Inter-Generational Conflict and the Declining Labor Share*

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Abstract

This paper argues that the decline in the labor income share since the 1970s is a consequence of the emergence of a relatively larger generation, the Baby Boomers, compared to other cohorts. I develop an OLG model in which public policy is endogenously shaped by the population's age structure through voting. When young, Baby Boomers vote to increase unemployment benefits to mitigate unemployment risk, raising the value of their outside option in wage bargaining and enabling them to negotiate higher wages. Firms respond by substituting labor with capital to limit workers' rent appropriation, causing a decline in the labor share. Once the Boomers retire, this effect reverses but is offset by capital accumulation driven by the Boomers' high savings rates, fueled by higher wages, further reducing the labor share. Calibrated for France and the United States, the model's simulations replicate the observed decline in labor share and labor market dynamics. The model predicts that, from 2020 onward, approximately one percentage point of labor income share will shift to capital income every 20 years, on average, through the end of the 21st century.

Keywords: Labor Share; Inter-generational Conflict; Capital Accumulation; Baby Boomer Cohort; Wage Bargaining; Public Policy
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1 Introduction

The labor income share, along with its evolution and distributional implications, has interested economists since at least Kaldor (1955).[1] While evidence suggested stability in the allocation between capital and labor income over decades, there has been a decline of the latter in favor of the latter in several OECD countries since the 1970s, prompting extensive debate on the causes of this shift; see Karabarbounis and Neiman (2014) and Elsby et al. (2013).

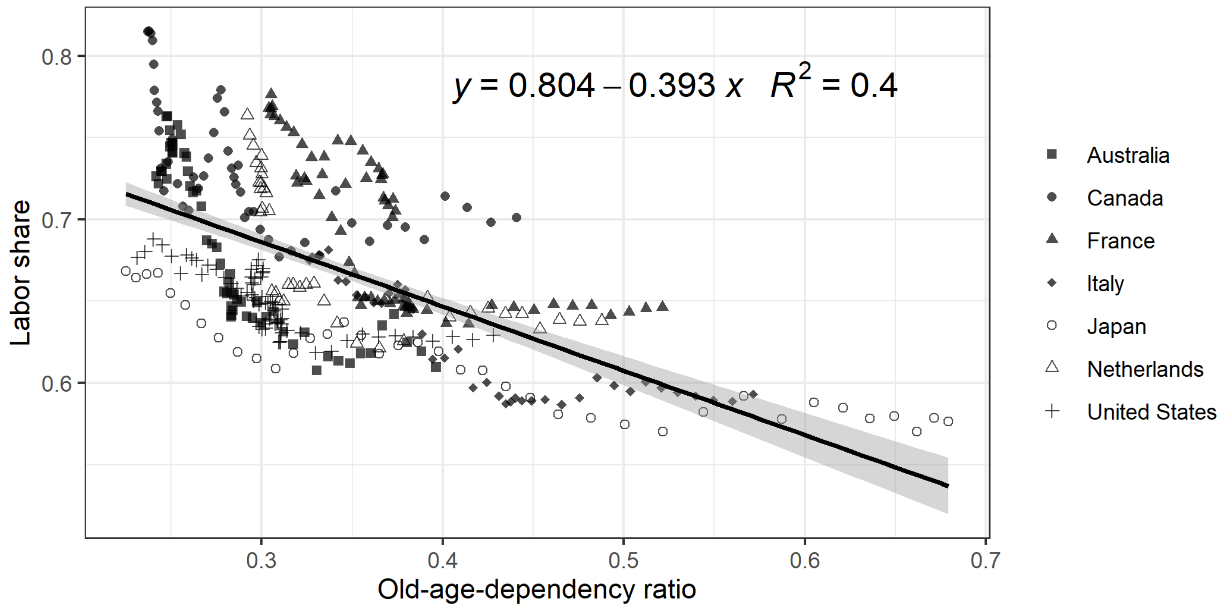
The decline in the labor share coincides with demographic shifts, particularly the labor market entry and aging of the "baby boomer" generation, born between 1945 and 1965. Figure 1 shows a negative correlation between the old-age-dependency ratio (defined as the ratio of the population aged 60+ to those aged 20–60) and the labor share across OECD countries from 1950 to 2019. This ratio reflects the life cycle of the boomer cohorts: when young, they keep the old-age dependency ratio low despite increasing life expectancy among older generations, but as they age, the ratio surges. During this period, these countries also saw shifts in public spending driven by population aging. Figure 2 shows a positive correlation between the old-age dependency ratio and the ratio of old-age to young-age specific government spending, suggesting that the aging boomer cohort may have influenced a shift in government spending toward older age groups.

In this paper, I argue that the observed shift from labor income to capital income is driven by changes in labor market institutions that are endogenously influenced by the age structure of the population. The Baby Boomer generation initiated the decline in labor's share of income when they were young and continues to contribute to this decline as they retire. This argument rests on the idea that public policy choices are largely shaped by the political influence of this sizable cohort. When the Boomers were young, they influenced labor market institutions to secure higher wages, enhancing their bargaining power. In response, firms reallocated resources from labor to capital to reduce rent appropriation by workers, thereby decreasing labor's share of income. As the Boomers age and retire, we would expect a reversal in labor share dynamics due to the weakening of pro-worker labor market institutions, which should promote employment. However, the potential positive effect of increased employment on the labor share is counterbalanced by the capital accumulation fueled by the Boomers' high savings rates during their youth, suggesting a continued decline in the labor share.

I begin by developing a two-period overlapping generations (OLG) model with young and old households. Both groups vote on public policy, but they differ in income sources and pol-

[1] A growing body of literature, beginning with Blanchard (1997), documents changes in the labor share. Renewed interest in its distributional consequences arises notably from Atkinson (2009), highlighting it as a key determinant of personal income distribution; see also Checchi and García-Peñalosa (2010) and Bengtsson and Waldenström (2018).

Figure 1: Labor Share and Old-Age-Dependency Ratio

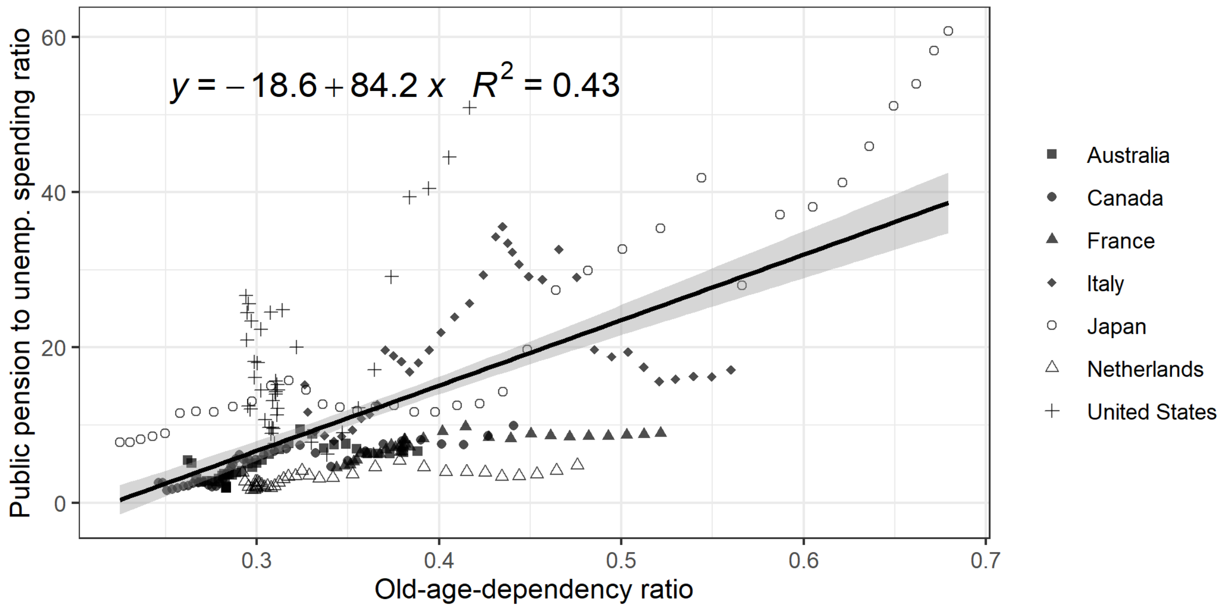


Notes: The figure displays the negative correlation between the labor share and old-age-dependency ratio for several OECD countries. Labor share data are from the Penn World Table 10.0. The old-age-dependency ratio is defined as the number of individuals above 60 over the number of those between 20 and 60. The ratio is computed with demographic data from the "medium variant" estimates from the United Nations World Population Prospects 2017.

icy preferences. Older agents receive capital income and support government spending targeting them, such as government health spending, whereas younger agents earn wages and prefer unemployment benefits due to their exposure to unemployment risk. When a large cohort, such as the Baby Boomers, enters the population, they leverage their political influence through voting to increase taxes and expand unemployment benefits to mitigate this unemployment risk. Both measures raise the outside option for workers in wage negotiations (i.e., the income they receive when unemployed), enabling them to negotiate higher wages. When labor and capital are gross substitutes, the representative firm shifts from labor to capital, resulting in a decline in labor's share of income. Once the Boomers retire, the political influence of younger cohorts diminishes, leading to a reduction in unemployment benefits, which promotes employment. However, the increase in employment's effect on the labor share is counterbalanced by capital accumulation driven by the Boomers' substantial savings in the previous period, which were supported by the higher wages they previously negotiated.

My framework suggests that demographic dynamics influence the labor share through two distinct mechanisms. First, there is a direct *factor-accumulation* effect that operates via the labor supply and capital stock. A large generation anticipating longer lifespans, such as the Baby Boomers, contributes to a higher labor supply when young and subsequently to a

Figure 2: Public Pension to Unemployment Spending Ratio and Old-Age-Dependency Ratio



Notes: The figure displays the positive correlation between the public pension to unemployment spending ratio and old-age-dependency ratio for several OECD countries. The public pension to unemployment spending ratio is computed using the total public unemployment spending and the total public pension spending (both as shares of GDP) from the OECD data. The old-age-dependency ratio is defined as the number of individuals above 60 over the number of those between 20 and 60. The ratio is computed with demographic data from the "medium variant" estimates from the United Nations World Population Prospects 2017.

larger capital stock (fueled by their savings) upon retirement. Second, there is an indirect *policy-mechanism* effect that reflects intergenerational conflicts over public policy. A large generation wields relatively greater political influence enabling it to shape public budget allocations in its favor through voting when young and old.

Both mechanisms have implications for wage bargaining in the labor market. The factor-accumulation effect comprises two opposite dynamics: a larger capital stock enables firms to substitute labor with capital, thereby increasing the capital-to-labor ratio; meanwhile, a greater labor supply exerts downward pressure on wages, promoting employment and thus reducing the capital-to-labor ratio. By contrast, the policy mechanism effect is more straightforward. As the political influence of younger generations rises, so do unemployment benefits, which enhance workers' outside options. This allows workers to negotiate higher wages, which, in turn, constrains employment as firms shift from labor to capital, ultimately raising the capital-to-labor ratio.

The elasticity of substitution between capital and labor is critical in this model, as it determines whether an increase in capital per worker raises or reduces the labor share. To calibrate the model, I estimate this elasticity for France and the United States, yielding values of 1.21 and

1.27, respectively. Following the specification of Klump et al. (2007), I use a single-equation estimation based on the two first-order conditions of profit maximization for a CES production function with biased technical change. The estimation periods are 1950-–2018 for France and 1950-–2019 for the United States; see Section 3.2 for further details. Since both elasticities exceed one, this indicates that capital and labor are gross substitutes. Consequently, any increase in capital per worker reduces the labor share, consistent with stylized facts observed in several OECD countries (Karabarbounis and Neiman 2014; Piketty 2014; Piketty and Zucman 2014; Piketty 2015).

There is considerable debate in the literature regarding the value of this elasticity. For the United States, many studies estimate an elasticity between 0.4 and 0.6 (Antràs 2004; Chirinko 2008; León-Ledesma et al. 2010, among others). While Chirinko and Mallick (2017) prefers an estimate around 0.4, they acknowledge that this elasticity is significantly higher—above one—when income shares are defined net of depreciation, aligning with my theoretical framework and data. Similarly, Rognlie (2016) argues that accounting for depreciation is essential in analyses of income distribution. My estimate incorporates these latter arguments and aligns with recent elasticity values used in the labor share literature. For instance, Caballero and Hammour (1998) employ a capital-labor elasticity of substitution of approximately 6 in simulations for French data, while Karabarbounis and Neiman (2014) use cross-sectional data from 50 countries between 1975 and 2012 to derive a baseline elasticity estimate of about 1.28. Additionally, Piketty (2015) demonstrates that the capital-income ratio and capital share are positively correlated, suggesting that only an elasticity above one can reconcile this pattern with the predictions of the standard one-sector model.

I then proceed to a quantitative analysis by calibrating the model for France and the United States, beginning in 1950. The model successfully replicates labor share dynamics through the 2010s, along with related labor market trends, and generates projections for future developments. In France, the labor share is projected to decline steadily from 64.7% in 2020 to 60.4% by 2100. In the United States, it is expected to remain stable at 62.7% until 2040, after which it will decline to 58.8% by 2100. From 2020 onward, approximately one percentage point of the labor income share is projected to shift to capital income every 20 years, on average, until the end of the century.

Additionally, I conduct a counterfactual analysis, demonstrating that the policy mechanism effect is as significant as the factor accumulation effect. Specifically, the policy mechanism partially offsets the factor accumulation effect when the Boomers are young, thereby reducing the labor share. Once the Boomers retire, this policy mechanism effect becomes dominant, a pattern observed in both countries.

Finally, I conclude by showing that the Boomers emerge as the winners in this age-related economic conflict, despite a decline in the labor share during their youth. Through their political influence, they compensate for labor income losses via redistribution. Thus, Boomer cohorts have enjoyed relatively higher income levels compared to both preceding and succeeding generations.

My paper relates to several strands of literature. First, it contributes to the expanding body of research on the impact of demographic changes on the allocation of income between capital and labor. Schmidt and Vosen (2013) show that an aging population leads to higher savings, and consequently, a capital increase. When capital and labor are gross substitutes, this capital accumulation reduces the labor share. I build on this mechanism—which I term the direct factor-accumulation effect—and introduce an additional mechanism: the indirect policy-mechanism effect, considering that labor market institutions are endogenous to these population dynamics. D'Albis et al. (2021) empirically find that an exogenous decline in the net population growth rate leads to a reduction in the labor share, whereas an exogenous increase in the net migration rate raises the labor share. My paper offers a theoretical framework that explains both of these patterns through the combined effects of factor accumulation and policy mechanisms.

Recent work has examined shifts in the labor share both across and within industries. Notably, Acemoglu and Restrepo (2022) argue that firms increasingly adopt automation technologies to replace middle-aged workers in manual production tasks as these workers become scarce due to population aging. They predict that the labor share will decline in industries that are intensive in such tasks. Similarly, Glover and Short (2020) suggest that population aging reduces the labor share by shifting aggregate earnings toward older workers, who experience a widening gap between their earnings and marginal productivity. My work introduces an additional mechanism, highlighting firms' responses to constraints in optimizing production factors due to endogenous changes in labor market institutions driven by demographic dynamics.

Second, my work contributes to the literature on the determinants of the labor share, a topic widely studied and debated. Key determinants range from globalization (Jayadev 2007; Pica 2010; Young and Tackett 2018; Autor et al. 2020, among others) to capital-biased technical change (Acemoglu 2002; Acemoglu 2003; Karabarbounis and Neiman 2014, among others) and labor market institutions (Blanchard 1997; Bentolila and Saint-Paul 2003; Bental and Demougin 2010, among others). Caballero and Hammour (1998) argue that pro-labor income institutions constrain firms by limiting their ability to optimize inputs and by enabling workers to secure a larger share of income. In response, firms shift from labor to capital via biased technical change. My paper examines an upstream driver of the key mechanism in Caballero and Hammour (1998), reproducing it without relying on biased technical change. Instead, I endogenize changes in labor market institutions, linking them to the population's age structure. I thus demonstrate that demography is a critical determinant of the labor share, potentially underlying several explanations documented in the literature (see, for instance, Alvarez-Cuadrado et al. 2018; Bergholt et al. 2021; Guimarães and Gil 2022).

Third, this paper relates to the literature on the role of demography in shaping institutions and its impact on macroeconomic outcomes (Lee and Mason 2010; Aksoy et al. 2019). Prior research has primarily examined topics such as the optimal retirement age for economic growth (Futagami and Nakajima 2001; Gonzalez-Eiras and Niepelt 2012) and the sustainability of pension systems (de la Croix et al. 2013; Dedry et al. 2017). My work expands this literature by addressing a macroeconomic indicator that has not previously been a focal point in this debate: the allocation of income between capital and labor.

Lastly, I contribute to the limited literature on the impact of cohort dynamics on aggregate labor market outcomes (Shimer 1998; Ferraro and Fiori 2020). My findings suggest that the Baby Boomer generation has been a significant driver of the declining labor share in France and the United States—a concept not previously emphasized in the literature.

This paper is organized as follows. Section 2 introduces the model, beginning with households, followed by the labor market and public policy, and then proceeds to analyze the equilibrium. Section 3 presents the quantitative analysis, starting with the data and then calibrating the model. I present model predictions, compare the factor-accumulation and policy-mechanism effects, and examine the winners of the age-related conflict. Finally, Section 4 provides concluding remarks.

2 Model

I consider a two-period overlapping generations (OLG) model with two types of households: young and old. An intergenerational conflict emerges because young and old households have differing public policy preferences; the young favor higher unemployment benefits, while the old prefer increased government spending targeted at older adults.

I model the intergenerational conflict over public budget allocation as a trade-off between unemployment benefits and old-age-specific government spending for two reasons. First, several types of government spending specifically benefit older households. For example, this spending could include health expenditures targeted at the elderly or, more broadly, public services such as residential care homes that directly enhance utility for older individuals.[2]

Second, substituting this government spending with pensions would be an alternative specification. However, doing so would reduce the model's tractability without adding substantial analytical insight.[3]

Decisions within each period unfold as follows. First, young and old households vote to set the tax rate, unemployment benefits, and old-age-specific government spending, thereby defining the public policy equilibrium. Second, young households negotiate wages with the representative firm, determining the labor market equilibrium. Third, uncertainty regarding the employment status of young households is resolved. Fourth, households make their consumption and savings choices.

2.1 Households

The population comprises N_t^y young and N_t^o old individuals. Demographic dynamics are defined by $N_t^y = n_t N_{t-1}^y$, where $n_t > 0$ represents the gross population growth rate, and $N_t^o = p_t N_{t-1}^y$, with $p_t \in (0,1]$ as the survival rate. The survival rate p_t is an increasing function of life expectancy and a decreasing function of the retirement age.[4] Both demographic parameters are exogenous and may vary over time. These variations generate population dynamics and influence the old-age dependency ratio, given by $N_t^o / N_t^y = p_t / n_t$.

Each cohort consists of a continuum of agents with identical preferences. Households have logarithmic utility functions and derive utility from consumption. Young households discount the future by a factor $\alpha \in (0,1)$. They face idiosyncratic longevity risk: with probability p_{t+1}, they survive and become old households in period $t+1$. Due to this mortality risk, the effective discount factor for young households is αp_{t+1}.

Young households earn a disposable income y_t, which they allocate between consumption $c_{1,t}$ and savings s_t. Once they reach old age, they receive the net return on their savings, $(1-\tau_{t+1}) s_t \hat{R}_{t+1}$, where τ_{t+1} is the tax rate and $\hat{R}_{t+1}$ is the gross return on the savings of a

[2] Although health spending benefits all age groups, it is positively correlated with age. Papanicolas et al. (2020) show that in 2015, average per-capita health expenditure in the United States was approximately three times higher for individuals over 65 compared to those aged 20 to 64. They also find a similar average ratio of about 3.14 across a sample of 8 OECD countries (excluding the US).

[3] Incorporating pensions would place the policy instrument within the budget constraint of older individuals rather than directly in their utility function. From the perspective of the *indirect policy mechanism*, the elderly would still advocate for more of this instrument. Regarding the *direct factor-accumulation mechanism*, Schmidt and Vosen (2013) arrive at similar conclusions about the direct effect of aging on the labor share under an exogenous pension system. Furthermore, additional assumptions would be required regarding the pension system type (e.g., pay-as-you-go versus fully funded).

[4] In this model, agents are considered old once they retire. If life expectancy and the retirement age increase at the same rate, the survival rate remains constant. For further discussion on measuring population aging, see Sanderson and Scherbov (2006), Sanderson and Scherbov (2013), and D'Albis and Collard (2013).

young household that survives to old age. I assume a perfect annuities market in which the savings of young agents who die before reaching old age are distributed among their surviving peers. Consequently, the gross return $\hat{R}_t$ equals R_t/p_t, where R_t is the gross return on physical capital.

Old households allocate all their capital income to consumption $c_{2,t+1}$ and also derive utility from old-age-specific government spending g_{t+1}, which is a public good funded through taxes. This spending can represent various public expenditures—from leisure activities to subsidies for personal assistance—that enhance the quality of life. Finally, old households die at the end of period $t+1$.

To maximize expected utility, a household in period t solves the following problem:

$$\begin{aligned}\max_{c_{1,t},\, c_{2,t+1}} \; & U_t = \ln c_{1,t} + \alpha p_{t+1}\left(\ln c_{2,t+1} + \beta \ln g_{t+1}\right) \\ \text{s.t.} \; & c_{1,t} + s_t = y_t, \\ & c_{2,t+1} = (1-\tau_{t+1}) s_t \hat{R}_{t+1},\end{aligned}$$

where $\beta > 0$ represents the preference for old-age-specific government spending. The first-period disposable income, y_t, depends on the household's employment status. Each young household faces an idiosyncratic unemployment risk, with probability $u_t \in [0,1)$. Employment status is known at the time of choosing consumption and savings. An employed household earns a net wage $y_t^e = (1-\tau_t)w_t$, where w_t is the wage rate, while an unemployed household receives unemployment benefits, $y_t^u = b_t$, where b_t denotes the unemployment benefit.

Solving the household's maximization problem yields optimal consumption in both periods and optimal savings in the first period:

$$c_{1,t} = \frac{1}{1+\alpha p_{t+1}} y_t, \tag{1}$$

$$c_{2,t+1} = \frac{\alpha p_{t+1}}{1+\alpha p_{t+1}} (1-\tau_{t+1}) \hat{R}_{t+1} y_t, \tag{2}$$

$$s_t = \frac{\alpha p_{t+1}}{1+\alpha p_{t+1}} y_t. \tag{3}$$

Since the utility function is logarithmic, savings are a constant proportion of disposable income. Aggregate savings in the economy are the weighted average of all disposable incomes of the young, given by

$$S_t = \frac{\alpha p_{t+1}}{1+\alpha p_{t+1}} \Big[(1-u_t)(1-\tau_t)w_t + u_t b_t\Big] N_t^y. \tag{4}$$

I assume that capital fully depreciates between the two periods. A period represents half the lifetime of a generation; thus, I assume capital is either depreciated or obsolete after such a duration. Therefore, Equation (4) determines the capital stock in the next period so that $K_{t+1} = S_t$. This assumption also implies that the gross return on physical capital is equal to the rental rate, i.e., $R_t = r_t$.

2.2 Labor Market

Consider a representative firm with a standard CES production function:

$$Y_t = A\left[\phi K_t^{\frac{\sigma-1}{\sigma}} + (1-\phi) L_t^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}}, \tag{5}$$

where K_t is the capital stock, L_t is labor, σ represents the elasticity of substitution between capital and labor, ϕ is the factor share parameter capturing the relative importance of inputs in production, and A is a scale parameter.

Rewriting the production function in per-worker terms:

$$\frac{Y_t}{L_t} = A\left(\phi k_t^{\frac{\sigma-1}{\sigma}} + 1 - \phi\right)^{\frac{\sigma}{\sigma-1}}, \tag{6}$$

where $k_t \equiv K_t/L_t$ denotes capital per worker.

The inverse labor demand function, derived from profit maximization, is given by:

$$w_t = (1-\phi)A\left(\phi k_t^{\frac{\sigma-1}{\sigma}} + 1 - \phi\right)^{\frac{1}{\sigma-1}}. \tag{7}$$

The labor share is defined as the ratio between the wage rate and output-per-worker, i.e. $\theta_t \equiv w_t L_t/Y_t$. Using Equations (6) and (7), the labor share is given by

$$\theta_t = \left(1 + \frac{\phi}{1-\phi} k_t^{\frac{\sigma-1}{\sigma}}\right)^{-1}. \tag{8}$$

Note that when the capital-labor elasticity of substitution equals unity, then the labor share is constant, i.e. $\theta_t = 1-\phi$. From Equation (8), I can also define the labor-to-capital income ratio as

$$\Theta_t \equiv \frac{\theta_t}{1-\theta_t} = \frac{1-\phi}{\phi} k_t^{\frac{1-\sigma}{\sigma}}. \tag{9}$$

The comparative statics of these expressions are straightforward. An increase in capital per worker raises both the wage and output per worker, i.e., $\partial w_t/\partial k_t > 0$ and $\partial(Y_t/L_t)/\partial k_t > 0$. However, the effect on the labor share depends on the elasticity of substitution between the factors: $\partial\theta_t/\partial k_t \lesseqgtr 0$ when $\sigma \gtreqless 1$. For a negative relationship between capital per worker and the labor share, the factors must be gross substitutes, i.e., $\sigma > 1$. In this case, any increase in capital per worker leads to a wage increase that is outweighed by the rise in output per worker, resulting in a decline in the labor share and a decrease in the labor-to-capital income ratio.

Young households bargain over the wage rate with the representative firm, but the employer retains the prerogative to hire and fire, as the labor market operates as a monopsony.[5] Consequently, the firm always operates on its labor demand curve, ensuring that Equation (7) holds.

As workers compete for employment, they undercut their wages, driving the wage rate down to their incentive constraint. This constraint requires that the net wage cannot fall below their outside option, namely, unemployment benefits, i.e., $(1-\tau_t)w_t \geq b_t$. Therefore, the equilibrium wage in the labor market—which implicitly determines employment level L_t—is given by:

$$w_t = \frac{b_t}{1-\tau_t}. \tag{10}$$

Using the labor demand function from Equation (7), I find that $dL_t/db_t < 0$ and $dL_t/d\tau_t < 0$ for all values of σ. When the unemployment benefit or the tax rate increases, the outside option for workers improves. Consequently, workers bargain for higher wages, prompting the firm to substitute labor with capital to mitigate the increased labor costs associated with workers' appropriation of rents. Thus, the model replicates the partial equilibrium effect identified by Caballero and Hammour (1998) regardless of the elasticity of substitution between labor and capital.

2.3 Public Policy

The government taxes both the labor income of the young and the returns on savings of the old at a uniform tax rate.[6] Revenue generated from these taxes is allocated to unemployment benefits and old-age-specific government spending. Therefore, the government's budget constraint is $\tau_t\left[w_t(1-u_t)N_t^y + R_t S_{t-1}\right] = b_t u_t N_t^y + g_t N_t^o$. Since the expression in brackets represents total income in the economy, Y_t, I can rewrite the government's budget constraint as:

[5] Possible extensions of the model could incorporate either a "right-to-manage" model *à la* Nickell and Andrews (1983) or an "efficient contract" model *à la* McDonald and Solow (1981). Both frameworks introduce a representative union that bargains with the firm, thereby increasing workers' relative bargaining power and potentially distorting the wage. In these settings, bargaining power could be endogenous to public policy. However, such extensions lie beyond the scope of this paper. With exogenous bargaining power, the right-to-manage model yields qualitatively similar results.

[6] I assume a common tax rate to simplify the analysis. Both young and old agents prefer a lower tax rate, as it increases their disposable income. Introducing separate tax rates for labor and capital income would introduce an additional layer of intergenerational conflict, complicating the voting process without yielding additional insights.

$$\tau_t Y_t = b_t u_t N_t^y + g_t N_t^o. \tag{11}$$

Everything else equal, both types of agents prefer lower taxes, as taxes reduce their disposable income. The young favor higher unemployment benefits due to the unemployment risk they face, whereas the elderly prefer increased government spending, from which they derive utility.[7]

I assume that individuals make different policy choices when young and when old. Recent empirical evidence indicates that people's preferences for public spending change over their life cycle, reflecting a form of age-related self-interest. For instance, Sørensen (2013) finds that elderly individuals prefer less spending on education but support increased health expenditures and pensions. Similarly, Busemeyer et al. (2009) identifies significant age-related differences in public policy preferences. Although these studies differ on the extent of this conflict, they both confirm its existence. Further, Ahlfeldt et al. (2020, 2022) provide evidence of intergenerational conflicts in public policy by examining direct democracy outcomes from various referendums in Switzerland and Germany, concluding that each generation tends to vote in favor of policies that benefit its own age group over the life cycle.

I adopt a probabilistic voting framework.[8] In this setup, all agents vote for a policy platform $\psi_t = (\tau_t, b_t, g_t)$ represented by opportunistic candidates or parties. Candidates aim to maximize their probability of winning the election. They differ in popularity, and voters have idiosyncratic biases favoring one candidate over the other, which candidates take into account. In equilibrium, all candidates select the same policy platform $\psi_t^\star$, which maximizes the political objective function $W_t(\psi_t)$ defined below. For more details on the probabilistic voting model, see Lindbeck and Weibull (1987).

The young vote before their employment status is known, and there is no coordination between voting and wage bargaining. Consequently, households consider only the direct effects of public policy on their utility and disregard any indirect effects through unemployment, wages, or capital accumulation.

[7]Households are assumed to care only about the direct effects of public policy on their utility. However, accounting for indirect effects—such as the impact on the wage w_t and interest rate R_t—would lead to similar conclusions for elderly households, as any increase in unemployment benefits reduces the gross return on physical capital, and therefore their income.

[8]An alternative would be a median voter model. However, this approach would lead to two extreme regimes, with one potentially resulting in a gerontocracy. It would also cause large swings in public policy if the median voter shifted from young to old or vice versa. By contrast, probabilistic voting produces an equilibrium policy platform that varies continuously with the old-age dependency ratio.

The maximization program that defines the public policy equilibrium is:

$$\max_{\tau_t, b_t, g_t} W_t(\tau_t, b_t, g_t) = \eta_t \underbrace{\left[(1-u_t)\ln(1-\tau_t) + u_t \ln b_t\right]}_{\text{Young indirect utility}} + \underbrace{\ln(1-\tau_t) + \beta \ln(g_t)}_{\text{Old indirect utility}}$$

subject to the government budget constraint from Equation (11), where

$$\eta_t = \frac{n_t}{p_t}\omega(1+\alpha p_{t+1}) \tag{12}$$

is the *political weight of the young*, and ω represents the relative ideological spread of the young compared to the elderly. This spread is characterized by the ratio of each group's sensitivity of voting behavior to policy changes. I assume this spread remains constant over time.[9] See Appendix A for more details on the probabilistic voting framework used here.

The political weight is a key variable in the model, as it is the channel through which the age structure influences public policy. Political weight depends negatively on the old-age dependency ratio, p_t/n_t: as the population ages, the political weight of the young in shaping policy decreases. It depends positively on the relative ideological spread, ω. The less ideologically fixed the youth are, the higher their political weight, as it becomes easier for opportunistic candidates to secure their votes through favorable public policy, prompting candidates to pay more attention to their preferences. Additionally, the political weight of the young increases with the effective discount factor, αp_{t+1}, since public policy at time t also impacts the future income dynamics of the young generation.

Focusing on the interior solution of the maximization program, the first-order conditions yield the following public policy equilibrium:

$$b_t = \frac{\eta_t}{1+\beta+\eta_t}\frac{Y_t}{N_t^y}, \tag{13}$$

$$g_t = \frac{\beta}{1+\beta+\eta_t}\frac{Y_t}{N_t^o}, \tag{14}$$

$$\tau_t = \frac{\beta + u_t\eta_t}{1+\beta+\eta_t}, \tag{15}$$

where Equation (13) defines the unemployment benefits per young household, Equation (14) the old-age specific government spending per old household, and Equation (15) gives the tax rate.

[9] This assumption allows for two interpretations: either both groups' ideological spreads are time-invariant, or they vary proportionally. Exploring these spreads as endogenous or cohort-specific would be interesting but lies beyond the scope of this paper.

The comparative statics are straightforward. The young generation favors higher taxation as long as the unemployment risk is sufficiently high, i.e., $\partial \tau_t / \partial \eta_t > 0$ if and only if $u_t > \beta/(1+\beta)$. Regardless of the unemployment level, they always prefer higher unemployment benefits, i.e., $\partial b_t / \partial \eta_t > 0$. Conversely, the young generation favors lower old-age-specific government spending, as they do not yet derive utility from it, i.e., $\partial g_t / \partial \eta_t < 0$.[10]

The aggregate net income of young households is defined as

$$Y_t^y = \left[(1-u_t)(1-\tau_t)w_t + u_t b_t\right] N_t^y.$$

Using Equations (10) and (13), I can express this as a share of total income:

$$\frac{Y_t^y}{Y_t} = \frac{\eta_t}{1+\beta+\eta_t}.$$

For a given level of total income Y_t, the comparative statics indicate that when the political weight of the young rises, they increase their income share through more redistribution i.e. $\partial(Y_t^y/Y_t)/\partial \eta_t > 0$. Conversely, the income share of the elderly shrinks when the political weight of the young increases, i.e. $\partial(Y_t^o/Y_t)/\partial \eta_t < 0$. Furthermore, the after-tax income ratio between young and old households can be expressed as

$$\frac{Y_t^y}{Y_t^o} = \eta_t. \tag{16}$$

Thus, the greater the political weight of the young, the higher their relative net income.

2.4 Equilibrium

Using Equations (13) and (15) from the public policy equilibrium, along with Equation (10) from the labor market equilibrium, leads to the equilibrium labor share:

$$\theta_t = \frac{\eta_t(1-u_t)}{1+\eta_t(1-u_t)}, \tag{17}$$

where the political weight of the young, η_t, is exogenous and determined by demographic dynamics, while the unemployment rate, u_t, is endogenous.

Using Equation (8), the capital-per-worker at equilibrium can be expressed as a function

[10] The model does not include explicit altruism. However, the parameter β, which represents the preference for old-age-specific spending, reflects a form of implicit altruism from the young toward the elderly. The larger this parameter, the more individuals care about government spending in old age. Introducing explicit altruism from the young toward the elderly would reduce the intensity of the age-related conflict but would not alter its outcome.

of exogenous variables:

$$k_t^\star = \left(\frac{\phi}{1-\phi}\frac{K_t}{N_t^y}\eta_t\right)^\sigma, \quad (18)$$

where the capital stock, K_t, is derived from savings in the previous period, while the labor supply, N_t^y, and the political weight of the young are determined by demographic dynamics. Thus, a unique, non-trivial equilibrium exists.

In equilibrium, capital per worker is an increasing function of the political weight of the young, η_t. The higher the political weight, the higher the unemployment benefits and, consequently, the bargained wage. This reduces the labor demand of the representative firm, resulting in a greater capital-to-labor ratio as the firm increasingly relies on capital over labor. Note that the strength of this mechanism depends positively on the elasticity of substitution between capital and labor.

Since the capital stock is determined by savings from the previous period, i.e., $K_t = S_{t-1}$, greater savings from the previous generation lead to a larger capital stock available to the firm, thereby increasing capital per worker. Conversely, a larger young generation, N_t^y, implies a greater labor force, which reduces the capital-to-labor ratio.

3 Quantitative Analysis

This section presents the quantitative analysis of the model with three main objectives: to reproduce the observed labor share dynamics from 1950 to 2010, to provide model-based predictions after 2010, and to analyze the transmission channels of demographic effects on the labor share. Model predictions are computed for France and the United States. These two countries are chosen because they have experienced significant changes in population age structure due to the Baby Boomer generation, yet they differ in labor market institutions and public policies.

To simulate the model, I follow the methodology of Gonzalez-Eiras and Niepelt (2012), which is standard in the literature for calibrating an OLG model. One period in the model corresponds to 40 years in the data, with households considered young from ages 20 to 60 and old thereafter.[11]

I generate four sequences of model predictions, each with a period length of 40 years. In

[11] An implicit assumption of the model is a constant retirement age. In reality, the average effective retirement age in France was 67.8 in 1970, declining to 59.3 by 2010, while in the United States, it fell from 68.4 to 65.6 over the same period (data from the OECD Database, Ageing and Employment Policies - Statistics on average effective age of retirement). For calibration, I assume a retirement age of 60 as an approximation. This assumption should not affect the voting outcome, as near-retirees can anticipate their future circumstances when voting. A 5-year change in retirement age is minor relative to the 40-year periods in the model.

the first sequence, periods correspond to 1950, 1990, 2030, and 2070; in the second, to 1960, 2000, 2040, and 2080; in the third, to 1970, 2010, 2050, and 2090; and in the fourth, to 1980, 2020, 2060, and 2100. When reporting time-series predictions, I combine these four sequences into a single time series, resulting in eight overlapping generations living simultaneously—four young and four old. Every 10 years, a new generation is born, and an old generation exits.

3.1 Data

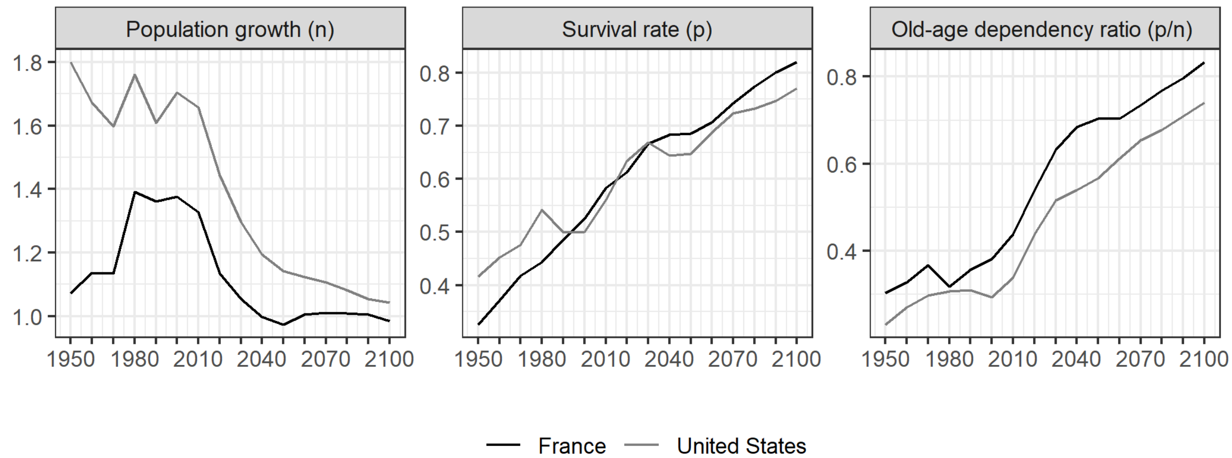
Demography. I use demographic data from the United Nations World Population Prospects 2017.[12] I begin by calculating the old-age dependency ratio from the data, defined as the number of old individuals divided by the number of young ones. Next, I compute the population growth rate as the ratio of young individuals in each period to those in the previous period of the sequence, i.e., $n_t = N_t^y / N_{t-1}^y$. Finally, I verify the survival rate using the identity $p_t \equiv (N_t^o / N_t^y) \times n_t$, where the survival rate is the product of the old-age dependency ratio and the population growth rate.

Figure 3 shows demographic trends for France and the United States, indicating that both countries face similar demographic contexts. I identify three distinct eras corresponding to the life cycle of the Baby Boomer generation: from 1970 to 2010, when the Boomers are young; the period of their retirement; and the period following their disappearance. Until 2010, the old-age dependency ratio remains relatively stable, as the massive entry of Boomers into the labor force offsets increases in the survival rate driven by rising life expectancy. After 2010, as the Boomer generation retires, the survival rate continues to rise while population growth declines, resulting in a sharp increase in the old-age dependency ratio.

Labor Share. I use labor share data from the Penn World Table (PWT) 10.0; see Feenstra et al. (2015) for more details on this dataset. In the PWT, the labor share θ_t represents the share of labor compensation in GDP. As noted by Gollin (2002), labor share measurements are affected by the method used to account for self-employed income. In the theoretical framework, workers are young individuals who supply only labor. To align with the model, I treat self-employed income as labor compensation.

[12] Demographic data from 1950 to 2010 come from the United Nations World Population Prospects 2017. For future projections, I rely on the "medium variant" estimates from the United Nations. Data prior to 1950 are from Populstat. Due to data limitations, expected survival rate p_{t+1} values are unavailable after 2060. I therefore assume that p_{t+1} grows at its observed average growth rate until 2060 for each country—4.921% for France and 4.137% for the United States. However, I limit my analysis to four periods (ending in 2100) due to the high uncertainty beyond this timeframe.

Figure 3: Demographic dynamics



Notes: The figure displays, for each country every 10 years, the population growth rate, the survival rate and the old-age dependency ratio. Data correspond to the "medium variant" estimates from the United Nations World Population Prospects 2017.

Capital Stock. I use the capital stock at constant 2011 national prices from the Penn World Table (PWT) as the measure for K_t. To isolate the effect of changes in hours worked, I adjust both capital stock and output by the average annual hours worked per person engaged, also sourced from the PWT.

Labor and Unemployment. I use the number of persons employed from the PWT. In the model, labor supply is inelastic, and there is no distinction between unemployed and inactive individuals. Here, unemployed agents represent all individuals not engaged in work. In high-income countries like France and the United States, inactive individuals often receive redistributive benefits through transfer payments. Thus, I classify them as unemployed, with redistribution captured in the model through the unemployment benefit b_t.

I calculate the unemployment rate as $u_t = 1 - emp_t / N_t^{15-64}$, where emp_t is the number of persons employed, and N_t^{15-64} is the working-age population.[13]

Finally, I compute labor supply using the identity $L_t \equiv (1 - u_t) N_t^y$.

Public Policy. I use government revenue as a share of GDP from the OECD Tax Database as a proxy for the tax rate, τ_t; however, data are not available before 1970. Pension spending,

[13] I consider the entire working-age population, rather than just the young population. In the model, young agents correspond to individuals between ages 20 and 60. However, the PWT does not provide data on persons engaged by age group, so using only N_t^y in the denominator would underestimate the unemployment rate. Although other sources of population data are available, I rely on the PWT for consistency, using the same data source for inputs and output.

Table 1: Parameters

	Parameter	France	US	Target
α	Discount rate	0.669	0.669	Set to 0.99^{40}
ϕ	Capital share in 1950	0.232	0.323	$1-\theta_{1950}$
σ	Capital-labor elasticity of substitution	1.206	1.270	Estimation
ω	Relative ideological spread-out	1.103	0.622	k_{1970}
β	Preference for old-age specific gov. spending	0.570	0.002	τ_{1970}
A	Scale parameter of the production function	127.782	18.430	θ_{1990}

Notes: The table reports the parameters and the targets from the calibration of the model for France and the United States. The discount rate is set to 0.99 on an annual basis. The capital share in 1950 matches the labor share in the same year. The capital-labor elasticity of substitution is obtained with a single-equation estimation from the two first-order conditions of the profit maximization with normalized CES production function. The relative ideological spread-out matches the capital-labor ratio in 1970, the preference for old-age specific government spending matches the tax rate in 1970, and the scale parameter of the production function matches the labor share in 1990.

expressed as a percentage of GDP, serves as a measure of old-age-specific government spending, i.e., $g_t N_t^o / Y_t$, as it is likely positively correlated with the needs of the elderly population. Lastly, I use public unemployment spending as a percentage of GDP to represent the share of total unemployment benefits, i.e., $b_t u_t N_t^y / Y_t$. The latter two variables are also sourced from OECD data.

Normalization. I normalize the capital-labor ratio, k_t, and the young population, N_t^y, to their 1950 values. The labor supply, L_t, is calculated so that the unemployment rate, u_t, matches the level derived for 1950, and K_t is determined to satisfy the identity $k_t \equiv K_t / L_t$.

3.2 Calibration

Once stock variables are normalized, I calibrate the model parameters $\alpha, \phi, \sigma, \omega, \beta, A$. Table 1 summarizes the parameters for both countries. The discount rate α is set at 0.669, equivalent to 0.99 on an annual basis. The parameter ϕ, representing the capital share in 1950, is derived from the labor share in the same year.

The primary parameter of the model is the elasticity of substitution between capital and labor, denoted by σ. I follow the specification in Klump et al. (2007) for a CES production function with biased technical change. I estimate σ using a single-equation approach based on the two first-order conditions for profit maximization:

$$\ln \Theta_t = \gamma_0 + \gamma_1 \ln\left(\frac{k_t}{k_0}\right) + \gamma_2 (t - t_0), \tag{19}$$

Table 2: Estimation of the Capital-Labor Elasticity of Substitution

	Linear regression - OLS			
	France		United States	
	(1)	(2)	(1)	(2)
γ_1	1.233^{***}	1.214^{***}	0.752^{***}	0.762^{***}
	(0.020)	(0.019)	(0.012)	(0.014)
γ_2	-0.318^{***}	-0.171^{***}	-0.213^{***}	-0.363^{***}
	(0.014)	(0.043)	(0.017)	(0.101)
γ_3		-0.005^{***}		0.002
		(0.001)		(0.002)
σ	1.466	1.206	1.270	1.571
R^2	0.891	0.908	0.703	0.713
Adj. R^2	0.889	0.906	0.699	0.704
Num. obs.	69	69	70	70

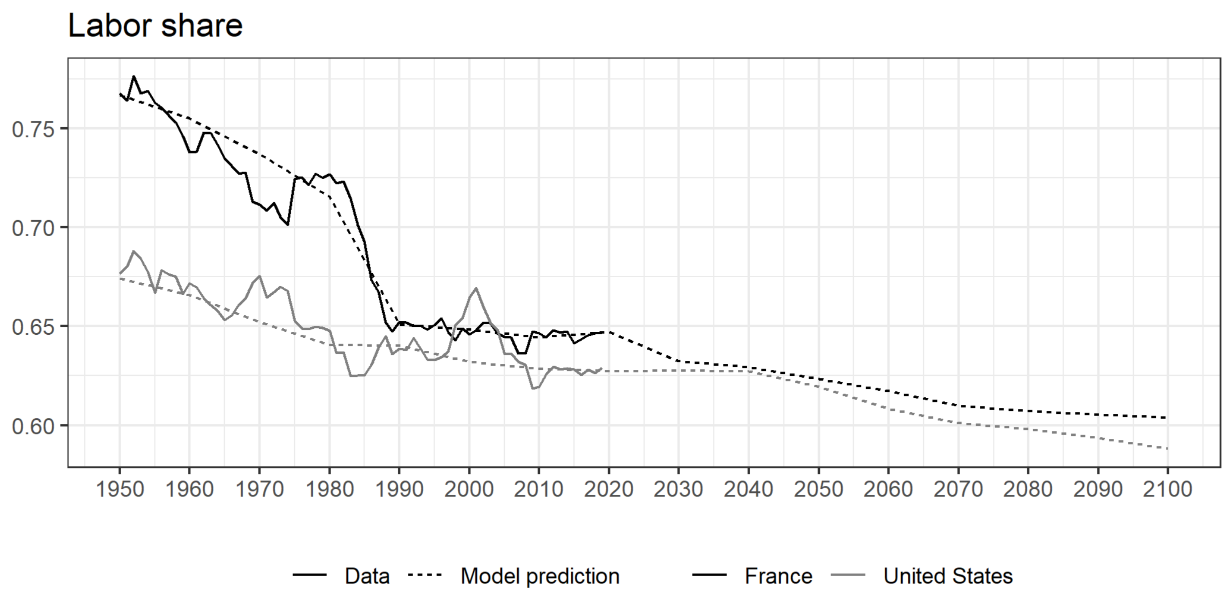
Notes: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$. Standard errors between parentheses. The labor-to-capital income ratio (in log) is the dependent variable. The periods of the estimate correspond to 1950-2018 for France and 1950-2019 for the US. Single-equation estimation from the two first-order conditions of the profit maximization for a CES production function with biased technical change. Coefficients are as follows. γ_0 is the intercept, $\gamma_1 \equiv (1-\sigma)/\sigma$ encompasses the elasticity of substitution between capital and labor, and γ_2 captures the overall bias in technical change.

where γ_0 is the intercept, $\gamma_1 \equiv \frac{1-\sigma}{\sigma}$ incorporates the elasticity of substitution between the factors, and γ_2 represents the overall bias in technical change.

Table 2 summarizes the coefficients and provides the estimated elasticity for both countries. For France, the preferred specification is column (2), which controls for the bias of technical change. The negative and significant γ_3 coefficient indicates that technical change is biased toward capital. For the United States, I use the first specification, as γ_3 is not significant in column (2). Notably, the coefficients from which I derive the elasticity, i.e., γ_2, are significantly negative, implying that σ is significantly greater than one.

This approach yields an elasticity of 1.206 for France and 1.270 for the United States, suggesting that both input factors are gross substitutes. These values align with recent estimates in the labor share literature, such as those of Karabarbounis and Neiman (2014), who use cross-sectional data from 50 countries over 1975–2012 and find an elasticity greater than 1, with an average of 1.28 in their baseline estimates. Caballero and Hammour (1998) use a relatively high capital-labor elasticity of substitution, around 6.00, in simulations for France. As my model examines a broader aspect of their mechanism, my estimates are considerably lower than in their original work.

Figure 4: Model Predictions of the Labor Share



Notes: The figure shows the labor share predictions of the model (dashed lines) and the labor share in the data (solid lines) from 1950 to 2100 for France and the US. Labor share data are from the Penn World Table 10.1 with self-employed income as labor compensation.

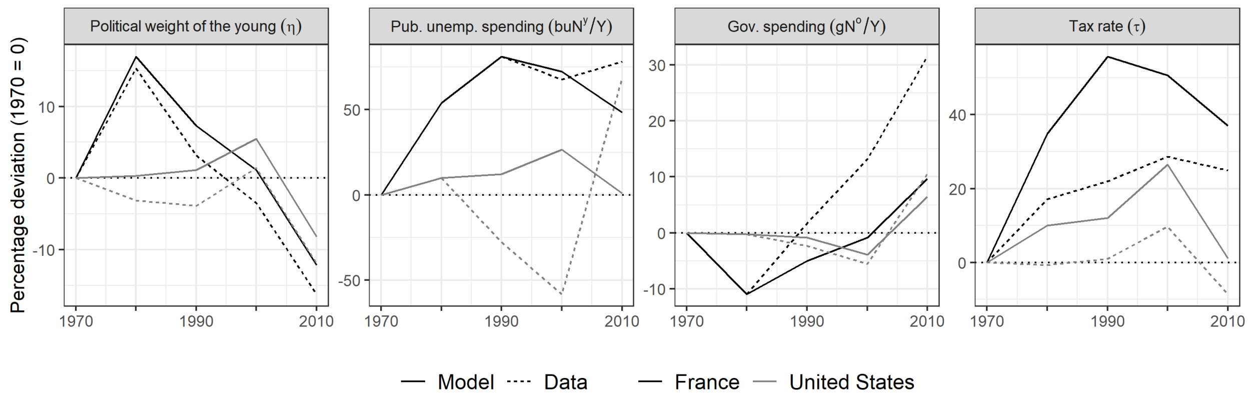
To calibrate the remaining three parameters, I match three moments in the data. First, the relative ideological spread, ω, is set to match the capital-labor ratio, k_t, in 1970 using Equation (18). Since this parameter is higher in France than in the United States, it suggests that young people have inherently more political weight in France. Second, the preference for old-age-specific government spending, β, is set to match the 1970 tax rate, τ_t, based on data and Equation (15). As expected, the preference for old-age-specific government spending—relative to private consumption—is higher in France than in the United States. Lastly, the scale parameter of the production function, A, is calibrated to match the average labor share between 1988 and 1992.

3.3 Model Predictions

I simulate the model using the parameter values specified above. For the remainder of the paper, I refer to this simulation as the benchmark simulation. Figure 4 shows the labor shares predicted by the model. The model reproduces the overall trend observed in the data for both countries through 2020. For the United States, the model slightly underestimates the labor share around 2000, though it captures the general trend over the period.

For France, the model's predictions align more closely with the data, reproducing observed values since 1950. Looking forward, the model predicts a decline in the labor share in both

Figure 5: Public Policy Dynamics over the 1970-2010 Period



Notes: The figure shows the percentage deviation of public policy equilibrium variables from their 1970 values for France and the United States over the 1970–2010 period. Solid lines represent model-simulated dynamics, dashed lines represent actual data, and the dotted line represents the 0-degree reference line.

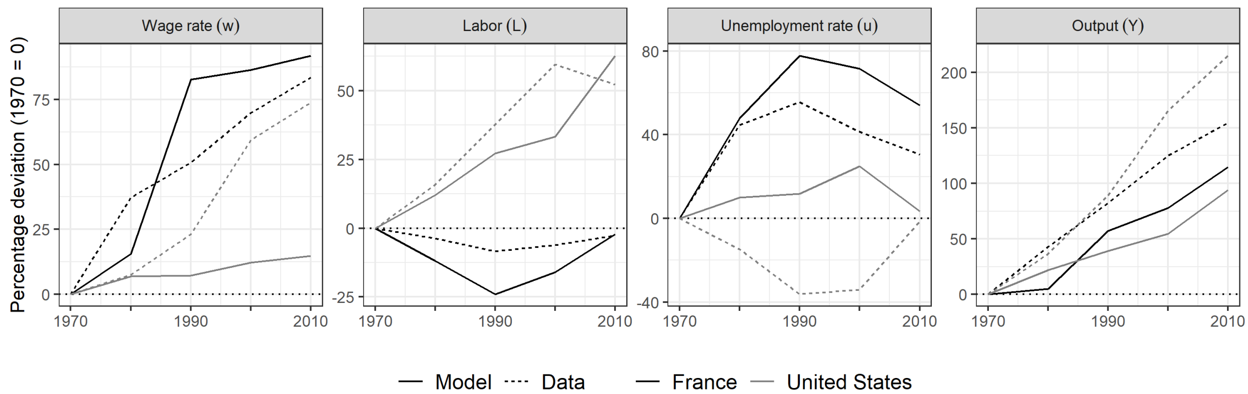
countries through the end of the century. I discuss the dynamics of variables in both the public policy equilibrium and the labor market equilibrium across three periods: when the Boomers are young (1970–2010), during their retirement (2010–2050), and in the years following (2050–2100).

The Young Boomers (1970–2010). Figure 5 shows the dynamics of public policy variables, expressed as percentage deviations from their 1970 values. The rate of population growth, n_t, slightly exceeds the increasing survival rate, p_t, between 1970 and 2000. Consequently, the old-age dependency ratio, p_t/n_t, remains relatively stable, with a slight decline in France between 1980 and 1990 due to the massive entry of the Baby Boomers into the labor force. Around 2000, the old-age dependency ratio begins to rise as population growth remains steady and the survival rate increases sharply, marking the start of the Baby Boomer generation's retirement. Given this demographic context, the political weight of the young, η_t, remains above its 1970 level until 2000 in both countries, as shown in the first panel of the figure.

As the political weight of the young Boomers increases, pro-youth policies are implemented due to the opportunistic behavior of political parties. These policies involve greater redistribution—specifically, higher tax rates and increased unemployment benefits—to offset income losses due to the unemployment risk faced by the young Boomers. Consequently, old-age-specific government spending declines initially but begins to rise again as the Boomer cohort starts to retire around 2010. Since unemployment benefits serve as an outside option for workers, these public policy dynamics have significant implications for the labor market.

Figure 6 shows the dynamics of labor market variables, expressed as percentage deviations from their 1970 values.

Figure 6: Labor Market Dynamics over the 1970-2010 Period



Notes: The figure displays the percentage deviation of labor market equilibrium variables from their 1970 values for France and the United States over the 1970–2010 period. Solid lines represent model-simulated dynamics, dashed lines represent the data, and the dotted line represents the 0-degree reference line.

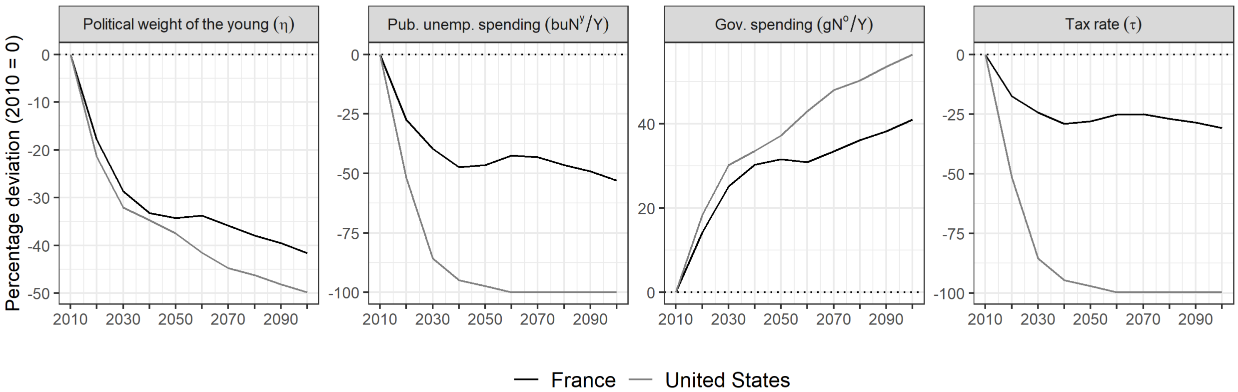
As workers' outside options improve, they can bargain for higher wages. This increase in labor costs (i.e., wages) encourages firms to shift away from labor. Two features of the model enable this behavior. First, the monopsony position of the firm in the labor market allows it to hire and fire at will. Second, the capital-labor elasticity of substitution, σ, is greater than one, meaning that labor and capital are gross substitutes; thus, firms are better able to substitute labor with capital for a given output level.

This behavior results in a decline in the number of workers, L_t, in France and a moderate increase in the United States, as shown in the second panel. The divergence between the two countries stems from a stronger substitution effect in France than in the United States. The higher elasticity of substitution in France, coupled with faster capital stock growth (K_t), drives French firms to substitute labor with capital to a greater extent. Consequently, the number of workers falls below its 1970 level in France, while in the United States, the labor factor experiences a slight increase, as the rise in wages is not as pronounced as in France.

This decline in employment raises unemployment in France, an effect amplified by labor force growth due to the large cohort of young Boomers. In the United States, the increase in labor does not fully offset population growth, leading to a rise in the unemployment rate, as shown in the third panel. Because labor and capital are gross substitutes, both total output Y_t and output per worker grow alongside capital per worker. The increase in output per worker surpasses the wage growth, resulting in a decline in the labor share.

Note that the model's predictions do not always align with the observed data. This discrepancy arises because the model only partially captures the economy, as other dynamics and explanatory mechanisms may also be at play. For instance, the model does not fully account for the observed unemployment rate in the United States around 1990.

Figure 7: Public Policy Dynamics over the 2010-2100 Period



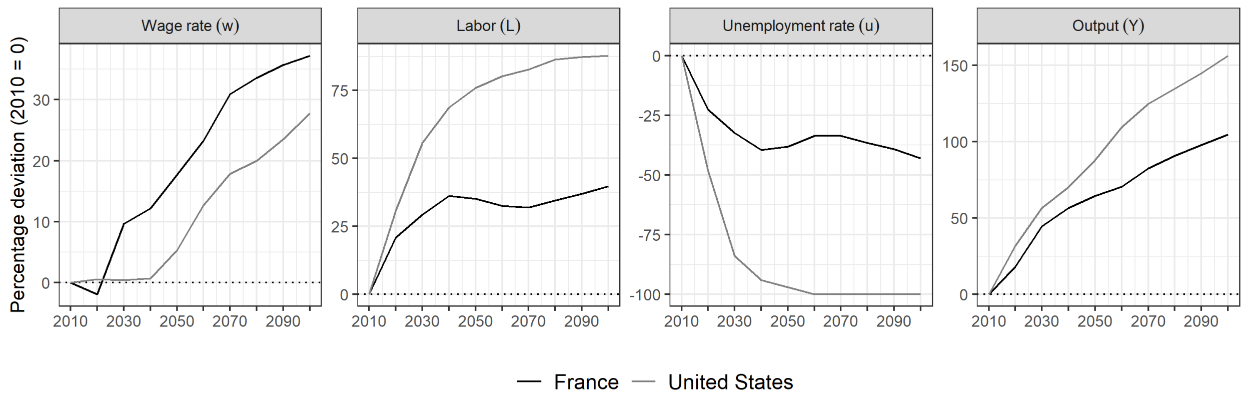
Notes: The figure displays the percentage deviation of public policy equilibrium variables from their 2010 values for France and the United States over the 2010–2100 period. Solid lines represent model-simulated dynamics, and the dotted line represents the 0-degree reference line.

The mechanisms driving these dynamics up to 2010 can be summarized as follows: the young Boomers influence labor market institutions in their favor due to their relatively high political weight. This raises workers' outside options and enhances their bargaining power, enabling them to negotiate higher wages. As labor becomes more costly, firms shift toward capital. This substitution increases output per worker more than it raises wages, leading to a decline in the labor share.

The Retired Boomers (2010–2050) and Afterward (2050–2100). The dynamics of the same set of variables also illustrate the mechanisms behind the model's labor share predictions after 2010. Figure 7 shows the dynamics of public policy variables, expressed as percentage deviations from their 2010 values. The demographic context over this period is as follows: the rate of population growth, n_t, declines sharply between 2010 and 2050, stabilizing thereafter. Meanwhile, the survival rate, p_t, increases by approximately 4% per decade. Consequently, the old-age dependency ratio rises steeply from 2010 to 2050. Once population growth stabilizes, the old-age dependency ratio continues to grow, though at a slower rate. As a result, the political weight of the young, η_t, does not return to its 2010 level and declines significantly until 2050 for both countries, as shown in the first panel.

As the political weight of the young declines, the reverse of the mechanism that led to the labor share decline when the Boomers were young is expected. Opportunistic political parties now favor the retired Boomers, implementing pro-elderly public policies—namely, a lower tax rate and increased old-age-specific government spending. Consequently, unemployment benefits decrease, reducing the outside option for workers. These shifts in public policy have significant implications for the labor market.

Figure 8: Labor Market Dynamics over the 2010-2100 Period



Notes: The figure displays the percentage deviation of labor market equilibrium variables from their 2010 values for France and the United States over the 2010–2100 period. Solid lines represent model-simulated dynamics, and the dotted line represents the 0-degree reference line.

Figure 8 shows the dynamics of labor market variables, expressed as percentage deviations from their 2010 values. As a result, wage growth stagnates, encouraging firms to increase hiring, as shown in the second panel. The unemployment rate declines due to higher employment coupled with a decrease in the population growth rate, as illustrated in the third panel. In the case of the US, note that the unemployment rate converges to zero in the very long run as the country reaches full employment. However, despite reaching full employment, the labor share continues to decline, as shown in Figure 4, due to the large capital stock accumulated.

Nonetheless, the labor share never returns to its 2010 level. Its dynamics are influenced by two main factors: an increase in employment and a higher capital stock resulting from the Boomers' savings during their youth. These savings were driven by the large size of the Boomer generation, increasing life expectancy, and their relatively high wages. While higher employment tends to boost the labor share, the expanded capital stock exerts downward pressure, keeping the labor share roughly stable in both countries during the Boomers' retirement.

After 2050, as the Boomers pass away, the decline in the political power of the young slows in both countries. This shift allows workers to negotiate higher wages. In France, firms respond by substituting labor with capital to prevent workers from capturing additional rents, resulting in a decline in employment and a rise in unemployment. In contrast, firms in the United States continue to hire, approaching full employment due to capital growth and stagnant labor supply. However, in both countries, wage gains do not keep pace with the increase in output per worker. Consequently, the labor share declines, reaching 60.4% in France and 58.8% in the United States by 2100, down from approximately 64.5% and 62.8% in 2010, respectively.

The mechanisms after 2010 can be summarized as follows: the Boomers retire and influence public policy in their favor, leading to reduced taxes and unemployment benefits, which

Table 3: Demographic variables in 1970

	Variable	France	United States
n_{1970}	Population growth rate	1.134	1.597
p_{1970}	Survival rate	0.417	0.476
p_{1990}	Expected survival rate	0.583	0.561
$\frac{p_{1970}}{n_{1970}}$	Old-age dependency ratio	0.368	0.298
η_{1970}	Young political weight of the young	4.169	2.869

Notes: The table reports the demographic variables in 1970 for France and the United States.

increases employment. The positive impact of higher employment on the labor share is offset by capital accumulation due to the extensive savings of the Boomers in their youth. Consequently, the labor share rises slightly in France and stabilizes in the United States, before declining again toward the end of the century due to population aging.

3.4 Factor-Rccumulation and Policy-mechanism Effects

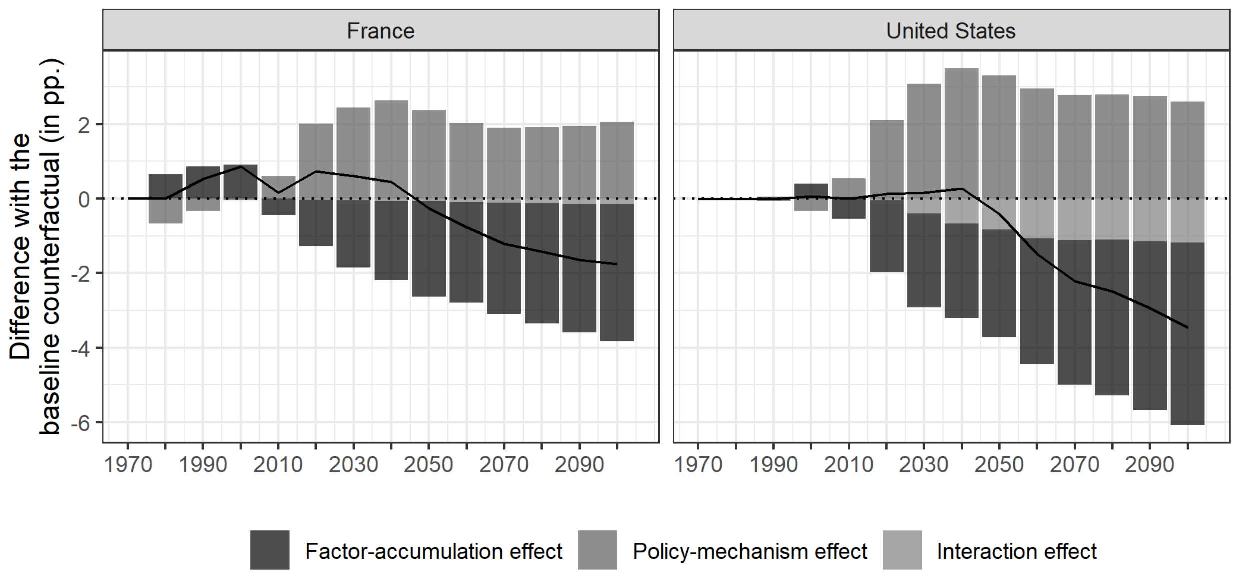
I have thus far highlighted the various mechanisms through which population age structure influences economic variables and, consequently, the labor share. Demographic changes stem from shifts in two exogenous variables: the population growth rate, n_t, and the survival rate, p_t. These dynamics affect the labor share through two primary channels: the *direct factor-accumulation* effect and the *indirect policy-mechanism* effect.

To quantify the respective impact of each effect, I conduct counterfactual simulations. In these simulations, I neutralize one channel of demographic change by setting it to its 1970 level, i.e., the decade before the massive entry of the Boomers into the labor market. Table 3 summarizes the demographic variables in 1970. I then compare the counterfactual simulations to the benchmark results obtained in section 3.3 to quantify the extent to which each channel affects the labor share. For more details on the methodology used to construct the counterfactual simulations, see Appendix B.

To neutralize the factor accumulation effect, I assume that all demographic parameters remain at their 1970 levels, i.e., $n'_t = n_{1970}$ and $p'_t = p'_{t+1} = p_{1970}$, which influences population dynamics and the savings rate. In this simulation, only the political weight of the young is kept identical to the benchmark simulation, i.e., $\eta'_t = \eta_t$.

Conversely, I neutralize the policy mechanism effect by setting the political weight of the young to its 1970 level, i.e., $\eta'_t = \eta_{1970}$, while all demographic parameters remain at their benchmark values. Finally, I perform a counterfactual simulation to neutralize both channels, where $n'_t = n_{1970}$, $p'_t = p'_{t+1} = p_{1970}$, and $\eta'_t = \eta_{1970}$. This last simulation serves as the

Figure 9: Decomposition of the channels of demographic changes



Notes: The figure shows the decomposition of demographic change channels on the labor share, with effects expressed as percentage point differences from the baseline counterfactual simulation. The baseline counterfactual assumes all demographic variables and the young political weight remain at their initial levels. The factor-accumulation effect represents the impact of demographic changes on the labor share through the factor-accumulation channel, while the policy-mechanism effect reflects the impact through the policy-mechanism channel. Both effects are calculated by taking the difference between the benchmark labor share and the labor share from the simulation in which each channel is neutralized. The interaction effect is defined as the portion of the outcome not explained by either effect independently. The solid line represents the net effect, corresponding to the sum of the three effects, which also reflects the difference between the benchmark and baseline counterfactual labor shares.

baseline counterfactual.

Figure 9 presents the magnitude of the factor accumulation effect and the policy mechanism effect, derived from the counterfactual simulations, in percentage points. The factor-accumulation effect is largely positive when the Boomers are young, as the increase in labor supply benefits firms in wage bargaining, keeping wages low and fostering employment. In contrast, the policy-mechanism effect negatively impacts the labor share, driven by the rising political weight of the young Boomers, which increases unemployment benefits (and thus wages), prompting firms to shift from labor toward capital.

Once the Boomers begin to retire around 2010, both effects reverse. The policy-mechanism effect becomes positive, as older Boomers support pro-elderly public policies. These policy changes come at the expense of labor market protections, limiting workers' ability to negotiate higher wages, which, in turn, encourages labor demand. However, the factor-accumulation effect turns negative due to the large capital stock available from the Boomers' earlier savings. Consequently, the factor-accumulation effect offsets the positive impact of the reversed policy-mechanism effect on the labor share.

Schmidt and Vosen (2013) focus solely on the factor-accumulation mechanism, showing that this mechanism disappears in a small open economy because capital per worker and the wage rate are independent of domestic savings, with labor share dynamics reflecting only changes in net foreign assets. A key advantage of my approach is that the policy mechanism remains relevant in a small open economy. With capital mobility, Pica (2010) argues that competition among countries to attract capital results in reduced labor market regulation and a lower labor share. However, Pica's model employs a Cobb-Douglas production function, which does not capture the shift away from labor toward capital that the CES production function in my model allows. In terms of the labor share, the effect of capital market integration through labor market deregulation in an open economy is analogous to firms substituting labor with capital in a closed economy to prevent workers from capturing additional rents.

3.5 Age-Related Conflict: Who Are the Winners ?

The results indicate that the labor share declines due to the large size of the Boomer cohort in both France and the United States. Initially, when Boomers are young, they influence labor market institutions in their favor, raising wages but prompting firms to shift from labor toward capital. Later, as they age, their substantial savings increase the available capital in the economy, encouraging firms to further substitute labor with capital. Although it may seem evident that Boomers benefit from the age-related conflict in their old age, the results raise the question of whether they were disadvantaged when they were young, as the labor share declined significantly during this period.

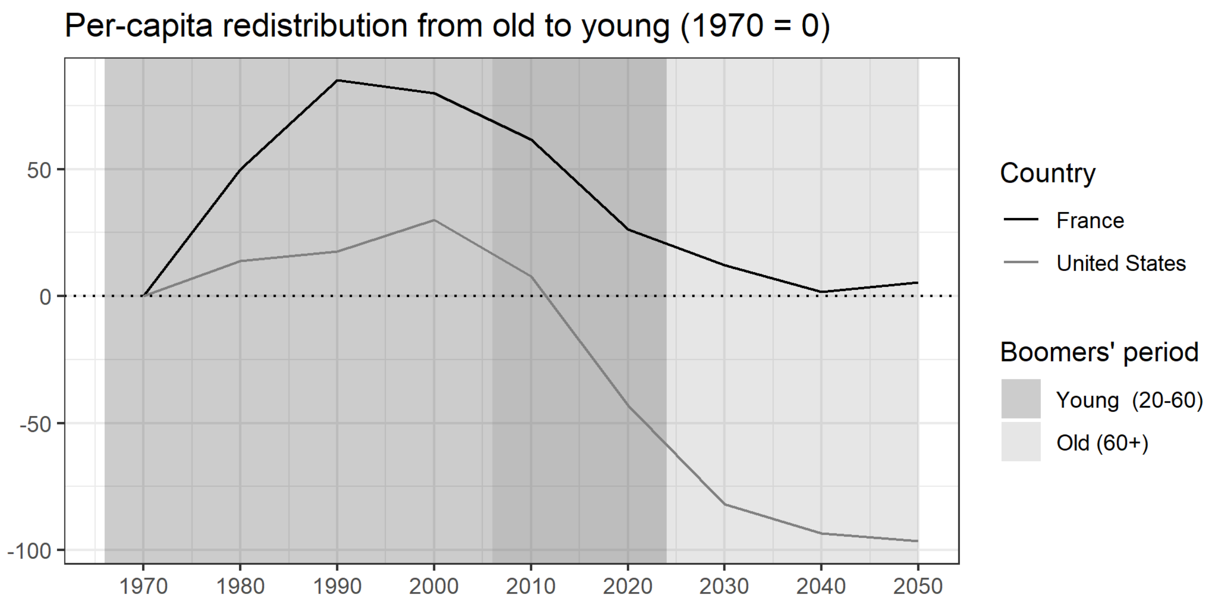
Despite its prominence in policy discussions, the labor share is a broad measure of income distribution that does not account for redistribution effects. The net income ratio between young and old is a more appropriate measure to determine the beneficiaries of the age-related conflict.[14]

Let T represent the per-capita redistribution from old to young, defined as the product of the old-age dependency ratio, p_t/n_t, and the difference between the after-tax and before-tax young-to-old income ratios, $Y_t^y/Y_t^o - \Theta_t$. Using Equation (16), I have

$$T_t \equiv \frac{p_t}{n_t}\left(\frac{Y_t^y}{Y_t^o} - \Theta_t\right) = \frac{p_t}{n_t}\left(\eta_t - \Theta_t\right).$$

[14] I do not use lifetime utility comparisons between generations to assess the winners. The shape of the utility function depends on the generation's entry date, as the effective discount factor αp_{t+1} varies with life expectancy across generations. Because each generation has a different baseline, direct utility comparisons are less meaningful.

Figure 10: Per-capita Redistribution Dynamics



Notes: The figure displays the per-capita redistribution from old to young for France and the United States, in percentage deviation from its 1970 level. Black and grey lines represent France and the United States, respectively. The dotted line represents the 0-degree reference line, and rectangles indicate periods when the Boomers are young and old, with an overlap as they start retiring. Data are from the model's benchmark simulation.

Thus, changes in per-capita redistribution reflect shifts in the old-age dependency ratio, p_t/n_t, and in aggregate redistribution, $\eta_t - \Theta_t$.

Figure 10 shows the per-capita redistribution from old to young, expressed as a percentage deviation from its 1970 value. As the Boomers enter the labor market in 1970, they earn labor income until they begin retiring around 2010. During this period, the labor share declines while per-capita redistribution from old to young increases in both countries. Young Boomers emerge as the winners of the age-related conflict during this time, as they compensate for labor income losses by increasing redistribution due to their political influence. Once they retire and primarily earn capital income, the labor share stabilizes, while per-capita redistribution sharply declines. Thus, Boomers also benefit from the age-related conflict in their old age, as the level of redistribution from old to young decreases. In the United States, redistribution from old to young approaches zero as the economy reaches full employment, reducing the need for unemployment benefits. Note that age is the only source of heterogeneity considered here; additional dimensions, such as human capital, could introduce winners and losers within each cohort.

4 Conclusion

A substantial body of literature emphasizes the role of biased technical change and institutional factors in explaining the shift from labor toward capital, which has contributed to the decline in the labor share observed in several countries over recent decades. This paper, however, examines the upstream determinants of these changes, highlighting demography as a force that shapes labor market institutions and, consequently, the allocation of factor incomes. These institutions establish the framework for wage bargaining between firms and workers. When a specific generation, such as the Boomers, is able to influence institutions in its favor, these rules adjust, affecting the distribution of income between capital and labor.

This mechanism reflects the indirect *policy-mechanism* effect of demographic shifts on the labor share, arising from intergenerational conflict in public policy decisions. Additionally, the population's age structure exerts a direct *factor-accumulation* effect through labor supply and capital stock changes. Together, these effects help clarify the role of the Boomer cohort in the decline of the labor share in France and the United States.

This paper demonstrates the importance of considering institution changes, endogenously determined by the population's age structure, in understanding long-run macroeconomic dynamics. By decomposing the direct factor-accumulation effect and the indirect policy-mechanism effect, I find that the latter is as significant as the former in explaining how demographic dynamics influence the labor share. Therefore, ignoring this indirect mechanism—or more broadly assuming that institutions remain fixed over the long term—leads to an underestimation of demography's role in factor income distribution. In this regard, my findings offer a new conceptual framework for future research on demographic dynamics and institutional change.

These results have significant implications for current policy debates. On one hand, many high-income countries are experiencing population aging, prompting discussions on optimal public policy. In this context, my findings highlight the impact of demographic changes on income allocation between capital and labor. On the other hand, developing countries undergoing substantial demographic shifts may soon see the emergence of a large generation, similar to the Boomer cohort, which could reshape their institutions and factor shares, with important consequences for their economic development.

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Appendices

A Probabilistic Voting

To determine their preferred public policy, households maximize their indirect utility function. Using the first-order conditions from the household maximization problem in Equations (1), (2) and (3), I obtain:

$$U_t^{y,i} = \ln\left[\frac{1}{1+\alpha p_{t+1}} y_t^i\right] + \alpha p_{t+1} U_{t+1}^{o,i}, \tag{20}$$

$$U_t^{o,i} = \ln\left[\frac{\alpha p_t}{1+\alpha p_t}(1-\tau_t) y_{t-1}^i \hat{R}_t\right] + \beta \ln g_t, \tag{21}$$

where $U_t^{y,i}$ is the indirect utility of a young household at time t in employment status $i \in \{e, u\}$ and $U_t^{o,i}$ is the indirect utility of an old household at time t who was in employment status i in the previous period. Thus, indirect utilities depend on the first-period disposable income, y_t^i, and, consequently, the employment status.[15]

The youth vote before their employment status is revealed and thus base their decision on expected utility, which is the weighted average of both indirect utilities: $\mathbb{E}(U_t^y) = (1-u_t)U_t^{y,e} + u_t U_t^{y,u}$. Therefore, the expected indirect utility of a young individual at time t is

$$\begin{aligned}\mathbb{E}(U_t^y) = (1+\alpha p_{t+1})\left\{(1-u_t)\ln\left[\frac{(1-\tau_t)w_t}{1+\alpha p_{t+1}}\right] + u_t \ln\left[\frac{b_t}{1+\alpha p_{t+1}}\right]\right\} \\ + \alpha p_{t+1}\left\{\ln\left[\alpha p_{t+1}(1-\tau_{t+1})\hat{R}_{t+1}\right] + \beta \ln g_{t+1}\right\},\end{aligned} \tag{22}$$

where $\mathbb{E}$ is the expectation operator. In contrast, the elderly have no uncertainty about the returns on their savings and therefore vote based on their realized indirect utility.

I consider a probabilistic voting setup.[16] In a probabilistic voting model, all agents vote for a policy platform $\psi_t = (\tau_t, b_t, g_t)$ represented by opportunistic candidates or parties. Candidates seek to maximize their probability of winning the election. They vary in popularity, and an idiosyncratic bias exists among voters toward one candidate or another, which candi-

[15] Implicitly, public policy preferences are functions of the economic environment experienced during youth. Consistent with literature on redistribution preferences, Giuliano and Spilimbergo (2013) show that individuals who grow up in recessions tend to favor redistribution; see also Alesina and Giuliano (2011) for a general review of this literature. However, in this model, such a link is neutralized by the logarithmic form of the utility function. For instance, the partial derivative of the old household's indirect utility with respect to either τ_t or g_t does not contain the previous period's disposable income y_{t-1}^i.

[16] An alternative would be a median voter setup. However, this approach would lead to two extreme regimes, with one potentially resembling a gerontocracy. It would also generate large policy swings if the median voter shifts from young to old or vice versa. By contrast, probabilistic voting produces an equilibrium policy platform that continuously adjusts with the old-age dependency ratio.

dates understand and account for. In equilibrium, all candidates converge to the same policy platform $\psi_t^\star$ that maximizes the political objective function $W_t(\psi_t)$ defined below. For more details on the probabilistic voting setup, see Lindbeck and Weibull (1987).

The political objective function depends on the share of each voter group in the population and their respective sensitivity to policy changes, denoted by ω^j with $j \in \{y, o\}$, where ω^j represents the density parameter of the uniform distribution function characterizing the ideology of group j. There are two groups of voters: young and old households. I assume all elderly voters have the same sensitivity to policy changes, regardless of their employment status when they were young. A larger ω^j indicates a wider ideological spread within group j; thus, opportunistic candidates prefer targeting less ideological groups (i.e., those with large ω^j) because they are easier to convince. The equilibrium public policy $\psi_t^\star$ maximizes the following political objective function:

$$W_t(\psi_t) = \frac{N_t^y}{N_t}\omega^y \mathbb{E}\left[U_t^y(\psi_t)\right] + \frac{N_t^o}{N_t}\omega^o \Big\{u_{t-1}U_t^{o,u}(\psi_t) + (1-u_{t-1})U_t^{o,e}(\psi_t)\Big\},$$

subject to the government budget constraint in Equation (11), where $\mathbb{E}\left[U_t^y(\psi_t)\right]$ and $U_t^{o,i}(\psi_t)$ are respectively defined by Equations (22) and (21), respectively.

There is no coordination between voting and wage bargaining. Therefore, households focus only on the direct effects of public policy on their utility and disregard indirect effects arising through unemployment, wages, and capital accumulation. Let $\tilde{U}_t^i$ represent the part of utility directly impacted by the public policy platform. From Equation (21), we have $\tilde{U}_t^o = \tilde{U}_t^{o,u} = \tilde{U}_t^{o,e}$.

Thus, I can rewrite the political objective function as

$$W_t(\psi_t) = \frac{N_t^y}{N_t}\omega^y \mathbb{E}\left[\tilde{U}_t^y(\psi_t)\right] + \frac{N_t^o}{N_t}\omega^o \tilde{U}_t^o(\psi_t) + \textit{other terms}$$

where *other terms* includes all components not directly influenced by public policy.

Let ω represent the *relative ideological spread* of the youth compared to the elderly. This spread is defined as the ratio of each group's sensitivity to policy changes, i.e., $\omega \equiv \omega^y/\omega^o$. I assume this spread remains constant over time.[17] Using Equations (21) and (22), I rewrite the

[17] This assumption can be interpreted in two ways: either both ideological spreads are time-invariant, or they vary proportionally. It would be interesting to explore endogenous spread variations or make them cohort-specific, but this is beyond the scope of this paper.

maximization program that characterizes the public policy equilibrium as

$$\max_{\tau_t, b_t, g_t} W_t(\tau_t, b_t, g_t) = \eta_t \left[(1-u_t)\ln(1-\tau_t) + u_t \ln b_t \right] + \ln(1-\tau_t) + \beta \ln(g_t)$$
$$+ \textit{ other terms}$$

subject to the government budget constraint from Equation (11), where

$$\eta_t = \frac{n_t}{p_t}\omega(1+\alpha p_{t+1})$$

is the *political weight of the young.*

B Methodology for Counterfactual Simulations

In this appendix, I provide details on the methodology used for the simulations and decompositions in Section 3.4. The benchmark simulation refers to the results obtained in Section 3.3. In the following, a variable with a prime symbol denotes the new value of that variable as used in the counterfactual simulation.

Factor-Accumulation Counterfactual Simulation. I neutralize the effect of factor accumulation by setting both the population growth rate and the survival rate to their 1970 levels, specifically, $n'_t = n_{1970}$ and $p'_t = p_{1970}$. The expected survival rate, p_{t+1}, of one generation equals the survival rate, p_t, once this generation reaches old age, which implies that $p'_{t+1} = p'_t = p_{1970}$.

Thus, the numbers of young and old households in the first period of each sequence (from 1970 to 2000) are recalculated to maintain consistency as follows:

$$N_t^{y\prime} = \frac{n'_t}{n_t} \times N_t^y \text{ and } N_t^{o\prime} = \frac{p'_t}{p_t} \times N_t^o,$$

This adjustment affects demographic dynamics, which are subsequently recalculated for the second and third periods of each sequence (from 2010 to 2080) as follows:

$$N_t^{y\prime} = n'_t N_{t-1}^{y\prime} \text{ and } N_t^{o\prime} = p_t N_{t-1}^{y\prime}.$$

The capital stock for the first period of each sequence (from 1970 to 2000) is recalculated as:

$$K'_t = \frac{1+\alpha p_t}{\alpha p_t} \frac{\alpha p'_t}{1+\alpha p'_t} K_t.$$

The initial capital stocks are recalculated because setting a constant survival rate implies changes in the saving rate, expressed as:

$$K_t \equiv S_{t-1} = \frac{\alpha p_t}{1+\alpha p_t} Y^y_{t-1},$$

where Y^y_{t-1} is the aggregate net income of young households. Thus, omitting the change in the saving rate would bias the interpretation of the effect of survival rate dynamics by neglecting the portion of the effect that operates through capital accumulation.

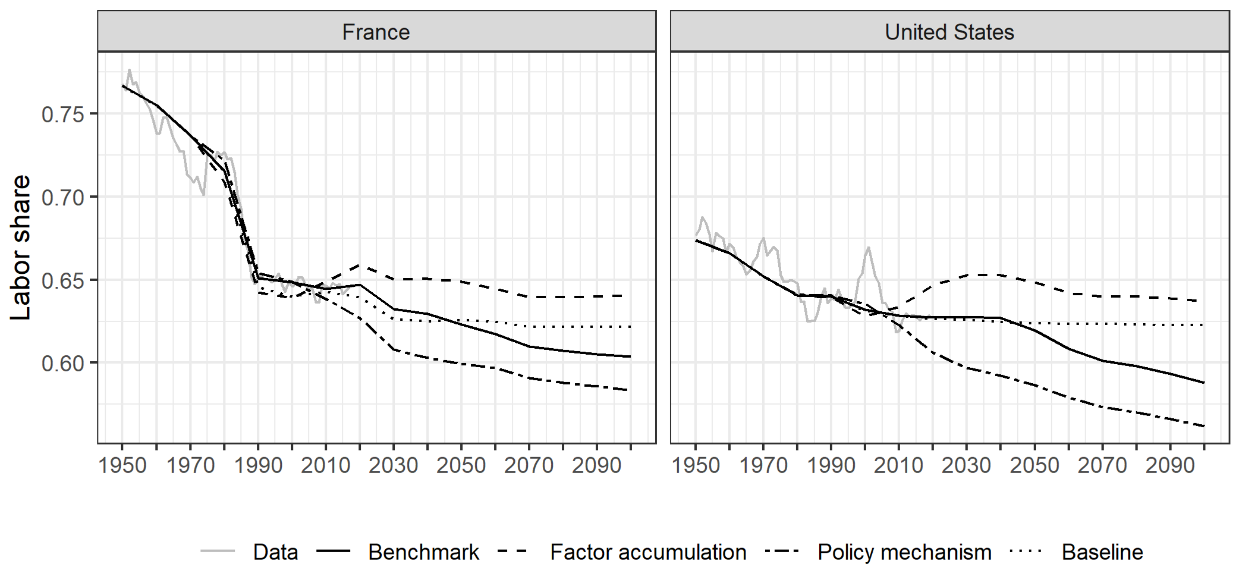
Policy-Mechanism Counterfactual Simulation. I neutralize the policy-mechanism effect by setting only the political weight of the young population to its 1970 level, specifically, $\eta'_t = \eta_{1970}$. All other demographic variables remain identical to those in the benchmark simulation.

Baseline Counterfactual Simulation. I neutralize both effects by setting $n'_t = n_{1970}$ and $p'_t = p'_{t+1} = p_{1970}$. This simulation combines the adjustments made in the two previous simulations. As in prior steps, the number of young and old households, along with the capital stock in the first period of each sequence (from 1970 to 2000), are recalculated. These adjustments affect the dynamics of young and old households, necessitating recalculations for the second and third periods of each sequence (from 2010 to 2080).

Throughout this simulation, the political weight of the young remains fixed at its 1970 level, specifically, $\eta'_t = \eta_{1970}$ for every year.

Factor Accumulation Versus Policy Mechanism. Figure B.1 shows the labor share resulting from the four counterfactual simulations discussed above. From this figure, I derive a decomposition of the channels of demographic changes, shown in Figure9.

Figure B.1: Counterfactual Simulations of the Channels of Demographic Changes.



Notes: This figure displays the counterfactual simulations of demographic change channels on the labor share. Labor share data are sourced from the Penn World Table 10.1 with self-employed income included as labor compensation. The benchmark labor share reflects the model's baseline predictions. The factor-accumulation simulation represents the labor share under the counterfactual scenario where the factor-accumulation channel is neutralized. The policy-mechanism simulation reflects the labor share under the counterfactual scenario where the policy-mechanism channel is neutralized. The baseline labor share corresponds to the predictions when both channels are neutralized.