction of the wealth distribution to changes in production structure.

The third, and most closely related, strand connects production networks and household heterogeneity, and is where we position our contribution. Baqaee and Farhi (2018) provide the general characterization of an economy in which heterogeneous households supply different factors to an arbitrary network of producers; we use this as the theoretical bridge, but we solve for an equilibrium wealth distribution rather than for comparative statics. Moreover, Schaab and Tan (2023), Rubbo (2025) and Bernon et al. (2022) study how a given household distribution transmits monetary, fiscal or productivity shocks through a given sectoral structure. Further, Rubbo et al. (2026) add labor markets segmented across twenty euro area countries and find that ownership structure shapes the cross-country incidence of common shocks, while Andreolli et al. (2026) find that the industries contracting most after a monetary tightening are those employing more hand-to-mouth workers. In all these studies, both the production network and the household distribution are taken as given. By contrast, we consider the steady-state distribution of liquid wealth an endogenous outcome of the production structure. In international trade, Galle et al. (2023) combine input-output linkages and heterogeneous workers in a multisector model to quantify aggregate and group-level welfare effects of trade; our focus is instead on how production structure shapes liquid wealth accumulation. On the empirical side, Goldberg and Pavcnik (2007), Helpman et al. (2017), Huneeus et al. (2022) and Cardoza et al. (2025) document that trade exposure and firm-to-firm linkages shape wages and earnings within countries, and Costinot et al. (2012) provide the corresponding theory for global supply chains; these are the empirical counterpart of our first channel, but they stop at labor income and do not follow it through to wealth accumulation. Finally, a smaller literature runs in the opposite direction: Doerr et al. (2026) and Braggion et al. (2021) show that household inequality feeds back into firm financing, job creation and business dy-

namism, and Rojas-Bernal (2026) shows that redistribution across households with different expenditure and factor-income positions changes aggregate efficiency in a distorted network. We abstract from this feedback. Relative to all three strands, our contribution is an exact result mapping the input-output matrix into labor intensity as well as wages and unit profits, together with a quantitative model and empirical evidence establishing how production networks shape the steady-state distribution of liquid wealth conditional on dividend incidence.

An important avenue for research is to bring these two margins together in the transmission of aggregate shocks, especially monetary policy shocks. On the production side, input-output linkages tend to dampen the aggregate price response to demand shocks, including monetary policy shocks, but can amplify real propagation in sectors that are both sticky-price and intermediate-input intensive (Pasten et al., 2020; Ghassibe, 2024; Gebauer et al., 2026). On the household side, the direction depends on the distribution and incidence margins under consideration. Cravino et al. (2020) find that lower income inequality makes aggregate prices more responsive to a monetary policy shock, although the corresponding difference in output responses is negligible, while Schaab and Tan (2023) find that earnings heterogeneity dampens the aggregate effect of a monetary tightening when the induced redistribution favors households with high expenditure-weighted marginal propensities to consume. These results caution against a universal claim that either networks or inequality necessarily amplify monetary policy. Our framework provides a basis for studying their interaction: production networks shape the division of income between wages and profits and the endogenous distribution of liquid wealth, while that distribution shapes households' spending responses and exposure to policy. A dynamic extension with nominal rigidities could therefore quantify how network-induced wealth inequality feeds back into the transmission of monetary policy to the aggregate economy, rather than treating the production structure and household distribution as independently fixed.

Roadmap. The remainder of the paper is organized as follows. Section 2 presents the heterogeneous-agent model with input-output linkages. Section 3 derives the relationship between the Consumer Leontief Multiplier, labor intensity, and the aggregate distribution of income between wages and profits. Section 4 describes the calibration. Section 5 presents the controlled counterfactual exercise, the dividend-incidence analysis, and the country calibrations. Section 6 provides the empirical validation of the model. Section 7 concludes.

2 The model

The model embeds a production network with input-output linkages between sectors in an otherwise standard heterogeneous-agent model. Specifically, the model economy is populated by households who consume and work, price-setting sectoral producers, and a fiscal authority borrowing from net saving households to finance unproductive spending, repay outstanding debt and rebate the rest to all households. On the household side, the model incorporates heterogeneous agents with idiosyncratic productivity shocks and incomplete markets. On the firm side, the model includes a continuum of monopolistically competitive firms for each sector producing goods or services with labor and intermediate inputs.

2.1 Households

A continuum of ex–ante identical households is indexed by idiosyncratic labor productivity e and beginning–of–period liquid wealth holdings a. Idiosyncratic productivity follows a finite-state Markov chain $\{e_t\}$ with transition matrix Π obtained by a Rouwenhorst discretization of an AR(1) process with persistence ρ_e and innovation standard deviation σ_e.[7] Let $D_t(e, a)$ denote the cross-sectional density over (e, a).

Households have preferences

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left[\frac{c_t^{1-1/\psi}}{1-1/\psi} - v_\phi \frac{n_t^{1+1/\phi}}{1+1/\phi} \right], \tag{1}$$

where c_t is consumption, n_t is hours worked, ψ is the elasticity of intertemporal substitution, ϕ is the Frisch elasticity of labor supply, and $v_\phi > 0$ scales the disutility of labor.

Real wages are W_t^R per efficiency unit. For a household with productivity e_t, the effective real wage is $w_t(e_t) = W_t^R e_t$. Let r_t denote the ex–post real interest rate on one-period risk-free bonds in period t, and let $T_t(e_t)$ denote net transfers (dividends minus taxes) received in real consumption units.

The per-period budget constraint for a household of type (e_t, a_t) is

$$c_t(e_t, a_t) + a_{t+1}(e_t, a_t) = (1 + r_t)\, a_t + w_t(e_t)\, n_t(e_t, a_t) + T_t(e_t), \tag{2}$$

[7] The discretized productivity states used in the model are multiplied by a common scale n_{mult}; thus, e_t below denotes this scaled efficiency state.

subject to the borrowing constraint

$$a_{t+1}(e_t, a_t) \geq \underline{a} \quad \text{with} \quad \underline{a} = 0. \tag{3}$$

Let $V_t(e, a)$ denote the value function and $V_{a,t}(e, a)$ its derivative with respect to assets. The first-order conditions can be written as

$$u_c(c_t(e_t, a_t), n_t(e_t, a_t)) = \beta \mathbb{E}_t \left[V_{a,t+1}(e_{t+1}, a_{t+1}) \,|\, e_t, a_t \right], \tag{4}$$

$$v_\phi n_t(e_t, a_t)^{1/\phi} = u_c(c_t(e_t, a_t), n_t(e_t, a_t))\, w_t(e_t), \tag{5}$$

where $u_c(c, n) = c^{-1/\psi}$ is the marginal utility of consumption.[8]

The law of motion for the cross-sectional distribution $D_t(e, a)$ is

$$D_{t+1}(e', a_j) = \sum_e \sum_i \Pi(e'|e)\, \Lambda_j(a_{t+1}(e, a_i))\; D_t(e, a_i), \tag{6}$$

where a_i and a_j index points on the asset grid, and $\Lambda_j(a')$ is the lottery weight assigned to asset node a_j for a policy choice a'. If $a' \in [a_k, a_{k+1}]$, the method assigns weights $(a_{k+1} - a')/(a_{k+1} - a_k)$ and $(a' - a_k)/(a_{k+1} - a_k)$ to nodes a_k and a_{k+1}, respectively, and zero weight to all other nodes. The productivity transition is governed by $\Pi(e'|e)$.

Aggregate variables are obtained by integrating over D_t:

$$A_t = \sum_e \sum_a a_t(e, a)\, D_t(e, a), \tag{7}$$

$$C_t = \sum_e \sum_a c_t(e, a)\, D_t(e, a), \tag{8}$$

$$N_t = \sum_e \sum_a e\, n_t(e, a)\, D_t(e, a), \tag{9}$$

where N_t is total efficiency units of labor supplied.

For our quantitative analysis, we approximate the quarterly marginal propensity to consume out of an unexpected cash transfer (MPC), holding prices fixed, by finite differences at each node (e, a) along the asset grid:

$$\text{MPC}(e, a) \approx \frac{1}{1 + r} \frac{\partial c(e, a)}{\partial a}. \tag{10}$$

[8] Equations (1)–(5) are solved with the endogenous-grid method (EGM), enforcing the borrowing constraint (3) via a direct adjustment of the policy functions at the lower asset bound.

2.2 Firms

Sectoral aggregators. Each sector $j = 1, \ldots, J$ consists of a continuum of monopolistically competitive firms, each producing a differentiated variety y_{jf}. A representative final user in sector j aggregates individual varieties via a CES aggregator,

$$Y_{j,t} = \left[\int_0^1 y_{jf,t}^{(\varepsilon_j - 1)/\varepsilon_j} \, df \right]^{\varepsilon_j/(\varepsilon_j - 1)}, \tag{11}$$

with elasticity of substitution $\varepsilon_j > 1$. The associated sector-level price index is

$$P_{j,t} = \left[\int_0^1 p_{jf,t}^{1-\varepsilon_j} \, df \right]^{1/(1-\varepsilon_j)}. \tag{12}$$

Individual firm's problem. Each firm f in sector j produces its variety using labor and intermediate inputs from all sectors according to a Cobb-Douglas technology,

$$y_{jf,t} = A_j Z_t \, n_{jf,t}^{\theta_j} \prod_{k=1}^{J} x_{jkf,t}^{\omega_{jk}}, \tag{13}$$

where $\theta_j + \sum_{k=1}^{J} \omega_{jk} = 1$, Z_t is aggregate total factor productivity, and A_j is a sector-specific productivity shifter, which is normalized such that

$$A_j = \theta_j^{-\theta_j} \prod_{k=1}^{J} \omega_{jk}^{-\omega_{jk}}, \qquad j = 1, \ldots, J, \tag{14}$$

which absorbs the Cobb-Douglas share constants into the sectoral productivity shifter.[9] The firm takes the nominal wage W_t and all sectoral prices $\{P_{k,t}\}_{k=1}^{J}$ as given. Cost minimization yields standard Cobb-Douglas input demands,

$$x_{jkf,t} = \frac{\omega_{jk} \, MC_{jf,t} \, y_{jf,t}}{P_{k,t}}, \qquad n_{jf,t} = \frac{\theta_j \, MC_{jf,t} \, y_{jf,t}}{W_t}, \tag{15}$$

and the firm-level marginal cost function

$$MC_{jf,t} = \frac{1}{A_j Z_t} \, W_t^{\theta_j} \theta_j^{-\theta_j} \prod_{k=1}^{J} P_{k,t}^{\omega_{jk}} \omega_{jk}^{-\omega_{jk}}. \tag{16}$$

[9] We adopt this normalization following standard practice in the production networks literature (e.g., Acemoglu et al., 2012; Baqaee and Farhi, 2019; Rubbo, 2023).

The CES demand schedule implies that firm f faces a constant price elasticity of demand ε_j, so profit maximization yields a constant-markup pricing rule,

$$p_{jf,t} = \mu_j \, MC_{jf,t}, \qquad \mu_j \equiv \frac{\varepsilon_j}{\varepsilon_j - 1} > 1. \tag{17}$$

Symmetric equilibrium. Since the marginal cost depends only on economy-wide factor prices and sector-level technology parameters, it is identical across all firms within sector j, so that $MC_{jf,t} = MC_{j,t}$ for all f. Hence, all firms in sector j set the same price in a symmetric equilibrium, that is $p_{jf,t} = P_{j,t}$ for all f. Aggregating the production function (13) over the unit continuum of firms, the sector-level technology becomes

$$Y_{j,t} = A_j Z_t \, N_{j,t}^{\theta_j} \prod_{k=1}^{J} X_{jk,t}^{\omega_{jk}}, \tag{18}$$

and, further imposing sectoral market clearing of the firm-level demand functions (15), the sector-level input demands are

$$X_{jk,t} = \omega_{jk} \frac{MC_{j,t} \, Y_{j,t}}{P_{k,t}}, \tag{19}$$

$$N_{j,t} = \theta_j \frac{MC_{j,t} \, Y_{j,t}}{W_t}, \tag{20}$$

where the sector-level marginal cost follows

$$MC_{j,t} = \frac{1}{A_j Z_t} W_t^{\theta_j} \theta_j^{-\theta_j} \prod_{k=1}^{J} P_{k,t}^{\omega_{jk}} \omega_{jk}^{-\omega_{jk}}, \tag{21}$$

and the sector-level price satisfies

$$P_{j,t} = \mu_j \, MC_{j,t} = \frac{\mu_j}{A_j Z_t} W_t^{\theta_j} \theta_j^{-\theta_j} \prod_{k=1}^{J} P_{k,t}^{\omega_{jk}} \omega_{jk}^{-\omega_{jk}}. \tag{22}$$

Sectoral nominal profits are then given by

$$\Pi_{j,t} = P_{j,t} Y_{j,t} - W_t N_{j,t} - \sum_{k=1}^{J} P_{k,t} X_{jk,t}, \tag{23}$$

and total profits aggregate to $\Pi_t = \sum_j \Pi_{j,t}$.

Final demand. On the demand side, a representative household and the government purchase sectoral goods according to Cobb-Douglas bundles with fixed expenditure shares. The private consumption bundle is

$$C_t = \prod_{j=1}^{J} \left(\frac{C_{j,t}}{\rho_j} \right)^{\rho_j}, \qquad \rho_j \in (0,1), \qquad \sum_{j=1}^{J} \rho_j = 1, \tag{24}$$

where $C_{j,t}$ denotes real consumption of the good produced by sector j and ρ_j is its expenditure weight. Minimizing nominal expenditure $\sum_j P_{j,t} C_{j,t}$ subject to (24) yields the consumer price index and the sectoral demand functions,

$$P_t^C = \prod_{j=1}^{J} P_{j,t}^{\rho_j}, \tag{25}$$

$$C_{j,t} = \rho_j \frac{P_t^C}{P_{j,t}} C_t, \tag{26}$$

so that each sector maintains a constant nominal share ρ_j of aggregate private consumption expenditure, $P_{j,t} C_{j,t} = \rho_j P_t^C C_t$.

Symmetrically, the government purchases a bundle with expenditure weights φ_j,

$$G_t = \prod_{j=1}^{J} \left(\frac{G_{j,t}}{\varphi_j} \right)^{\varphi_j}, \qquad \varphi_j \in (0,1), \qquad \sum_{j=1}^{J} \varphi_j = 1, \tag{27}$$

with associated government price index and sectoral demand functions

$$P_t^G = \prod_{j=1}^{J} P_{j,t}^{\varphi_j}, \tag{28}$$

$$G_{j,t} = \varphi_j \frac{P_t^G}{P_{j,t}} G_t, \tag{29}$$

so that $P_{j,t} G_{j,t} = \varphi_j P_t^G G_t$.

Sectoral market clearing. Each sector's output is absorbed by private consumption, government demand, and intermediate use by all sectors,

$$Y_{j,t} = C_{j,t} + G_{j,t} + \sum_{m=1}^{J} X_{mj,t}, \qquad j = 1, \ldots, J. \tag{30}$$

2.3 Government

The government issues one-period real debt B_{t+1}, denominated in units of the consumption good, and purchases the government consumption bundle defined above. Government expenditure expressed in consumption units is

$$G_t^C \equiv \frac{P_t^G G_t}{P_t^C} \tag{31}$$

The government budget constraint in consumption units is

$$B_{t+1} + \mathcal{T}_t = (1 + r_t)B_t + G_t^C, \tag{32}$$

where $\mathcal{T}_t$ denotes aggregate real tax revenue.

2.4 Distribution of dividends, taxes, and transfers

The importance of profit incidence for heterogeneous-agent aggregate demand (Bilbiie et al., 2022) motivates treating the distribution of dividends separately from aggregate profits.

Let π_e denote the stationary population mass in productivity state e. To allow profit income to be distributed unequally across households, we order the N_e productivity states from lowest to highest and assign each state a normalized rank

$$q_e = \frac{\text{rank}(e) - 1}{N_e - 1} \in [0, 1]. \tag{33}$$

Let $\Pi_t^R \equiv \Pi_t / P_t^C$ denote aggregate profits in units of the consumption good. For $\lambda_{\text{div}} > 0$, the share of aggregate profits received by productivity state e is

$$s_e^{\text{div}}(\lambda_{\text{div}}) = \frac{\pi_e q_e^{\lambda_{\text{div}}}}{\sum_h \pi_h q_h^{\lambda_{\text{div}}}}, \tag{34}$$

and the corresponding dividend payment per household of type e is

$$d_t(e) = \Pi_t^R \frac{s_e^{\text{div}}(\lambda_{\text{div}})}{\pi_e} = \Pi_t^R \frac{q_e^{\lambda_{\text{div}}}}{\sum_h \pi_h q_h^{\lambda_{\text{div}}}}. \tag{35}$$

When $\lambda_{\text{div}} = 0$, dividends are distributed equally per household. Higher values of λ_{div}

shift progressively more profit income toward high-productivity households.[10] By construction,

$$\sum_e \pi_e d_t(e) = \Pi_t^R. \tag{36}$$

Throughout our quantitative analysis, taxes are distributed equally per household. Since the population masses sum to one, the per-household tax payment is

$$\tau_t(e) = \mathcal{T}_t \qquad \text{for all } e, \tag{37}$$

and therefore

$$\sum_e \pi_e \tau_t(e) = \mathcal{T}_t.$$

Net transfers entering the household budget constraint are

$$T_t(e) = d_t(e) - \tau_t(e) \qquad \text{for all } e, \tag{38}$$

and therefore

$$\overline{T}_t \equiv \sum_e \pi_e T_t(e) = \Pi_t^R - \mathcal{T}_t. \tag{39}$$

2.5 Aggregation and national accounts

Aggregate assets A_t, consumption C_t, and effective labor supply N_t are given by Equations (7)–(9). Sectoral outputs and inputs $(Y_{j,t}, X_{jk,t}, N_{j,t})$ satisfy the production conditions above together with sectoral goods-market clearing, Equation (30).

We define nominal GDP as the sum of expenditure-side and income-side measures from the aggregate resource constraint of the economy, namely

$$NGDP_t \equiv P_t^C C_t + P_t^G G_t = W_t N_t + \Pi_t, \tag{40}$$

Aggregate nominal gross output is instead defined as

$$Y_t^N = \sum_j P_{j,t} Y_{j,t}, \tag{41}$$

[10] We denote the tax-incidence curvature by λ_{tax}; its benchmark value is zero, corresponding to equal lump-sum taxes.

which, assuming a similar Cobb-Douglas structure across sectors, implies the following output deflator

$$P_t^Y = \prod_{j=1}^{J} P_{j,t}^{\chi_j}, \qquad \chi_j \equiv \frac{P_{j,t} Y_{j,t}}{\sum_k P_{k,t} Y_{k,t}} \in (0,1), \qquad \sum_{j=1}^{J} \chi_j = 1, \tag{42}$$

and real gross output

$$Y_t = \frac{Y_t^N}{P_t^Y}. \tag{43}$$

Asset, labor, and consumption goods markets clear:

$$\begin{aligned} A_t &= B_t, && \text{(asset market)}, \\ N_t &= \sum_{j=1}^{J} N_{j,t}, && \text{(labor market)}, \\ C_t &= \frac{\sum_{j=1}^{J} P_{j,t} C_{j,t}}{P_t^C}, && \text{(consumption goods markets)} \end{aligned}$$

thus closing the model.

3 The Consumer Leontief Multiplier, labor intensity, and the real consumer wage

This section explores the implications of the supply side of the model under the assumptions of Cobb-Douglas production, common productivity Z, a common gross markup μ, and the normalization in Equation (14). Let $\Omega = \{\omega_{jk}\}_{j,k=1}^{J}$ denote the matrix of intermediate-input expenditure shares, where ω_{jk} is the share of sector j's production cost spent on inputs produced by sector k. Constant returns to scale imply $\theta_j + \sum_{k=1}^{J} \omega_{jk} = 1$, where θ_j is the labor share in sector j. For the definition of our main objects of interest and for the derivation of our main analytical results, this section assumes that private consumption represents the only component of final demand, thus abstracting from the presence of public consumption. For the sake of consistency with our theoretical results and simplicity, these definitions are then applied to the calculations of the relevant metrics throughout the quantitative and the empirical analyses.[11] We now define the two main objects of interest.

[11] Given the relatively small weight of public consumption relative to private consumption, as well as their similar sectoral compositions, using also public consumption to capture final demand does not alter qualitatively the conclusions of either the quantitative model or the empirical analysis, and it only slightly changes them quantitatively.

Definition 1 (Consumer Leontief Multiplier)**.** *The Consumer Leontief Multiplier (CLM) is defined as*

$$\text{CLM}(\Omega, \boldsymbol{\rho}, \mu) \equiv \boldsymbol{\rho}' \left(I - \frac{\Omega}{\mu} \right)^{-1} \mathbf{1}, \tag{44}$$

where $\boldsymbol{\rho}$ is the vector of private consumption shares. Since households consume a Cobb-Douglas bundle of sectoral products, the vector $\boldsymbol{\rho}$ is constant and each element ρ_j represents the share of total household spending allocated to sector j.

Definition 1 captures how nominal household spending propagates through the network using intermediate-input shares divided by the common markup, i.e., the revenue-based input-output matrix Ω/μ. Under the assumption of private consumption representing final demand, the CLM is akin to the Domar-weighted version of standard gross-output multipliers and backward-linkage measures (Baqaee and Farhi, 2018; Jones, 2011; Bartelme and Gorodnichenko, 2015; Fadinger et al., 2022), also related to the upstreamness measure of Antràs et al. (2012). Intuitively, the CLM can be interpreted as the total nominal output generated per unit of household spending. When household spending is tilted toward sectors with high upstream linkages, the CLM is larger, reflecting the greater amplification of household demand through the production network. Typically, sectors with strong upstream connections are those with a high share of their production costs spent on intermediate inputs or, conversely, with a low share of their production costs spent on labor (e.g., energy and manufacturing).

Definition 2 (Labor intensity)**.** *Labor intensity is defined as the sales-weighted labor share*

$$\bar{\theta} \equiv \sum_j \theta_j \chi_j, \qquad \chi_j = \frac{P_j Y_j}{Y^N}. \tag{45}$$

Given constant returns to scale and the common markup, aggregate profits are a fixed fraction of nominal gross output, so that Definition 2 implies that labor intensity incorporates the allocation of income between labor and profits. Moreover, under these assumptions, labor intensity is also the ratio of aggregate labor compensation to total production costs, namely

$$\bar{\theta} = \frac{\sum_j \theta_j MC_j Y_j}{\sum_j MC_j Y_j} = \frac{WN}{WN + \sum_{j,k} P_k X_{jk}}, \tag{46}$$

which implies that a model-consistent measure of labor intensity can be estimated as

$$\bar{\theta} = \frac{D_1}{D_1 + P_2}, \tag{47}$$

where D_1 is compensation of employees and P_2 is intermediate consumption in the national accounts. Labor intensity is constructed as defined above throughout our quantitative and empirical analyses. We now turn to the main analytical results of the paper.

Lemma 1 (CLM and labor intensity)**.** *Under the assumptions above, labor intensity is a decreasing function of the CLM:*

$$\frac{\partial \bar{\theta}}{\partial \text{CLM}} = -\frac{\mu}{\text{CLM}^2} < 0 \quad (\mu > 1).$$

Proof. See Appendix A. □

Lemma 1 records the accounting relationship between this standard multiplier and labor intensity under the maintained assumptions. The sign of the relationship is unambiguous: when the CLM increases, labor intensity falls. When household demand is more tilted toward sectors with strong upstream linkages, each unit of spending generates more output through the network. This reduces the relative importance of labor and increases that of other factors, including profits, in total output.

The accounting result also changes the profit-to-wage-income ratio. Proposition 1 characterizes the resulting relative response of the real consumer wage and real consumer unit profit along a network change, without assigning a sign to either income level in general. We define these real income objects as follows.

Definition 3 (Real consumer wage and real consumer unit profit)**.** *Let* $\mathbf{w} = (W/P_1, \ldots, W/P_J)'$ *denote the vector of sectoral real wages. Under the maintained production assumptions,*

$$\log \mathbf{w} = (\log Z - \log \mu)(I - \Omega)^{-1}\mathbf{1}, \tag{48}$$

and the real consumer wage, $W^R \equiv W/P^C$*, can be expressed in log terms as follows:*

$$\log W^R = \boldsymbol{\rho}' \log \mathbf{w} = (\log Z - \log \mu)\boldsymbol{\rho}'(I - \Omega)^{-1}\mathbf{1}. \tag{49}$$

The real consumer unit profit is defined as real aggregate profit per efficiency unit of labor,

$$\pi^R \equiv \frac{\Pi/P^C}{N} = W^R \frac{\mu-1}{\bar{\theta}} = W^R \frac{(\mu-1)\mathrm{CLM}}{\mu-(\mu-1)\mathrm{CLM}}. \tag{50}$$

Based on the definitions above, we can now analyze how changes in the CLM affect the real consumer wage and the real consumer unit profit.

Proposition 1 (CLM and real consumer wage and unit profit)**.** *Under the assumptions above, consider a differentiable network change with* $d\log \mathrm{CLM}/dt \neq 0$*:*

(i) Along any differentiable path $\Omega(t)$*, the impact of a network change on the real consumer wage is*

$$\frac{d\log W^R}{d\log \mathrm{CLM}} = (\log Z - \log \mu)\frac{d\left[\boldsymbol{\rho}'(I-\Omega)^{-1}\mathbf{1}\right]/dt}{d\log \mathrm{CLM}/dt}. \tag{51}$$

(ii) Writing $x \equiv (1-1/\mu)\mathrm{CLM}$*, the response of real consumer unit profit along the same path is*

$$\frac{d\log\left[\pi^R\right]}{d\log \mathrm{CLM}} = \frac{d\log W^R}{d\log \mathrm{CLM}} + \frac{1}{1-x}. \tag{52}$$

(iii) Under the maintained assumptions, $x < 1$*, and therefore*

$$\frac{d\log \pi^R}{d\log \mathrm{CLM}} > \frac{d\log W^R}{d\log \mathrm{CLM}}.$$

Proof. See Appendix B. □

Proposition 1 makes Lemma 1 operational for relative prices and incomes. A higher CLM lowers $\bar{\theta}$ and shifts aggregate income away from labor and toward profits. The additional term $1/(1-x)$ in Equation (52) is strictly positive: real consumer unit profit responds more positively, or less negatively, than the real consumer wage. This comparison matters because $\pi^R/W^R = \Pi/(WN) = (\mu-1)/\bar{\theta}$ is the profit-to-labor-income ratio.[12] However, note that

[12]The common-markup and Cobb-Douglas assumptions are important for the exact sufficient-statistic statements. With fixed heterogeneous sectoral markups μ_j, the accounting comparison between aggregate profits and labor income remains, but the price system contains the vector of markups and labor intensity is a markup-weighted function of sectoral sales; a scalar CLM based only on Ω is therefore no longer sufficient. A markup-adjusted CLM can restore an analogous formulation under additional restrictions, but Equations (A.5) and (52) do not hold unchanged. With generic CES production, cost shares vary with relative factor prices, so the linear wage system in Definition 3 changes. With generic CES consumption, expenditure weights vary with relative prices, so the weights entering the consumer price index and CLM are endogenous. The qualitative income-shifting intuition may survive, but neither exact formula is generally invariant without further restrictions.

the sign of the wage response remains ambiguous and depends on the sign of the coefficient $\log Z - \log \mu$.[13]

Overall, Lemma 1 establishes the CLM as a sufficient statistic for labor intensity and aggregate profit shares under the maintained assumptions. Proposition 1 adds that, when a network change raises the CLM, real unit profit responds more positively, or less negatively, than the real consumer wage, thus raising the real unit profit-to-real wage ratio π^R/W^R. This relative response, rather than the individual responses of real unit profits or real wages, is central to the distributional mechanism in the quantitative model, which also accounts for heterogeneous labor-profit income exposure and consumption-saving behavior across households. The empirical analysis documents conditional correlations of the CLM and labor intensity with the liquid wealth Gini and top 10% share that are consistent with this income-composition channel. The CLM is not sufficient for the distribution of wealth, which also depends on the equilibrium distribution of interest income, consumption, and saving.

To conclude, note that the Leontief representation and gross output multiplier are standard in the literature on production networks (Acemoglu et al., 2012; Jones, 2011; Bartelme and Gorodnichenko, 2015; Fadinger et al., 2022; Antràs et al., 2012; Baqaee and Farhi, 2018). Moreover, the importance of markups is consistent with Baqaee and Farhi (2019, 2024). However, taking a step further to the literature, we combine the accounting link between the CLM and production-side income shares with Proposition 1's relative real wage and unit-profit response. On this basis, we then trace the resulting income flows through heterogeneous household profit-labor income exposure and consumption-saving behavior. In this way, we show that the distribution of liquid wealth is not a sufficient-statistic implication, but an endogenous general equilibrium outcome.

4 Calibration

We calibrate the benchmark economy to the euro area using 2021 data from Eurostat's FIGARO input-output tables, Eurostat National Accounts, and the Household Finance and Consumption Survey (HFCS). For parameters that are not directly disciplined by these data, we follow standard values in the heterogeneous-agent literature, in particular Kaplan et al. (2018)

[13] When the network change raises $\boldsymbol{\rho}'(I-\Omega)^{-1}\mathbf{1}$, the wage response has the sign of this coefficient. Such an increase follows from an elementwise increase in Ω, but not from a higher CLM alone under arbitrary network reallocations, since the CLM uses the different inverse $(I-\Omega/\mu)^{-1}$.

Table 1: Sectoral aggregation

Model sector	NACE activities
Energy	B, D, E
Manufacturing	C
Construction	F
Market services	G–N, R–U
Others	O, P, Q, A

and Auclert et al. (2024).

The production side is aggregated into five sectors: energy, manufacturing, construction, market services, and Others (public administration and defense, education, human health and social work, and agriculture, forestry and fishing). Table 1 reports the corresponding NACE activities. The input-output matrix Ω contains sectoral intermediate-input expenditure shares, while $\theta_j = 1 - \sum_k \omega_{jk}$ is the corresponding labor share.

On the household side, the elasticity of intertemporal substitution is $\psi = 0.5$, the Frisch elasticity of labor supply is 0.5 and the scale of labor disutility is $v_\phi = 2$, which are standard values in the literature. The discount factor is $\beta = 0.9768$ to target a real interest rate of 0.0% in line with the euro area nominal risk-free interest rate on 3-month deposits adjusted by realized inflation over the period 1999-2019. Idiosyncratic productivity follows an AR(1) process with quarterly persistence $\rho_e = 0.9498$ and stationary standard deviation of log productivity $\sigma_e = 0.3108$, following Floden and Lindé (2001) and Auclert et al. (2024), which contain the underlying estimation of the productivity process for Sweden. The productivity process is then discretized using seven productivity states. The liquid wealth grid contains 500 points between zero and 150.

On the production side, the sectoral elasticity of substitution is $\varepsilon_j = 11$ for all sectors, implying a common gross markup $\mu = 1.1$. This value is standard in the literature. Aggregate productivity and gross nominal output are normalized to $Z = 1$ and $Y^N = 1$, respectively.

The single asset held by households is disciplined by the euro area liquid wealth-to-GDP ratio, measured relative to annualized GDP. In the benchmark calibration this ratio is 0.707. Since the model is quarterly, asset supply in units of real private consumption is $B = 0.707 \frac{4 \quad NGDP}{P^C}$, where $NGDP$ is nominal GDP as defined in Equation (40). Thus, it is the liquid wealth-to-GDP ratio, not the level of liquid wealth supply, that is held fixed: B adjusts with endogenous GDP and the consumption price P^C. This object is the model counterpart of

household real liquid wealth and should not be interpreted as total public debt.

The benchmark dividend-incidence curvature $\lambda_{\text{div}} = 3.97$ is set to match the euro area liquid wealth Gini of 72.9 points on a 0-100 scale. As described in Section 2.4, higher values of this parameter assign a larger share of aggregate profits to high-productivity households. Taxes are distributed equally per household. These incidence rules are held fixed in the baseline production network counterfactual.

This calibration is a reduced-form device for matching liquid wealth concentration, not a structural estimate of the mechanisms generating total wealth inequality. Benhabib et al. (2019) find that skewed earnings, differential saving rates, and idiosyncratic returns are jointly important for matching US wealth concentration and mobility. Hubmer et al. (2021) emphasize tax progressivity and heterogeneous portfolio returns in explaining US wealth inequality over time. Our one-asset model does not explicitly include heterogeneous asset returns, saving preferences, or a progressive tax schedule. Thus, λ_{div} disciplines unequal profit-income incidence conditional on the maintained household block; it should not be interpreted as an estimate of these omitted mechanisms or as validation of the upper tail of total wealth. Section 5.2 assesses how the network counterfactual changes as we vary this assumption on dividend incidence.

In each steady state, we solve for the real interest rate r, the labor shifter n_{mult} and the nominal wage W to clear the asset, labor and consumption goods markets. Note that n_{mult} is a common scale on the discretized productivity states. Since effective wages are $W^R e$, this scale shifts the productivity component of the return to working and affects households' hours choices through the intratemporal condition. It allows equilibrium hours to adjust while keeping v_ϕ and the Frisch elasticity fixed. By contrast, changing v_ϕ shifts the marginal disutility of hours without changing the effective wage per hour. Thus, n_{mult} is a reduced-form productivity normalization, not an explicit labor wedge; goods-market and aggregate resource accounting remain separately enforced.

Table 2 reports the main euro area benchmark moments and their model counterparts. Given the target liquid wealth Gini of 72.9 points and liquid wealth-to-GDP ratio of 0.707, the model generates a top 10% liquid wealth share of 0.520, slightly below the euro area benchmark, and a stationary-distribution-weighted average quarterly MPC of 0.114, also slightly below the quarterly-equivalent data benchmark of 0.143.[14]

[14]The 2021 HFCS reports an annual MPC of $m_a = 0.460$. We convert it to a quarterly equivalent as $m_q =$

Table 2: Baseline data moments and model moments

	Targeted		Untargeted	
	Liquid wealth Gini	Liquid wealth-to-GDP ratio	Liquid wealth Top 10% share	Quarterly MPC
Data	72.9	0.707	0.573	0.143
Model	72.9	0.707	0.520	0.114

Notes: The euro area distributional benchmark is computed from the 2021 HFCS. The liquid wealth-to-GDP ratio is measured relative to annualized GDP and disciplines the supply of the model's single liquid asset. The model MPC is averaged using the stationary household distribution; the data MPC is the quarterly equivalent of the reported annual MPC.

All household preference parameters, the idiosyncratic income process, the liquid wealth-to-GDP ratio, sectoral final-demand weights, the ratio of private to public nominal expenditure, and incidence rules are held fixed across the main production network counterfactuals. The only exogenous object that changes in Section 5.1 is the input-output matrix Ω. For each alternative network, the real interest rate r, the nominal wage W, and the labor-efficiency scale n_{mult} are endogenously determined to clear the markets for liquid wealth, total production, and labor. Accordingly, the level of liquid wealth supply adjusts with GDP and P^C rather than being held fixed.

For the cross-country calibration exercise, we consider three progressively richer specifications. In the first, we replace the euro area input-output matrix with the country-specific matrix while retaining the euro area labor shares. The country matrix is rescaled row by row so that $\sum_k \omega_{jk} = 1 - \theta_j^{EA}$. This isolates differences in the allocation of intermediate purchases across suppliers while preserving the euro area intermediate-input intensity of each sector.

In the second specification, both Ω and $\boldsymbol{\theta}$ take their country-specific values. This specification hence restores each country's observed production function, with the actual division between labor and intermediate inputs.

Finally, the full country calibration also allows the remaining country-specific calibration

$1 - (1 - m_a)^{1/4} = 1 - (1 - 0.460)^{1/4} = 0.143$. This conversion imposes a geometric within-year spending profile rather than measuring a quarterly response directly. In the model, households can use part of an unexpected transfer to reduce labor supply rather than increase consumption, so even borrowing-constrained households need not have an MPC of one. This mechanism follows from the intratemporal condition (5), and contributes to quantifying the shortfall relative to the data. The model's annual MPC is 0.186, compared with the annual data benchmark of 0.460, and measures the cumulative consumption response over four quarters to an unexpected, one-off equal transfer per household, holding prices fixed. Both comparisons are approximate: the quarterly data benchmark relies on a temporal conversion, while the annual model response relies on the model's saving and labor-supply dynamics over the year.

objects to vary, including final-demand shares and household liquid wealth supply. Comparing the three specifications separates variation generated by the input-output structure from variation generated by other production-side and household-side characteristics.

5 Quantitative results

We use the calibrated model for two quantitative exercises. First, we construct controlled changes in the euro area input-output matrix that deliver different values of the markup-adjusted CLM in Definition 1, while keeping all non-network parameters fixed. To understand the mechanisms at play, we highlight how the distributional response depends on the incidence of profit income. Second, we compare country-specific calibrations and their data counterparts. Together, these exercises separate the production-side relationship between the CLM and labor intensity from the general-equilibrium relationship between the production structure and liquid wealth inequality.

5.1 A production network controlled counterfactual

The CLM is a scalar, while the input-output matrix contains J^2 entries. There are therefore many alternative production networks that can generate the same value of the CLM. To obtain a disciplined counterfactual, we select, for each target value of the CLM, the input-output matrix that is closest to the euro area benchmark.

Let Ω^{EA} denote the baseline euro area matrix and let $\bar{c}$ denote a target value for the Consumer Leontief Multiplier. We solve

$$\min_{\Omega \geq 0} \left\| \Omega - \Omega^{EA} \right\|_F^2 \tag{53}$$

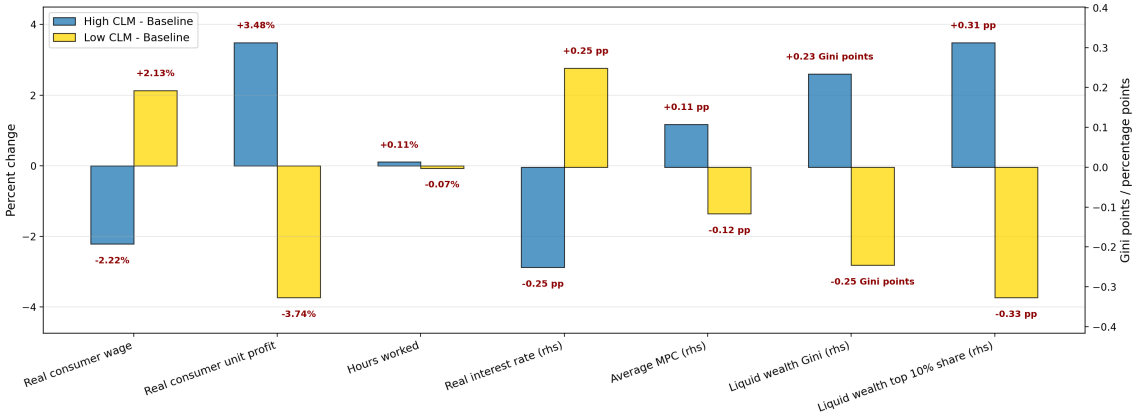
subject to

$$\mathrm{CLM}(\Omega, \boldsymbol{\rho}) = \bar{c}, \tag{54}$$

$$\sum_k \omega_{jk} = \sum_k \omega_{jk}^{EA} \qquad \forall j. \tag{55}$$

The second restriction preserves each sector's total intermediate-input share and therefore its labor share θ_j. The exercise changes the pattern of supplier relationships while leaving the

Figure 3: Steady-state effects of the CLM counterfactual



Notes: The blue bars report the difference between the high-CLM counterfactual and the euro area baseline; the yellow bars report the difference between the lowest-CLM counterfactual and the baseline. The real consumer wage, real consumer unit profit, and hours worked are expressed as percentage changes. The real interest rate is expressed as an annualized percentage-point change, and the MPC and top 10% liquid wealth share are expressed in percentage points. Changes in the liquid wealth Gini are expressed in Gini points on a 0-100 scale. Counterfactual input-output matrices minimize their distance from the baseline matrix subject to the targeted CLM and unchanged sectoral row sums. All non-network structural parameters are held fixed and the general-equilibrium steady state is re-solved in each counterfactual.

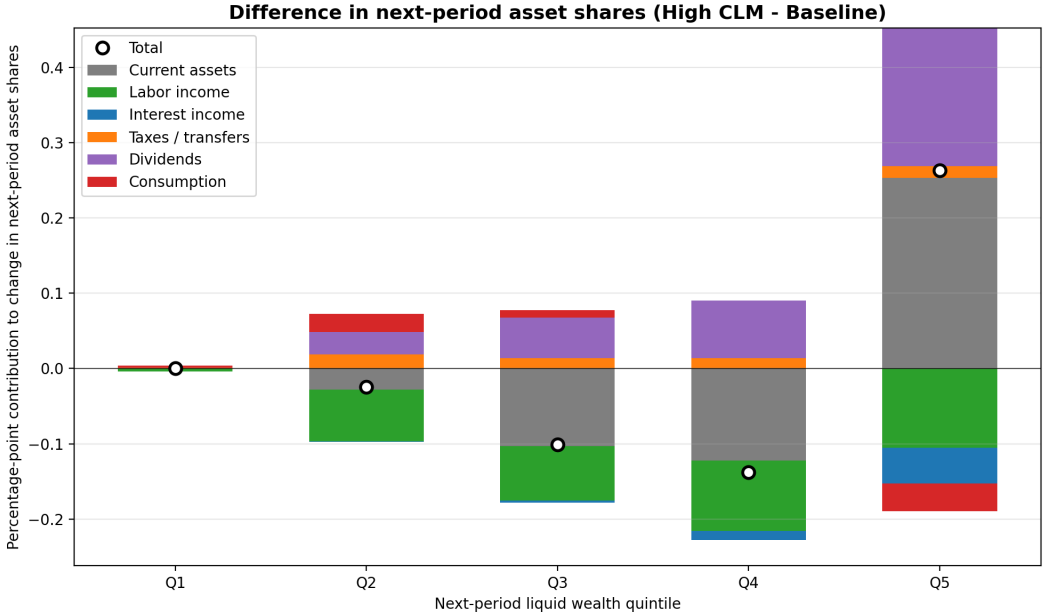
overall intermediate intensity of each sector unchanged.

We consider two network configurations centered on the euro area benchmark. Relative to the baseline CLM, we target deviations of -5% and $+5\%$, whereby the latter broadly corresponds to the change in the cross-country median CLM between 2021 and 2022 reported in Figure 1. For each target, we numerically select the input-output matrix that minimizes its Frobenius distance from the euro area matrix subject to the targeted CLM and unchanged sectoral row sums, and then re-solve the full heterogeneous-agent steady state. Both target values are attained up to numerical precision.

Figure 3 reports the two counterfactuals. Raising the CLM by 5% lowers the real consumer wage by 2.22% and raises real consumer unit profit by 3.48%. Hours worked increase by 0.11%, while the annualized real interest rate falls by 0.25 percentage points. The average quarterly MPC rises by 0.11 percentage points. Liquid wealth becomes more concentrated: the liquid wealth Gini increases by 0.23 Gini points and the top 10% share by 0.31 percentage points. The 5% reduction in the CLM produces changes of the opposite sign: the real consumer wage rises by 2.13%, real consumer unit profit falls by 3.74%, and the liquid wealth Gini and top 10% share fall by 0.25 Gini points and 0.33 percentage points, respectively.

These results are consistent with Lemma 1 and Proposition 1. The CLM, which is based

Figure 4: Asset accumulation in the high-CLM counterfactual



Notes: Bars provide an accounting decomposition of the high-CLM-minus-baseline change in each quintile's share of aggregate next-period liquid wealth. Quintiles are defined separately in each steady state using next-period liquid wealth, and each contains 20% of that steady state's household population. Levels in each steady state are normalized by mean next-period assets before differences are taken. The bars are percentage-point contributions from beginning-of-period assets, labor income, interest income, net transfers, dividend income, and consumption. The marker reports their sum, which is the total percentage-point change in the quintile's next-period asset share.

on $(I - \Omega/\mu)^{-1}$, is sufficient for labor intensity under the maintained assumptions. Proposition 1 also implies that, when the CLM rises, real unit profit responds more positively, or less negatively, than the real consumer wage. The real consumer wage instead depends on $\boldsymbol{\rho}'(I - \Omega)^{-1}\mathbf{1}$ as well as the log difference between Z and μ. Along the minimum-distance network changes used here, a higher CLM is associated with a lower real consumer wage and a larger real consumer unit profit. This is due to the normalization of TFP $Z = 1 < \mu = 1.1$ in the baseline calibration, which implies a negative coefficient on the price-system multiplier in the expression for the real consumer wage.[15] The inequality measures, the interest rate, hours, and the MPC are full equilibrium outcomes. Their responses depend on the distribution of income and saving behavior, not only on the production network.

Figure 4 uses the household budget constraint to decompose the high-CLM-minus-baseline

[15] In additional simulations, setting $Z = 1.2$ delivers an increase in the real consumer wage following the rise in the CLM, together with increases in both liquid wealth inequality measures. The wage response is consistent with Proposition 1. However, the inequality response is consistent with the main counterfactual exercise under $Z = 1 < \mu = 1.1$. Results are available from the authors upon request.

change in the share of aggregate next-period assets held by each quintile. The total changes are approximately zero in the first quintile, -0.02 percentage points in the second, -0.10 in the third, -0.14 in the fourth, and $+0.26$ in the fifth. Thus, the increase in aggregate concentration in Figure 3 is visible as a shift in next-period asset shares toward the top quintile, mainly from the fourth and third quintiles.

The components explain this shift. Lower labor income contributes negatively in every quintile. Lower interest income is small at the bottom and more relevant higher in the asset distribution. Net transfers provide small positive offsets, while the consumption response offsets losses in the lower quintiles but reduces the top quintile's gain. Dividend income is positive and increases strongly across quintiles because the benchmark incidence rule assigns more profit income to high-productivity households. The contribution of beginning-of-period assets is negative in the middle of the distribution and strongly positive in the top quintile. Since quintiles are redefined in each steady state, this last component also captures changes in household rankings and composition; it is not an additional income flow.

5.2 The incidence of profit income

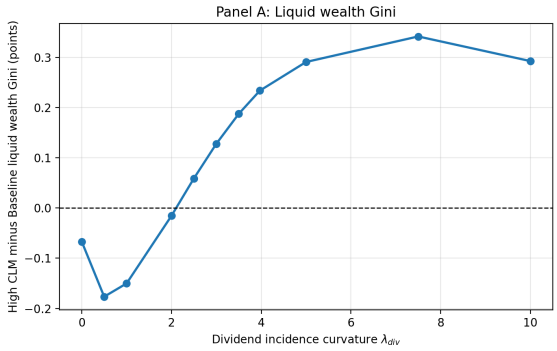
The previous exercise holds fixed the dividend-incidence parameter λ_{div} introduced in Section 2.4. We now vary this parameter to study how the distributional effect of the production network counterfactual depends on the concentration of profit income.

Higher values of λ_{div} assign a larger fraction of aggregate profits to high-productivity households while leaving aggregate profits unchanged. For each value of λ_{div}, we solve both the euro area baseline and the high-CLM counterfactual using the same dividend-incidence rule. The comparison therefore changes the production network while holding the distribution rule for profits fixed at each point. This exercise is the counterpart, in our setting, of the mechanism studied by Boar and Midrigan (2025), who show that when firm ownership is concentrated the allocation of markup income across households is decisive for the equilibrium distribution of wealth.

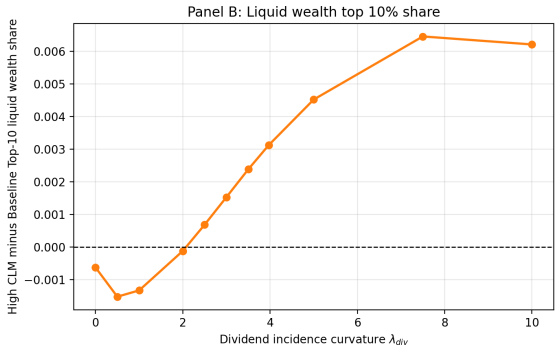
Figure 5 shows that the distributional effect depends systematically on the incidence of profit income. When dividends are distributed relatively evenly, the high-CLM network reduces liquid wealth concentration. The effect becomes positive as profit income is tilted toward high-productivity households. The sign-switching values are $\lambda_{\text{div}} = 2.10$ for the liquid wealth Gini and 2.07 for the top 10% share. At the benchmark value, $\lambda_{\text{div}} = 3.97$, the increases

Figure 5: Dividend incidence and the distributional effect of the high-CLM counterfactual

a) Liquid wealth Gini



b) Top 10% liquid wealth share



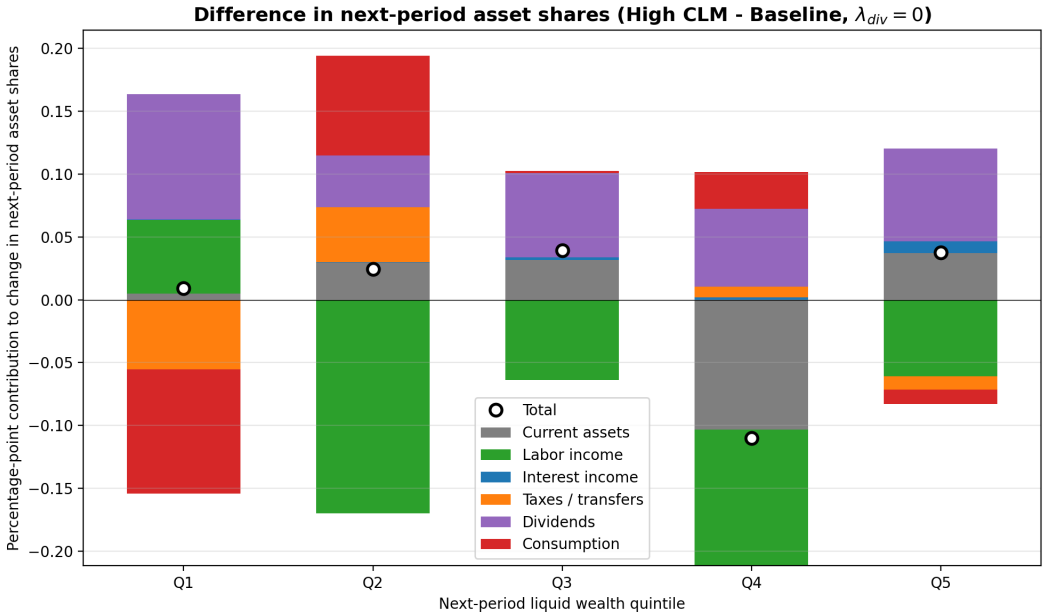
Notes: Each panel reports the difference between the high-CLM counterfactual and the euro area baseline at the same value of λ_{div}. Gini differences are expressed in points on a 0-100 scale; top 10% share differences are expressed as fractions. Higher values of λ_{div} assign a larger fraction of aggregate profit income to high-productivity households. The benchmark calibration is $\lambda_{\text{div}} = 3.97$.

are 0.23 Gini points and 0.31 percentage points, respectively. Both responses rise over most of the reported range before declining between $\lambda_{\text{div}} = 7.5$ and 10. The benchmark result is therefore not invariant to profit incidence, but it is obtained for both inequality measures and lies clearly above both sign-switching values.

Figure 6 shows how equal dividend incidence changes asset accumulation. The total next-period asset share rises by 0.01 percentage points in the first quintile, 0.02 in the second, 0.04 in the third, and 0.04 in the fifth, while it falls by 0.11 percentage points in the fourth quintile. The labor-income contribution is negative except in the first quintile and is largest in absolute value in the fourth. The dividend contribution is positive throughout, rather than strongly concentrated in the fifth quintile. Beginning-of-period assets, taxes, and consumption also contribute differently across quintiles, reflecting household responses and re-ranking across steady states. Thus, the top quintile's share need not fall for aggregate inequality to decline: with equal dividend incidence, the Gini falls by 0.07 points and the top 10% share by 0.06 percentage points.

Intuitively, this result stems from the heterogeneous saving behavior across the wealth distribution, embedded in standard heterogeneous-agent models. Households at the top of the wealth distribution tend to save a larger fraction of their income (or, conversely, they tend to consume a smaller fraction of their income, exhibiting a lower MPC). As in the baseline controlled counterfactual, a higher CLM lowers the real consumer wage while raising the real

Figure 6: Asset accumulation in the high-CLM counterfactual with equal dividend incidence



Notes: The figure repeats the accounting decomposition in Figure 4 with equal dividend incidence, $\lambda_{\text{div}} = 0$. Bars are percentage-point contributions to the high-CLM-minus-baseline change in each quintile's share of aggregate next-period liquid wealth. Quintiles are defined separately in each steady state and levels are normalized by mean next-period assets before differences are taken. The marker reports the sum of the contributions.

consumer unit profit. However, differently from the baseline controlled counterfactual, since labor income accrues more to high-productivity households while profit income is distributed evenly, their labor-income loss is not offset by a disproportionately large dividend gain, as happens when profit income is concentrated among high-productivity households. The resulting saving responses reduce overall liquid wealth concentration in the economy, although the quintile decomposition also reflects changes in household rankings and composition.

5.3 Production structure and model outcomes across country calibrations

The counterfactual exercise changes the euro area production network in a controlled environment. We next ask how large the corresponding variation is when we use the production structures observed across European economies.

We consider three calibrations for each country. The first varies only the input-output matrix Ω. Since the sectoral labor shares remain fixed at their euro area values in this exercise,

we rescale each country matrix so that

$$\sum_k \omega_{jk} = 1 - \theta_j^{EA}$$

for every sector. This preserves constant returns to scale and makes the exercise directly comparable to the row-sum-preserving counterfactual above. It should therefore be interpreted as an Ω-only experiment rather than as the country's complete observed production technology.

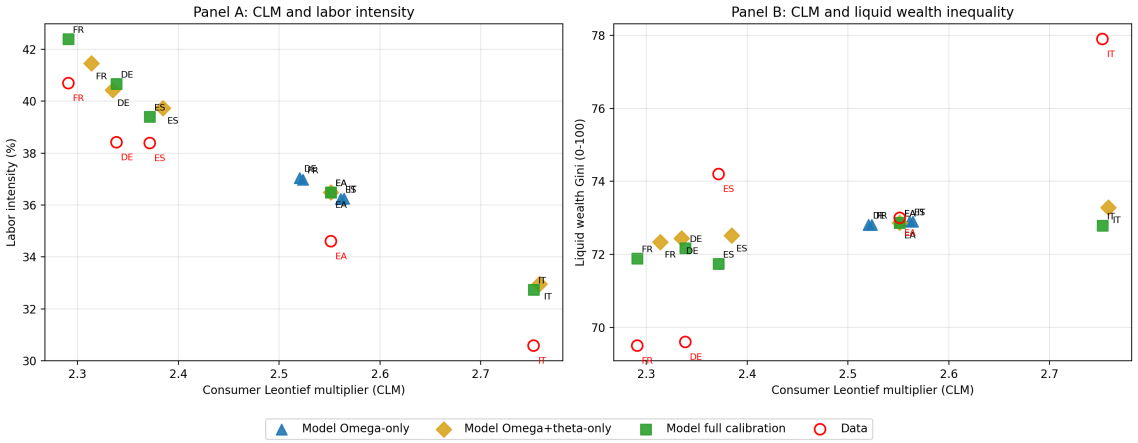
The second specification allows both the input-output matrix and sectoral labor shares, $(\Omega, \boldsymbol{\theta})$, to take their country-specific values. This restores the observed division between labor and intermediate inputs and provides a more realistic measure of production-side heterogeneity across countries.

The third specification uses the full country calibration. In addition to $(\Omega, \boldsymbol{\theta})$, it allows the relevant final-demand shares, the supply of household liquid wealth, and the remaining country-specific calibration targets to vary. The difference between the production-only and full calibrations therefore measures the contribution of characteristics outside the production network itself. However, other important parameters, such as the markup and the dividend-incidence rule, remain fixed at their euro area values, ensuring that the comparison isolates the effects of the country-specific production and demand structures.

Figure 7 reports the three exercises. The Ω-only calibration produces little dispersion: labor intensity ranges from 36.2% to 37.0%, and the liquid wealth Gini remains close to 72.9. Allowing both Ω and sectoral labor shares to vary expands labor intensity to a range of 33.0–41.5% and the Gini to 72.3–73.3. The full calibration produces a similar range for labor intensity, 32.7–42.4%, and a wider Gini range of 71.7–72.9. Thus, the allocation of intermediate purchases alone has modest effects in this five-country comparison. Observed labor shares account for most of the model's production-side dispersion, while final demand, liquid wealth supply, and the other country targets make an additional contribution to liquid wealth inequality.

The red circles provide a direct, but deliberately limited, comparison with the data. In line with the empirical analysis, the horizontal coordinate shows the CLM based on the model calibration of μ in order to reduce the cross-country heterogeneity induced by different structural characteristics reflecting different markups, which go beyond the scope of this paper. In the data, labor intensity falls from about 40.7% in France, where the calibrated CLM is 2.29,

Figure 7: Production structure and model outcomes across country calibrations



Notes: The figure reports model-implied steady-state outcomes for the euro area (EA), Germany (DE), France (FR), Italy (IT), and Spain (ES). Triangles vary only the country-specific input-output matrix Ω, rescaled so that each sector's total intermediate-input share remains consistent with the euro area labor share. Diamonds allow both the input-output matrix and sectoral labor shares, $(\Omega, \boldsymbol{\theta})$, to take their country-specific values. Squares report the full country calibration, which additionally allows final-demand shares, the supply of household liquid wealth, and the remaining country-specific calibration targets to vary. The left panel reports labor intensity and the right panel the liquid wealth Gini on a 0-100 scale. Red open circles use the full-calibration model CLM on the horizontal axis, so that model and data observations are compared at the same calibrated network statistic. Their vertical coordinates are actual country data: output-weighted sectoral labor intensity in the left panel and the HFCS liquid wealth Gini in the right panel.

to 30.6% in Italy, where it is 2.75. The corresponding liquid wealth Ginis are 69.5 and 77.9 points. The five observations therefore reproduce the predicted negative CLM-labor-intensity relationship and the positive CLM-inequality relationship.

The fit is closer for the production-side ordering than for every level. The model overstates observed labor intensity by about 1–2 percentage points in these calibrations and generates less cross-country dispersion in the liquid wealth Gini than the data. The full calibration does not reproduce every country's Gini ordering: Spain's model Gini is below the euro area value, while its observed Gini is above it. A model with one liquid asset, one idiosyncratic risk process, and a common dividend-incidence rule leaves out several sources of country heterogeneity. These omissions matter for country levels and dispersion. Ultimately, Lemma 1 remains an accounting benchmark under its maintained technology, markup, and final-demand assumptions. The broader panel in the next section provides a separate assessment of both predicted signs.

These quantitative findings are consistent with the broader production network result that markups and other wedges make input-output structure relevant for aggregate outcomes

(Baqaee and Farhi, 2019) and with evidence that network position affects labor income and labor shares (Huneeus et al., 2022; Bernon et al., 2022). The novelty here is the next step: the network changes the steady-state distribution of liquid wealth through household saving, and the sign and size of that change depend on who receives profit income. This incidence result is also consistent with the role of concentrated markup income in Boar and Midrigan (2025), although our experiment varies the production network rather than market shares across firms.

This exercise serves a different purpose from the empirical analysis below. The country calibrations are model-implied outcomes obtained after feeding country-specific objects into the quantitative model. They are not estimates of the relationship between production networks and inequality in the data. We therefore use the panel regressions in Section 6 as a separate empirical assessment of the relationships highlighted by the model.

6 Empirical validation of the model

We now examine whether the relationships highlighted by the model are visible in European data. The empirical exercise is organized around three conditional associations that correspond to the theory and quantitative results. First, we estimate the relationship between the CLM and liquid wealth inequality. Second, we estimate the relationship between labor intensity and liquid wealth inequality. Third, we examine the production-side prediction that the CLM is negatively related to labor intensity. These regressions assess whether the signs and economic relevance of the model relationships are present in the data. They are not intended to identify causal effects.

6.1 Data

Our measures of household inequality come from the HFCS, which provides harmonized information on household balance sheets and income across European economies. We focus on liquid wealth, proxied by deposits (HFCS code: DA2101), the empirical counterpart most closely aligned with the single liquid asset in the quantitative model. We measure its distribution using the Gini coefficient and the share held by the top 10% of households. We also use HFCS measures of disposable income inequality. For the liquid wealth Gini regressions, the corresponding control is the Gini coefficient of disposable income. For the top 10% liquid

wealth share regressions, we use the top 10% share of disposable income. All these variables are expressed on a 0-100 scale.

The production-side data come from Eurostat's FIGARO input-output tables. To align the empirical production statistic with the quantitative model, we construct a model-consistent domestic CLM. For each country and year, sectoral intermediate input cost shares are measured relative to labor compensation plus domestic intermediate expenditures. We divide these shares by the model common gross markup, μ, to obtain model-implied expenditure-to-sales coefficients, Ω/μ. We then form $(I - \Omega/\mu)^{-1}$ and weight the resulting multipliers by sectoral household final consumption shares, the empirical counterpart of $\boldsymbol{\rho}$. We prefer this construction because its variation reflects changes in the production network without incorporating differences in markups across countries and time. It maintains the model's restricted cost structure and is distinct from a multiplier based on observed gross output.[16] Labor intensity is compensation of employees divided by the sum of compensation of employees and intermediate expenditures, as in Definition 2. To control for other production characteristics, we also measure production network intensity as the share of intermediate purchases sourced from other sectors, and sectoral (output) concentration as the Herfindahl-Hirschman index of sectoral output.

The panel relating the CLM and labor intensity to the liquid wealth inequality contains 101 country-wave observations across 23 countries. In these panel regressions, HFCS and FIGARO data are matched as follows: first wave-2010, second wave-2014, third wave-2017, fourth wave-2021 and fifth wave-2023 for each country.[17] The panel relating the CLM to labor intensity contains instead 378 country-year observations across 27 countries over 2010-2023. To facilitate the interpretation of the estimated coefficients, note that the unweighted pooled cross-country, cross-time standard deviation of the CLM is 0.240 in the 101-observation liquid wealth inequality sample and 0.270 in the 378-observation labor intensity sample.

[16] Relative to the estimated coefficients reported below, using a fully data-based CLM, with intermediate purchases measured relative to observed gross output, yields larger coefficients and stronger statistical significance, also reflecting its lower variability. Relative to our preferred model-consistent CLM, this measure has the advantage of implicitly incorporating the markups embedded in the data. However, it also has the drawback of conflating markup profits with other components of gross operating surplus, which are absent from the restricted cost structure in the model. These results are available from the authors upon request.

[17] An alternative matching scheme could consider matching the country-specific year in which the HFCS was fielded in each country with the corresponding year in FIGARO. This approach would have the advantage of more accurately reflecting the timing of the data collection. However, the low variability of FIGARO data observed from one to the other wave suggests that the simpler matching scheme is reasonable.

6.2 Empirical specification

A generic specification can be written as

$$y_{it} = \alpha_i + \delta_t + \beta x_{it} + \gamma' Z_{it} + \varepsilon_{it}, \tag{56}$$

where y_{it} is a measure of liquid wealth inequality or labor intensity, x_{it} denotes either the Consumer Leontief Multiplier or labor intensity, and Z_{it} contains the controls included in the relevant specification. For the liquid wealth inequality regressions, our preferred specifications include country and wave fixed effects, α_i and δ_t, absorbing persistent country differences and common movements across survey waves. Country-only inequality estimates are reported in Appendix C. For the labor intensity regressions, we report both country and year fixed effects separately and jointly. Standard errors are clustered by country in every specification.[18]

For the liquid wealth inequality regressions, we first include only country and wave fixed effects, then add the corresponding measure of disposable income inequality. We subsequently add labor productivity, production network intensity, and sectoral concentration separately and jointly. This large set of controls aims to account for potential confounding factors that could influence the relationship between the CLM and liquid wealth inequality. For the labor intensity regressions, we similarly first include only country and year fixed effects, but then control only for productivity to reflect the conditional association established in Lemma 1 of the model.

The CLM-liquid wealth inequality regressions provide a formal econometric test of the model-predicted link between the CLM and liquid wealth inequality. The other two sets of regressions assess the labor-intensity channel highlighted by the quantitative model: the labor intensity-liquid wealth inequality regressions test whether labor intensity is associated with liquid wealth inequality, while the CLM-labor intensity regressions test whether the CLM is associated with labor intensity. Together, these conditional associations provide empirical validation of the model's predicted relationships, but do not establish causality or identify the channel as a causal mediation mechanism. The structural link from production networks to liquid wealth inequality is established within the model, conditional on its maintained

[18] We also cross-check our inference with country-level wild cluster bootstrap-t inference with 5,000 Rademacher replications, following Cameron et al. (2008). The results, available upon request, suggest very similar inference conclusions.

assumptions. Finally, note that, given the measurement of the CLM in the data, the regressions are most closely comparable to the quantitative counterfactual allowing both Ω and $\boldsymbol{\theta}$ to vary, rather than to the exercise varying Ω alone.

6.3 Results

Table 3 reports the main inequality results. Panel a relates the liquid wealth Gini to the CLM; panel b relates the liquid wealth Gini to labor intensity. All six columns include country and wave fixed effects, with the control sets described above. Table 4 then relates labor intensity to the CLM. Appendix C reports the country-only estimates, estimator checks for the Gini, and parallel results for the top 10% liquid wealth share.

The CLM coefficient in panel a of Table 3 is positive in all six specifications and ranges from 8.230 to 10.968. Since the Gini is expressed on a 0-100 scale, a 0.1 increase in the CLM is associated with a 0.82–1.10 point increase in the liquid wealth Gini, conditional on the included controls and fixed effects. Multiplying by the pooled sample CLM standard deviation of 0.240 gives a 1.97–2.63 point increase. The estimates are statistically significant at least at the 5% level using country-clustered standard errors. As expected, disposable income inequality is also positive, and including it does not remove the CLM association. Adding productivity, production network intensity, sectoral concentration, or all three together leaves the sign and broad magnitude intact. Country-only CLM estimates in Appendix C range from 4.054 to 6.211, thus preserving the sign, although the coefficients are smaller and are not statistically distinguishable from zero at the 10% level. The evidence therefore supports the predicted conditional association after common time variation is removed, rather than a relationship invariant to the fixed-effects specification.

Panel b reports a conditional association consistent with the household income channel emphasized by the model. The labor intensity coefficient is negative in all six specifications, between -0.402 and -0.520, and statistically significant at the 1% level using country-clustered standard errors. A one-percentage-point increase in labor intensity is therefore associated with a 0.40–0.52 point reduction in the liquid wealth Gini. This result is not a mechanical implication of panel a: labor intensity is measured directly from compensation and intermediate consumption, and its relationship with wealth inequality is estimated separately.

Table 4 reports the empirical counterpart of Lemma 1. In the baseline panel, the CLM coefficient ranges from -17.527 to -18.091 and is statistically significant at the 1% level in

Table 3: Consumer Leontief Multiplier, labor intensity, and liquid wealth inequality

a) Consumer Leontief Multiplier						
CLM	9.366***	9.202***	8.505**	10.968***	8.230***	8.947***
	(2.750)	(2.866)	(3.433)	(2.940)	(2.421)	(3.167)
Income inequality		0.389***	0.371**	0.423***	0.391**	0.398**
		(0.135)	(0.133)	(0.140)	(0.143)	(0.148)
Productivity			-4.169			-5.245
			(3.772)			(4.298)
PNI				-0.311**		-0.280*
				(0.142)		(0.163)
SCI					1.505**	1.501*
					(0.723)	(0.816)
F-stat p-value	0.003	0.000	0.000	0.001	0.000	0.000
b) Labor intensity						
Labor intensity	-0.499***	-0.442***	-0.418***	-0.520***	-0.402***	-0.450***
	(0.122)	(0.138)	(0.147)	(0.120)	(0.133)	(0.130)
Income inequality		0.351**	0.335**	0.379***	0.356**	0.363**
		(0.129)	(0.126)	(0.129)	(0.136)	(0.134)
Productivity			-4.092			-4.765
			(3.407)			(3.851)
PNI				-0.328***		-0.304**
				(0.108)		(0.127)
SCI					1.122	1.011
					(0.687)	(0.797)
F-stat p-value	0.000	0.000	0.000	0.000	0.000	0.000
Fixed effects	C & Y	C & Y	C & Y	C & Y	C & Y	C & Y
Observations	101	101	101	101	101	101

Notes: The dependent variable is the Gini coefficient of liquid wealth, expressed on a 0-100 scale. Income inequality is measured by the Gini coefficient of disposable income. Labor intensity refers to the share of compensation of employees out of the sum of intermediate input expenditures and compensation of employees. PNI refers to production network intensity, measured by the sum of intermediate input expenditures on other sectors over the sum of total intermediate input expenditures. SCI refers to sectoral concentration index, measured by Herfindahl-Hirschman index of sectoral output. Fixed effects are country ("C"), year ("Y"), or both additive country and year effects jointly ("C & Y"). Standard errors are clustered by country in every specification and are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels using the country-clustered standard errors. As a robustness check, wild cluster bootstrap-t inference with 5,000 country-level Rademacher replications yields similar significance patterns.

every specification. Equivalently, a 0.1 increase in the CLM is associated with a reduction in labor intensity of about 1.75-1.81 percentage points. Using the annual panel pooled CLM standard deviation of 0.270 gives a 4.72-4.88 percentage-point reduction in labor intensity. The coefficient changes little when labor productivity is included. The sign is therefore the

Table 4: Consumer Leontief Multiplier and labor intensity

a) Baseline								
CLM	-17.645***	-17.527***	-17.711***	-18.054***	-17.748***	-17.762***	-17.810***	-18.091***
	(1.455)	(1.267)	(1.537)	(1.617)	(1.507)	(1.429)	(1.585)	(1.719)
Productivity					-0.358	-1.001	-0.353	-0.258
					(0.772)	(1.756)	(0.770)	(1.502)
F-stat p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
b) Feasible generalized least squares								
CLM	-17.151***	-17.401***	-17.163***	-17.051***	-17.036***	-17.342***	-17.045***	-16.739***
	(0.349)	(0.572)	(0.399)	(0.898)	(0.345)	(0.605)	(0.381)	(0.852)
Productivity					-0.090	0.523	-0.094	2.059***
					(0.143)	(0.561)	(0.128)	(0.731)
F-stat p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fixed effects	None	C	Y	C & Y	None	C	Y	C & Y
Observations	378	378	378	378	378	378	378	378

Notes: See notes to Table 3. Feasible generalized least squares weights combine inverse estimated country residual variances with the observation weights.

same in the theory, the controlled counterfactual, the country calibrations, and the annual panel. Although the CLM and labor intensity share some underlying input-output data, their negative comovement provides empirical support for the production-side relationship derived under the maintained assumptions of Lemma 1, complementing the evidence on its association with liquid wealth inequality.

The country counterfactual varying both Ω and $\boldsymbol{\theta}$ in Figure 7 is the closest model comparison to the observed production-side variation, since sectoral labor shares need not remain fixed in the data. Between France and Italy in that exercise, the CLM rises from 2.314 to 2.758, labor intensity falls from 41.46% to 32.96%, and the Gini rises from 72.34 to 73.29. Per 0.1 increase in the CLM, these differences imply about 1.91 percentage points lower labor intensity and 0.21 Gini points higher inequality. The empirical production-side association, 1.75-1.81 percentage points, is close in magnitude, while the empirical Gini association, 0.82-1.10 points, is about four to five times larger. Similarly, the model comparison implies about 0.11 Gini points per percentage point of labor intensity, against 0.40-0.52 in the data. These are comparisons of magnitudes, where the model exercise holds non-production parameters fixed, while the panel estimates conditional associations over time.

Alternative estimators and inference methods provide further checks, conditional on the fixed-effects specification. An estimator with correlated random effects that adds country

means of the time-varying regressors, following Mundlak (1978), produces coefficients close to the country-only fixed-effects estimates, but still without statistical significance for the CLM-inequality relationship. Country-level wild cluster bootstrap-t inference with 5,000 Rademacher replications, following Cameron et al. (2008), retains the positive CLM-Gini association at least at the 10% level in all preferred specifications, though not always at the 5% level. Two-step feasible generalized least squares (FGLS), using inverse country residual variances, also preserves the positive CLM-Gini association with country and wave effects. Appendix C reports the inequality FGLS estimates, while panel b of Table 4 reports the production-side estimates, ranging from -16.739 to -17.401.

Restricting the analysis to euro area economies leaves the positive CLM-inequality association intact in the preferred specifications. In the 86-observation sample reported in Appendix C, the CLM-Gini coefficients range from 9.688 to 12.438 and are statistically significant at least at the 10% level. For the top 10% liquid wealth share, the preferred full-sample coefficients range from 12.273 to 16.530 and are significant at least at the 5% level using country-clustered standard errors. The CLM estimates with country fixed effects only remain insignificant at the 10% level for both inequality measures in the baseline and euro area samples.

The production-side estimates are consistent with evidence that firm and sector positions in production networks are related to labor shares and earnings (Huneeus et al., 2022; Bernon et al., 2022). Our CLM and aggregation differ from those studies, so the coefficient magnitudes are not directly comparable. The positive relationship between the CLM and liquid wealth inequality is instead novel. The related literature studies earnings, income, or the incidence of shocks through a fixed household distribution, rather than the steady-state distribution of liquid wealth (Baqaee and Farhi, 2018; Schaab and Tan, 2023; Rubbo, 2025).

The main limitation of the empirical analysis is that changes in input-output structure may be correlated with unobserved changes in technology, demand, and institutions. Country and time fixed effects absorb time-invariant country differences and common time movements, but do not eliminate country-specific time-varying confounding factors. The econometric evidence therefore documents a conditional association between the CLM and liquid wealth inequality, rather than identifying a causal effect. The quantitative model rationalizes the mechanism underlying this association through the interaction of a multi-sector production structure and heterogeneous households.

7 Conclusions

This paper studies how production networks shape the steady-state distribution of household liquid wealth. In a first step, it identifies a mechanism through which production networks affect liquid wealth inequality in a general equilibrium model with a multi-sector production structure and heterogeneous households. In a second step, it validates the predicted relationships of the model via country-specific calibrations of the model and formal econometric panel regressions reflecting descriptive conditional associations in a panel of European economies.

As regards the first step, looking at the production side of the economy, we characterize analytically the CLM as a sufficient statistic for the distribution of aggregate labor and profit income. We further prove that, as firms' intermediate expenditures shift from low multiplier sectors to high multiplier sectors, the CLM rises and so does the ratio of real unit profits to real wages. Turning to the quantitative general equilibrium model, we find that a higher CLM raises real unit profits and reduces the real wage, consistent with the analytical result on the rise of their ratio. It also increases liquid wealth inequality. Crucially, we argue that this distributional result depends on the incidence of dividends. With concentrated dividend incidence, higher unit profits compensate high-productivity and high-saving households for lower labor income, and liquid wealth concentration rises. With equal dividend incidence, dividend gains are spread evenly and both aggregate inequality measures decline.

As regards the second step, country calibrations and European panel data provide empirical validation of the model predictions. Across country-specific calibrations for Germany, France, Italy, and Spain, a higher CLM is indeed associated with lower labor intensity and broadly with higher liquid wealth inequality. However, the model only partly captures the cross-country ranking and dispersion in terms of inequality. In the broader panel regressions of European economies with country and wave fixed effects, the CLM is positively associated with the liquid wealth Gini in line with the general predictions of the model. Moreover, the CLM is negatively associated with labor intensity, which is in turn negatively associated with inequality, thus corroborating the relative income channel identified in the model. Overall, the quantitative model rationalizes the association between production networks and the wealth distribution via a relative income channel, empirically validated by country calibrations and European panel data.

More broadly, our contribution is to bring together two dimensions of heterogeneity that

are often studied separately: the structure of production across interconnected sectors and the distribution of income, savings, and wealth across households. Our framework traces how changes in production networks affect the allocation of income between labor and profits and, through heterogeneous household responses, shape the steady-state distribution of liquid wealth. This connection provides a foundation for future research on the distributional implications of structural change and macroeconomic policies, including dynamic monetary policy transmission, richer asset and ownership structures, and international production linkages. Our central insight is that production networks matter not only for aggregate economic outcomes, but also for how wealth is distributed across households.

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A Proof of Lemma 1

As in Section 3, assume that private consumption is the only component of final demand, so $G_k = 0$ for every sector k. Nominal final demand in sector k is

$$f_k \equiv P_k C_k = \rho_k P^C C, \qquad \sum_{k=1}^{J} \rho_k = 1. \tag{A.1}$$

Multiplying the sectoral market-clearing condition (30) by P_k and using the intermediate-input demand (19) together with $MC_j = P_j/\mu$ gives $P_k X_{jk} = \frac{\omega_{jk}}{\mu} P_j Y_j$. Defining nominal sales $s_k \equiv P_k Y_k$, the nominal sales system is

$$s_k = f_k + \frac{1}{\mu} \sum_{j=1}^{J} \omega_{jk} s_j \qquad \Longleftrightarrow \qquad \mathbf{s}' = P^C C \, \boldsymbol{\rho}' L_\mu, \tag{A.2}$$

where $L_\mu \equiv (I - \Omega/\mu)^{-1}$, which exists since the spectral radius of Ω is below one and $\mu > 1$.

With no public consumption, Equation (40) gives $NGDP = P^C C = WN + \Pi$. Summing nominal sales across sectors therefore yields

$$Y^N = \mathbf{s}'\mathbf{1} = P^C C \, \boldsymbol{\rho}' L_\mu \mathbf{1} = NGDP \cdot \text{CLM}, \tag{A.3}$$

so the CLM is nominal gross output per unit of household spending.

Constant returns imply $\boldsymbol{\theta} = \mathbf{1} - \Omega\mathbf{1}$. The definition of L_μ implies $L_\mu \Omega = \mu \left(L_\mu - I\right)$. So,

$$L_\mu \boldsymbol{\theta} = L_\mu \mathbf{1} - \mu \left(L_\mu - I\right) \mathbf{1} = (1-\mu) L_\mu \mathbf{1} + \mu \mathbf{1}. \tag{A.4}$$

Using Definition 2 and Equation (A.2), the common factor $P^C C$ cancels:

$$\bar{\theta} = \frac{\mathbf{s}'\boldsymbol{\theta}}{\mathbf{s}'\mathbf{1}} = \frac{\boldsymbol{\rho}' L_\mu \boldsymbol{\theta}}{\boldsymbol{\rho}' L_\mu \mathbf{1}} = \frac{(1-\mu)\,\text{CLM} + \mu}{\text{CLM}} = \frac{\mu}{\text{CLM}} - (\mu - 1), \tag{A.5}$$

Holding the common markup fixed, differentiation gives

$$\frac{\partial \bar{\theta}}{\partial \text{CLM}} = -\frac{\mu}{\text{CLM}^2} < 0,$$

which proves Lemma 1. With no intermediate inputs $\Omega = 0$, CLM $= 1$ and $\bar{\theta} = 1$. ■

B Proof of Proposition 1

We maintain the assumptions of Section 3, including private consumption as the only component of final demand, and hold Z, μ, and $\boldsymbol{\rho}$ fixed along the network change.

Step 1: sectoral real wages. Using the price equation (22) and the normalization in (14), the share-specific constants cancel:

$$P_j = \frac{\mu}{Z} W^{\theta_j} \prod_{k=1}^{J} P_k^{\omega_{jk}}. \tag{B.1}$$

Taking logs gives

$$\log P_j = \log \mu - \log Z + \theta_j \log W + \sum_{k=1}^{J} \omega_{jk} \log P_k. \tag{B.2}$$

Define $w_j \equiv W/P_j$. Since $\theta_j + \sum_k \omega_{jk} = 1$, we obtain

$$\log w_j = \log Z - \log \mu + \sum_{k=1}^{J} \omega_{jk} (\log W - \log P_k) \tag{B.3}$$

$$= \log Z - \log \mu + \sum_{k=1}^{J} \omega_{jk} \log w_k. \tag{B.4}$$

In vector form,

$$(I - \Omega) \log \mathbf{w} = (\log Z - \log \mu)\mathbf{1}. \tag{B.5}$$

Because the spectral radius of Ω is below one, $I - \Omega$ is invertible. Therefore,

$$\log \mathbf{w} = (\log Z - \log \mu)(I - \Omega)^{-1}\mathbf{1}, \tag{B.6}$$

which establishes Equation (48) in Definition 3. Premultiplying by $\boldsymbol{\rho}'$ and using $P^C = \prod_{j=1}^{J} P_j^{\rho_j}$ gives Equation (49). Along a differentiable productive network $\Omega(t)$, differentiation gives

$$\frac{d \log W^R}{dt} = (\log Z - \log \mu)\boldsymbol{\rho}'(I - \Omega)^{-1} \frac{d\Omega}{dt} (I - \Omega)^{-1}\mathbf{1}.$$

Dividing by $d \log \mathrm{CLM}/dt \neq 0$ proves part (i).

Step 2: cost, revenue, and the profit-to-labor-income ratio. Constant returns to scale imply that total cost in sector j equals $MC_j Y_j$, while the pricing rule (22) gives $P_j = \mu\, MC_j$. Sectoral

profits in Equation (23) are therefore

$$\Pi_j = P_j Y_j - MC_j Y_j = \Big(1 - \frac{1}{\mu}\Big) P_j Y_j, \tag{B.7}$$

and summing over sectors gives

$$\Pi = \Big(1 - \frac{1}{\mu}\Big) Y^N, \qquad Y^N \equiv \sum_{j=1}^{J} P_j Y_j, \tag{B.8}$$

From the labor demand condition (20), $WN_j = \theta_j MC_j Y_j = \frac{\theta_j}{\mu} P_j Y_j$, so that

$$WN = \frac{1}{\mu} \sum_{j=1}^{J} \theta_j P_j Y_j = \frac{\bar{\theta}}{\mu} Y^N, \qquad \bar{\theta} \equiv \frac{\sum_j \theta_j P_j Y_j}{\sum_j P_j Y_j}. \tag{B.9}$$

Dividing Equation (B.8) by Equation (B.9), nominal gross output cancels:

$$\frac{\Pi}{WN} = \frac{\mu - 1}{\bar{\theta}}, \qquad \text{and hence} \qquad \frac{\Pi / P^C}{N} = \frac{W}{P^C} \cdot \frac{\Pi}{WN} = W^R \, \frac{\mu - 1}{\bar{\theta}}. \tag{B.10}$$

Both sides of Equation (B.10) are homogeneous of degree zero in the nominal scale Y^N, so the household block affects the level of Π and N separately but not their ratio.

By Equations (B.8) and (A.3), $x \equiv \Pi / NGDP = (1 - 1/\mu)\,\mathrm{CLM}$, which establishes the CLM representation in Equation (50).

Step 3: decomposition. Taking logs of Equation (B.10) and using $\Pi/(WN) = x/(1-x)$,

$$\log \pi^R = \log W^R + \log \frac{x}{1 - x}. \tag{B.11}$$

Since $x = (1 - 1/\mu)\,\mathrm{CLM}$ and μ is fixed,

$$\frac{d \log[x/(1-x)]}{d \log \mathrm{CLM}} = 1 + \frac{x}{1-x} = \frac{1}{1-x}.$$

Differentiating along the same network change therefore gives Equation (52), proving part (ii). Moreover, $0 < x = \Pi / NGDP < 1$ because $\mu > 1$, $NGDP = WN + \Pi$, and aggregate labor compensation is strictly positive. The latter follows from positive final demand in sectors with $\theta_j > 0$ and the labor demand condition (20). Thus $1/(1-x) > 0$, which proves part (iii). ■

C Additional Empirical Evidence

Table C.1: Consumer Leontief Multiplier and liquid wealth inequality (Gini coefficient)

a) Baseline												
CLM	5.194	9.366***	5.651	9.202***	4.341	8.505**	6.211	10.968***	5.222	8.230***	4.054	8.947***
	(4.653)	(2.750)	(3.813)	(2.866)	(3.219)	(3.433)	(4.400)	(2.940)	(4.053)	(2.421)	(3.392)	(3.167)
Income inequality			0.475***	0.389***	0.413***	0.371**	0.491***	0.423***	0.478***	0.391**	0.427***	0.398**
			(0.160)	(0.135)	(0.135)	(0.133)	(0.168)	(0.140)	(0.166)	(0.143)	(0.145)	(0.148)
Productivity					-8.012**	-4.169					-10.125**	-5.245
					(3.503)	(3.772)					(3.713)	(4.298)
PNI							-0.111	-0.311**			-0.165	-0.280*
							(0.221)	(0.142)			(0.225)	(0.163)
SCI									0.861	1.505**	1.550*	1.501*
									(1.147)	(0.723)	(0.900)	(0.816)
F-stat p-value	0.276	0.003	0.005	0.000	0.000	0.000	0.022	0.001	0.018	0.000	0.001	0.000
Observations	101	101	101	101	101	101	101	101	101	101	101	101
b) Feasible generalized least squares												
CLM	6.142*	8.311***	3.784***	9.179***	2.455*	7.947***	3.772*	10.662***	3.655**	8.782***	2.690	8.412***
	(3.254)	(1.768)	(1.328)	(1.822)	(1.235)	(2.152)	(1.851)	(1.934)	(1.352)	(1.692)	(1.769)	(2.260)
Income ineq.			0.570***	0.413***	0.440***	0.376***	0.567***	0.439***	0.566***	0.385***	0.410***	0.361***
			(0.084)	(0.095)	(0.115)	(0.107)	(0.083)	(0.105)	(0.084)	(0.099)	(0.108)	(0.121)
Prod.					-8.943***	-5.571					-9.654***	-6.670*
					(2.838)	(4.006)					(3.020)	(3.882)
PNI							0.004	-0.267*			-0.027	-0.263*
							(0.152)	(0.132)			(0.166)	(0.139)
SCI									0.346	1.047	0.612	1.084
									(0.792)	(0.696)	(0.936)	(0.853)
F-stat p-value	0.072	0.000	0.009	0.000	0.059	0.001	0.054	0.000	0.013	0.000	0.143	0.001
Observations	101	101	101	101	101	101	101	101	101	101	101	101
c) Only euro area countries												
CLM	3.786	12.007**	4.705	12.252**	5.259	12.438**	4.738	12.363**	2.314	9.688*	2.916	10.101*
	(4.876)	(4.569)	(4.505)	(4.652)	(4.325)	(4.694)	(4.607)	(4.504)	(3.774)	(4.976)	(3.532)	(4.870)
Income inequality			0.359**	0.318**	0.337**	0.312**	0.384**	0.354**	0.353**	0.314**	0.350**	0.347**
			(0.144)	(0.135)	(0.135)	(0.136)	(0.157)	(0.141)	(0.155)	(0.145)	(0.153)	(0.155)
Productivity					-4.395	-1.812					-5.666	-0.616
					(3.543)	(3.913)					(3.725)	(4.513)
PNI							-0.183	-0.308**			-0.187	-0.298*
							(0.191)	(0.127)			(0.206)	(0.146)
SCI									1.812**	1.433	1.923**	1.297
									(0.855)	(0.996)	(0.872)	(1.116)
F-stat p-value	0.448	0.018	0.032	0.006	0.009	0.013	0.091	0.013	0.030	0.000	0.012	0.004
Observations	86	86	86	86	86	86	86	86	86	86	86	86
Fixed effects	C	C-Y	C	C-Y	C	C-Y	C	C-Y	C	C-Y	C	C-Y

Notes: The dependent variable is the Gini coefficient of liquid wealth, expressed on a 0-100 scale. Income inequality is measured by the Gini coefficient of disposable income. PNI refers to production network intensity, measured by the sum of intermediate input expenditures from other sectors over the sum of total intermediate input expenditures. SCI refers to sectoral concentration index, measured by Herfindahl-Hirschman index of sectoral output. Fixed effects are country ("C"), year ("Y"), or both additive country and year effects jointly ("C & Y"). Euro area countries include Germany, France, Italy, Spain, Netherlands, Austria, Belgium, Finland, Ireland, Portugal, Greece, Luxembourg, Slovenia, Slovakia, Croatia, Lithuania, Estonia, Latvia, Malta and Cyprus. Standard errors are clustered by country in every specification and are reported in parentheses. Feasible generalized least squares weights combine inverse estimated country residual variances with the observation weights. *, **, and *** denote significance at the 10%, 5%, and 1% levels using country-clustered standard errors. As a robustness check, wild cluster bootstrap-t inference with 5,000 country-level Rademacher replications yields similar significance patterns.

Table C.2: Consumer Leontief Multiplier and liquid wealth inequality (Top 10%)

a) Baseline												
CLM	6.246	12.782***	7.550	13.253***	5.891	12.273**	9.014	16.530***	7.071	12.281***	6.355	14.521***
	(6.899)	(4.446)	(5.638)	(4.256)	(4.951)	(4.919)	(6.722)	(4.202)	(5.802)	(3.792)	(5.394)	(4.596)
Income inequality			0.929***	0.809***	0.819***	0.772***	0.988***	0.890***	0.934***	0.813***	0.866***	0.851***
			(0.226)	(0.194)	(0.197)	(0.190)	(0.220)	(0.185)	(0.231)	(0.202)	(0.201)	(0.194)
Productivity					-9.646**	-5.669					-12.692**	-6.013
					(4.641)	(4.971)					(5.066)	(5.880)
PNI							-0.282	-0.565**			-0.346	-0.536**
							(0.329)	(0.207)			(0.332)	(0.225)
SCI									0.971	1.510	1.637	1.246
									(1.571)	(1.238)	(1.346)	(1.390)
F-stat p-value	0.375	0.009	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.001	0.000
Observations	101	101	101	101	101	101	101	101	101	101	101	101
b) Feasible generalized least squares												
CLM	4.573*	9.356***	4.196**	12.000***	4.635***	11.378***	4.117	14.029***	3.977*	11.978***	5.327**	13.798***
	(2.450)	(1.993)	(1.891)	(2.237)	(1.297)	(2.348)	(2.612)	(2.434)	(1.981)	(2.019)	(2.416)	(2.689)
Income inequality			0.859***	0.761***	0.627***	0.734***	0.835***	0.801***	0.853***	0.768***	0.612***	0.748***
			(0.069)	(0.115)	(0.116)	(0.130)	(0.074)	(0.129)	(0.074)	(0.119)	(0.135)	(0.145)
Productivity					-10.766***	-1.871					-10.365***	-2.185
					(3.018)	(3.144)					(3.059)	(3.814)
PNI							-0.129	-0.379**			-0.068	-0.408**
							(0.179)	(0.173)			(0.231)	(0.183)
SCI									0.252	0.459	0.398	-0.245
									(1.236)	(0.918)	(1.237)	(1.189)
F-stat p-value	0.075	0.000	0.037	0.000	0.002	0.000	0.129	0.000	0.057	0.000	0.038	0.000
Observations	101	101	101	101	101	101	101	101	101	101	101	101
c) Only euro area countries												
CLM	5.562	16.923**	6.738	17.158**	7.250	17.348**	6.807	17.348**	3.792	14.538*	4.584	15.124*
	(7.378)	(7.584)	(6.878)	(7.306)	(6.700)	(7.391)	(7.202)	(6.929)	(5.756)	(7.742)	(5.726)	(7.415)
Income inequality			0.706***	0.657***	0.674***	0.648***	0.788***	0.754***	0.705***	0.657***	0.740***	0.761***
			(0.197)	(0.187)	(0.191)	(0.194)	(0.195)	(0.176)	(0.214)	(0.198)	(0.208)	(0.196)
Productivity					-4.075	-1.844					-5.849	1.392
					(4.305)	(4.852)					(4.834)	(6.251)
PNI							-0.408	-0.583***			-0.409	-0.583***
							(0.270)	(0.181)			(0.288)	(0.200)
SCI									2.245**	1.466	2.254*	1.164
									(1.063)	(1.452)	(1.171)	(1.666)
F-stat p-value	0.461	0.039	0.005	0.001	0.009	0.002	0.005	0.001	0.007	0.000	0.004	0.002
Observations	86	86	86	86	86	86	86	86	86	86	86	86
Fixed effects	C	C-Y	C	C-Y	C	C-Y	C	C-Y	C	C-Y	C	C-Y

Notes: The dependent variable is the share of liquid wealth held by the top 10% of the liquid wealth distribution, expressed on a 0-100 scale. Income inequality is measured by the share of disposable income held by the top 10% of the income distribution. PNI refers to production network intensity, measured by the sum of intermediate input expenditures from other sectors over the sum of total intermediate input expenditures. SCI refers to sectoral concentration index, measured by Herfindahl-Hirschman index of sectoral output. Fixed effects are country ("C"), year ("Y"), or both additive country and year effects jointly ("C & Y"). Euro area countries include Germany, France, Italy, Spain, Netherlands, Austria, Belgium, Finland, Ireland, Portugal, Greece, Luxembourg, Slovenia, Slovakia, Croatia, Lithuania, Estonia, Latvia, Malta and Cyprus. Standard errors are clustered by country in every specification and are reported in parentheses. Feasible generalized least squares weights combine inverse estimated country residual variances with the observation weights. *, **, and *** denote significance at the 10%, 5%, and 1% levels using country-clustered standard errors. As a robustness check, wild cluster bootstrap-t inference with 5,000 country-level Rademacher replications yields similar significance patterns.

D Production Block Algorithm Details

Model setup. There are J production sectors. Sector j uses labor N_j and intermediate inputs $\{X_{jk}\}_{k=1}^{J}$, where X_{jk} denotes the quantity of good k used by sector j. The input-output matrix follows the convention that rows are users and columns are suppliers: ω_{jk} is the expenditure share of input k in sector j's production. The labor cost share is

$$\theta_j \equiv 1 - \sum_{k=1}^{J} \omega_{jk}.$$

The sectoral production function is

$$Y_j = A_j Z N_j^{\theta_j} \prod_{k=1}^{J} X_{jk}^{\omega_{jk}}, \qquad j = 1, \ldots, J,$$

where

$$A_j = \theta_j^{-\theta_j} \prod_{k=1}^{J} \omega_{jk}^{-\omega_{jk}}.$$

This is the same normalization used in the main text: aggregate productivity Z enters the technology once, while A_j absorbs the Cobb-Douglas expenditure-share constants.

Prices, markups, and marginal costs. Firms in sector j face a constant elasticity of demand $\varepsilon_j > 1$ and charge a constant gross markup

$$\mu_j = \frac{\varepsilon_j}{\varepsilon_j - 1}.$$

Let MC_j denote sectoral marginal cost. The pricing rule is

$$P_j = \mu_j MC_j.$$

Given the nominal wage W, the input-output matrix $\Omega = \{\omega_{jk}\}$, the labor shares $\{\theta_j\}$, and markups $\{\mu_j\}$, the sectoral price system is solved before sectoral quantities are computed. Equivalently, the model solves the Leontief price-wage system implied by the unit-cost equations and then recovers

$$MC_j = \frac{P_j}{\mu_j}.$$

Input demands. Conditional on sectoral output Y_j, cost minimization implies that intermediate and labor demands are

$$X_{jk} = \omega_{jk} \frac{MC_j Y_j}{P_k}, \qquad N_j = \theta_j \frac{MC_j Y_j}{W}.$$

These expressions use $MC_j Y_j$, not $P_j Y_j$, because input and labor shares are cost shares. Since firms charge markups, total variable cost is below sales revenue:

$$MC_j Y_j = \frac{P_j Y_j}{\mu_j}.$$

Final demand. Private and public final expenditures are specified as fixed shares of the endogenous nominal scale Y^N. The variable Y^N determines the level of nominal final demand and is solved jointly with the household equilibrium; it should not be interpreted as sectoral gross nominal output. Let C/Y^N and G/Y^N denote the private- and public-consumption shares of nominal output, and let ρ_j and φ_j denote the sectoral expenditure weights for private and public consumption, respectively. Then real final demand for sector j is

$$C_j = \rho_j \frac{C/Y^N \cdot Y^N}{P_j}, \qquad G_j = \varphi_j \frac{G/Y^N \cdot Y^N}{P_j}.$$

Equivalently, using the consumption and government price indices P^C and P^G,

$$C_j = \rho_j \frac{P^C}{P_j} \frac{(C/Y^N)Y^N}{P^C}, \qquad G_j = \varphi_j \frac{P^G}{P_j} \frac{(G/Y^N)Y^N}{P^G}.$$

Sectoral goods-market clearing. The output of each sector must equal final demand plus intermediate demand from all user sectors:

$$Y_k = C_k + G_k + \sum_{j=1}^{J} X_{jk}, \qquad k = 1, \ldots, J.$$

Using the cost-minimizing input demand,

$$X_{jk} = \omega_{jk} \frac{MC_j Y_j}{P_k},$$

the goods-market-clearing system becomes

$$Y_k = C_k + G_k + \sum_{j=1}^{J} \omega_{jk} \frac{MC_j}{P_k} Y_j.$$

Define the supply-use matrix A^{sup} by

$$A^{\text{sup}}_{kj} \equiv \omega_{jk} \frac{MC_j}{P_k}.$$

Then the vector of sectoral outputs solves the linear system

$$(I - A^{\text{sup}})\, Y = C + G.$$

This is the system solved in the quantitative implementation.

Algorithm. Given W, Z, Ω, $\{\theta_j\}$, $\{\mu_j\}$, C/Y^N, G/Y^N, $\{\rho_j\}$, $\{\varphi_j\}$, and Y^N, the production block proceeds as follows:

1. Solve the Leontief price-wage system for sectoral prices $\{P_j\}_{j=1}^{J}$ and real wages W/P_j.
2. Recover marginal costs from the markup pricing rule:

$$MC_j = P_j / \mu_j.$$

3. Construct sectoral final demands:

$$C_j = \rho_j \frac{C/Y^N \cdot Y^N}{P_j}, \qquad G_j = \varphi_j \frac{G/Y^N \cdot Y^N}{P_j}.$$

4. Construct the supply-use matrix:

$$A^{\text{sup}}_{kj} = \omega_{jk} \frac{MC_j}{P_k}.$$

5. Solve sectoral outputs from

$$Y = (I - A^{\text{sup}})^{-1} (C + G).$$

6. Recover intermediate-input demands:

$$X_{jk} = \omega_{jk} \frac{MC_j Y_j}{P_k}.$$

7. Recover sectoral labor demand:

$$N_j = \theta_j \frac{MC_j Y_j}{W}, \qquad N^D = \sum_{j=1}^{J} N_j.$$

8. Compute sectoral profits:

$$\Pi_j = P_j Y_j - W N_j - \sum_{k=1}^{J} P_k X_{jk}.$$

9. Check sectoral goods-market residuals:

$$\text{resid}_k^{GM} = C_k + G_k + \sum_{j=1}^{J} X_{jk} - Y_k, \qquad k = 1, \ldots, J.$$

The goods-market residuals are zero up to numerical precision because sectoral output is computed directly from the linear market-clearing system.

E Calibration Table

Table E.1: Euro area calibration and baseline equilibrium

Parameter	Description	Value / source
Household preferences and idiosyncratic risk		
β	Discount factor	0.9768
ψ	Elasticity of intertemporal substitution	0.5
ϕ	Frisch elasticity of labor supply	0.5
v_ϕ	Scale of labor disutility	2.0
ρ_e	Persistence of idiosyncratic productivity	0.9498
σ_e	Stationary standard deviation of log productivity	0.3108
n_e	Number of productivity states	7
λ_{div}	Dividend-incidence curvature	3.97
λ_{tax}	Tax-incidence curvature	0 (equal lump-sum taxes)
Asset supply and final demand		
$P^C B/(4\,NGDP)$	Liquid wealth-to-annualized-GDP ratio	0.707221
B	Real liquid wealth supply	$0.707221 \times 4NGDP/P^C$
Production network and sectoral calibration		
J	Number of sectors	5
Sectors	Sectoral aggregation	BDE, C, F, G–N/R–U, O–Q/A
$\Omega = \{\omega_{jk}\}$	Input-output expenditure-share matrix	FIGARO 2021
θ_j	Labor share, $1 - \sum_k \omega_{jk}$	FIGARO 2021
ρ_j	Private-consumption expenditure weights	Eurostat National Accounts 2021
φ_j	Public-consumption expenditure weights	Eurostat National Accounts 2021
ε_j	Sectoral elasticity of substitution	11 for all j
μ	Common gross markup	1.1
Z	Aggregate productivity normalization	1.0
Y^N	Gross nominal output normalization	1.0
A_j	Cobb-Douglas normalization	$\theta_j^{-\theta_j} \prod_k \omega_{jk}^{-\omega_{jk}}$
Numerical grid		
$a_{\min}$	Minimum liquid wealth grid point	0
$a_{\max}$	Maximum liquid wealth grid point	150
n_a	Number of liquid wealth grid points	500
Baseline endogenous equilibrium outcomes		
r	Quarterly real interest rate	0.000091
W	Nominal equilibrium wage	0.326201
n_{mult}	Labor-efficiency scale	1.057246
Liquid wealth Gini	Data; model	72.9; 72.9
Top 10% liquid wealth share	Data; model	0.573; 0.520
Liquid wealth-to-GDP ratio	Data; model	0.707; 0.707
Weighted quarterly MPC	Data; model	0.143; 0.114
Weighted annual MPC	Data; model	0.460; 0.186

Notes: Production network and final-demand objects are calibrated using 2021 FIGARO and Eurostat National Accounts data. Household distributional moments are based on the 2021 HFCS. The liquid wealth-to-GDP ratio uses annualized GDP. r, W, and n_{mult} are endogenous equilibrium objects rather than calibrated parameters. For the data, the quarterly-equivalent MPC is obtained from the reported annual MPC using $(m_q = 1 - (1 - m_a)^{1/4})$. For the model, the quarterly MPC is the stationary-distribution-weighted average of household one-quarter MPCs. The annual MPC measures the cumulative consumption response over four quarters to an unexpected, one-off equal transfer per household, holding prices fixed.