Political Economy of Climate Change Adaptation*

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Abstract

We study the evolution of voter support for climate policy when preferences respond to rising climate risk and economic inequality. Households differ in age, income and beliefs, and vote on public intervention to protect households from climate shocks. Support for preventive policy is initially low, gradually rising as climate risk increases. Beliefs on climate risk converge over time, while beliefs on public effectiveness persist and lead to rising disagreement. The political choice of climate intervention jumps at a tipping point driven by rising climate damage, as long as political beliefs are not too far apart. Rising inequality may induce a second tipping point. Agents do not fully internalize the effect of loss of habitat, leading to higher house prices. The political conflict combines with the *"tragedy of the horizon"* to produce underinvestment under any coalition.

Keywords — Climate adaptation, inequality, tragedy of the horizon, political tipping points.

JEL codes — D63, H23, Q54, Q58.

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I. Introduction

Climate change leads to a gradual rise in global temperatures, destabilizing the weather system. Extreme weather events, such as severe storms, rising sea levels and desertification reduce habitatable land and the housing stock, and undermine living conditions. Following a period of rising awareness in recent years which led to a phase of public intervention, preferences have shifted markedly, leading to a policy stall on climate risk mitigation efforts as policy responses – which are often time-inconsistent – tend to face political backlash once their costs become visible Besley and Persson, 2023; Hsiao, 2023.

As the green transition picks up slowly, global warming is likely to continue in the coming decades. As sea levels rise and extreme weather events intensify in the near future, climate shocks grow larger, accelerating the loss of habitable land (Burzyński et al., 2019). Individuals and corporations will adapt to a changing climate, either through self-protective measures (e.g., Fried, 2022; Van der Straten, 2023) or by reallocating capital via financial markets (Kahn et al., 2024). Yet most climate damage is best contained by large-scale investments in public adaptation to limit the impact of global warming. Such a collective effort is fiscally costly, and depends on political support.

We study a context in which global warming and climate risk are expected to persist, and examine how political support for public damage control evolves over time. Our analysis takes place against a backdrop of rising economic inequality – an important driver of increasingly polarized views (Voorheis et al. 2015), especially with regard to climate policy preferences (Douenne and Fabre, 2022). Climate shocks damage the housing stock and lead to degradation of habitable land (e.g., through rising sea levels, desertification or ecological degradation Van der Straten (2023)). The economic impact is considerable: housing accounts for two-thirds of global wealth, and a tenth of the housing stock is already under climate threat.[1] Physical damage from extreme climate event or gradual climate change may be contained by protective infrastructure, so underinvestment leads to more loss of housing and habitat. On the other hand, public intervention requires support for its fiscal cost.

We consider a political environment in which households differ by age, income, and

[1]See, e.g., "Homeowners face a $25trn bill from climate change" in The Economist, (April 11, 2024).

beliefs – three key predictors of voter support for climate policies (Dechezleprêtre et al., 2022).[2]

We study how majority coalitions around climate policy evolve over time in an overlapping generation context where climate risk and inequality steadily rise.[3] Households derive utility from consumption and their own housing. They also partially internalise habitat conditions for their children in the near future.[4] In each period, households vote for the coalition favoring the adaptation rate closest to their preference. In the basic model households vote before they know their future income (thus under a Rawlsian veil of ignorance), though they are aware of rising inequality.

There are two possible notions of diverging beliefs. We first consider different priors on actual climate risk, a debate most evident over several decades (see e.g., Murfin and Spiegel, 2020; Baldauf et al., 2020; Bakkensen and Barrage, 2021). Learning from the experience of climate events should, in principle, resolve political conflict over time. For such conflict to persist, there must be some fundamental difference in opinion or ideology among voters. We therefore consider political beliefs over public policy effectiveness.[5] While the updating of climate change beliefs lead to convergence in preferences over time, with rising agreement on public policy, voter preference do not converge under political beliefs.

Our aim is to better understand how political coalitions respond over time to a rising climate threat. We focus on the realistic case in which the old cohort is more numerous or politically active than the young cohort, and skeptic voters constitute a majority in any age or income cohort. Feasible political majorities can be formed by a coalition of the older cohort leading to low public investment, a more proactive coalition of old and young skeptics moderately supportive of an active policy, or a most proactive coalition of young skeptics and old realists.

We show that when political beliefs are more polarized, age differences matters less.

[2]Dechezleprêtre et al. (2022) explore international attitudes toward climate policies. Their results indicate that support for an active climate policy is influenced by its perceived effectiveness in reducing emissions, redistributive effects on lower-income households, and direct impact on people's own households.

[3]Our model builds on the redistributive growth framework outlined in Döttling and Perotti (2017) to capture the effect of long term trends.

[4]This implies caring for 'the world we leave for our children', as opposed to caring for the long term climate on the planet.

[5]Survey evidence suggests that skepticism often centers not on the existence of global warming, but on the perceived effectiveness of climate measures (Douenne and Fabre, 2022).

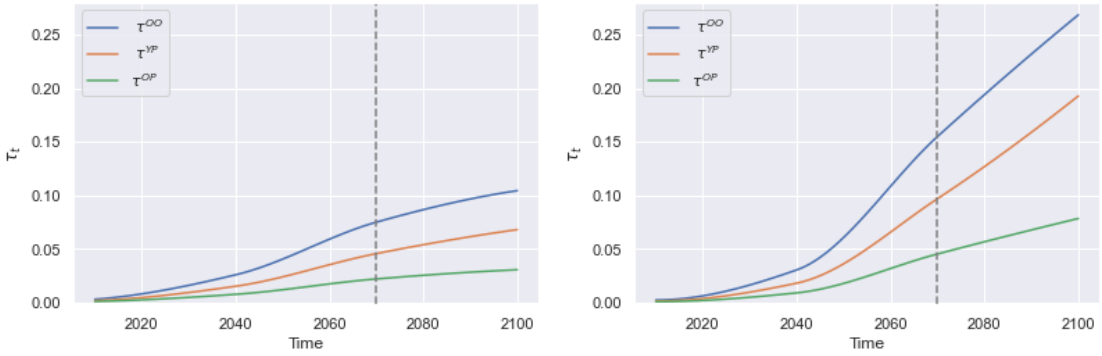


FIGURE 1: **Evolution of the political equilibrium**

Key: The time paths of the adaptation rate preferred by the old optimists (blue line), the young skeptics (orange line) and the old skeptics (green line) for different SSP$x-y$ scenarios. The dashed, vertical line indicates the point in time at wish the political equilibrium tips. The left panel shows the evolution of the bounds under the SSP1-2.6 scenario, in line with the aggregate Nationally Determined Contribution emission levels by 2030; the right panel shows the evolution of the bounds under the SSP3-7.0 scenario, a medium to high climate change scenario.

Thus young skeptics emerge as the pivotal group in the political equilibrium. Initially as climate risk is limited the skeptic young have a weaker motive to support public intervention. Consequently, the initial majority coalition consists of skeptics households of all ages who favour limited public policy. Less preventive policy leads to a faster loss of houses and habitat and increases house values. As climate risk rises, more support for public adaptation emerges among all groups of voters.[6] However, the change in support varies across subgroups and their coalitions. We show that rising climate risk induces a political equilibrium tipping point, as the policy preferences of the pivotal group (young skeptics) shifts faster than for their initial allies. Young households receive a larger benefit from adaptation; as climate risk rises, residual habitat gains value, encouraging more preventive measures. As a result their preferred adaptation rate gradually moves closer to the preferences of old optimists, as shown in Figure 1. Provided that polarization is not too extreme, the winning coalition shifts once climate damages and habitat loss become sufficiently large. The political equilibrium shift leads to a jump in public adaptation. This first result is intuitive: as climate risk and inequality rise, even political coalitions dominated by skeptics and older cohorts gradually support more climate adaptation.

The more active policy still falls short of the socially optimal value, however. We refer

[6]Cain et al. (2020) and Demski et al. (2017) show how flood experiences reduce polarization on climate priorities and increase support for adaptation; see also Rasmussen et al. (2021); MacInnis and Krosnick (2020).

to this difference as the *adaptation gap*. The gap is in part due to skepticism about policy efficacy that persists even when beliefs on climate risk have converged. The "tragedy of the horizon" effect adds another cause for underinvestment, as households care more about the present and near future habitat, and do not fully internalize benefits for future generations.

We subsequently study how economic status affects voting. Household get to know their income level over time, sharpening their preferences. A steady rise in inequality leads to more favor for adaptation among low-income old workers. Over time, this induces a second political tipping point, where low-income voters join the majority coalition. Their effect on public adaptation is ambiguous. When inequality rises gradually the shift leads to less public investment in adaptation, due to the inclusion of low-income, skeptic households in the majority coalition. This produces a backlash effect, where increasing vulnerability is met with reduced collective action. When inequality rises rapidly, its impact becomes dominant; in this case, the second tipping point triggers an increase in support for public adaptation. These results reflect that the evolution of economic inequality is critical to understand the evolution of climate policy.

The remainder of paper is structured as follows. We discuss the related literature in Section 2. In Section 3 we introduce the baseline framework. The conditions relevant for the definition of an equilibrium are derived in Section 4. In Section 5, we introduce the political economy framework and derive the political equilibrium. Section 6 provides a quantitative assessment of the evolution of the equilibrium over time. We derive the optimal policy in Section 7. We extend the model to allow for inequality in Section 8. Section 9 concludes.

II. Related Literature

The normative literature on climate policy studies mitigation policies such as optimal carbon pricing (e.g., Nordhaus, 2008; Golosov et al., 2014; Dietz and Stern, 2015). Our paper relates to work on adaptation to climate change (e.g., Lasage et al., 2014; Muis et al., 2015; Fried, 2022; Van der Straten, 2023), predominantly focused on private incentives to adapt to climate change. Fried (2022) studies investments in seawalls, stilts and other choices to cope with severe storms in the US. Fried (2022) studies damages from storms,

showing how idiosyncratic climate risk impacts adaptation and the welfare cost of climate change. Van der Straten (2023) studies how financial incentives shape private efforts to contain climate damage. While house values in frictionless markets fully price the effect of climate adaptation, Van der Straten (2023) shows that credit-constrained households cannot fully adapt, increasing the rate of habitat loss. The present paper focuses on the evolution of political support for tax funded adaptation aimed at protecting habitat.

Our paper relates to Hong et al. (2023), who analyze how the private and public sectors should adapt to manage disaster risks to the capital stock when they learn about the adverse consequences of global warming for disaster arrivals. Following Hong et al. (2023), who highlight that adaptation is more valuable under learning, political support for public adaptation rises in our framework as climate change becomes evident through the increasing frequency of extreme weather events.

Next to learning, we allow for differences in subjective perceptions on the severity of climate risks. As such, our results are related to recent studies on how learning about climate risk affect coastal housing markets (e.g., Murfin and Spiegel, 2020, Baldauf et al., 2020, Bakkensen and Barrage, 2021). Bakkensen and Barrage (2021) show that heterogeneity in beliefs reconciles the mixed evidence on whether flood risk is capitalized in house prices. They find significant under-estimation of flood risks and sorting based on flood risk beliefs and amenity values.[7]

Differences in climate change perceptions also affect the response of households to climate risks in housing markets.[8] Bakkensen et al. (2022) show that households who are pessimistic about climate risks take up higher and longer-term mortgages. Anticipating high risk of collateral damage, households value the option to default. Bernstein et al. (2022) show that beliefs about climate risk contribute to partisan sorting in housing markets. Voters with skeptics views on climate risk are less likely to change their sorting behavior in response to climate change - which indicates that these households may ultimately bear the burden of climate change. Our paper illustrates that these households further frustrate the political process. Therefore, skeptic voters may not only bear a larger burden themselves, but also increase the burden of climate change borne by society at

[7]In a related study, Ikefuji et al. (2022) use a hedonic pricing model to study how subjective perception of earthquake risks in five Japanese cities affect real estate prices in the short and long run.

[8]Zappalà (2024) shows that technology adoption levels are lower when farmers underestimate climate change.

large.

Our work also relates more broadly to the literature studying political economy considerations in a climate change context. Besley and Persson (2023) study the evolution of environmental values along with technology, showing a dynamic complementarity of technology and values that may either promote a green transition or create a vicious circle, leading to a so called "climate trap". Delfgaauw and Swank (2024) also develop a political-economy model of a climate trap. Bez et al. (2023) show that globalization, through the distributional consequences of import competition, reduces electoral support for green parties across the US and Western Europe, consistent with the deprioritization of environmental concerns under economic distress. Our analysis differs from these contributions as our focus reflects on the interplay between rising climate risk and rising inequality through skill-biased technological change, a well-document trend (Acemoglu and Autor, 2011). This calls for a dynamic political economy approach, distinguishing the (perceived) impact of climate change across polarized cohorts. Intuitively, more extreme weather events or sea-level rise raise support for adaptation, but may increase divergence across age and income cohorts. While the literature studying political economy considerations in a climate change context has abstracted from how such differential impacts affect the political outcome, our work highlights how the tension between inequality and beliefs significantly affects the political feasibility of climate policy.

Finally, as our approach is to solve for the political majority equilibrium by considering all possible coalitions of subgroups (old versus young, high and low income, optimists versus pessimists), our work is closely related to the early political economy literature on migration and pensions (see e.g., Razin and Sadka, 1999, 2000; Razin et al., 2002; Razin, 2021), which adopted a OLG framework to study political shifts in response to long term trends, adding climate risk to the classic focus on inequality.

III. Baseline Model

Time is discrete and is denoted by $t \in \{0, 1, ..., \infty\}$. The economy is characterized by two overlapping generations, where each new generation is infinitesimally smaller compared to the existing population. Thus the old generation dominates in terms of

number of voters.[9] Households earn heterogeneous income in both periods and use it for consumption of housing habitat and a numeraire good in abundant supply. Climate risk rises deterministically over time. At the start of each period, an extreme weather event hits a fraction of households and damages their housing capital, reducing habitat. Households differ in their initial perception on the severity of climate risks and learn over time. We later explore the possibility that households have persistent political beliefs on the merit of public intervention. The government can reduce climate risk exposure by investing in public adaptation (e.g., building of seawalls, dykes, or stilts; funding fire departments) financed by a flat-tax on labour income. Politicians propose an adaptation rate and compete for votes in each period's electoral competition. Households vote for the politician proposing the adaptation rate closest to their preferred amount.

A. Households

Households live for two periods and derive utility from consuming housing, and a non-durable consumption good. They also derive utility from the state of the environment inherited by the next generation. When young, households purchase housing capital, denoted by L, from the old generation at a price p. Once old, households channel the proceeds from selling the house, as well as the return earned on their savings to the purchase of a numeraire good, denoted by c. There is an initial generation at $t = 0$ endowed with the supply of houses, $\bar{L}_0$.

Preferences Households have convex preferences over housing and linear in consumption. We adopt the notion of intergenerational altruism (Barro, 1974), departing from personal bequest (dynastic) motives. In particular, we assume households care about the collective quality of the habitat left behind, rather than individual wealth transfers.[10] Specifically, utility is increasing in the aggregate housing stock available in the next period, $\bar{L}_{t+1}$, which reflects the availability of livable land for future generations.[11] Expected lifetime

[9]This assumption reflects life expectancy and demographics in many countries. The young generation size N^Y while is lower than the old generation's N^O, where $N^Y = \varepsilon N^O$ with ε close to, but not equal to 1.

[10]Housing serves both as a consumption good and as a legacy asset, reflecting an intergenerational motive. While the size of habitat determines the intergenerational wealth transfers, habitable land can be degraded due to climate risks. Public adaptation reduce climate risk exposure, preserving habitat.

[11]This specification captures a collective action problem, as each household individually undervalues the long-term benefits of adaptation. This is because the gains from preserving land accrue to all future

utility is given by:

$$U\left(L_{i,t}, c_{i,t+1}, X_t\right) = v\left(L_{i,t}\right) + c_{i,t+1} + f\left(\bar{L}_{t+1}\right), \tag{1}$$

where $v\left(L_{j,t}\right)$ is the utility derived from housing consumption in period t, with $v'(\cdot) > 0$ and $v''(\cdot) < 0$. $f\left(L_{i,t+1}\right)$ captures the utility of leaving behind habitable land to the next generation, with $f'(\cdot) > 0$ and $f'(\cdot) < 0$.

Income Households earn income in each period. A fraction $\phi \leq 0.5$ of households is of the high-income type, denoted by h, and the remaining fraction $1 - \phi$ is of the low-income type, denoted by l. High-income households earn $y_{h,t} = q$, and low-income households earn $y_{l,t} = w$, where $q > w$.

B. Climate Change

The economy is exposed to rising climate risk. The common probability of an extreme weather event affecting any household in period t is denoted by γ_t, which increases deterministically over time (cf. Van der Straten, 2023). By the law of large numbers, γ_t is the fraction of households whose house suffers climate-related damages in period t. Damages, denoted by $\xi_{i,t}$, are i.i.d. shocks distributed according to $F\left(\xi_{i,t}\right)$. We denote by μ the common fraction of losses to housing capital caused by an extreme weather event. We then have

$$\mathbb{E}_t\left(\xi_{i,t+1}\right) = \underbrace{\mathbb{E}_t\left(\xi_{i,t+1}\middle|\text{Hit by Extreme weather event}\right)}_{\mu} \cdot \underbrace{\mathbb{P}\left(\text{Hit by Extreme weather event}\right)}_{\gamma_{t+1}}. \tag{2}$$

The housing capital of household i after an extreme weather event is reduced to

$$L_{i,t+1} = \left(1 - \xi_{t+1}\right) L_{j,t}. \tag{3}$$

generations, and are therefore collectively shared, while households only internalize the effect on the next generation. This incomplete internalization gives rise to a "tragedy of the horizon" effect (Carney, 2015), in which myopic preferences and the public good nature of adaptation lead to underinvestment in protective measures that have distant benefits.

Physical climate events not only destroy part of the housing stock, but also permanently degrade its land.[12] Denote the supply of livable land (cf. Burzyński et al. (2019)) in a given period by $\bar{L}_t$. Consistent with the macroeconomic literature analyzing land and long-run economic - and house price growth, we assume that the supply of livable is fixed in the long run.[13] As a result of land degradation, the supply of habitable land therefore evolves dynamically over time and follows the law of motion:

$$\bar{L}_{t+1} = \int_0^1 (1 - \xi_{i,t+1})\, di L_t \tag{4}$$

$$\overset{\text{LLN}}{=} (1 - \mu\gamma_{t+1})\, \bar{L}_t. \tag{5}$$

Beliefs about Climate Change The empirical literature demonstrates that climate change beliefs influence the extent to which climate risk is priced in housing markets, sorting patterns, as well as the adaptive response to extreme weather events.[14] To capture the role of climate change beliefs in shaping housing market outcomes and adaptive responses, we assume that households differ in their perceptions of the likelihood of extreme weather events. Beliefs are orthogonal to income and reflect differences in risk perception or ideology. A fraction $\omega > 0$ of households consists of skeptics (s), who underestimate climate risk, while the remaining households are realists (r), who correctly perceive the probability of climate-related disasters. In the initial state of the economy, skeptics form the majority.

Let $\theta_{j,t}$ denote the belief of a household of type $j \in \{s, r\}$ at time t about the probability

[12] Land degradation occurs over a quarter of the Earth's ice-free land area and climate change accelerates the rate and scale of ongoing land degradation processes and generates new degradation patterns IPCC (2019).

[13] See for example Ricardo (1817), who shows that economic growth benefits landlords disproportionatly due to the fixed nature of land. Nichols (1970) includes land as fixed production factor in a Solow model to show that house prices grow at the same rate as output in the steady state. Also Hansen and Prescott (2002) build a one-good, two-sector overlapping generations (OLG) model land is in fixed supply. More recently, Grossmann et al. (2025) consider a two-good, two-sector infinitely-lived agent model in which the land development sector becomes inactive in the long run. Combined with differences in the intensity by which land is used in different sectors, the fixed nature of land explains the rise in real house prices in the long run as observed in the data. Finally, Saiz (2010) shows empirically that the fraction of undevelopable land is higher in areas where there are regulatory or geographical constraints. This is particularly true for coastal cities, such as Miami, San Francisco, and New Orleans.

[14] Murfin and Spiegel (2020); Baldauf et al. (2020); Bakkensen and Barrage (2021) show that climate change beliefs influences the pricing of physical climate risk in housing markets. Bernstein et al. (2019) shows that households "vote with their feet", with climate change deniers (believers) sorting in to neighborhoods which are (not) exposed to climate risks. Zappalà (2024) show that technology adoption levels are lower when farmers underestimate climate changes.

that an extreme weather event occurs. Realists assign the correct probability, $\theta_{r,t} = \bar{\theta} = 1$, in every period. Skeptics instead perceive the probability as $\theta_{s,t} = \underline{\theta} < 1$, and act as if an extreme event occurs with probability $\underline{\theta} \cdot \gamma$, where γ is the objective probability of the event. Skeptics' beliefs influences their expectation on the damages suffered due to an extreme weather event and therefore their preferences for adaptation. Specifically, the housing capital that remains in expectation after the extreme weather event for a skeptic household is given by

$$\mathbb{E}_{s,t}\left(L_{s,t+1}\right) = \left(1 - \underline{\theta} \cdot \mu\gamma_{t+1}\right) L_{s,t}. \tag{6}$$

While beliefs are initially fixed within a generation, they evolve across generations as climate impacts occur. This captures the idea that each cohort enters the economy with its own beliefs—shaped by experience and social context, and updates these in response to observed climate impacts. Following the standard learning models (cf. Hong et al., 2023), we allow for gradual belief revision between generations. Belief updating is triggered by the occurrence of extreme weather events. If such an event occurs in period t, a skeptic household adjusts its belief upwards for period $t+1$:

Definition 1. *When an extreme weather event occurs in period t, a type-j household updates its belief in period $t+1$ according to:*

$$\theta_{s,t+1} = \min\left\{\theta_{s,t} + \delta,\ 1\right\} \tag{7}$$

where $\delta > 0$ is a parameter capturing the responsiveness of belief updating. If no extreme event occurs, beliefs remain unchanged: $\theta_{s,t+1} = \theta_{s,t}$.

This reflects the idea that households learn from the experience of extreme weather events, but only do so gradually. While beliefs may shift toward realism over time, ideological differences persist for various generations.[15]

[15]While Hong et al. (2023) show that learning improves the adaptive response of the economy and mitigates welfare losses, other studies highlight that belief updating can be ideologically polarized. For instance, Djourelova et al. (2023) find that exposure to disasters increases climate concern among liberals but reduces it among conservatives, thereby widening the ideological divide.

C. *Public Policy Intervention*

Government intervention is called for to prevent a sharp fall in supply of habitat and to alleviate any underinvestment in private protection (cf. Van der Straten, 2023). There are various measures available for government intervention, such as public adaptation (e.g., the Deltawork in the Netherlands after the flood of 1953), subsidizing private adaptation, and bailing out households in case of large adverse shocks.[16] We focus on preventive measures and model public intervention as investments in public adaptation, which directly offers protection to all households in the economy.

Public Adaptation To protect households from idiosyncratic losses when an extreme weather event occurs, the government invests in public adaptation (e.g., building of seawalls or dykes). Since large-scale adaptation investments can take substantial time to realize, this is an intertemporal investment and the pay-off is only realized in the next period. Define $X_t \in [0, 1)$ as the public choice of protection or public adaptation. It represents the percentage by which households' idiosyncratic losses from climate shocks are prevented in period $t + 1$. For a given choice of public adaptation, the distribution of household losses $F(\xi_{i,t+1})$ is shifted to the left:

$$\mathbb{E}_t\left(\xi_{i,t+1}\right) = \left(1 - X_t\right)\mu\gamma_{t+1}. \tag{8}$$

Hence, public intervention reduces the losses of all households.[17] For each household, the expectation of the housing capital that remains preserved after the extreme weather event is then

$$L_{i,t+1} = \left(1 - \left(1 - X_t\right)\mu\gamma_{t+1}\right) L_{j,t}. \tag{9}$$

Since adaptation preserves housing capital and habitable land, it reduces the speed at which its supply shrinks. Then, the supply of houses evolves according to the following

[16]The first two policy measures are *preventive*. The third measure is a form of *corrective* action. Corrective action may not always be effective, however, as bailouts may trigger moral hazard. Another form of corrective action is the restoration of habitat. This may be more difficult than preventing its loss ex ante. We therefore assume that this is prohibitively costly.

[17]Note that adaptation does not increase the utility from consuming housing in the current period. Rather, adaptation increases household utility by raising the stock of undamaged housing capital which can be sold in the next period.

law of motion:

$$\bar{L}_{t+1} = \int_0^1 (1 - \xi_{i,t+1})\, di \cdot \bar{L}_t \tag{10}$$

$$\overset{\text{LLN}}{=} (1 - (1 - X_t)\, \mu\gamma_{t+1})\, \bar{L}_t. \tag{11}$$

Finance of Public Adaptation Investments in public adaptation come at a cost, $\psi(X_t) = \frac{1}{2}\bar{L}_t X_t^2$. These costs are proportional to the aggregate housing stock, $\bar{L}$, since larger areas require more extensive and resource-intensive infrastructure.[18] The investment costs rise at an accelerating rate in the choice of adaptation, indicating that even the most ambitious investments cannot entirely prevent climate-related losses and damages (Van der Straten, 2023).

We assume that public adaptation is financed with a flat labour income tax, τ_t, which we refer to as the adaptation rate. The tax burden is shared among young and old households, and taxes cannot be targeted at a social group.[19] The budget constraint for household i in each period t is

$$(1 - \tau_t)\, y \leq p_t L_{i,t} + S_{i,t}. \tag{12}$$

Political Process In each period, households vote over the level of public adaptation. Adaptation investments reduce expected climate-related damages in the following period. The electorate includes both young and old households, and the policy is implemented by an elected government. We assume a simple voting process: two politicians compete in a majoritarian election by proposing specific adaptation rates, and households cast their votes for one of the two politicians. The adaptation rate supported by the majority is implemented.

Because households live for two periods, both young and old generations participate in voting and contribute to financing public adaptation. While both generations pay taxes,

[18] For example, protecting a larger area involves constructing longer and potentially taller dykes, which increases the quantity of materials needed. This directly raises costs in proportion to the protected land area. Also, expanding the coverage of a dyke system involves addressing more varied geographical features, such as rivers, coastal regions, and floodplains. This brings forward engineering complexities, which scale with the size of the protected region.

[19] If neither spending nor taxes can be targeted to specific voter groups and politicians cannot appropriate tax revenues, policy preferences will become monotonic with respect to income. Specifically, as taxes are proportional to income, richer households will tend to prefer a smaller government, while poorer households will tend to favor a larger government (cf. Persson and Tabellini, 2002).

they benefit from adaptation in different ways. Young households benefit directly through reduced damages to their housing, which increases its future resale value. Old households benefit indirectly through their bequest motive, which becomes more relevant the stronger their altruistic preferences for the next generation.

A key determinant of voting preferences is belief heterogeneity. Households differ in their perception of climate risk, which directly affects how much households value adaptation. Let $X^*_{i,j,t}$ denote the individually preferred level of public adaptation by household $i \in \{Y, O\}$, with belief type $j \in \{r, s\}$ at time t. Each household votes for the policy closest to $X^*_{i,j,t}$, and the equilibrium policy X^*_t is determined by the majority preference. Over time, the beliefs of skeptics evolve endogenously, moving closer to those of realists as they update their perceptions based on observed climate impacts. This gradually shifts the majority coalition's policy support over time.

D. Housing Market Dynamics

The housing market opens after the extreme weather events takes place. Since destroyed housing capital has zero liquidation value, households with a mortgage risk default and pay the risky rate of return, $\hat{r} \geq r$, where the interest rate r is exogenous. Net savings of a household i in period t is defined as

$$S_{i,t} \equiv y_{i,t} - p_t L_{j,t}, \tag{13}$$

where $S_{i,t} \geq 0$ indicates that household i is a net lender and $S_{i,t} < 0$ implies it is a net borrower. Default occurs once losses become sufficiently large, i.e.,

$$p_{t+1} L_{i,t+1} \leq (1 + \hat{r})(-S_{i,t}). \tag{14}$$

The loan-to-value ratio is defined by

$$LTV_{i,t+1} \equiv \frac{(1 + \hat{r})(-S_{i,t})}{p_{t+1} L_{j,t}}. \tag{15}$$

This implicitly defines the threshold of losses above which a homeowner defaults by

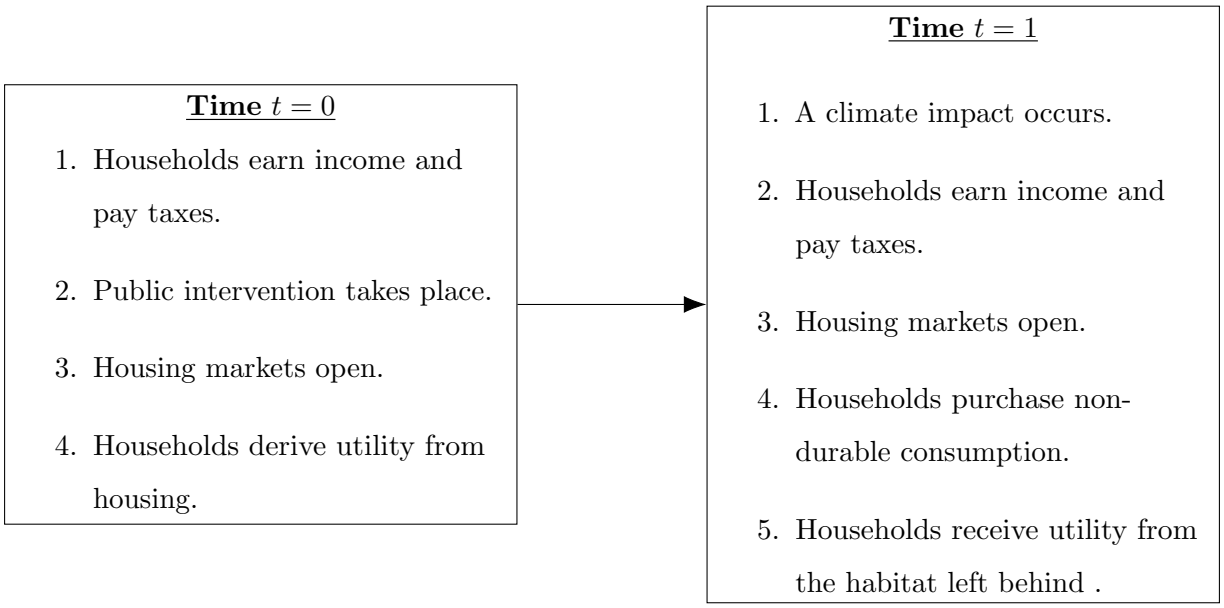
$$\hat{\xi}_{i,t+1} = 1 - LTV_{i,t+1}, \tag{16}$$

while the probability of default is

$$\chi_{i,t} = \left(1 - F\left(\hat{\xi}_{i,t+1}\right)\right). \tag{17}$$

E. Timing of Events

The timeline of each individual household in the baseline model is illustrated below:



where the household is young in period $t = 0$, and old in period $t = 1$.

IV. Equilibrium

Households maximize expected utility subject to their budget constraints, credit constraint and a limited liability constraint:

$$\max_{L_{i,j,t}, S_{i,j,t}, c_{i,j,t+1}} \mathbb{E}\left(U\left(L_{i,j,t}, c_{i,j,t+1}, X_t\right)\right) = v\left(L_{i,j,t}\right) + \mathbb{E}_{i,j,t}\left(c_{i,j,t+1}\right) + \mathbb{E}_{i,j,t}\left(f\left(\bar{L}_{t+1}\right)\right) \tag{18}$$

$$\begin{aligned} s.t. \quad & (1-\tau_t)\, y_{i,t} \leq p_t \cdot L_{i,j,t} + S_{i,j,t} \\ & c_{i,j,t+1} \leq (1-\tau_{t+1})\, y_i + \max\left\{p_{t+1}\left(1-\xi_{i,t+1}\right) L_{i,j,t} + \left(1+\hat{r}\right) S_{i,j,t}, 0\right\} \\ & L_{i,j,t}, c_{i,j,t+1} \geq 0, \end{aligned}$$

where $c_{i,jt+1}$ denotes the consumption of household i, j in period $t+1$.

A. *Demand for Housing Capital*

Due to the quasi-linearity of preferences, housing demand is independent of a households' income. Households' perception on the severity of climate risk does affect housing demand, however. Since skeptics expect a larger fraction of their housing capital to remain undamaged after the climate impact - and therefore to have a positive liquidation value - they have a higher demand for housing.

Lemma 1. *Demand for housing in period t equals*

$$L^*_{j,t} = L^*_{i,t} = v'^{-1}\left((1+r)p_t - \left(1 - \mu\left(1 - X_t\right) \cdot \theta_{j,t} \cdot \gamma_{t+1}\right) \cdot p_{t+1}\right). \tag{19}$$

This implicitly defines the price of housing capital in period t, which equals

$$p_t = \frac{\left(1 - \mu\left(1 - X_t\right) \cdot \theta_{j,t} \cdot \gamma_{t+1}\right) \cdot p_{t+1} + v'(L^*_t)}{(1+r)}. \tag{20}$$

Demand for housing determines house price . The price today reflects the discounted value of the total benefits from owning housing. These include the utility households derive from consuming housing in the current period, captured by $v'\left(L^*_t\right)$, and the expected revenue from selling undamaged housing capital at the start of the next period. Specifically, the expected benefit from the next period equals the future price p_{t+1}, which is discounted for the expected fraction of housing that becomes damaged, which depends on the beliefs of the marginal buyer θ_j, the objective risk exposure γ_{t+1}, and the level of public adaptation X_t.

B. *Demand for Household Debt*

Household debt follows residually. Households with net savings lend to others households while households with negative savings take out a mortgage.

C. *Equilibrium and Market Clearing*

A competitive equilibrium is an allocation $\{c_{t+1}, L_t, S_t\}_{t=0}^T$ and prices $\{p_t, \tau_t\}_{t=0}^T$, so that in each period, t, given prices, households maximize lifetime utility and all markets clear.

Housing market Total housing demand equals total housing supply, so that

$$\int_0^{\omega} L_{s,t}^* ds + \int_{\omega}^1 L_{r,t}^* dr = \bar{L}_t. \tag{21}$$

Using Lemma 1, a housing market equilibrium requires

$$\bar{L}_t = \left(1 - \left(1 - X_{t-1}\right) \mu \gamma_t\right) \bar{L}_{t-1}. \tag{22}$$

Financial market Aggregate after-tax income of young households must in equilibrium equal aggregate investment in housing. Hence,

$$\left(1 - \tau_t\right) \cdot \int_0^1 y_{i,t}^Y di = p_t\left(\theta_j, X_t\right) \bar{L}_t, \tag{23}$$

where aggregate gross labour income of the young is

$$\int_0^1 y_{i,t}^Y di = \phi q + \left(1 - \phi\right) w. \tag{24}$$

Government budget balance Government tax revenues must equal the convex costs of public adaptation,

$$\tau_t \cdot \left(\int_0^1 y_{i,t}^Y di + \int_0^1 y_{i,t}^O di\right) = \frac{1}{2} X_t^2 \bar{L}_t, \tag{25}$$

where aggregate gross income of the old is the same as that of the young.

$$\int_0^1 y_{i,t}^O di = \int_0^1 y_{i,t}^Y di = \phi q + \left(1 - \phi\right) w. \tag{26}$$

C.1 Housing Market Clearing Condition

The housing market clearing condition pins down the equilibrium price of housing capital:

$$p_t^* = \frac{\left(1 - \mu\left(1 - X_t^*\right) \int_0^1 \theta_{j,t} dj \cdot \gamma_{t+1}\right) \cdot p_{t+1} + v'(\bar{L}_t)}{1 + r}. \tag{27}$$

Over time, two dynamics shape the evolution of house prices in the presence of climate risk. First, climate damages reduce the supply of habitat. Since households are risk-averse with respect to housing consumption, the reduction in supply increases the marginal

utility of housing and thereby households' willingness to pay for housing. This raises the contemporaneous price of housing – a mechanism similar to that in Van der Straten (2023).

Moreover, belief heterogeneity feeds into prices through aggregation. As households endogenously revise their beliefs about climate change, they increasingly internalize the impact of climate-related damages on the resale value of housing. The imperfect internalization of climate risk puts upwards pressure on prices by weakening the effect of the exposure of housing to future damages. Crucially, the larger the dispersion in climate risk perceptions, the more muted the risk-exposure effect (i.e., the sea-level rise discount effect; see e.g., Baldauf et al. (2020); Bernstein et al. (2019); Bakkensen and Barrage (2021)) becomes. This hinders the capitalization of climate risk and can lead to rising house prices under weaker conditions than in the rational agent case.[20]

*C.*2 Financial Market Clearing

If labour income is insufficient to cover the purchase of a house, some agents need to borrow. Because at least one type of workers must have positive savings (cf. Döttling and Perotti, 2017), the volume of mortgage credit in the economy, m, is

$$m_t = \max\left\{0, \int_0^{(1-\phi)} L_{i,t} di \cdot p_t - (1-\tau_t)\, w\right\}. \tag{28}$$

If households are sufficiently risk averse with respect to their housing consumption, public adaptation limits the upwards effect that climate change has on house prices. On the other hand, taxation reduces disposable income, which increases mortgage credit demand.

V. Political Economy

Public adaptation is the outcome of electoral competition in which young and old households vote. Specifically, two politicians compete in a majoritarian election by proposing specific public adaptation levels, and households cast their votes for one of the two

[20]We derive the equilibrium condition under which the supply effect dominates in Appendix A1. Compared to Van der Straten (2023), this condition is less restrictive because of the belief heterogeneity. As some households underestimate their true exposure to climate risk, the downward pressure on prices from perceived exposure is weakened, while the upward pressure from the supply reduction remains unchanged due to market clearing. As a result, house prices may rise with climate risk for values of relative risk aversion (RRA) below one.

politicians. Households are heterogeneous in terms of their income and their beliefs about climate change, and vote for the politician which proposes a adaptation rate closest to their preferred policy. We first consider the case in which households vote under a Rawlsian veil of ignorance, hence before income-types are revealed ($t = 0$) and before the impact of the climate shock ($t = 1$). This allows us to first isolate the effects of belief dispersion on the political equilibrium. In an extension, we consider the case in which households get to know their income-type over time as they vote.

A. Preferred Adaptation Rates

When households vote under a Rawlsian veil of ignorance, they are not yet aware of their income type. This creates four distinct groups in society, with preferences for adaptation shaped by both age and climate change beliefs. Household prefer an adaptation rate that maximizes their expected lifetime utility.

Lemma 2. *The preferred adaptation rate of a young household i with beliefs θ_j is*

$$\tau_t^{Yij*} = \frac{1}{\bar{L}_t} \cdot [\phi q + (1-\phi)\, w] \cdot \left(\frac{\tilde{\theta}_{j.t} \cdot \mu \gamma_{t+1} \cdot (p_{t+1} + \pi_{j,t})}{(1+r) y_{i,t}} \right)^2, \tag{29}$$

and the preferred adaptation rate of a old household i with beliefs θ_j is

$$\tau_t^{Oij*} = \frac{1}{\bar{L}_t} \cdot [\phi q + (1-\phi)\, w] \cdot \left(\frac{\tilde{\theta}_{j.t} \cdot \mu \gamma_{t+1} \cdot \pi_{j,t}}{y_{i,t}} \right)^2, \tag{30}$$

where we define

$$\pi_{j,t} \equiv f(\mathbb{E}_{j,t}(\cdot))/\partial\, \mathbb{E}_{j,t}(\cdot) \tag{31}$$

$y_{i,t} = \phi q + (1-\phi)\, w$*, since households vote under a Rawlsian veil of ignorance with respect to their income type, and where we denote by $\tilde{\theta}_{j,t}$ the belief-weighted exposure of household type j.*

Proof: See Appendix A2.B.

The preferred adaptation rate of households in both age groups increases as climate risk (γ_{t+1}) intensifies and the supply of habitable land ($\bar{L}_t$) diminishes. These factors increase

the need for protective measure and, consequently, raise the support for public adaptation. Additionally, households with stronger perceptions on the severity of climate change ($\tilde{\theta}_{j.t}$) favor higher adaptation rates, as they view public adaptation as more critical in addressing rising climate risks, indicating that $\tau^{Yir*} > \tau^{Yis*}$ and $\tau^{Oir*} > \tau^{Ois*}$. Similarly, the preferred adaptation rate rises with the marginal utility of leaving behind habitat ($\partial f(\cdot)/\partial(\cdot)$), as households place greater value on the benefits of public adaptation for the welfare of the future generation. Conversely, the preferred adaptation rate decreases with individual income levels, as the tax burden is proportional to income. However, it increases with higher aggregate labor income ($\phi q + (1-\phi)\, w$), reflecting society's greater capacity to shoulder the tax burden. Finally, and distinctively, the young's preferred adaptation rate increases with the house prices (p_{t+1}), which reflects the value of housing which is potentially lost upon a climate impact. Becomes of the intertemporal nature of the investment, adaptation reduces only the risk exposure of young households, who become the homeowners. This indicates that the old have relatively less to gain from public adaptation. Hence, the adaptation preferred by the old is less than that of the young, i.e., $\tau^{Yij*} > \tau^{Oij*}$.

B. Feasible Coalitions

To win an election, politicians must secure a majority of votes. Lemma 2 shows that households' preferred adaptation rate varies based on their age and their beliefs about climate change. Since no single group is large enough to constitute a majority, voters must form coalitions to ensure the implementation of their preferred policy. The initial set of potential coalitions include: (i) all young households, (ii) young and old realists, (iii) all old households, (iv) young and old skeptics, (v) young realists and old skeptics, and (vi) young skeptics and old realists. Our modeling assumptions identify a realistic subset of these coalitions. Specifically, coalitions (i) and (ii) are too small to form a majority and influence the political equilibrium. Moreover, Lemma 2 implies that coalition (v) is too ideologically dispersed.

We focus on majority coalitions which are both internally and externally stable. That is, no member prefers to leave and form an alternative coalition, and no party outside the coalition can join and improve outcomes for all members. We assume that coalitions

choose an adaptation rate that maximizes their joint utility, subject to their budget constraints.

Lemma 3. *If there are fewer young than old households and skeptics constitute a majority ($\omega > 0.5$), then the set of feasible coalitions is either (i) a coalition of young skeptics and old realists with preferred adaptation rate,*

$$\tau_t^{Ys,Or*} = A \cdot \left(\frac{\omega \tilde{\theta}_{s,t} p_{t+1} + \left(\omega \cdot \tilde{\theta}_{s,t} + (1-\omega) \cdot \tilde{\theta}_{r,t} \right) \cdot \pi_{s,r,t}}{(1+\omega r)} \right)^2, \tag{32}$$

or (ii) a coalition of young and old skeptics with preferred adaptation rate,

$$\tau_t^{Ys,Os*} = A \cdot \left(\frac{\tilde{\theta}_{s,t} \left(\frac{1}{2} p_{t+1} + \pi_{s,t} \right)}{\left(1 + \frac{1}{2} r \right)} \right)^2, \tag{33}$$

or (iii) a coalition of the old with preferred adaptation rate,

$$\tau_t^{Or,Os*} = A \cdot \left(\left(\omega \cdot \tilde{\theta}_{s,t} + (1-\omega) \cdot \tilde{\theta}_{r,t} \right) \cdot \pi_{r,s,t} \right)^2. \tag{34}$$

Common terms in the adaptation rates are defined by

$$A \equiv A\left(\bar{L}_t, \gamma_{t+1} \right) = \frac{(\mu \gamma_{t+1})^2}{\bar{L}_t} \cdot \frac{1}{[\phi q + (1-\phi) w]}. \tag{35}$$

Proof: See Appendix A2.B.

The adaptation rate proposed by each coalition increases with intensifying climate risk (γ_{t+1}), diminishing habitable land supply ($\bar{L}_t$), rising aggregate labor income ($\phi q + (1-\phi)w$), higher future house prices (p_{t+1}), and in the marginal utility of leaving behind livable land ($\partial f(\cdot)/\partial(\cdot)$). These factors collectively reflect the increasing need to adapt as climate risks rise. The proposed adaptation rates also rise in the belief-weighted climate exposure ($\tilde{\theta}_{j,t}$), highlighting the role of beliefs in shaping political outcomes. Moreover, the adaptation rates proposed by a coalition of old realists and young skeptics, as well as by a coalition of old realists and skeptics, increase with the share of realists, $1-\omega$.

The political equilibrium hinges on two key factors: (i) whether young skeptics choose to form a coalition with old skeptics or old realists, and (ii) whether old skeptics prefer to align with young skeptics or old realists.

Lemma 4. *Define by* $\tilde{\Theta} \equiv \tilde{\theta}_{r,t}/\tilde{\theta}_{s,t}$ *the dispersion in beliefs between skeptics and realists. If it holds that*

Assumption 1. $\tilde{\Theta} > \frac{p_{t+1}+\pi_{s,t}}{\pi_{r,t}\cdot(1+r)}$.

then, the preferred adaptation rates satisfy

$$\tau_t^{YO*} > \tau_t^{Or*} > \tau_t^{Or,Ys*} > \tau_t^{Ys*} > \tau_t^{Or,Os*} > \tau_t^{Ys,Os*} > \tau_t^{Os*}. \tag{36}$$

Under Assumption 1, old realists prefer to form a coalition with young skeptics rather than old skeptics. Conversely, if Assumption 1 does not hold, old households form the majority coalition, and the prevailing adaptation rate is:

$$\tau_t^{Or,Os*} = A \cdot \left(\left(\omega \cdot \tilde{\theta}_{s,t} + (1-\omega) \cdot \tilde{\theta}_{r,t}\right) \cdot \pi_{r,s,t}\right)^2. \tag{37}$$

The ordering of preferred adaptation rates in Lemma 4 reflects the interplay of age and climate change beliefs in shaping political dynamics. Young realists propose the highest adaptation rate, as they face the longest horizon to experience the benefits of reduced climate risks, and also have an accurate perception of climate risks. Old skeptics, by contrast, propose the lowest rate, as their short remaining time horizon reduces the perceived benefits of adaptation, and they underestimate the risks the economy is exposed to.

For old realists to prefer a higher adaptation rate than young skeptics ($\tau^{Or*} > \tau^{Ys*}$), belief dispersion must be sufficiently large. On the one hand, young skeptics gain directly from public adaptation through reduced damages to the housing they own, making them inclined to support a more involved public adaptation policy. However, they underestimate climate risks. Old realists, in contrast, have an accurate perception of climate risks. Yet, only if the dispersion in beliefs is sufficiently large, this effect will dominate. Assumption 1 provides a sufficient condition for this to hold, as under this assumption the adaptation rates satisfy $\tau_t^{Or*} > \tau_t^{Or,Ys*} > \tau_t^{Or,Os*}$. Given that utility of old realists is concave in the adaptation rate and rises for $\tau_t \leq \tau_t^{Or*}$, forming a coalition with young skeptics provides higher utility to old realists than forming a coalition with old skeptics. The strict ranking of preferences ensures that this equilibrium is unique, and both internally and externally stable. As climate risk intensifies over time, Assumption 1 becomes increasingly harder to

satisfy, as rising climate risk leads to habitat loss, which in turn drives up house prices. This raises the economic stakes for young skeptics, who benefit from public adaptation as it reduces expected damages to their increasingly valuable housing capital.

C. Political Tipping

The young skeptics are the pivotal group in shaping political outcomes under Assumption 1, with their preferences influencing coalition formation and thereby the public adaptation policy chosen. The equilibrium thus hinges on whether young skeptics prefer to form a coalition with old realists or old skeptics.

Proposition 1. *Let there be less young than old, skeptics then represent a majority ($\omega > 0.5$), Assumption 1 is satisfied and $v(L_{j,t}) = ln(L_{j,t})$. Then, if*

$$\tilde{\Theta} < \left(\frac{1}{\pi_{r,s,t}} \left(\frac{1+\omega r}{(1-\omega)} \cdot \sqrt{\left(\frac{B}{\tilde{\theta}_{s,t}^2} + \frac{1}{\left(1+\frac{1}{2}r\right)^2} \cdot \left(\frac{1}{2} p_{t+1} + \pi \right)^2 \right)} - p_{t+1} \right) - 1 \right) \tag{38}$$

the political economy equilibrium is then characterized by a coalition of young skeptics and old realists. The adaptation rate proposed by this coalition equals

$$\tau_t^{Ys,Or*} = A \cdot \left(\frac{\omega \cdot \tilde{\theta}_{s,t} \cdot p_{t+1} + \pi_{r,s,t} \cdot \left(\omega \cdot \tilde{\theta}_{s,t} + (1-\omega) \cdot \tilde{\theta}_{r,t} \right)}{(1+\omega \cdot r)} \right)^2 . \tag{39}$$

If condition (38) on the dispersion of beliefs is not satisfied, the political economy equilibrium is characterized by a coalition of young and old skeptics with adaptation rate

$$\tau_t^{Ys,Os*} = A \cdot \left(\frac{\tilde{\theta}_{s,t} \left(\frac{1}{2} p_{t+1} + \pi_{s,t} \right)}{\left(1+\frac{1}{2}r\right)} \right)^2 . \tag{40}$$

Proof: See Appendix A1.B.

Proposition 1 highlights that at low levels of climate risk, young skeptics prefer to form a coalition with old skeptics. This is driven by their shared perceptions about the severity of climate change, creating ideological alignment, even as economic incentives between young and old differ. However, as climate risk intensifies, the economic incentives of these groups diverge. Habitat loss resulting from climate change increases house prices, which raises the preferred adaptation rate of young relative to that of old. While rising climate risk raises the preference for public adaptation across all households, the preferred

rate of young rises more rapidly. This is because the economic value of public adaptation in protecting housing assets increases. Hence, public adaptation becomes more significant for young skeptics over time.

If beliefs are not too dispersed, the political equilibrium evolves over time. While initially dominated by a coalition of all young and old skeptics, the equilibrium may shift toward a coalition of young skeptics and old realists. The increasing alignment between these groups in response to rising climate risk may bring forward "political tipping". The coalition of young skeptics and old realists supports a higher adaptation rate, therefore bringing forward a discrete jump in the intensity of public adaptation policies. This reflects young skeptics' growing interest in addressing their rising economic stakes from climate change.

The young skeptics emerge as the pivotal group only when beliefs about climate change are sufficiently dispersed (as outlined in Assumption 1). However, for political tipping to occur — and thus to shift to a more intensive public adaptation policy — beliefs must not be too dispersed. When belief dispersion is moderate, young skeptics' economic interests align with the ideological interests of the old realists, making a coalition with them increasingly relevant. Conversely, if beliefs are too polarized, the ideological gap between skeptics and realists outweighs the increased economic value of adaptation for the young skeptics. In that case, the young skeptics continue to prefer a coalition with the old skeptics, despite their increasingly divergent economic interests.

D. Fundamental Differences of Opinions

While habitat loss brings forward the possibility of political tipping, the occurrence of extreme weather events allows households to update their beliefs about climate risk exposure. Therefore, the political conflict resolves as $t \to \infty$, even for low speeds of of learning (δ), given that beliefs converge over time. Yet empirically, we do not observe such convergence or a consistent increase in climate action, even as extreme weather events become more frequent and severe.

This suggests that persistent political disagreement may not be due to differences in perceived exposure to climate risk, but rather to ideological or institutional factors. To reflect this, we assume that households hold different beliefs about what should be done

about rising climate risk or the effectiveness of public adaptation, rather than its necessity. Specifically, let $\vartheta_j \in \{\underline{\vartheta}; \bar{\vartheta}\}, j \in \{r, s\} \leq 1$ denote the subjective belief of a household of type j about the effectiveness of public adaptation. We continue to refer to households with $\underline{\vartheta} > 0$ as skeptics, and those with $\bar{\vartheta} > \underline{\vartheta}$ as realists. In this case, beliefs of households, ϑ_j, are independent of households' perception of their climate risk exposure. Instead, they reflect ideological views or the (perceived) quality of public institutions.[21]

Introducing belief heterogeneity in the effectiveness of adaptation preserves the core structure of the analysis: the first-order conditions for the preferred adaptation rate remain unchanged compared to the case when households had different beliefs about climate change. However, this modification alters the dynamics of the model. It allows political disagreement to persist even in the long run, since convergence in perceived climate risk does not imply convergence in political trust or institutional beliefs. As a result, the political system may remain polarized despite increasing climate impacts.

VI. Quantitative Assessment of Political Equilibrium Tipping

To illustrate the equilibrium effects of rising climate risk on the political equilibrium, we provide a parameterization based on the Dutch economy. The Netherlands is extremely prone to flooding. Specifically, 59% of land area prone to flooding (Ligtvoet and Knoop, 2014) and 48% of the houses is at risk of direct inundation (Klimaateffectatlas, n.d.). This area is densely populated, with approximately 70% of population residing here. The Netherlands also has a long history in flood risk management. Since flood risk is the main climatic impact in the Netherlands, the country offers an ideal closed-economy context for this study.

We run our model for the periods 2010 till 2100, with each time period equal to 30 years. We conduct counterfactual analysis to demonstrate the effects of different scenarios of sea level rise, based on a low greenhouse gas emission-scenario (SSP1-1.9, SSP1-2.6), an intermediate greenhouse gas emission-scenario (SSP2-4.5) and a high greenhouse gas

[21]For instance, Douenne and Fabre, 2022 use survey data to show that French households reject a carbon tax - and dividend policy, because these households overestimate their monetary losses after the protests of the Yellow Vests movement. Moreover, the authors show that these households do not perceive the policy as environmentally effective, and tend to discard positive information about it - which highlights their mistrust.

Parameter	Description	Value	Source
μ	Conditional expectation of losses to housing capital	1	Sea-level rise
$\bar{L}$	Housing stock	1	Normalization
ϕ	Fraction of high skilled labour	0.20	Van der Mooren and De Vries (2022)
ω	Fraction of pessimists	0.51	Initial majority
q	Wage of high-income households	0.167	Van der Straten (2023)
r	Rate of interest	0.718	Van der Straten (2023)
w	Wage of low-income households	0.089	Van der Straten (2023)

TABLE 1: **Parameter Values.**

emission-scenario (SSP3-7.0) based on IPCC (2023).[22]

We use the illustrative parameter values stated in Table 1 (cf. Van der Straten, 2023).[23] [24] For the purpose of illustrating the effects of the model, we let γ_t represent the fraction of the currently flood-safe houses that a future rise in sea levels would put at risk of flooding) (cf. Van der Straten, 2023). We rely on Bosker et al. (2019), who provide estimates of the number of currently flood safe houses that a future rise in sea levels would put at risk of flooding of at least 50 centimeters for various levels of sea level rise.[25] To approximate the evolution of γ_t under different scenarios of sea level rise, we use the NASA Sea Level Projection Tool (Garner et al., 2021; Fox-Kemper et al., 2021; Garner et al., in prep.). This tool visualizes the median projections of global and regional sea level rise, relative to a 1995-2014 baseline. These projections are based on IPCC (2023). We source the data for the region IJmuiden, a port city in the Dutch province of North Holland.[26] By the end of the century, this region is expected to experience a sea level rise of 0.59 meters under

[22]The SSP$x-y$ scenarios describe different climate futures depending on socio-economic trends underlying the scenario (x) and the approximate level of radiative forcing (in watts per square meter) resulting from the scenario in the year 2100 (y). Under SSP1-1.9 (SSP1-2.6), global warming remains approximately below 1.5 (2.0) degrees Celsius above 1850-1900 in the year 2100, which is the target of the Paris Agreement. This scenario requires net zero CO2 emissions by 2050 (in the second half of the century). SSP2-4.5 is in line with the aggregate Nationally Determined Contribution emission levels by 2030. Under this scenario, global warming reaches approximately 2.7 degrees Celsius above 1850-1900 by the end of the century. SSP3-7.0 is a medium to high climate change scenario. Under this scenario, global warming reaches approximately 3.6 degrees Celsius above 1850-1900 by the end of the century.

[23]These are reported for the Netherlands as of 2010, or based on the terminal values in Van der Straten (2023).

[24]Since agents are financially risk neutral, we only need to specify the risk-free rate of interest, r. Since the risk free rate of interest is reported for a period of 30 years, the corresponding annual rate is equal to to $(1+0.718)^{1/30}-1=1.18\%$.

[25]Bosker et al. (2019) provides estimates of the number of the currently flood safe houses that a future rise in sea levels would put at risk of flooding in a best-, medium-, and worst-case scenario with sea levels rising by 24, 100 or 150 cm respectively, based on Dutch elevation data.

[26]While regional projections are provided for various Dutch regions, there is relatively little variability in their projection. Projections are provided for the regions Vlissingen, Roompot Buiten, Hoek van Holland, Maassluis, Ijmuiden, Den Helder, West-Terschelling, Harlingen, Delfzijl and Borkum.

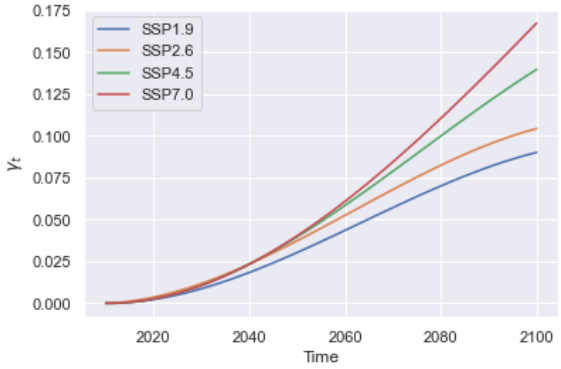


FIGURE 2: **Evolution of the share of flood-safe houses that future sea level rise puts at risk of flooding (γ_t) under the distinct SSP$x-y$ trajectories.**

an intermediate greenhouse gas emission scenario (SSP2-4.5). The evolution of climate risk is depicted in Figure 2 under the different SSP$x-y$ trajectories. It indicates that more severe global warming scenarios put more houses at risk of flooding. Finally, the functional form specifications are given by $v(L) = ln(L)$ and $f\left(\bar{L}\right) = ln\left(\bar{L}\right)$

A. Results

We provide the results under an initial stage without public adaptation, $X_t = 0$. We conduct counterfactual analysis under various climate change scenarios. Since the climate change scenarios of projected socioeconomic global changes are available up to the year 2100, we assume that a steady state is reached at that point and solve the model backwards from then on.

***A*.1 Evolution of the Housing Stock and House Prices**

The supply of inhabitable houses falls exogenously in the model with climate risk, leading to a reduction in the housing stock by approximately 25 percent at the end of the century in the SSP3-7.0 trajectory (see left panel of Figure 3). In accordance with Van der Straten (2023), the rising scarcity of habitable land translates into a sharp rise of house prices over time (right panel, Figure 3).

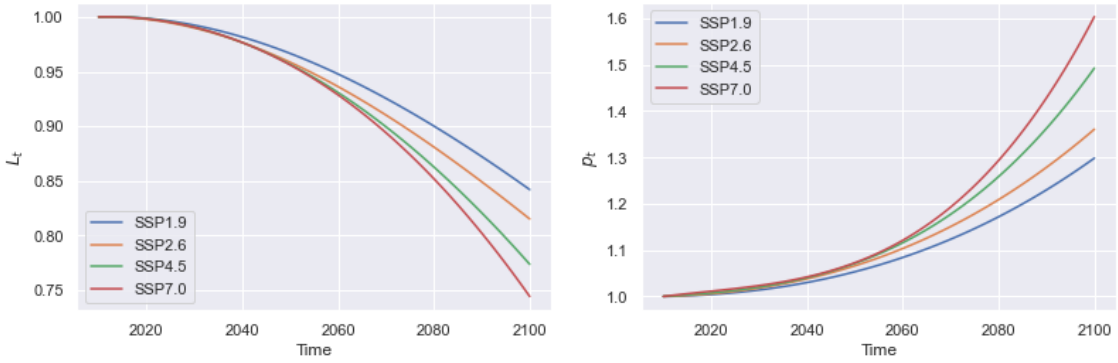


FIGURE 3: **Evolution of the housing stock and housing prices**

KEY: THE STEADY-STATE OF SUPPLY OF INHABITABLE HOUSES (LEFT PANEL, INDEXED TO 1 IN 2010) AND HOUSE PRICES (RIGHT PANEL, INDEXED TO 1 IN 2010) FOR DIFFERENT SSP$x-y$ TRAJECTORIES.

A.2 Evolution of the Political Equilibrium

The political equilibrium depends on the level of disagreement between realists and skeptics. A coalition between young skeptics and old realists only forms when their beliefs are sufficiently dispersed, but not too dispersed. Figure 4 illustrates the time paths of the upper and lower limits on belief dispersion (denoted as Θ) for which a coalition of young skeptics and old realists is stable, under different SSP$x-y$ scenarios. Assumption 1 sets the lower bound on Θ, representing the minimum level of belief dispersion at which old realists prefer to join forces with young skeptics rather than old skeptics. The blue-shaded area in the figure shows where Assumption 1 is *not* met, meaning that the belief gap isn't wide enough to make old realists' adaptation rate higher than that preferred by young skeptics. In this case, old realists would rather form a coalition with old skeptics. Hence, the political equilibrium that emerges is a coalition of the old.

In contrast, the pink- and yellow-shaded areas highlight regions where Assumption 1 is satisfied. Here, the belief dispersion is sufficient for old realists to prefer a coalition with young skeptics, as their adaptation rate is higher than the one preferred by old skeptics. Old optimists are then strictly better off if they form a coalition with young pessimists. Proposition 1 provides the upper limit for Θ, defining the maximum level of belief dispersion at which young skeptics still prefer allying with old realists over old skeptics.[27] The yellow-shaded area shows where the condition in Proposition 1 is *not* met,

[27]If utility of young pessimists, $\mathbb{E}_t(U^{Ys})$ is symmetric around the optimal adaptation rate, τ_t^{Ys*}, the bound in Proposition 2 can be approximated by $\tau_t^{Ys,Or}-\tau_t^{Ys*} \leq \tau_t^{Ys*}-\tau_t^{Ys,Os}$. We use this approximation

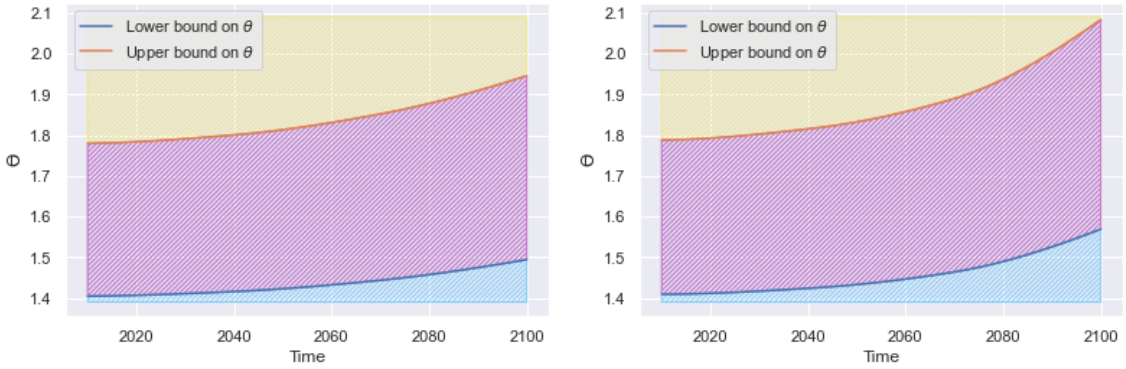


FIGURE 4: **Evolution of the political equilibrium**

KEY: JOINT EVOLUTION OF THE UPPER (PROPOSITION 2) AND LOWER (ASSUMPTION 3) BOUNDS ON DISPERSION IN BELIEFS FOR WHICH A COALITION OF YOUNG PESSIMISTS AND OLD OPTIMISTS PREVAILS (PINK-SHADED AREA). THE LEFT PANEL SHOWS THE EVOLUTION OF THE BOUNDS UNDER SSP1-2.6 AND THE RIGHT PANEL SHOWS THE EVOLUTION OF THE BOUNDS UNDER SSP3-7.0.

meaning young skeptics would prefer to form a coalition with old skeptics. The pink-shaded areas, on the other hand, show where the condition is met, and where Assumption 1 holds. In this region, young skeptics gain more utility by forming a coalition with old realists.

As climate risk intensifies, the region where Assumption 1 is satisfied becomes smaller, both over time and for more adverse climate change scenarios. This happens because climate change—driven habitat loss raises house prices and thereby the value of public adaptation. This, in turn, increases the preferred adaptation rate of young skeptics relative to that of the old. Therefore, the belief dispersion must grow larger to overcome the effect of rising house prices and ensure our coalitions remain internally stable.

At the same time, as house prices rise, the preferred adaptation rate of young skeptics increases, making them more likely to favor a coalition with old realists rather than old skeptics. This weakens the condition in Proposition 1, causing the upper bound on belief dispersion to rise. In other words, this coalition remains internally stable for larger levels of belief dispersion over time. As a result, the region where a coalition of young skeptics and old realists dominates expands, especially as climate risk becomes more urgent and for more adverse climate change scenarios.

in Figure 4.

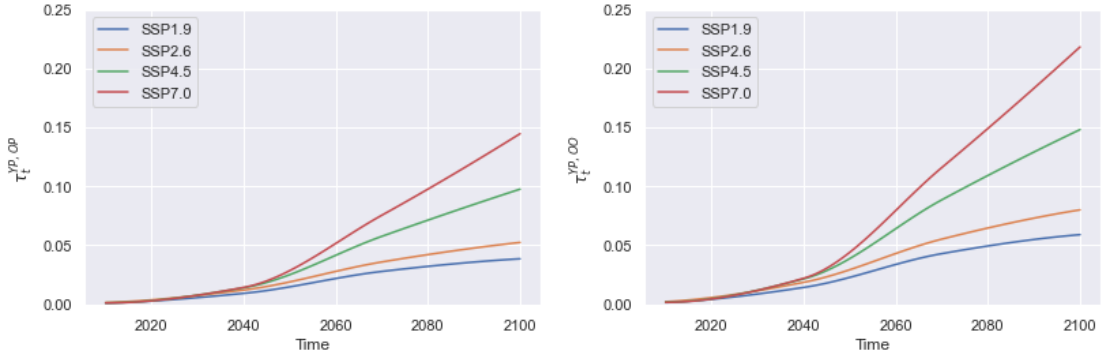


FIGURE 5: **Adaptation rates proposed by different coalitions**

KEY: THE ADAPTATION RATE PROPOSED BY A COALITION OF PESSIMISTS (LEFT PANEL) AND A COALITION OF YOUNG PESSIMISTS AND OLD OPTIMISTS (RIGHT PANEL) FOR DIFFERENT SSP TRAJECTORIES.

A.3 Political Tipping in Adaptation Rates

Using the insights from Figure 4, we focus on a value for the dispersion in beliefs, Θ, such that the political equilibrium tips. Figure 5 shows the time paths of the adaptation rates proposed by each coalition. The adaptation rates proposed by the majority coalition is illustrated by a solid line at each point in time. The proposed adaptation rates rise as climate risk increases over time. However, the outcome of the political process crucially matters for the level of public adaptation, as the adaptation rate proposed by a coalition of young skeptics and old realists is consistently higher than the rate proposed by a coalition of skeptics.

Under the current specification of beliefs, the political equilibrium shifts from a coalition of only skeptics to a coalition of young skeptics and old realists around 2070. This tipping point marks a pivotal change in the proposed adaptation rate. As shown in Figure 6, the quantitative impact of this political shift becomes more pronounced as climate change intensifies. Consequently, it significantly shapes the overall adaptation strategy, precisely when the need for adaptation is greatest under more adverse climate scenarios.

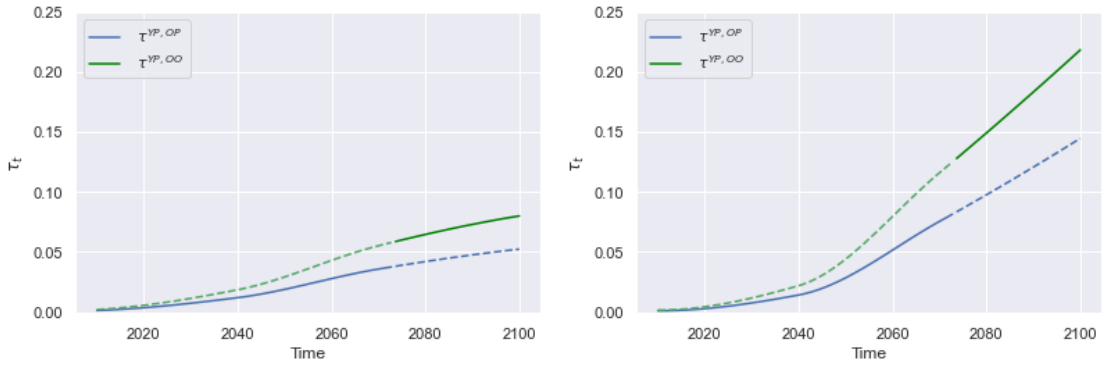


FIGURE 6: **Political tipping**

KEY: THE PREVAILING ADAPTATION RATE IN THE ECONOMY OVER TIME OVER TIME WHEN THE POLITICAL EQUILIBRIUM TIPS AROUND 2070, UNDER SSP1-2.6 (LEFT PANEL) AND SSP3-7.0 (RIGHT PANEL).

VII. Public Adaptation Gap

To compare the political economy equilibrium to the social optimum, we determine the optimal public policy where X_t is chosen to maximize utilitarian social welfare. We first consider the case in which the social optimum is determined with realistic perceptions on the severity of climate risk only, i.e., $\theta_j = 1, \forall j$. We also consider a social optimum in which the dispersion in beliefs is accounted for.

$$\max_{X_{G,t}} \sum_{t=0}^{\infty} \left(\frac{1}{1+r}\right)^t \left((1+r)\left((1-\tau_t)\left[\phi q + (1-\phi)w\right]\right) + v(\bar{L}_t) + f(\bar{L}_{t+1})\right)$$

$$s.t. \qquad \frac{1}{2} X_{G,t}^{2*} \bar{L}_t = \tau_t \cdot [\phi q + (1-\phi)\, w]$$

$$\bar{L}_j = \bar{L}_t \prod_{\iota=t}^{j-1} \left(1 - (1 - X_{G,\iota})\, \mu \gamma_{\iota+1}\right). \tag{41}$$

Proposition 2. *The socially optimal level of public adaptation equals*

$$X_t^* = \frac{\mu_L \gamma_{t+1}}{(1+r)} \cdot \sum_{j=t+1}^{\infty} \left(\frac{1}{1+r}\right)^{j-t} \left[-\frac{1}{2}(1+r) X_j^2 + v'(\bar{L}_j)\right] \prod_{\iota=t+1}^{j-1} \left(1 - (1 - X_\iota)\, \mu_L \gamma_{\iota+1}\right)$$

$$+ \left(f'\left(\bar{L}_{t+1}\right) + \sum_{j=t+1}^{\infty} \left(\frac{1}{1+r}\right)^{j-t} \left(f'(\bar{L}_{j+1})\right) \prod_{\iota=t+1}^{j} \left(1 - (1 - X_\iota)\, \mu_L \gamma_{\iota+1}\right)\right). \tag{42}$$

Proof: See Appendix A1.C.

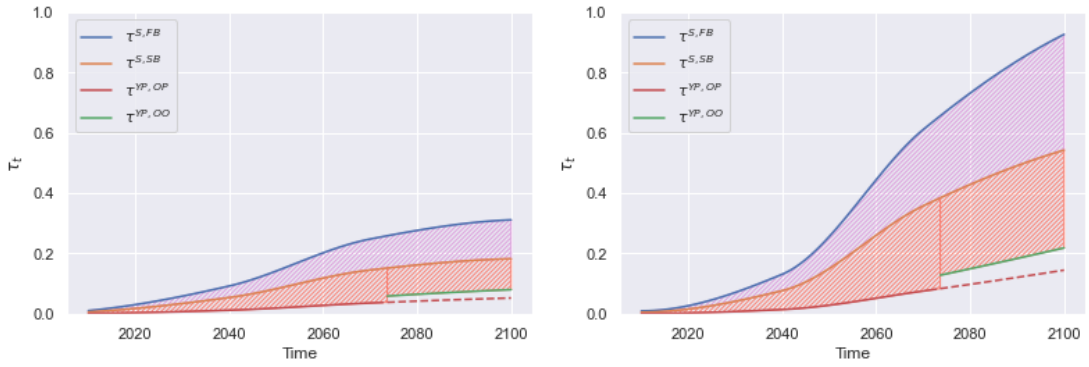


FIGURE 7: **Decomposition of the public adaptation gap**

KEY: EVOLUTION OF THE TIME PATH OF THE ADAPTATION GAP (ORANGE- AND PURPLE-SHADED AREA) AND THE ADAPTATION GAP IN THE CASE IN WHICH THE BELIEFS ABOUT THE EFFICACY OF PUBLIC INTERVENTION ARE TAKEN INTO ACCOUNT (ORANGE-SHADED AREA). THE RESULTS ARE SHOWN UNDER SSP1-2.6 4.5 (LEFT) AND SSP3.-7.0 (RIGHT PANEL).

A comparison between the socially optimal adaptation rate with the preferred adaptation rate of the young and old reveals that the socially optimal adaptation rate is higher. Households thus do not fully internalize the benefits of public adaptation. Since the old do not own housing capital, they do not respond to price incentives and thus do not take into consideration that public adaptation reduces the speed at which habitat shrinks. While the young partially internalize the impact of public adaptation on the evolution of the housing stock – through its capitalization into house prices (Van der Straten, 2023) – the horizon they internalize remains limited. Specifically, they fail to account for the fact that preserving housing benefits *all* future generations, not just their off-springs. In contrast, under the social optimum, the benefits associated with public adaptation are fully internalized across *each* subsequent generation. Hence, the private choice of adaptation does not equal the social optimum – even if all households were to have realistic perceptions on the severity of climate risk ($\theta_j = 1, \forall j$).

To quantify the public adaptation gap, we compare the socially optimal adaptation rate with the adaptation rates proposed by the prevailing coalitions over time. Figure 7 illustrates the evolution of this gap, with each panel corresponding to a distinct SSP$x-y$ trajectory. The blue line represents the socially optimal adaptation rate, determined under realistic perceptions of the efficacy of public policy. The green line depicts the adaptation rate set by a coalition of skeptics, while the red line shows the adaptation rate chosen after the political equilibrium shifts to a coalition of young skeptics and old

realists. The public adaptation gap is visualized by the purple and orange shaded areas between these lines at any given time. A significant part of the adaptation gap arises from skepticism about the efficacy of public policy (purple-shaded area). However, even if all households shared realistic perceptions of, a residual adaptation gap would persist. This is because households primarily value the present and near-term supply of habitable land, failing to internalize the long-term benefits of public adaptation for future generations . To decompose the adaptation gap, we also compute the optimal adaptation rate under the assumption that dispersion in political beliefs is fully accounted for (see Appendix A.1.C), which is represented by the orange line in Figure 7. The orange-shaded area corresponds to the "tragedy of the horizon" effect, highlighting the gap caused by the short-term focus of individual households. While skeptical political beliefs explain a significant share of the adaptation gap, the tragedy of the horizon effect remains a substantial contributor. Over time, the adaptation gap widens further at an accelerating rate as the supply of habitable land diminishes. While this increases the urgency for public adaptation to preserve land for all future generations, the prevailing coalitions fall short of internalizing, and thus addressing, this increasing need.

VIII. The Role of Income Inequality

We provide an extension of our analysis in which old households know their income level and adjust their preferences over adaptation based on their income and beliefs. This distinction matters for voting outcomes and consequently affects the political equilibrium that prevails.

A. Old Households' Choice of Adaptation Rate

An old household, with beliefs $j \in \{r, s\}$ and income $y \in \{q, w\}$ maximizes

$$\begin{aligned} \max_{\tau_t} \mathbb{E}\left(U\left(c_{i,t},, \bar{L}_j, t+1\right)\right) &= \mathbb{E}_{j,t}\left(c_{i,t}\right) + f\left(\mathbb{E}_{j,t}\left(\bar{L}_{t+1}\right)\right) \qquad (43) \\ s.t. \quad c_{i,t} &\leq \left(1-\tau_t\right) y_i + \max\left\{p_t\left(1-\xi_{i,t}\right) L_{i,t-1} + \left(1+\hat{r}\right) S_{i,t-1}, 0\right\} \\ \tau_t &\geq 0. \end{aligned}$$

Lemma 5. *The optimal adaptation rate of an old household with beliefs θ_j and income y is*

$$\tau_t^{O,i,j*} = \frac{1}{\bar{L}_t} \cdot [\phi q + (1-\phi)\, w] \cdot \left(\frac{\mu \cdot \theta_{j,t} \cdot \gamma_{t+1} \cdot \pi_{j,t}}{y_i} \right)^2 \tag{44}$$

If the wage gap is smaller than the dispersion in beliefs (scaled by the marginal utilities of the future housing stock), i.e.,

$$\frac{q}{w} < \frac{\theta_{r,t}}{\theta_{s,t}} \cdot \frac{\pi_{r,t}}{\pi_{s,t}} \tag{45}$$

then we have

$$\tau^{O,r,l*} > \tau^{O,r,h*} > \tau^{O,s,l*} > \tau^{O,s,h*}.$$

Otherwise, we have

$$\tau^{O,r,l*} > \tau^{O,s,l*} > \tau^{O,r,h*} > \tau^{O,s,h*}.$$

Since the present investment in adaptation does not benefit the old households directly any longer, the difference in the preferred adaptation rates of high- respectively low-income households is fully explained by differences in wages. As low-income, old households bear an smaller fraction of the investment costs associated with public adaptation, due to the proportionality of taxes, they favour a higher adaptation rate than high-income households.

B. Feasible Coalitions

Income is a distinguishing factor among old households, influencing the preferred adaptation rate of the old. As a consequence, the voting preferences of the old household groups now also depends on their income type and coalitions must include (at least) three groups of households to form a majority. We summarize the set of feasible coalitions, and the adaptation rates that maximize the joint utility of each coalition, in Lemma A1 in Appendix A2.F.

The wage gap, which determines the relative ordering of the adaptation rates preferred by the various groups of old households (see Lemma 5), also affects the set of feasible

coalitions. In particular, a rise in economic inequality, as reflected by an increase in the wage gap, q/w, increases the adaptation rate preferred by the low-income, old skeptics relative to the adaptation rate preferred by the high-income, old realists.[28] This is because the relative reduction in their income lowers fraction of the investment costs which are borne by the low-income households. Consequently, if the wage gap is sufficiently large, the preferences of pivotal voters align more closely with those of the low-income, old skeptics than with their previous coalition partners – the high-income, old realists. As a result, old skeptics become relevant in the formation of majority coalitions. This highlights how rising economic inequality reshapes the political equilibrium.

C. Evolution of the Political Equilibrium and Equilibrium Tipping

While some coalitions are politically feasible, the political equilibrium that emerges depends on the preferences of young skeptics. We evaluate the viability of the most ambitious coalition, determining the conditions under which young skeptics prefer to form a coalition which leads to the highest attainable adaptation rate within our environment. If beliefs are not too dispersed, an equilibrium exists in which the economy tips to a political equilibrium characterized by the prevailing of this "high-ambition" coalition (see Proof of Proposition A2, in Appendix A1.C).

To study the evolution of the political equilibrium over time, we use a comparable parameterization as for the baseline model. With regards to wages, we start from a case in which the wages of high- and low-income workers are equal, and reduce the wage of low-income workers disproportionately over time to reflect rising inequality. We let inequality increase gradually over time, picking up speed temporarily during the mid of the century.[29] We also show the results in the case the rise in the inequality accelerates in Appendix A3.B.

The evolution of the political equilibrium is displayed in Figure **??**, in Appendix A3.A. The panels reveal that the coalition of young skeptics and old realists prevails until 2060, after which the political equilibrium shifts to a less ambition coalition. Once inequality is

[28] If economic inequality declines, this does not lead to a change in the relative ordering of the preferred adaptation rates of the old, unless economic inequality is very large at the onset. If the latter is the case, the political equilibrium tips between the same coalitions as outlined below, although in reverse order.

[29] The evolution of inequality, to which we fit an S-curve, is plotted in Figure 9 in Appendix A3.A.

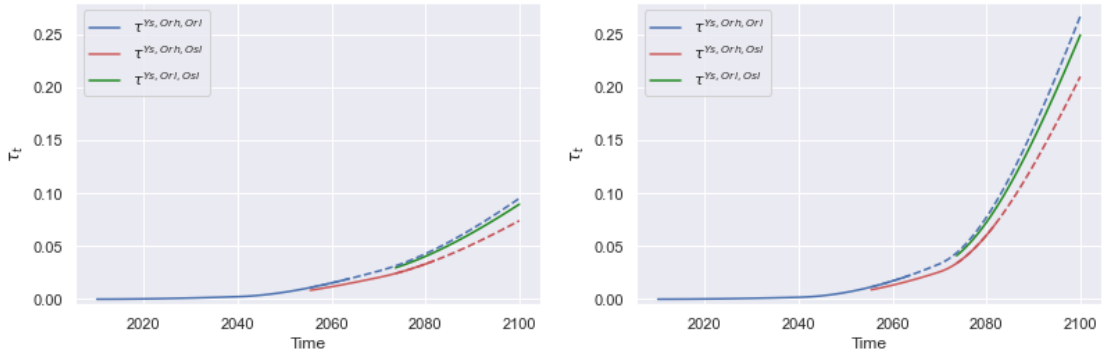


FIGURE 8: **Tipping of the adaptation rate**

KEY: THE TIME PATH FOR THE ADAPTATION RATE WHEN THE POLITICAL EQUILIBRIUM TIPS AROUND 2050, AND 2080, UNDER SSP1-2.6 4.5 (LEFT PANEL) AND SSP3-7.0 (RIGHT PANEL).

sufficiently high (see Lemma 5), the political equilibrium tips around 2080 to the high-ambition coalition, which includes the young skeptics and low-income, old.

Political tipping again affects the prevailing adaptation rate, as shown in Figure 8. While the prevailing adaptation rate is higher after the second tipping point than in the case in which the political equilibrium does not tip, the prevailing adaptation rate is lower compared to the case in which inequality remains constant over time. The political backlash occurs due to tension between beliefs and income. Specifically, the low-income old skeptics enter the new majority coalition, replacing the high-income old realists. If inequality rises gradually, the difference in income between the groups of old households is not sufficient to offset the inclusion of a larger number of skeptics in the majority coalition. Hence, political tipping leads to *less* spending on public intervention in this case.

Escalating inequality Figure 11 in Appendix A3.B shows that the effect of the tipping point on the adaptation rate depends crucially on the rate at which economic inequality rises. Specifically, if economic inequality rises at an accelerating rate, the effect of income on the adaptation rate dominates the effect due to skeptic beliefs. Then, the second tipping point leads to *more* public intervention. Thus, our findings indicate that economic inequality plays a critical role in shaping the political feasibility of climate policy, highlighting the importance of addressing inequality to effectively contain the damages from climate change.

D. Rising Inequality and the Young

In our extension, old households know their income level and adjust their preferences accordingly, while the young remained under the Rawlsian veal of ignorance. However, as inequality rises, the young may view it more likely that they will be of the low-income type. While this does not change the composition of the political equilibrium that emerges, it does affect the speed at which the political equilibrium tips. As young households view it more likely that they are of the low-income type, their preferred adaptation rate rises.[30] Consequently, the preferences for adaptation of the young skeptics converge to those of the old realists, and diverge from those the old skeptics. Then, for relatively lower levels of climate risk, the young skeptics prefer to form a coalition with the old realists.

Corollary 1. *If young households view it more likely that they are of the low-income type, the first political tipping point occurs sooner.*

The timing of the second tipping point depends entirely on the evolution of the wage gap and how it's size compares to the dispersion in beliefs. Hence, the timing of the second tipping point remains unaffected by a change in the perceived probability of being of the low income type.

Corollary 2. *If young households view it more likely that they are of the low-income type, the likelihood that the second tipping point occurs increases, but its timing remains unaffected.*

IX. Conclusion

We study the evolution of political support for preventive measures against the impact of climate change. We focus on the collective impact of climate change, recognizing how extreme events and rising temperature exacerbates land degradation through increasing

[30] Suppose the young's perceived probability of being of the low-income type is $(1-\phi+\epsilon)$ with $\epsilon \in (0, \phi)$. Then, the preferred adaptation rate of a young household with beliefs θ_j becomes

$$\tau_t^{Ys*} = \frac{(\mu\gamma_{t+1})^2}{\bar{L}_t} \cdot \frac{[\phi q + (1-\phi)\, w]}{[(\phi-\epsilon)q + (1-\phi+\epsilon)\, w]^2} \cdot \left(\frac{\tilde{\theta}_{j,t} \cdot (p_{t+1} + \pi_{s,t})}{(1+r)} \right)^2$$

floods, erosion, soil salinity, landslides, and sea level rise. As a result, previously habitable land becomes unsuitable for development, thus negatively affecting its long-term usability.

Political preferences are shaped by age, income and belief; over time they are affected by rising climate risk and economic inequality. Modelling these trends allows to analyze changing policy attitudes. Rising physical climate risks strengthens incentives even for skeptical voters to make compromises and agree to public intervention. At the same time, rising economic inequality also affect voter views on the role for public investment in protective infrastructure, but may lead to political backlash.

Next to differences in age and income, we study the role of different beliefs. In the main model we focus on voter skepticism about the efficacy of climate adaptation, showing its major effect on the adaptation rate. If beliefs are sufficiently polarized, the subgroup of skeptic young household turns out to be pivotal. As long as climate risk is modest, these skeptic young households support only modest investment in public adaptation.

Our political economy analysis highlights the possibility of political tipping, which occurs when the prevailing coalition changes due to gradual climate change. Rising climate risk increases support for public adaptation, as more scarce habitat increases house prices and the value of preventive measures. Critically, the preferred adaptation rate of young skeptics rises at a faster rate than their political allies. When the beliefs on the efficacy of public adaptation are not too polarized, the political equilibrium eventually tips from a coalition of skeptics to a coalition of young skeptics and old realists willing to will spend more on climate change adaptation.

While political tipping increases public adaptation, the shift does not manage to internalize its broader societal value. The outcome of the political process yields an adaptation rate that is lower than the social optimum. This is in part due to skepticism about the efficacy of the public intervention. Moreover, as the political process only affects the present and near future, it fails to internalize the benefits of public adaptation for all future generations. This "tragedy of the horizon" effect inevitably associated with the political process undermines public investments in flood protection, and prevents adaptation from catching up with the long-term social optimum.

In an extension, we consider the role of income inequality. We show that a steady rise in inequality ultimately induces a second political tipping point, towards a coalition

of low-income old and the young skeptics. When inequality increases gradually, this tipping point reduces the politically feasible level of flood protection, which illustrates the tension between economic inequality and the climate policy. Moreover, this highlights the importance of redistributive policies to effectively contain the damages from climate change.

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A1. Proof of Propositions

A. Proof of Proposition A1

Proposition A1. *Suppose climate risk, γ rises in all future periods by a factor $\zeta > 1$, so that $\{\zeta\gamma_{t+1}, ..., \zeta\gamma_{\infty}\}$. Then, house prices rise in this factor ζ if*

$$-\frac{\frac{\partial v'(\bar{L}_j)}{\partial \bar{L}_j} \cdot \mathbb{E}\left(\bar{L}_j\right)}{v'\left(\bar{L}_j\right)} \cdot \frac{\sum_{\iota=t}^{j-1} X_{\iota}^{*}\gamma_{\iota+1} \cdot \prod_{\iota'=t,\iota'\neq\iota}^{j-1}\left(1-\left(1-X_{\iota'}^{*}\right)\mu\zeta\cdot\gamma_{\iota'+1}\right)}{\sum_{\iota=t}^{j-1}\int_0^1 X_{\iota}^{*}\theta_{j,\iota}di\cdot\gamma_{\iota+1}\cdot\prod_{\iota'=t,\iota'\neq\iota}^{j-1}\left(1-\left(1-X_{\iota'}^{*}\right)\mu\zeta\cdot\int_0^1\theta_i di\gamma_{\iota'+1}\right)} \geq 1. \tag{A1}$$

This condition becomes more stringent in $\int_0^1 \theta_{j,\iota}di$ and for $\int_0^1 \theta_{j,\iota}di = 1$, this condition is equivalent as in Van der Straten (2023).

The price of housing capital in a given period, t, is given by

$$p_t^{*} = \frac{\left(1-\left(1-X_t^{*}\right)\mu\int_0^1\theta_{i,t}di\cdot\gamma_{t+1}\right)p_{t+1} + v'(\bar{L}_t)}{(1+r)} \tag{A2}$$

Forward substitution gives

$$p_t^{*} = \sum_{j=t}^{\infty}\left(\frac{1}{1+r}\right)^{j-t+1}\left[v'\left(\bar{L}_j\right)\right]\prod_{\iota=t}^{j-1}\left(1-\left(1-X_t^{*}\right)\mu\int_0^1\theta_{i,t}di\cdot\gamma_{\iota+1}\right) \tag{A3}$$

where

$$\bar{L}_j = \bar{L}_t\prod_{\iota=t}^{j-1}\left(1-\left(1-X_t^{*}\right)\mu\gamma_{\iota+1}\right) \tag{A4}$$

Suppose climate risk, γ, increases in all future periods, i.e. $\{\gamma_{t+1}, ..., \gamma_{\infty}\}$ by some factor $\zeta > 0$, i.e. $\{\zeta\gamma_t, ..., \zeta\gamma_{\infty}\}$. Then, the price of house capital is given by

$$p_t = \sum_{j=t}^{\infty}\left(\frac{1}{1+r}\right)^{j-t+1}\left[v'\left(\bar{L}_j\right)\right]\prod_{\iota=t}^{j-1}\left(1-\left(1-X_{\iota}^{*}\right)\mu\zeta\cdot\int_0^1\theta_i di\gamma_{\iota+1}\right) \tag{A5}$$

Then, the FOC of p_t with respect to ζ is given by

$$\begin{aligned}\frac{\partial p_t}{\partial\zeta} = &\sum_{j=t}^{\infty}\left(\frac{1}{1+r}\right)^{j-t+1}\frac{\partial v'(\bar{L}_j)}{\partial\bar{L}_j}\cdot\frac{\partial\bar{L}_j}{\partial\zeta}\cdot\prod_{\iota=t}^{j-1}\left(1-\left(1-X_{\iota}^{*}\right)\mu\zeta\cdot\int_0^1\theta_i di\gamma_{\iota+1}\right) \\ &+ v'\left(\bar{L}_j\right)\cdot\frac{\partial}{\partial\zeta}\left(\prod_{\iota'=t}^{j-1}\left(1-\left(1-X_{\iota'}^{*}\right)\mu\zeta\cdot\int_0^1\theta_i di\gamma_{\iota'+1}\right)\right)\end{aligned} \tag{A6}$$

where

$$\frac{\partial \bar{L}_j}{\partial \zeta} = -\mu \bar{L}_t \sum_{\iota=t}^{j-1} (1 - X_\iota^*) \gamma_{\iota+1} \prod_{\iota'=t, \iota' \neq \iota}^{j-1} \left(1 - (1 - X_{\iota'}^*) \, \mu\zeta \cdot \gamma_{\iota'+1}\right) \tag{A7}$$

and

$$\begin{aligned} &\frac{\partial}{\partial \zeta} \left(\prod_{\iota'=t}^{j-1} \left(1 - (1 - X_{\iota'}^*) \, \mu\zeta \cdot \int_0^1 \theta_i di \gamma_{\iota'+1} \right) \right) \\ &= -\mu \int_0^1 \theta_i di \cdot \sum_{\iota=t}^{j-1} (1 - X_\iota^*) \, \gamma_{\iota+1} \cdot \prod_{\iota'=t, \iota' \neq \iota}^{j-1} \left(1 - (1 - X_{\iota'}^*) \, \mu\zeta \cdot \int_0^1 \theta_i di \gamma_{\iota'+1} \right) \end{aligned} \tag{A8}$$

Define

$$\mathbb{E}\left(\bar{L}_j\right) = \bar{L}_t \cdot \prod_{\iota=t}^{j-1} \left(1 - (1 - X_\iota^*) \, \mu \int_0^1 \theta_i di \cdot \gamma_{\iota+1} \right) \tag{A9}$$

Then, this becomes

$$\begin{aligned} \frac{\partial p_t}{\partial \zeta} = &-\mu \sum_{j=t}^{\infty} \left(\frac{1}{1+r} \right)^{j-t+1} \frac{\partial v'(\bar{L}_j)}{\partial \bar{L}_j} \cdot \mathbb{E}\left(\bar{L}_j\right) \cdot \sum_{\iota=t}^{j-1} (1 - X_\iota^*) \gamma_{\iota+1} \cdot \prod_{\iota'=t, \iota' \neq \iota}^{j-1} \left(1 - (1 - X_{\iota'}^*) \, \mu\zeta \cdot \gamma_{\iota'+1}\right) \\ &+ v'\left(\bar{L}_j\right) \cdot \int_0^1 \theta_i di \cdot \sum_{\iota=t}^{j-1} (1 - X_\iota^*) \, \gamma_{\iota+1} \cdot \prod_{\iota'=t, \iota' \neq \iota}^{j-1} \left(1 - (1 - X_{\iota'}^*) \, \mu\zeta \cdot \int_0^1 \theta_i di \gamma_{\iota'+1} \right) \end{aligned} \tag{A10}$$

This is positive if

$$-\frac{\frac{\partial v'(\bar{L}_j)}{\partial \bar{L}_j} \cdot \mathbb{E}\left(\bar{L}_j\right)}{v'\left(\bar{L}_j\right)} \cdot \frac{\sum_{\iota=t}^{j-1} (1 - X_\iota^*) \gamma_{\iota+1} \cdot \prod_{\iota'=t, \iota' \neq \iota}^{j-1} \left(1 - (1 - X_{\iota'}^*) \, \mu\zeta \cdot \gamma_{\iota'+1}\right)}{\sum_{\iota=t}^{j-1} \int_0^1 \theta_i di \cdot (1 - X_\iota^*) \, \gamma_{\iota+1} \cdot \prod_{\iota'=t, \iota' \neq \iota}^{j-1} \left(1 - (1 - X_{\iota'}^*) \, \mu\zeta \cdot \int_0^1 \theta_i di \gamma_{\iota'+1} \right)} \geq 1 \tag{A11}$$

Compare this with the condition under which house prices rise in Van der Straten (2023), i.e.

$$-\frac{\frac{\partial v'(\bar{L}_j)}{\partial \bar{L}_j} \cdot \bar{L}_j}{v'(\bar{L}_j)} \geq 1$$

The derived condition is less stringent than the one in Van der Straten (2023) if

$$\frac{\bar{L}_j}{\mathbb{E}\left(\bar{L}_j\right)} \leq \frac{\sum_{\iota=t}^{j-1} (1 - X_\iota^*) \gamma_{\iota+1} \cdot \prod_{\iota'=t, \iota' \neq \iota}^{j-1} \left(1 - (1 - X_{\iota'}^*) \, \mu\zeta \cdot \gamma_{\iota'+1}\right)}{\sum_{\iota=t}^{j-1} \int_0^1 \theta_i di \cdot (1 - X_\iota^*) \gamma_{\iota+1}) \cdot \prod_{\iota'=t, \iota' \neq \iota}^{j-1} \left(1 - (1 - X_{\iota'}^*) \, \mu\zeta \cdot \int_0^1 \theta_i di \gamma_{\iota'+1} \right)} \tag{A12}$$

This becomes

$$\sum_{\iota=t}^{j-1}\left(\frac{\int_0^1\theta_i di\cdot\left(1-X_\iota^*\right)\gamma_{\iota+1}}{\left(1-\left(1-X_\iota^*\right)\mu\zeta\cdot\int_0^1\theta_i di\gamma_{\iota+1}\right)}\right)\leq\sum_{\iota=t}^{j-1}\left(\frac{(1-X_\iota^*)\gamma_{\iota+1}}{(1-(1-X_\iota^*)\mu\zeta\cdot\gamma_{\iota+1})}\right) \tag{A13}$$

which is always satisfied as $\int_0^1\theta_i di\leq 1$.

B. Proof of Proposition 1

Young skeptics prefer to form a coalition with old realists rather than old skeptics if

$$\mathbb{E}_t\left(U_{Ys}\left(\tau^{Ys,Or*}\right)\right)>\mathbb{E}_t\left(U_{Ys}\left(\tau^{Ys,Os*}\right)\right) \tag{A14}$$

Using that

$$v'\left(L_{Ys,t}\right)=(1+r)p_t-\left(1-\left(1-X_t\right)\mu\tilde{\theta}_{Ys,t}\cdot\gamma_{t+1}\right)p_{t+1}$$

and assuming $v\left(L_{i,t}\right)=ln\left(L_{it}\right)$, the relevant condition becomes

$$\begin{aligned}&\underbrace{v\left(L_{Ys,t}\left(\tau^{Ys,Or*}\right)\right)-v\left(L_{Ys,t}\left(\tau^{Ys,Os*}\right)\right)}_{(i)>0} \\ &+\underbrace{f\left(\mathbb{E}_{s,t}\left(\bar{L}_{t+1}\left(\tau^{Ys,Or*}\right)\right)\right)-f\left(\mathbb{E}_{s,t}\left(\bar{L}_{t+1}\left(\tau^{Ys,Os*}\right)\right)\right)}_{(ii)>0} \\ &>(1+r)\underbrace{\left(\tau^{Ys,Or*}-\tau^{Ys,Os*}\right)}_{(iii)>0}y_{Ys,t}\end{aligned} \tag{A15}$$

Substituting the expressions for $\tau^{Ys,Or*},\tau^{Ys,Os*}$ and rewriting gives

$$\begin{aligned}&\left(\frac{\left(\omega\cdot\tilde{\theta}_{s,t}p_{t+1}+\pi_{r,s,t}\cdot\left(\omega\cdot\tilde{\theta}_{s,t}+(1-\omega)\cdot\tilde{\theta}_{r,t}\right)\right)}{(1+\omega r)}\right)^2-\left(\frac{\tilde{\theta}_{s,t}\cdot\left(\frac{1}{2}p_{t+1}+\pi_{s,t}\right)}{\left(1+\frac{1}{2}r\right)}\right)^2 \\ &<\frac{\bar{L}_t}{\left(\mu\gamma_{t+1}\right)^2}\cdot\frac{\Delta_\tau v\left(L_{Ys,t}\right)+\Delta_\tau f\left(\mathbb{E}_{s,t}\left(\bar{L}_{t+1}\right)\right)}{(1+r)}\end{aligned} \tag{A16}$$

where

$$\Delta_\tau v\left(L_{Ys,t}\right)=v\left(L_{Ys,t}\left(\tau^{Ys,Or*}\right)\right)-v\left(L_{Ys,t}\left(\tau^{Ys,Os*}\right)\right),$$

and

$$\Delta_\tau f\left(\mathbb{E}_{s,t}\left(\bar{L}_{t+1}\right)\right) = f\left(\mathbb{E}_{s,t}\left(\bar{L}_{t+1}\left(\tau^{Ys,Or*}\right)\right)\right) - f\left(\mathbb{E}_{s,t}\left(\bar{L}_{t+1}\left(\tau^{Ys,Os*}\right)\right)\right).$$

Denote by

$$B \equiv B\left(\bar{L}_t, \gamma_{t+1}, \Delta_\tau v\left(L_{Ys,t}\right), \Delta_\tau f\left(\mathbb{E}_{s,t}\left(\bar{L}_{t+1}\right)\right)\right) = \frac{\bar{L}_t}{\left(\mu\gamma_{t+1}\right)^2} \cdot \frac{\Delta_\tau v\left(L_{Ys,t}\right) + \Delta_\tau f\left(\mathbb{E}_{s,t}\left(\bar{L}_{t+1}\right)\right)}{(1+r)}.$$

This allows us to rewrite the condition as

$$\frac{\omega^2}{\left(1+\omega r\right)^2} \cdot \left(p_{t+1} + \pi_{r,s,t} \cdot \left(1 + \frac{(1-\omega)}{\omega} \cdot \frac{\tilde{\theta}_{r,t}}{\tilde{\theta}_{s,t}}\right)\right)^2 < \frac{B}{\tilde{\theta}_{s,t}^2} + \frac{1}{\left(1+\frac{1}{2}r\right)^2} \cdot \left(\frac{1}{2}p_{t+1} + \pi_{s,t}\right)^2 \tag{A17}$$

which can be simplified to obtain

$$p_{t+1} + \pi_{r,s,t} \cdot \left(1 + \frac{(1-\omega)}{\omega} \cdot \frac{\tilde{\theta}_{r,t}}{\tilde{\theta}_{s,t}}\right) < \frac{1+\omega r}{\omega} \cdot \sqrt{\left(\frac{B}{\tilde{\theta}_{s,t}^2} + \frac{1}{\left(1+\frac{1}{2}r\right)^2} \cdot \left(\frac{1}{2}p_{t+1} + \pi_{s,t}\right)^2\right)} \tag{A18}$$

Then, young skeptics prefer to form a coalition with old realists if

$$\tilde{\Theta} < \left(\frac{1}{\pi_{r,s,t}}\left(\frac{1+\omega r}{(1-\omega)} \cdot \sqrt{\left(\frac{B}{\tilde{\theta}_{s,t}^2} + \frac{1}{\left(1+\frac{1}{2}r\right)^2} \cdot \left(\frac{1}{2}p_{t+1} + \pi\right)^2\right)} - p_{t+1}\right) - 1\right) \tag{A19}$$

Otherwise, we have that

$$\mathbb{E}_t\left(U_{Ys}\left(\tau^{Ys,Or*}\right)\right) < \mathbb{E}_t\left(U_{Ys}\left(\tau^{Ys,Os*}\right)\right) \tag{A20}$$

and a coalition of young skeptics and old skeptics prevails.

C. Proof of Proposition 2

In the social optimum, the severity of climate risk is fully internalized, i.e. $\theta_j = 1, \forall j$. Then, the optimal choice of public adaptation is determined by maximizing a utilitarian social welfare function, i.e.

$$\max_{X_t} \sum_{t=0}^{\infty} \left(\frac{1}{1+r}\right)^t \left((1+r)\left((1-\tau_t)\left[\phi q + (1-\phi)w\right]\right) + v(\bar{L}_t) + f\left(\bar{L}_{t+1}\right)\right) \tag{A21}$$

$$s.t. \qquad \frac{1}{2}X_t^{2*}\bar{L}_t = \tau_t \cdot [\phi q + (1-\phi)\, w]$$

$$\bar{L}_j = \bar{L}_t \prod_{\iota=t}^{j-1} \left(1 - (1 - X_\iota)\, \mu \gamma_{\iota+1}\right).$$

The first order condition for X_t is

$$(1+r)X_t^* \bar{L}_t = \mu \gamma_{t+1} \bar{L}_t \cdot f'\left(\bar{L}_{t+1}\right) \tag{A22}$$

$$+ \sum_{j=t+1}^{\infty} \left(\frac{1}{1+r}\right)^{j-t} \left(\left[-\frac{1}{2}(1+r)X_j^2 + v'(\bar{L}_j)\right] \frac{\partial \bar{L}_j}{\partial X_t} + f'\left(\bar{L}_{j+1}\right) \cdot \frac{\partial \bar{L}_{j+1}}{\partial X_t}\right)$$

Using that

$$\frac{\partial \bar{L}_j}{\partial X_t} = \mu_L \gamma_{t+1} \cdot \bar{L}_t \prod_{\iota=t+1}^{j-1} \left(1 - (1 - X_\iota)\, \mu_L \gamma_{\iota+1}\right) \tag{A23}$$

The socially optimal public choice of adaptation becomes

$$X_t^*|_{\theta_j=1 \forall j} = \frac{\mu_L \gamma_{t+1}}{(1+r)} \cdot \underbrace{\sum_{j=t+1}^{\infty} \left(\frac{1}{1+r}\right)^{j-t} \left[-\frac{1}{2}(1+r)X_j^2 + v'(\bar{L}_j)\right] \prod_{\iota=t+1}^{j-1} \left(1 - (1 - X_\iota)\, \mu_L \gamma_{\iota+1}\right)}_{p_{t+1}|\theta_j=1, \forall j} \tag{A24}$$

$$+ \left(f'\left(\bar{L}_{j+1}\right) + \sum_{j=t+1}^{\infty} \left(\frac{1}{1+r}\right)^{j-t} \cdot f'\left(\bar{L}_{j+1}\right) \prod_{\iota=t+1}^{j} \left(1 - (1 - X_\iota)\, \mu_L \gamma_{\iota+1}\right)\right)$$

Decomposing the Adaptation Gap We solve for the optimum in the case in which the heterogeneity in the perceptions about climate change are accounted for, i.e. $\theta_{j,t}$:

$$\max_{X_t} \sum_{t=0}^{\infty} \left(\frac{1}{1+r}\right)^t \left((1+r)\left((1-\tau_t)\left[\phi q + (1-\phi)w\right]\right) + v(\bar{L}_t) + f\left(\bar{L}_{t+1}\right)\right) \tag{A25}$$

$$s.t. \qquad \frac{1}{2}X_t^{2*}\bar{L}_t = \tau_t \cdot [\phi q + (1-\phi)\, w]$$

$$\mathbb{E}\left(\bar{L}_j\right) = \bar{L}_t \prod_{\iota=t}^{j-1} \left(1 - (1 - X_\iota)\, \mu \int_0^1 \theta_{i,t} di \cdot \gamma_{\iota+1}\right).$$

In this case, the optimal level of public adaptation is given by

$$X_t^* = \frac{\mu_L \int_0^1 \theta_{i,t} di \cdot \gamma_{t+1}}{(1+r)} \cdot \sum_{j=t+1}^{\infty} \left(\frac{1}{1+r}\right)^{j-t} \left[-\frac{1}{2}(1+r)X_j^2 + v'(\bar{L}_j)\right] \prod_{\iota=t+1}^{j-1} \left(1 - \cdot (1-X_\iota)\,\mu_L \int_0^1 \theta_{i,t} di \cdot \gamma_{\iota+1}\right)$$
$$+ \left(f'\left(\bar{L}_{j+1}\right) + \sum_{j=t+1}^{\infty} \left(\frac{1}{1+r}\right)^{j-t} f'\left(\bar{L}_{j+1}\right) \prod_{\iota=t+1}^{j} \left(1 - (1-X_\iota)\,\mu_L \int_0^1 \theta_{i,t} di \cdot \gamma_{\iota+1}\right)\right) \tag{A26}$$

D. Proof of Proposition A2

Proposition A2. *Let there be less young than old, skeptics represent a majority ($\omega > 0.5$), high-income households are a minority ($\phi < 0.5$), Assumption 2(*) (see Lemma A1) is satisfied, $v(L_{j,t}) = ln(L_{j,t})$ and $f(\bar{L}_{t+1}) = ln(\bar{L}_{t+1})$. Then, if inequality is sufficiently low and*

$$\begin{aligned} &\frac{1}{(1+\omega r)^2} \cdot \left(p_{t+1} + \left(1 + \frac{(1-\omega)}{\omega} \cdot \frac{\tilde{\theta}_{r,t}}{\tilde{\theta}_{s,t}}\right) \cdot \pi_{s,r,t}\right)^2 \\ &- \left(\frac{[\phi q + (1-\phi)\, w]}{(1+\omega r)\,\phi \cdot q + (2+r)\omega\,(1-\phi) \cdot w}\right)^2 \\ &\cdot \left(p_{t+1} + \left((2-\phi) + \phi \cdot \frac{(1-\omega)}{\omega} \cdot \frac{\tilde{\theta}_{r,t}}{\tilde{\theta}_{s,t}}\right) \cdot \pi_{r,s,t}\right)^2 \\ &< \frac{\Delta v\left(L_{Ys,t}\right) + \Delta f\left(E_{P,t}\left(\bar{L}_{t+1}\right)\right)}{(1+r)} \cdot \frac{\bar{L}_t}{(\omega \cdot \tilde{\theta}_{s,t} \mu \gamma_{t+1})^2} \end{aligned} \tag{A27}$$

the political economy equilibrium is characterized by a coalition of young skeptics and old realists. The adaptation rate proposed by this coalition equals

$$\tau_t^{Ys,Orh,Orl*} = A \cdot \left(\frac{\omega \tilde{\theta}_{s,t} p_{t+1} + \left(\omega \cdot \tilde{\theta}_{s,t} + (1-\omega) \cdot \tilde{\theta}_{r,t}\right) \cdot \pi_{r,s,t}}{(1+\omega r)}\right)^2. \tag{A28}$$

If economic inequality is high and it holds that

$$\begin{aligned} &\left(\frac{\left[p_{t+1} + \left((2-\phi) + \frac{(1-\omega)}{\omega} \cdot (1-\phi) \cdot \frac{\tilde{\theta}_{r,t}}{\tilde{\theta}_{s,t}}\right) \cdot \pi_{r,s,t}\right]}{\omega\,(1+r)\,[\phi q + (1-\phi)\, w] + (1-\phi)\, w}\right)^2 \\ &- \left(\frac{\left[p_{t+1} + \left((2-\phi) + \frac{(1-\omega)}{\omega} \cdot \phi \cdot \frac{\tilde{\theta}_{r,t}}{\tilde{\theta}_{s,t}}\right) \cdot \pi_{r,s,t}\right]}{(1+\omega r)\,\phi \cdot q + (2+r)\omega\,(1-\phi) \cdot w}\right)^2 \\ &< \frac{\Delta v\left(L_{Ys,t}\right) + \Delta f\left(E_{P,t}\left(\bar{L}_{t+1}\right)\right)}{(1+r) \cdot [\phi q + (1-\phi)\, w]} \cdot \frac{\bar{L}_t}{(\omega \cdot \tilde{\theta}_{s,t} \mu \gamma_{t+1})^2} \end{aligned} \tag{A29}$$

the political economy equilibrium is characterized by a coalition of young pessimists and the low-income old. The adaptation rate proposed by this coalition equals

$$\tau_t^{Ys,Orl,Osl*} = A \cdot [\phi q + (1-\phi)\, w]^2 \cdot \left(\frac{\omega \cdot \tilde{\theta}_{s,t} p_{t+1} + \left(\omega(2-\phi) \cdot \tilde{\theta}_{s,t} + (1-\omega)(1-\phi) \cdot \tilde{\theta}_{r,t} \right) \cdot \pi_{s,r,t}}{\omega\,(1+r)\,[\phi q + (1-\phi)\, w] + (1-\phi)\, w} \right)^2 . \tag{A30}$$

Alternatively, Assumption 2 is not satisfied (in either case), the political economy equilibrium is characterized by the mixed coalition. Then, the adaptation rate proposed equals

$$\tau_t^{Ys,Orh,Osl*} = A \cdot [\phi q + (1-\phi)\, w]^2 \cdot \left(\frac{\omega \cdot \tilde{\theta}_{s,t} p_{t+1} + \left(\omega(2-\phi) \cdot \tilde{\theta}_{s,t} + (1-\omega)\phi \cdot \tilde{\theta}_{r,t} \right) \cdot \pi_{r,s,t}}{\omega \cdot (1+r) \cdot [\phi q + (1-\phi)\, w] + (1-\omega)\phi \cdot q + \omega(1-\phi) \cdot w} \right)^2 . \tag{A31}$$

Low Economic Inequality Young skeptics prefer a coalition with high-income and low-income, old realists rather than high-income, old realists and low-income, old skeptics if

$$\mathbb{E}_t \left(U_{Ys} \left(\tau^{Ys,Orh,Orl*} \right) \right) > \mathbb{E}_t \left(U_{Ys} \left(\tau^{Ys,Orh,Osl*} \right) \right) \tag{A32}$$

Using similar steps as in Proof of Proposition 2, the relevant condition becomes

$$\begin{aligned} & \frac{1}{(1+\omega r)^2} \cdot \left(p_{t+1} + \left(1 + \frac{(1-\omega)}{\omega} \cdot \frac{\tilde{\theta}_{r,t}}{\tilde{\theta}_{s,t}} \right) \cdot \pi_{s,r,t} \right)^2 \\ & - \left(\frac{[\phi q + (1-\phi)\, w]}{(1+\omega r)\, \phi \cdot q + (2+r)\omega\,(1-\phi) \cdot w} \right)^2 \\ & \cdot \left(p_{t+1} + \left((2-\phi) + \phi \cdot \frac{(1-\omega)}{\omega} \cdot \frac{\tilde{\theta}_{r,t}}{\tilde{\theta}_{s,t}} \right) \cdot \pi_{r,s,t} \right)^2 \\ & < \frac{\Delta v\,(L_{Ys,t}) + \Delta f\left(E_{P,t}\left(\bar{L}_{t+1} \right) \right)}{(1+r)} \cdot \frac{\bar{L}_t}{(\omega \cdot \tilde{\theta}_{s,t} \mu \gamma_{t+1})^2} \end{aligned} \tag{A33}$$

High Economic Inequality Young skeptics prefer to prefer a coalition with low-income, old realists and low-income, old skeptics rather than high-income, old realists and low-income, old skeptics if

$$\mathbb{E}_t \left(U_{Ys} \left(\tau^{Ys,Orl,Osl*} \right) \right) > \mathbb{E}_t \left(U_{Ys} \left(\tau^{Ys,Orh,Osl*} \right) \right) \tag{A34}$$

Using similar steps as in Proof of Proposition 2, the relevant condition becomes

$$\left(\frac{\left[p_{t+1}+\left((2-\phi)+\frac{(1-\omega)}{\omega}\cdot(1-\phi)\cdot\frac{\tilde{\theta}_{r,t}}{\tilde{\theta}_{s,t}}\right)\cdot\pi_{r,s,t}\right]}{\omega\left(1+r\right)\left[\phi q+\left(1-\phi\right)w\right]+\left(1-\phi\right)w}\right)^{2} \tag{A35}$$

$$-\left(\frac{\left[p_{t+1}+\left((2-\phi)+\frac{(1-\omega)}{\omega}\cdot\phi\cdot\frac{\tilde{\theta}_{r,t}}{\tilde{\theta}_{s,t}}\right)\cdot\pi_{r,s,t}\right]}{\left(1+\omega r\right)\phi\cdot q+(2+r)\omega\left(1-\phi\right)\cdot w}\right)^{2}$$

$$<\frac{\Delta v\left(L_{Ys,t}\right)+\Delta f\left(E_{P,t}\left(\bar{L}_{t+1}\right)\right)}{(1+r)\cdot\left[\phi q+\left(1-\phi\right)w\right]}\cdot\frac{\bar{L}_{t}}{(\omega\cdot\tilde{\theta}_{s,t}\mu\gamma_{t+1})^{2}}$$

These conditions implicitly define an upper bound on the degree of dispersion in beliefs for which young skeptics prefer to form a coalition with high-income and low-income, old realists, respectively, low-income, old optimists and low-income, old pessimists. If this condition is not satisfied (in either case), a coalition of young skeptics, high-income, old realists, and low-income, old skeptics prevails.

A2. Derivation of Lemmas

A. Derivation of Lemma 1

The demand for housing follows from the first order condition for housing, $L_{j,t}$.

B. Derivation of Lemma 2

Young Households Young households favor a adaptation rate that maximizes their expected lifetime utility:

$$\max_{\tau_t}\mathbb{E}\left(U\left(L_{j,t},c_{i,t+1},X_t\right)\right)=v\left(L_{j,t}\right)+\mathbb{E}_{j,t}\left(c_{i,t+1}\right)+f\left(\mathbb{E}_{j,t}\left(\bar{L}_{t+1}\right)\right) \tag{A36}$$

$$s.t.\quad\left(1-\tau_t\right)y_{i,t}\leq p_tL_{j,t}+S_{i,t}$$

$$c_{i,t+1}\leq\left(1-\tau_{t+1}\right)y_i+\max\left\{p_{t+1}\left(1-\xi_{i,t+1}\right)L_{j,t}+\left(1+\hat{r}\right)S_{i,t},0\right\}$$

$$\tau_t\geq 0$$

where $c_{i,t+1}$ is consumption of household i in period $t+1$ and $\mathbb{E}_t$ denotes expectations formed at date t.

Given the probability of default, the expectation of household i's consumption in period $t+1$, $c_{i,t+1}$, as formed at date t, becomes:

$$\mathbb{E}_t\left(c_{i,t+1}\right) = G\left(\hat{\xi}_{i,t+1}\right)\left(p_{t+1}\left(1-\mathbb{E}\left(\xi_{i,t+1}|\xi_{t+1}\leq\hat{\xi}_{i,t+1}\right)\right)L_{j,t}+(1+\hat{r})S_{i,t}\right) \tag{A37}$$

No arbitrage requires that the expected payoff of holding household debt to be equal to the riskless return earned on savings:

$$(1+r)(-S_{i,t}) = G\left(\hat{\xi}_{i,t+1}\right)(1+\hat{r})(-S_{i,t}) + \left(1-G\left(\hat{\xi}_{i,t+1}\right)\right)p_{t+1}\left(1-\mathbb{E}\left(\xi_{i,t+1}|\xi_{i,t+1}>\hat{\xi}_{i,t+1}\right)\right)L_{j,t} \tag{A38}$$

where the expected payoff of holding household debt is equal to the repayment of the loan with interest in case the household does not default and the revenue from selling the collateral in case of default.

Then, the expectation of household i's consumption in period $t+1$, $c_{i,t+1}$, as formed at date t, becomes

$$\mathbb{E}_{j,t}\left(c_{i,t+1}\right) = (1+r)(S_{i,t}) + p_{t+1}\left(1-\mathbb{E}_{j,t}\left(\xi_{i,t+1}\right)\right)L_{j,t} \tag{A39}$$

Using that $\mathbb{E}_{j,t}\left(\xi_{i,t+1}\right) = \left(1-X_t\right)\mu\cdot\theta_{j,t}\gamma_{t+1}$, the household optimization problem can be written as

$$\begin{aligned}\max_{\tau_t}\mathbb{E}\left(U\left(L_{j,t},c_{i,t+1},X_t\right)\right) &= (1+r)\left(\left(1-\tau_t\right)y_{i,t}-p_tL_{j,t}\right) \\ &\quad + p_{t+1}\left(1-\left(1-X_t\right)\mu\theta_{j,t}\cdot\gamma_{t+1}\right)L_{j,t}+v\left(L_{j,t}\right)+f\left(\mathbb{E}_{j,t}\left(\bar{L}_{t+1}\right)\right) \\ s.t. \quad \tau_t &\geq 0\end{aligned} \tag{A40}$$

We abstract from path-dependency in public policy (i.e. $\partial\tau_{t+1}/\partial\tau_t = 0$). Moreover, we define

$$\pi_{j,t} \equiv f(\mathbb{E}_{j,t}(\cdot))/\partial\,\mathbb{E}_{j,t}(\cdot) \tag{A41}$$

and, for notational simplicity, we denote by $\tilde{\theta}_{j,t}$ the belief-weighted landholdings exposure of household j at time t .[31]

[31]This allows us to rewrite the first-order condition without explicitly tracking heterogeneity in landholdings across belief type.

Then, the FOC for τ_t is given by

$$-(1+r)y_{i,t} + \mu\tilde{\theta}_{j,t} \cdot \gamma_{t+1} \cdot (p_{t+1} + \pi_{j,t}) \cdot \frac{\partial X_t}{\partial \tau_t} + \underbrace{\left[-(1+r)p_t \cdot + p_{t+1}\left(1 - (1 - X_t)\,\mu\theta_j \cdot \gamma_{t+1}\right) + \frac{\partial v(L_{j,t})}{\partial L_{j,t}}\right]}_{=0} \cdot \frac{\partial L_{j,t}}{\partial \tau_t} = 0 \tag{A42}$$

where

$$\frac{\partial X_t}{\partial \tau_t} = \sqrt{\frac{[\phi q + (1-\phi)\,w]}{\tau_t \bar{L}_t}} \geq 0 \tag{A43}$$

Then, the optimal choice of adaptation rate of a young household of belief type j is

$$\tau_t^{Yj*} = \frac{1}{\bar{L}_t} \cdot [\phi q + (1-\phi)\,w] \cdot \left(\frac{\tilde{\theta}_j \cdot \mu\gamma_{t+1} \cdot (p_{t+1} + \pi_{j,t})}{(1+r)y_{i,t}}\right)^2 \tag{A44}$$

Old Households Old households maximize their expected utility, as given by

$$\begin{aligned} \max_{\tau_t} \mathbb{E}\left(U\left(c_{i,t},, X_t\right)\right) &= \mathbb{E}_t\left(c_{i,t}\right) + f\left(\mathbb{E}_{j,t}\left(\bar{L}_{t+1}\right)\right) \\ s.t. \quad c_{i,t} &\leq (1-\tau_t)\,y_t + \max\left\{p_t\left(1-\xi_{i,t}\right)L_{i,t-1} + (1+\hat{r})\,S_{i,t-1}, 0\right\} \\ \tau_t &\geq 0 \end{aligned} \tag{A45}$$

where $c_{i,t}$ is consumption of household i in period t and $\mathbb{E}_{j,t}$ denotes expectations formed at date t by belief type j.

Using similar steps as before, the maximization problem can be rewritten as

$$\begin{aligned} \max_{\tau_t} \mathbb{E}\left(U\left(c_{i,t+1}, X_t\right)\right) &= (1-\tau_t)\,y_t + (1+r)S_{i,t-1} \\ &\quad + p_{t+1}\left(1 - (1 - X_{t-1})\,\mu\theta_{j,t} \cdot \gamma_t\right)L_{i,t-1} + f\,\mathbb{E}_{j,t}\left(\bar{L}_{t+1}\right)\Big) \\ s.t. \quad \tau_t &\geq 0 \end{aligned} \tag{A46}$$

and the optimal choice of adaptation rate of an old household of belief type j is given by

$$\tau_t^{Oj*} = \frac{1}{\bar{L}_t} \cdot [\phi q + (1-\phi)\,w] \cdot \left(\frac{\tilde{\theta}_{j,t} \cdot \mu\gamma_{t+1} \cdot \pi_{j,t}}{y_{i,t}}\right)^2 \tag{A47}$$

C. Derivation of Lemma 3

The relative ordering of the adaptation rates follows directly from Assumption 1.

D. Derivation of Lemma 4

We assume that coalitions choose a adaptation rate that maximizes their joint utility function.

Coalition of Young Skeptics and Old Realists Consider first the coalition of young skeptics and old realists. This coalition maximizes:

$$\max_{\tau_t} \mathbb{E}\left(U_{Ys,Or}\right) = \omega \cdot \left(v\left(L_{Ys,t}\right) + \mathbb{E}_t\left(c_{Ys,t+1}\right)\right) + (1-\omega) \cdot \left(\mathbb{E}_t\left(c_{Or,t}\right)\right) + f\left(\mathbb{E}_{Ys,Or,t}\left(\bar{L}_{t+1}\right)\right) \tag{A48}$$

$$\begin{aligned} s.t. \quad & (1-\tau_t)\, y_{Ys,t} \leq p_t L_{Ys,t} + S_{Ys,t} \\ & c_{Ys,t+1} \leq (1-\tau_{t+1})\, y_{Ys,t+1} + \max\left\{p_{t+1}\left(1-\xi_{Ys,t+1}\right) L_{Ys,t} + \left(1+\hat{r}\right) S_{Ys,t}, 0\right\} \\ & c_{Or,t} \leq (1-\tau_t)\, y_{Or,t} + \max\left\{p_t\left(1-\xi_{Or,t}\right) L_{Or,t-1} + \left(1+\hat{r}\right) S_{Or,t-1}, 0\right\} \\ & \tau_t \geq 0 \end{aligned}$$

Using the no-arbitrage condition as in Lemma 2, the expectation of a young pessimists' consumption in period $t+1$, $c_{Ys,t+1}$, as formed at date t, becomes

$$\begin{aligned} \mathbb{E}_t\left(c_{Ys,t+1}\right) = (1+r)\left((1-\tau_t)\, y_{Ys,t} - p_t L_{Ys,t}\right) \\ + p_{t+1}\left(1-(1-X_t)\,\mu\cdot\theta_{Ys,t}\cdot\gamma_{t+1}\right) L_{Ys,t} + (1-\tau_{t+1})\, y_{Ys,t+1} \end{aligned} \tag{A49}$$

and the expectation of an old optimists' consumption in period t, $c_{Or,t}$, as formed at date t, becomes

$$\mathbb{E}_t\left(c_{Or,t}\right) = (1-\tau_t)\, y_{Or,t} + (1+r) S_{Or,t-1} + p_t\left(1-(1-X_{t-1})\,\mu\theta_{Or,t}\cdot\gamma_t\right) L_{Or,t-1} \tag{A50}$$

Using similar definitions as in Proof of Lemma 2, the FOC for τ_t becomes

$$\begin{aligned} \omega\left(-(1+r) y_{Ys,t} + \mu\tilde{\theta}_{Ys,t}\cdot\gamma_{t+1}\cdot p_{t+1}\cdot\frac{\partial X_t}{\partial\tau_t}\right) + (1-\omega)\left(-y_{Or,t}\right) \\ + \pi_{r,s,t}\cdot\left(\omega\cdot\mu\tilde{\theta}_{s,t}\cdot\gamma_{t+1} + (1-\omega)\cdot\mu\tilde{\theta}_{r,t}\cdot\gamma_{t+1}\right)\cdot\frac{\partial X_t}{\partial\tau_t} = 0 \end{aligned} \tag{A51}$$

Then, the adaptation rate preferred by a coalition of young skeptics and old realists is given by

$$\tau_t^{Ys,Or*} = \frac{1}{\bar{L}_t} \cdot \frac{1}{[\phi q + (1-\phi)\, w]} \cdot \left(\frac{\mu\gamma_{t+1} \left(\omega \tilde{\theta}_{s,t} p_{t+1} + \pi \cdot \left(\omega \cdot \tilde{\theta}_{s,t} + (1-\omega) \cdot \tilde{\theta}_{r,t} \right) \right)}{(1+\omega \cdot r)} \right)^2 \tag{A52}$$

Coalition of Young and Old Skeptics Using similar steps as above, the adaptation rate preferred by a coalition of young and old skeptics is given by

$$\tau_t^{Ys,Os*} = \frac{1}{\bar{L}_t} \cdot \frac{1}{[\phi q + (1-\phi)\, w]} \cdot \left(\frac{\tilde{\theta}_{s,t} \cdot \mu\gamma_{t+1} \left(\frac{1}{2} p_{t+1} + \pi_{s,t} \right)}{\left(1 + \frac{1}{2} r \right)} \right)^2 \tag{A53}$$

Coalition of Old Realists and Old Skeptics The adaptation rate preferred by a coalition of old realists and old skeptics is given by

$$\tau_t^{Or,Os*} = \frac{1}{\bar{L}_t} \cdot \frac{1}{[\phi q + (1-\phi)\, w]} \cdot \left(\mu\gamma_{t+1} \cdot \pi_{r,s,t} \cdot \left(\omega \cdot \tilde{\theta}_{s,t} + (1-\omega) \cdot \tilde{\theta}_{r,t} \right) \right)^2 \tag{A54}$$

E. Derivation of Lemma 5

Old households maximize their expected utility, as given by

$$\begin{aligned} \max_{\tau_t} \mathbb{E} \left(U \left(c_{y,t}, , \bar{L}_{t+1} \right) \right) &= \mathbb{E}_t \left(c_{y,t} \right) + f \left(\mathbb{E}_{j,t} \left(\bar{L}_{t+1} \right) \right) \qquad \text{(A55)} \\ s.t. \quad c_{y,t} &\leq (1-\tau_t)\, y + \max \left\{ p_t \left(1 - \xi_{y,t} \right) L_{y,t-1} + \left(1 + \hat{r} \right) S_{y,t-1}, 0 \right\} \\ \tau_t &\geq 0 \end{aligned}$$

where $c_{y,t}$ is the consumption of an old household with income $y \in \{w, q\}$ in period t and $\mathbb{E}_{j,t}$ denotes expectations formed at date t by belief type j.

Using similar steps as in Lemma 2, the optimal choice of adaptation rate of an old household of belief type j and with income y is given by

$$\tau_t^{Ojy*} = \frac{1}{\bar{L}_t} \cdot [\phi q + (1-\phi)\, w] \cdot \left(\frac{\mu \tilde{\theta}_{j,t} \cdot \gamma_{t+1} \cdot \pi_{j,t}}{y} \right)^2 \tag{A56}$$

We determine the relative ordering of the adaptation rates preferred by the different types of old households. Specifically, as $q > w$, we have that $\tau^{OOl*} > \tau^{OOh*}$ and $\tau^{OPl} > \tau^{OPh*}$.

Moreover, as $\bar{\theta} > \underline{\theta}$, we have that $\tau^{Orh*} > \tau^{Osh*}$ and $\tau^{Orl} > \tau^{Osl*}$. If it additionally holds that

$$\frac{q}{w} < \frac{\theta_{r,t}}{\theta_{s,t}} \cdot \frac{\pi_{r,t}}{\pi_{s,t}} \tag{A57}$$

then, the relative ordering of the adaptation rates preferred by old households is given by

$$\tau^{Orl*} > \tau^{Orh*} > \tau^{Osl*} > \tau^{Osh*} \tag{A58}$$

Otherwise, this becomes

$$\tau^{Orl*} > \tau^{Osl*} > \tau^{Orh*} > \tau^{Osh*} \tag{A59}$$

F. Derivation of Lemma A1

Lemma A1. *Let there be less young than old, skeptics represent a majority ($\omega > 0.5$), and high-income households are a minority ($\phi < 0.5$). Then, if it holds that*

Assumption 2.

$$\tilde{\Theta} > \underbrace{\frac{p_{t+1} + \pi_{s,t}}{\pi_{r,t} \cdot (1+r)}}_{\textit{Assumption 1}} \cdot \underbrace{\frac{q}{\phi \cdot q + (1-\phi) \cdot w}}_{\textit{Inequality multiplier}}. \tag{A60}$$

and economic inequality is sufficiently low, then we have that

$$\tau_t^{Yr*} > \tau_t^{Orl*} > \tau_t^{Orh*} > \tau_t^{Ys*} > \tau_t^{Osl*} > \tau_t^{Osh*} \tag{A61}$$

and the young skeptics are pivotal. The set of feasible coalitions is then:

(i) ***"High Ambition Coalition"****: Low-income, old realists ($(1-\phi)(1-\omega)$), high-income, old realists ($\phi(1-\omega)$) and young pessimists (ω), i.e. young skeptics and old realists.*

(ii) ***Mixed Coalition*** *($2(\omega - \phi\omega) + \phi$): high-income, old realists ($\phi(1-\omega)$), young skeptics (ω), and low-income, old skeptics ($(1-\phi)\omega$). We refer to this as the "mixed coalition".*[32]

[32]For $\omega > 0.5$, a mixed coalition is always larger - and thus politically more powerful than the high ambition coalition. Moreover, under Assumption 1, a mixed coalition is always politically more powerful than the low-ambition coalition.

(iii) ***"Low Ambition Coalition"*** *(2ω): Young skeptics (ω), low-income, old skeptics ($(1-\phi)\omega$), and high-income, old skeptics ($\phi\omega$), i.e. young and old skeptics.*[33]

If economic inequality is sufficiently high, and it holds that

Assumption 2*.

$$\tilde{\Theta} < \frac{p_{t+1} + \pi_{s,t}}{\pi_{r,t} \cdot (1+r)} \cdot \frac{q}{\phi \cdot q + (1-\phi) \cdot w}. \tag{A62}$$

then we have that

$$\tau_t^{Yr*} > \tau_t^{Orl*} > \tau_t^{Osl*} > \tau_t^{Ys*} > \tau_t^{Orh*} > \tau_t^{Osh*} \tag{A63}$$

and, the young skeptics are again pivotal. The set of feasible coalitions is then:

(i) ***"High Ambition Coalition*"*** *($1-\phi+\omega$): low-income, old realists ($(1-\phi)(1-\omega)$), young skeptics (ω), and low-income, old skeptics ($\omega(1-\phi)$), i.e. young skeptics and low-income old.*

(ii) ***Mixed Coalition**** *($2(\omega - \phi\omega) + \phi$): high-income, old realists ($\phi(1-\omega)$), young skeptics (ω), and low-income, old skeptics ($(1-\phi)\omega$) households. We refer to this as the "mixed coalition".*[34]

(iii) ***"Low Ambition Coalition*"*** *($\omega\phi$): Young skeptics (ω), high-income, old realists ($(1-\omega)\phi$), and high-income, old skeptics ($\phi\omega$), i.e. young skeptics and high-income, old.*

If Assumption 2 is not satisfied (in either case), the high-income, old realists emerge as pivotal group and the political equilibrium is characterized by the prevailing of the mixed coalition.

The adaptation rates that maximize joint utility of each coalition when economic inequality is sufficiently low are:

[33] If $\omega > 0.5$, the low-ambition coalition is always politically more powerful than the high ambition coalition. Hence, the high ambition coalition always has the least political power.

[34] If $\phi < \omega$, the high ambition coalition is always larger and thus politically more powerful than a mixed coalition.

1.

$$\tau_t^{Ys,Orh,Orl*} = A \cdot \left(\frac{\omega \tilde{\theta}_{s,t} p_{t+1} + \left(\omega \cdot \tilde{\theta}_{s,t} + (1-\omega) \cdot \tilde{\theta}_{r,t} \right) \cdot \pi_{r,s,t}}{(1+\omega r)} \right)^2,$$

2.

$$\tau_t^{Ys,Orh,Osl*} = A \cdot [\phi q + (1-\phi) w]^2 \cdot \left(\frac{\omega \cdot \tilde{\theta}_{s,t} p_{t+1} + \left(\omega(2-\phi) \cdot \tilde{\theta}_{s,t} + (1-\omega)\phi \cdot \tilde{\theta}_{r,t} \right) \cdot \pi_{r,s,t}}{\omega \cdot (1+r) \cdot [\phi q + (1-\phi) w] + (1-\omega)\phi \cdot q + \omega(1-\phi) \cdot w} \right)^2,$$

3.

$$\tau_t^{Ys,Osh,Osl*} = A \cdot \left(\frac{\tilde{\theta}_{s,t} \cdot \frac{1}{2} p_{t+1} + \pi_{s,t}}{\left(1 + \frac{1}{2} r\right)} \right)^2.$$

and the adaptation rates that maximize joint utility of each coalition when economic inequality is sufficiently high are:

1.

$$\tau_t^{Ys,Orl,Osl*} = A \cdot [\phi q + (1-\phi) w]^2 \cdot \left(\frac{\omega \cdot \tilde{\theta}_{s,t} p_{t+1} + \left(\omega(2-\phi) \cdot \tilde{\theta}_{s,t} + (1-\omega)(1-\phi) \cdot \tilde{\theta}_{r,t} \right) \cdot \pi_{s,r,t}}{\omega (1+r) [\phi q + (1-\phi) w] + (1-\phi) w} \right)^2,$$

2.

$$\tau_t^{Ys,Orh,Osl*} = A \cdot [\phi q + (1-\phi) w]^2 \cdot \left(\frac{\omega \cdot \tilde{\theta}_{s,t} p_{t+1} + \left(\omega(2-\phi) \cdot \tilde{\theta}_{s,t} + (1-\omega)\phi \cdot \tilde{\theta}_{r,t} \right) \cdot \pi_{s,r,t}}{\omega \cdot (1+r) \cdot [\phi q + (1-\phi) w] + (1-\omega)\phi \cdot q + \omega(1-\phi) \cdot w} \right)^2,$$

3.

$$\tau_t^{Ys,Orh,Osh*} = A \cdot [\phi q + (1-\phi) w]^2 \cdot \left(\frac{\omega \cdot \tilde{\theta}_{s,t} p_{t+1} + \left(\omega(1+\phi) \tilde{\theta}_{s,t} + (1-\omega)\phi \cdot \tilde{\theta}_{r,t} \right) \cdot \pi_{s,r,t}}{\omega (1+r) [\phi q + (1-\phi) w] + \phi q} \right)^2.$$

Alternatively, if Assumption 2 is not satisfied (in either case), the adaptation rate that maximizes the joint utility of the prevailing coalition is given by $\tau_t^{Ys,Orh,Osl*}$.

A3. Additional Simulations: Extended Model

A. Gradually Increasing Inequality

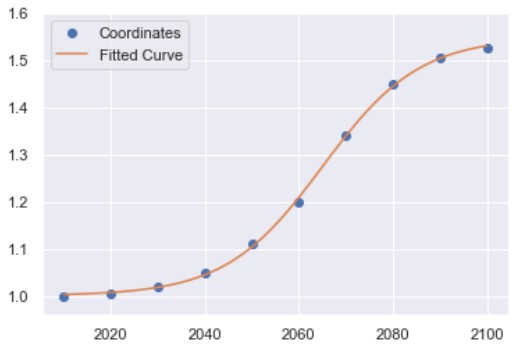


FIGURE 9: **The evolution of the inequality multiplier following a fitted S-curve in the extended model.**

B. Escalating Inequality

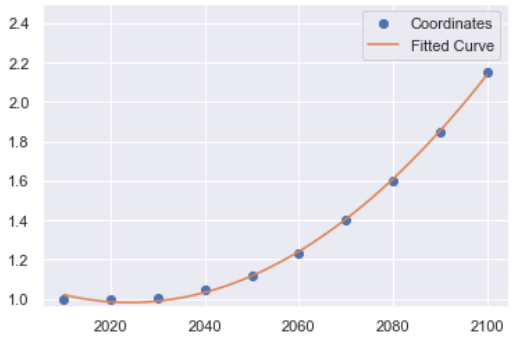


FIGURE 10: **The evolution of the inequality multiplier following a convex curve in the extended model..**

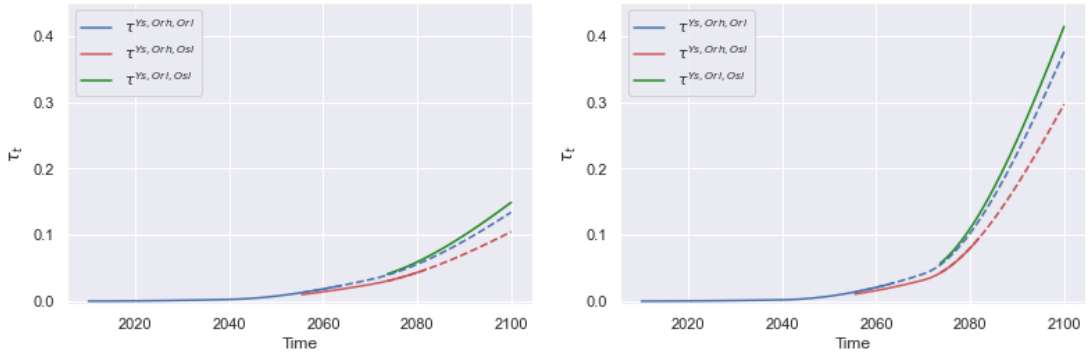


FIGURE 11: **Tipping of the adaptation rate**

KEY: THE TIME PATH FOR THE ADAPTATION RATE WHEN THE POLITICAL EQUILIBRIUM TIPS AROUND 2050, AND 2080, UNDER SSP1-2.6 (LEFT PANEL), AND SSP3-7.0 (RIGHT PANEL), WHEN INEQUALITY RISES AT AN INCREASING RATE.