Inheritance, Entrepreneurship, and Estate Taxation

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Abstract. *In this paper, I investigate the efficiency and distributional implications of estate taxation in a quantitative model that incorporates a non-homothetic bequest motive, entrepreneurship, and the transmission of ability across generations. The benchmark model is governed by novel empirical findings on the heterogeneity in the relative importance of inheritance, which I document from the data. To further emphasize the significance of these new empirical moments, I also calibrate an alternative model with an identical setup, but is not disciplined by these empirical moments. Two key findings emerge from this analysis. First, the aggregate effects of changing the estate tax in the benchmark model are limited. Specifically, increasing the estate tax rate from 0 to 1 results in a change in aggregate output from 0.50% to -0.32%. In contrast, in the alternative model, the change in output ranges from 0.79% to -1.99%. Second, the share of wealth held by the richest 1% generally increases with the estate tax in the benchmark model. This trend is reversed in the alternative model, where the wealth share of the top 1% decreases monotonically as the estate tax rate rises.*

Keywords*: inheritance, intergenerational links, household wealth, inequality, entrepreneurship, estate taxation.*

JEL Codes*: D14, D31, D64, E21, H21.*

1. Introduction

How should we tax estates? This question has been a focal point of controversial policy debates for many years. Proponents of the estate tax argue that it serves as a vital mechanism for reducing wealth inequality by directly targeting the rich. For instance, the American Housing and Economic Mobility Act of 2024 proposes increasing the estate tax as part of broader efforts to ensure that wealthy individuals contribute more[1]. Conversely, opponents characterize the estate tax as a 'death tax,' contending that it hinders business activity and job creation. They advocate for reducing or even repealing the estate tax altogether. For example, in January 2024, House Republicans reintroduced legislation aimed at permanently abolishing the federal estate tax through the proposed Death Tax Repeal Act[2].

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[1] *Forbes*: Kamala Harris Endorses American Housing and Economic Mobility Act Tax Proposals

[2] *CNBC*: House Republicans Reintroduce Bill to Repeal 'Death Tax'

To effectively address the question of how to tax estates and assess the impact of estate taxation, it is crucial to understand the roots of pronounced wealth inequality, specifically, whether fortunes are inherited or self-made. In light of this, this paper makes two key contributions. First, it documents new facts about the inheritance patterns of wealthy households. Second, by employing a quantitative model disciplined by these new empirical findings, it examines the effects of changing estate taxation on aggregate output, inequality, and welfare.

The key finding is that the wealth inequality, measured as the share of wealth held by the top 1%, is overall increasing with the estate tax rate. This result contrasts with findings from previous literature that examines the effects of estate taxation in quantitatively calibrated models. To understand where this divergence comes from, I also calibrated an alternative model that is not governed by these new empirical moments. The distributional effects of changing the estate tax in this alternative model are consistent with the literature, showing that the wealth share of the top 1% decreases monotonically as the estate tax rate rises. The differing policy implications between the benchmark and alternative models arise because the role of inheritance in generating wealth concentration at the top is not constrained by the new empirical moments in the alternative model. As a result, the alternative model tends to overstate the effect of inheritance on wealth accumulation for the very rich.

Previous empirical studies have mainly focused on the overall value of inheritances, documenting that rich households receive a significant share of wealth transfers (see, for example, Feiveson and Sabelhaus (2018)). Instead, this paper focuses on the inheritance patterns among the top wealth holders. I find that even though richer households tend to receive larger amounts of inheritance, the relative importance of inheritance is less significant for them, as wealthy heirs inherit less relative to their own wealth. Specifically, using the Survey of Consumer Finances data (SCF), I document that inheritances account for, on average, just 13% of the net worth of the richest one percent.[3] Moreover, over half of the wealthiest one percent have not received any inheritance during their lifetime.

Relying solely on these empirical moments does not provide a complete understanding of the effects of changing estate taxation. An emerging body of research highlights substantial and persistent differences in individual returns to wealth (e.g., Bach et al. (2020), Fagereng et al. (2020), Hubmer et al. (2020)). Both theoretical and empirical studies have demonstrated that the rate of return heterogeneity is a key mechanism for generating the highly skewed wealth distribution observed in the U.S. economy (e.g., Benhabib et al. (2019)). Following this logic, inheritances received in the past may have served as the "seed capital" for current wealth accumulation among the rich, amplified over time by their high rates of return. Thus, while the immediate contribution of inheritance to wealth appears modest due to a low inheritance-to-wealth ratio, increasing the estate tax rate could potentially reduce wealth inequality by limiting the wealth accumulated through inheritance. However, this complex dynamic cannot be directly observed in the data, necessitating the use of a formal model to explore these interactions.

[3]Intergenerational wealth transfer includes both inter vivos gifts and bequests. However, throughout this paper, I will interchangeably use the two terms: inheritance and intergenerational wealth transfer. From the Survey of Consumer Finances data, around 85% of intergenerational transfers are in the form of inheritances. Therefore, in this paper, the term *inheritance* is used to refer to the total intergenerational wealth transfers a household receives.

To address this gap, I develop a heterogeneous agent, general equilibrium, overlapping generations model that explicitly incorporates occupation choice between wage work and entrepreneurship, a non-homothetic bequest motive, and intergenerational transmission of ability. The model features two key components. First, the model incorporates a non-homothetic bequest function and the coexistence of parents and children. This modeling choice allows for a more nuanced perspective on the timing and incidence of inheritances. Children observe their parents' state variables, allowing them to infer the size of the bequest they are likely to receive in the future. Consequently, inheritance influences children's optimal decisions both directly, by altering their wealth holdings, and indirectly, through its anticipated effects. Second, return heterogeneity, a well-documented concept in the literature, is explicitly modeled as entrepreneurial activities, which serve as a driver of differences in wealth accumulation over time. By modeling entrepreneurship as a source of return heterogeneity, the framework provides a nuanced understanding of how inheritances and entrepreneurial returns jointly shape wealth inequality and broader economic outcomes.

The model is then calibrated to match not only the standard moments related to wealth and entrepreneurship but, importantly, the new empirical findings documented in the data. This calibrated model successfully reproduces all key characteristics of U.S. data, thereby establishing itself as a good laboratory to study the effects of estate taxation. Additionally, to emphasize the significance of the new empirical evidence regarding inheritance patterns, I explore an alternative model. The structure of this alternative model is identical to that of the benchmark model, but without calibration to the new empirical moments regarding inheritance receipt. This alternative model is also capable of generating a highly skewed wealth distribution that closely resembles what is observed in the data.

The policy counterfactual analysis is conducted in the long-run steady state by varying the estate tax rate from 0 to 1 while fixing the estate tax exemption level at its baseline value. Additional tax revenues are redistributed among all households through a lump-sum transfer. Two key findings emerge. First, the aggregate effects of changing the estate tax rate are more pronounced in the alternative model. In the benchmark model, increasing the estate tax rate from 0 to 1 results in a change in aggregate capital that shifts from 3.16% to -1.78%, which in turn leads to a change in aggregate output from 0.50% to -0.32%. However, in the alternative model, the changes in capital range from 4.41% to -9.67%, corresponding to a change in output from 0.79% to -1.99%. Second, and notably, the wealth share held by the richest 1% exhibits a non-linear trend in relation to the estate tax in my benchmark model. Specifically, the wealth share of the top 1% generally increases with the tax rate, except at the extreme tax rates. This finding contrasts with previous literature. In contrast, the distributional effect pattern in the alternative model is consistent with existing literature, demonstrating that the wealth share held by the top 1% monotonically decreases as the estate tax rate increases.

The diverging effects from changing the estate tax between the benchmark model and the alternative model stem from the different strength of inheritance in generating wealth concentration at the top. In the benchmark model, the role of inheritance in wealth concentration is governed by two key moments: the inheritance-to-wealth ratio for the richest 1% is 0.13, and 87% of this wealth group either receive no inheritance at all or have small inheritances with an inheritance-to-wealth ratio less than 0.2. The benchmark model successfully matches these two moments and reproduces the observation that only about 4% of the richest 1% have an inheritance-to-wealth ratio greater than 1. In contrast, the calibration of the alternative model does not incorporate these new empirical moments, which leads it to overstate the role of inheritance in wealth accumulation among the rich. For instance, the inheritance-to-wealth ratio for the richest 1% in the alternative model reaches as high as 0.66, which is more than five times the observed value. Furthermore, 16% of the richest 1% are found to have large inheritances with an inheritance-to-wealth ratio exceeding 1. As a result, the saving behavior of the very wealthy is more sensitive to changes in estate taxation in the alternative model, causing the wealth share at the top to decrease monotonically with the estate tax rate.

All households in the top 5% are subject to the estate tax in both the benchmark and alternative models. Reducing the estate tax increases the return on leaving bequests for the wealthy, making rich households to accumulate greater wealth. However, in the benchmark model, the increase in wealth among households with large bequests in the top 1% is not as substantial as the increase in wealth among households in the 95th to 99th wealth percentile group, given that the inheritance-to-wealth ratio for the richest 1% is approximately 0.13, while the ratio for the 95th to 99th wealth percentile group is 0.22. Consequently, the overall wealth share of the top 1% decreases as the estate tax rate is lowered in the benchmark model.

Additionally, I calculate the optimal estate tax rate that maximizes welfare, as measured by consumption equivalent variation in the new steady state. The resulting tax rate is 0.75. When comparing the new steady state with a tax rate of 0.75 to the baseline economy, I find only a modest welfare gain of 0.02% of consumption equivalent per year for newborns in the benchmark calibration. The implementation of the welfare-maximizing estate tax rate yields disparate effects across households with different innate abilities. Newborns with high innate ability face a welfare loss, largely because they tend to be born into wealthy families where their parents similarly possess high innate ability due to the intergenerational transmission of skills. Additionally, these high-ability newborns are likely to accumulate significant wealth in the future as a result of their considerable innate potential. As a consequence, these households experience a reduction in utility, not only due to receiving lower net estates but also because the utility they can get in the future by leaving bequests is reduced. In contrast, the remaining newborns experience a welfare gain as a result of the higher estate tax rate.

The objective of this paper is not to quantify the role of inheritance in wealth concentration per se, but to highlight the importance of incorporating new empirical evidence on inheritance receipt patterns among the wealthy into economic models. The result of this paper indicates that whether or not including these inheritance moments in calibrating the model to inform the interaction between entrepreneurship and inheritance can result in different policy implications for estate taxation.

The rest of the paper is organized as follows. Section 2 frames the contribution of this paper in the context of the previous literature. Section 3 presents motivating facts on inheritances received by the rich. Section 4 lays out the quantitative model and defines the equilibrium. Section 5 discusses the calibration procedure and evaluates the fit of the model against a number of important features of the data. The core of my analysis, the policy experiments, is presented in Section 6. Section 7 concludes.

2. Related Literature

In this paper, I first document facts regarding inheritances received by wealthy households. Then, I develop a heterogeneous agent general equilibrium OLG model that incorporates bequest motives and entrepreneurship to investigate the effects of estate taxation. This research contributes to the macroeconomic literature in several key ways.

This paper adds to the empirical work on intergenerational wealth transfers. The previous studies focus on the aggregate evidence either by studying intergenerational transfers as an essential determinant of household wealth in the overall economy (e.g., Kotlikoff and Summers (1981), Gale and Scholz (1994), Davies and Shorrocks (2000), Brown and Weisbenner (2004)) or by looking at the aggregate value of inheritance received by the rich (e.g., Feiveson and Sabelhaus (2018)). Previous research highlights that intergenerational transfers, particularly bequests, are substantial and predominantly received by rich households. The literature finds that around 40% of the U.S. capital stock is attributable to intergenerational transfers.[4] As for the concentration of bequests, the intergenerational transfers reported by the richest ten percent are seven times as high as those reported by the bottom half of the wealth distribution (e.g., Feiveson and Sabelhaus (2018)). Rather than solely examining aggregate moments related to inheritance, my study delves deeper into the heterogeneity of the relative importance of inheritance. I demonstrate that while wealthier heirs inherit larger amounts, the relative significance of inheritance is greater for less affluent heirs, who inherit more relative to their wealth. This finding is consistent with the observation made by Elinder et al. (2018) using population register data in Sweden. Another closely related study is Hurd and Mundaca (1989), which examines the importance of inheritances for individual wealth holdings but focuses specifically on income-rich households. Furthermore, Wolff and Gittleman (2014) also discusses inheritances as a proportion of current net worth. But they focus on the aggregate economy and investigate how inheritances as a share of household wealth change over time. My paper completes the literature by characterizing the features of inheritance received by the richest few.

This paper contributes to the body of literature examining the effects of estate taxation within quantitatively calibrated models with incomplete markets and heterogeneous agents. This includes studies by Nishiyama (2002), Castañeda et al. (2003), Cagetti and De Nardi (2009), De Nardi and Yang (2016). What sets my approach apart is that, unlike these quantitative studies, which primarily calibrate their models to match moments on inheritance for the overall economy, my model is further governed by new moments on inheritance received by the rich. The findings of this paper diverge from previous literature, highlighting the critical importance of integrating these new empirical moments to discipline the model. This integration informs the underlying interplay between inheritance and other mechanisms that contribute to wealth concentration. Additionally, these new moments yield important implications for revising estate taxation policies, emphasizing the need for a nuanced understanding of how inheritance shapes wealth dynamics in the economy.

[4] Kotlikoff and Summers (1981) estimate that around 80% of the U.S. capital stock is attributable to intergenerational transfers. Even though Modigliani (1988) reaches a different conclusion, claiming that less than 20% of wealth can be attributed to transfers, this discrepancy is mainly due to methodological issues. After summarizing the findings of the literature, Davies and Shorrocks (2000) conclude that inheritances are responsible for approximately $35\% - 45\%$ of aggregate wealth.

Lastly, this paper contributes to the extensive literature on wealth distribution and the sources contributing to the highly skewed wealth inequality observed in the U.S. economy. For instance, Castaneda et al. (2003) demonstrate that a temporary high earning state can create a significantly skewed wealth distribution. Additionally, studies by Cao and Luo (2017), Benhabib et al. (2019), and Hubmer et al. (2020) provide quantitative assessments of the contribution of rate of return heterogeneity to wealth concentration. Works such as Quadrini (2000) and Cagetti and Nardi (2006) explicitly model entrepreneurship to generate wealth distribution, while research like that of De Nardi (2004) seeks to explain skewed wealth distribution through parental background and bequests. A recent study by Kaymak et al. (2022) evaluates the relevance of various macroeconomic modeling approaches to wealth concentration. In my model, I incorporate not only the key mechanisms identified in the literature as drivers of wealth concentration but also emphasize the interplay between these channels. In particular, the relationship between inheritance and entrepreneurship among the rich is further guided by new empirical moments, providing novel insights into the dynamics of wealth accumulation and distribution.

3. Motivating Facts

This section characterizes the features of inheritances received by rich households that will serve as inputs for the calibration of the quantitative model. I present a series of empirical findings following a brief overview of my primary data source and methodology. Discussions regarding the robustness of these findings are included in the final part of this section.

3.1. Data and Methodology

The primary data source is the Survey of Consumer Finances (SCF) 1989-2019, a cross-sectional survey conducted every three years. I compute the statistics by pooling across all years.[5] SCF asks interviewees to provide details for up to three inheritances, gifts, or trusts they have received: the year in which the transfer was received, the value of the transfer when received, and the type of the transfer.[6] Given that more than 85% of transfers are in the form of inheritances, I use the term *inheritance* in this paper to refer to the total wealth transfers (bequests and inter vivos) received by a household. Therefore, all results presented herein can be regarded as an upper bound.

Adopting the standard approach in the literature (e.g., Brown and Weisbenner (2004), Wolff and Gittleman (2014)), I apply a 3% real interest rate to calculate the present value of each inheritance. This calculation is based on both the reported value and the date of receipt. I then aggregate the value of all past inheritances received by each household. Finally, I directly estimate the fraction of wealth attributable to inheritances by taking the ratio of these two. The wealth concept used here is net worth, defined as the current value of all marketable assets less the current value of debts. Both the value of wealth and the value of inheritances are in 2019 dollars. As Brown and Weisbenner (2004) discusses, this direct estimation method computes the maximum possible

[5]The group of interviewees changes in each survey year. However, similar results are obtained using the data from every survey year.

[6]The type of transfers in the SCF is defined as bequest or inter vivos.

portion of current household wealth that could be derived from past inheritances, assuming that all received inheritances, along with their accumulated interest, have been saved until the present.

On average, from 1989 to 2019, 21% of households in the U.S. received an inheritance at some point in the past, contributing to approximately 43% of their net worth. To investigate the total inheritances received over a lifetime, the facts presented next focus on households who are at least 60 years old and do not expect to receive a substantial inheritance or transfer of assets in the future. Over the lifetime, about 30% of households could expect to receive an inheritance, and these inheritances constitute nearly 49% of their net worth.

3.2. Facts

Fact 1. The size distribution of inheritances received over a lifetime is highly skewed.

Most households do not receive any inheritances, as evidenced by more than 70% of households report having zero inheritance. At the other end of the size distribution, 10% of households receive inheritances that account for almost 90.6% of total dollars inherited. The top one percentile in the inheritance size distribution accounts for a staggering 54.3% of the total dollars inherited. On average, 2.9% of inheritances, by count, exceed the top decile cutoff value in a given year's wealth distribution, representing 68.8% of the total dollars inherited.

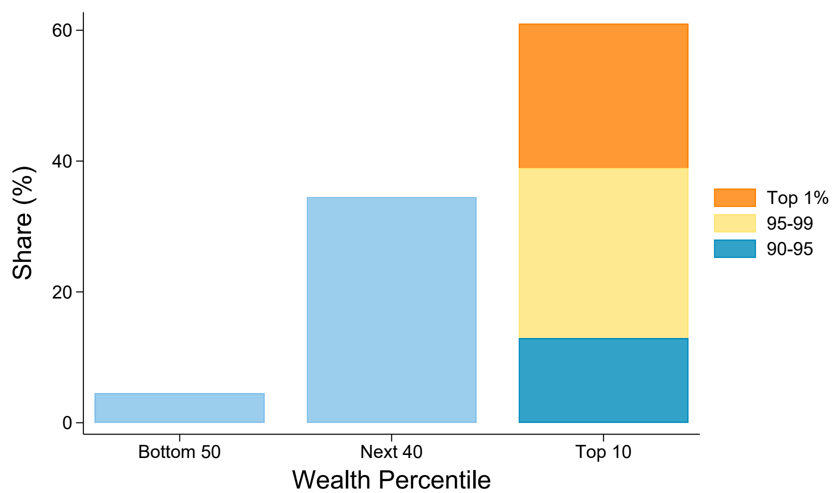

Figure 1. Concentration of Inheritances Received by Wealth

Notes: This figure illustrates the percentage of aggregate inheritances received by different household groups, categorized according to percentiles of the wealth distribution. Specifically, I focus on households within each wealth group who are at least 60 years old and do not anticipate receiving a substantial inheritance in the future.

Fact 2. The majority of inheritances predominantly flow to wealthy households.

Figure 1 displays the share of total inheritances received by households in different wealth groups. Households in the top decile of the wealth distribution receive a substantial 61% of the total dollars inherited. Furthermore, the wealthiest one percent alone holds 22.1% of these inheritances. In stark contrast, households in the bottom half of the wealth distribution receive less than 5% of the total amount inherited.

Fact 3. Inheritances received by rich households account for a small fraction of their wealth holding.

Facts 1 and 2 present aggregate moments about inheritance that are consistent with previous findings (see, for example, Feiveson and Sabelhaus (2018)). I then examine the relative importance of inheritance among the wealthy, introducing new empirical facts. The fraction of wealth directly accounted for by inheritances is calculated as the ratio of the present value of inheritance to the current net worth. I compute this statistic using households in the top decile wealth group who are at least 60 years old and do not expect to receive a substantial inheritance or transfer of assets in the future. As shown in Table 1, less than 20% of the wealth of the richest ten percent can be directly attributed to transfers. Among households in the top one percentile, this fraction is even smaller, at approximately 13%.

Wealth top decile	Sub-groups in top decile		
	$90-95$	$95-99$	Top 1%
0.18	0.24	0.22	0.13

Table 1. Ratio of Inheritances to Current Net Worth

Notes: $1989-2019$ SCF data. This table presents the ratio of inheritance to the current net worth for households in each top wealth group. The focus is on households that are at least 60 years old and do not expect any substantial future inheritance or asset transfer. Inheritances are calculated as their present value, applying a 3% real interest rate, and based on both the reported value and the date of receipt. Since the net worth values are expressed in 2019 dollars, the value of the inheritance is also converted to 2019 dollars for consistency.

Fact 4. Half of the rich households do not receive any inheritances over their lifetime.

Figure 2 shows the number of households within each inheritance-to-wealth ratio bin, reported as a fraction of the total number of households in each wealth group. Notably, 52% of households in the top one percent by wealth do not receive any inheritances throughout their lifetime. Additionally, approximately 35% of the wealthiest one percent receive inheritances that account for less than one-fifth of their wealth. Less than 10% of the top one percent fall into the category where inheritances account for at least half of their current net worth. Similar patterns are also observed in households within the wealth $90-95^{th}$ and $95-99^{th}$ percentile groups.

The primary insight derived from the SCF data is that wealthier heirs tend to receive larger inheritances (Facts 1 and 2); however, the relative importance of inheritance is less significant for them, as they inherit less relative to their own net worth (Facts 3 and 4). In fact, nearly 90% of the wealthiest one percent either received no inheritances or only a small amount relative to their current net worth. Facts 1 and 2 are well-established in the existing literature, whereas Facts 3 and 4 provide new insights. I conducted various robustness checks using the SCF data, which are detailed in Appendix A. Additionally, to further validate these findings, I employed data from the Panel Study of Income Dynamics (PSID) from 1984, which yielded similar results. A detailed description of the sample, along with the corresponding results, is provided in Appendix B.

My findings are also consistent with the observations made by Korom et al. (2017). Using data from the annual American Forbes 400 ranking (1982-2013), Korom et al. (2017) noted that 55% of the fortunes on this list are self-made, defined as those built entirely from scratch. Furthermore, their finding indicates that approximately 60-70% of multimillionaires originate from backgrounds where their parents were blue-collar workers or from lower-middle or middle-class families, rather than wealthy ones.

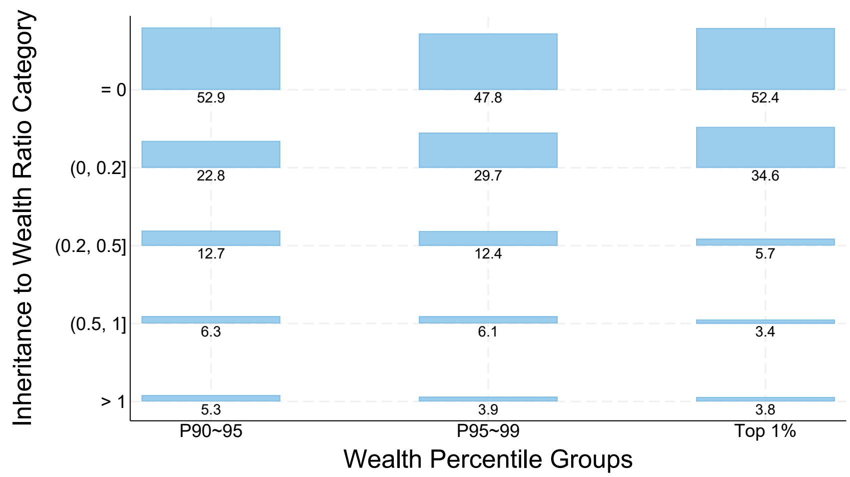

Figure 2. Share of Households in Each Inheritance-to-Wealth Ratio Category

Notes: This figure shows the number of households within each inheritance-to-wealth ratio bin, reported as a fraction of the total number of households in different wealth groups. More precisely, there are three subgroups of households within the top decile of wealth distribution: $90-95$ percentile, $95-99$ percentile, and the top 1%. In each wealth group, households, who are at least 60 years old and do not expect to receive a substantial inheritance or transfer of assets in the future, are divided into five categories according to the ratio of inheritances they received to their current net worth. The y-axis shows the share of households that belong to each category.

3.3. Discussions

The concerns regarding the empirical findings of this paper are as follows. First, the results are derived using a 3% real interest rate to compute the present value of inheritances. There is a concern that wealthier households may have access to better investment portfolios yielding higher returns, which could elevate the role of inheritance in their wealth accumulation. Hubmer et al. (2020) estimates that the expected excess return on net worth for households in the top decile of wealth distribution ranges from 3% to 6%. As a robustness check, I recalculated all statistics using a 6% real interest rate to compute the present value of inheritances.[7]

When using the higher interest rate, all figures in Table 1 increase. This increase is expected, as the denominator (households' current net worth) remains constant while the numerator (present value of inheritances) grows due to the higher interest rate. However, as Figure 3 indicates, the inheritances of most wealthy individuals remain small relative to their wealth holdings. Firstly, regardless of the interest rate used, half of the wealthy received no inheritance, making the interest rate irrelevant for them. Secondly, when applying a 6% real interest rate, the proportion of the richest one percent with an inheritance-to-wealth ratio below 0.2 decreases only slightly, from 34.6% to 30.5%. This suggests that most wealthy households received only small inheritances relative to their wealth. My conclusion, that the relative importance of inheritance is less significant for the wealthy, is robust. It stems from the fact that half of this group inherited nothing and a third received only small inheritances compared with their wealth. This finding holds true even when a higher real interest rate is used for the present value calculations of inheritances.

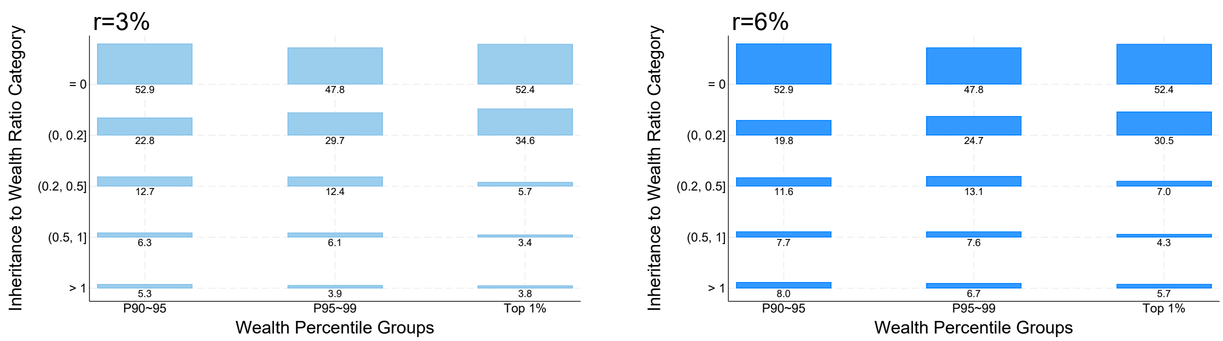

Figure 3. Share of Households in Each Inheritance-to-Wealth Ratio Category

Notes: This figure shows the number of households within each inheritance-to-wealth ratio bin, reported as a fraction of total number of households in different wealth groups. The x-axis categorizes households into three subgroups within the top decile of the wealth distribution: the $90^{th} - 95^{th}$ percentile, the $95^{th} - 99^{th}$ percentile, and the top 1%. On the y-axis, households in each of these wealth groups are classified into five categories based on the ratio of inheritance received to their current net worth. For example, the number 52.9 in the first column indicates that 52.9% of households in the $90^{th} - 95^{th}$ wealth percentile have an inheritance-to-wealth ratio of 0. The sum of the percentages in each column equals 100. Present value of inheritance in the left panel of the figure is computed using a 3% real interest rate. This panel contains the same information as Figure 2. The right panel, on the other hand, calculates the present value of inheritance using a 6% real interest rate.

Another potential issue with the data is underreporting of received inheritances. Recall error is a possible cause of this. The SCF collects information on bequests and gifts received by individual households in a retrospective way, which can lead to underreporting, particularly for small inheritances received long ago. However, the likelihood of recall error decreases for larger inheritances. de Nicola and Giné (2014) investigates the accuracy of recall data by comparing administrative

[7] According to the estimates by Hubmer et al. (2020), the mean excess returns for households in the 90^{th} to 99^{th} percentile are lower than 6%, but I use the 6% rate for all households, treating this as an upper bound analysis.

records with retrospective, self-reported survey responses. Their findings suggest that higher-value variables are more accurately recalled.[8] My paper, which focuses on inheritances received by the very wealthy, deals primarily with significant-value inheritances, thereby suffering less from recall error. The second factor that might lead to underreporting is tax avoidance. Nevertheless, the SCF, being a cross-sectional household survey, does not delve into detailed questions about household tax filings or liabilities. As a result, respondents have less motivation to misreport their inheritance in this survey context.

4. Model

While the data indicate a relatively small inheritance-to-wealth ratio among the wealthiest households, this observation alone is insufficient to conclude that inheritance plays a minor role in wealth accumulation. Inheritances, even when modest, can serve as pivotal "seed capital," enabling households to establish businesses or alleviate financial constraints faced by incumbent entrepreneurs. The high returns generated from entrepreneurial activities can significantly amplify wealth, propelling these households into the ranks of the wealthy. Without inheritances, these pathways to wealth accumulation may become inaccessible. Thus, despite a seemingly small inheritance-to-wealth ratio, inheritances could still play a crucial role in driving wealth concentration. However, this underlying mechanism is not directly observable in the data. At present, it is unclear which perspective holds true: that inheritance is unimportant due to its modest immediate contribution to wealth, or that it is critical because it provides the seed capital necessary for substantial wealth accumulation. To resolve this ambiguity, a quantitative model calibrated to capture the key features of wealth distribution and inheritance patterns is necessary.

To analyze these dynamics, I develop a heterogeneous agent, general equilibrium model that explicitly incorporates entrepreneurship as a central mechanism driving return heterogeneity. Additionally, the overlapping generations framework integrates a non-homothetic bequest function, enabling a more nuanced analysis of the timing and effects of inheritances. In this model, children observe their parents' state variables, which allows them to form expectations about the size of the bequest they are likely to receive. As a result, inheritance influences wealth not only directly, by increasing children's wealth holdings upon receipt, but also indirectly, by shaping their expectations and subsequent decision-making. This comprehensive framework facilitates an in-depth examination of how inheritances and entrepreneurial returns jointly contribute to wealth concentration and broader economic outcomes.

4.1. Demographics and Preferences

Time is modeled as discrete, with each period corresponding to one year. The economy consists of a government, a representative corporate firm, and overlapping generations of households, who are heterogeneous in their productivity levels. Parents and children are linked through both bequests and the intergenerational transmission of a portion of the parents' productivity.

Agents enter the economy at the age of 25 ($t = 1$) and have children at age 35 ($t = 11$). During their working years, agents make occupation choices between wage employment and entrepreneurship in each period. Upon reaching age 60 ($t = 36$), agents are mandatorily retired,

[8] The data they use are on earnings. They find that monthly earnings higher than the median are better recalled.

and their children enter the economy. From that period on, each household faces an age-dependent probability of death (Ω_t). To simplify computations, the model assumes a zero mortality rate before age 60, reflecting the small share of adults in the U.S. who die before this age. This assumption has negligible effects on my results. Agents face a mortality rate of 1 at age 95, meaning they die with certainty by this age. Additionally, since the analysis is conducted in a stationary environment, variables are indexed only by model age (t), and the time index is omitted for clarity.

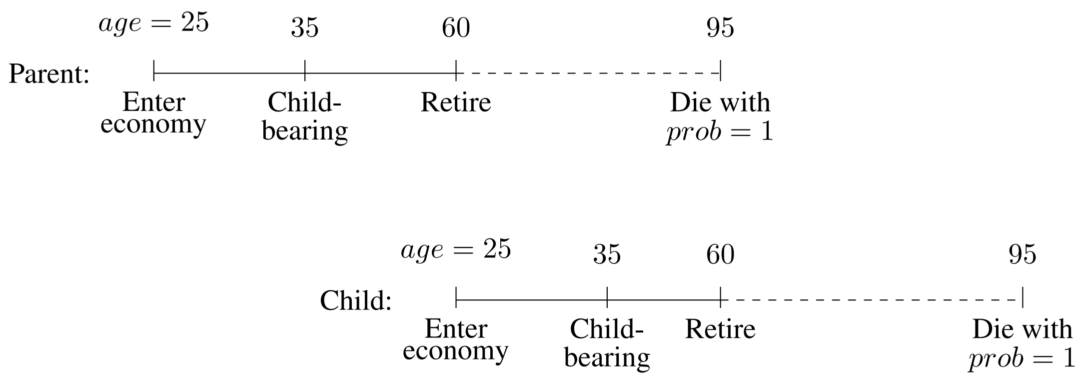

Figure 4. Life Cycle of the Model

Preferences are time-separable, with a constant discount factor, β. The utility derived from consumption in each period is represented by the following function:

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

where c denotes consumption, and σ is the coefficient of relative risk aversion, capturing the curvature of the utility function.

Moreover, parents derive utility from leaving bequests to their children, which are subject to estate taxes. The utility from leaving a bequest, net of estate taxes, b, is given by

$$\nu(b) = \phi_1 \cdot [(b + \phi_2)^{1-\sigma} - 1] \tag{2}$$

where ϕ_1 represents the strength of the bequest motive, indicating the relative weight parents place on bequests compared to consumption, and ϕ_2 reflects the extent to which bequests are luxury goods, with higher values of ϕ_2 implying that households are more willing to leave larger bequests as their wealth increases.

4.2. Endowments

Households are endowed with one unit of time each period. In addition, each household possesses two types of skills: one that determines their productivity as a worker and another that governs their productivity in entrepreneurial activities. As a result, households make occupation choices at each period during their working years, based on these two skills as well as other state variables.

Labor Market Productivity: Labor market productivity for individual i at age t, denoted by ω_{it}, is specified as follows:

$$\log(\omega_{it}) = \log(\kappa_i) + \log(g(t)) + \log(s_{it}) \tag{3}$$

where κ_i is an individual fixed effect, $g(t)$ is an exogenous age-dependent component that is common to all individuals, and s_{it} is a persistent idiosyncratic working productivity shock that follows an AR(1) process:

$$log(s_{it}) = \rho_s \log(s_{i,t-1}) + \epsilon^s_{it}, \quad \epsilon^s_{it} \sim \mathcal{N}(0, \sigma^2_{\epsilon_s}) \tag{4}$$

The permanent component, κ_i, is imperfectly inherited from parents:

$$log(\kappa_i^{\text{child}}) = \rho_\kappa \log(\kappa_i^{\text{parent}}) + \epsilon^\kappa_i, \quad \epsilon^\kappa_i \sim \mathcal{N}(0, \sigma^2_{\epsilon_\kappa}) \tag{5}$$

Due to the imperfect transmission of ability, the intergenerational link in this model operates through two channels: bequests and ability. Notably, the imperfect transmission of ability means that some low-ability children may inherit substantial fortunes from their high-ability parents, while some high-ability children will inherit little wealth from their low-ability parents.

Entrepreneurial Productivity: The entrepreneurial productivity for individual i at age t, denoted by Q_{it}, is given as:

$$\log(Q_{it}) = \log(\kappa_i) + \log(q_{it}) \tag{6}$$

where κ_i, again, the permanent innate productivity, which can be partially inherited from parents, and q_{it} is the idiosyncratic business productivity shock that evolves according to a Markov chain. The idiosyncratic shock q_{it} is assumed to be independent of the individual's ability as a worker, as represented by both $g(t)$ and s_{it}.

4.3. Technologies

Entrepreneurial Sector: Households must pay a fixed one-time entry cost, C_{entry}, to start a business. Once they enter entrepreneurship, they produce using a decreasing returns to scale production function:

$$f(k, n) = Q\Big(k^\alpha(\omega + n)^{1-\alpha}\Big)^\eta \tag{7}$$

where $\eta < 1$ is the span-of-control parameter. A fraction η of the output is allocated to factor inputs, with a share α going to capital and $1 - \alpha$ allocated to labor. The production function also allows entrepreneurs to supply their own labor, ω, as an input to production, in addition to hiring external labor, n. Entrepreneurs rent capital at rate r and hire labor at rate w, choosing their capital and labor inputs in each period to maximize profits.

Corporate Sector: Following Cagetti and De Nardi (2008), I model a second production sector, referred to as the non-entrepreneurial corporate sector, which consists of a large number of homogeneous firms that are not directly managed by households. This sector is represented by a single representative corporate firm operating under a constant returns to scale production function:

$$F_c(K_c, N_c) = A_c K_c^\alpha N_c^{1-\alpha} \tag{8}$$

where A_c denotes the time-invariant corporate productivity, normalized to one without loss of generality. The variables K_c and N_c represent the corporate sector's demand for capital and labor, respectively. The outputs produced by the corporate and entrepreneurial sectors are assumed to be perfect substitutes. Additionally, capital depreciates at a rate δ in both sectors.

4.4. Asset Market and Borrowing Constraints

Households have access to competitive financial intermediaries, who accept deposits from both workers and entrepreneurs and rent out capital to entrepreneurs. The analysis focuses on within-period borrowing, where capital can only be rented for production purposes. This implies that households cannot borrow for intertemporal consumption smoothing, resulting in a non-negativity constraint on financial wealth: $a \geq 0$. Entrepreneurs face a collateral constraint when renting capital for production:

$$k \leq \lambda a \tag{9}$$

where $\lambda \geq 1$. A value of $\lambda = 1$ indicates that entrepreneurs can only use their own wealth as capital input for production, while higher values of λ allow for greater leverage.

4.5. Government and Tax Systems

The government levies taxes on household income, consumption, and estates to finance its expenditures, denoted by $\overline{G}$, and to provide retirement benefits τ_p to the retired agents.

Consumption is taxed at a flat rate, τ_c. Income taxation is progressive and follows a non-linear function as in Heathcote et al. (2017)

$$T_y(y) = y - (1 - \tau_y^1) y^{1-\tau_y^2} \tag{10}$$

where τ_y^1 governs the average tax rate, and τ_y^2 determines the degree of progressivity of the tax system. The U.S. federal estate tax is modeled as a progressive tax on the total value of net worth at the time of a household's death. In line with the literature, I assume a constant marginal tax rate for estates above an exemption threshold (see, for example, Castañeda et al. (2003), Cagetti and De Nardi (2009), De Nardi and Yang (2016)). Specifically, the estate tax is described by two parameters: an exemption level, $\underline{e}$, and a constant marginal tax rate, τ_e, applied to estates exceeding the exemption threshold. The estate tax is defined as:

$$T_e(a) = \begin{cases} 0 & \text{for } a \leq \underline{e} \\ \tau_e(a - \underline{e}) & \text{for } a > \underline{e} \end{cases} \tag{11}$$

4.6. The Household's Recursive Problem

I assume that children have full knowledge of their parents' state variables and can infer the size of the bequest they are likely to receive based on this information. As a result, the potential state variables for a young household are given by $x = (t, \kappa, s, q, a, a_p)$, where t is the household's age, κ represents the fixed innate individual ability, s is the current working productivity shock, q is the current entrepreneurial productivity shock, a is the household's asset holdings, and a_p denotes the asset holdings of the household's parent. Due to the demographic setup, young households enter the model economy in the year their parents retire. For retired households, the state space is defined by two variables: age and asset holdings, (t, a). Given the fixed age gap between parents and children, a young household's age inherently provides information about the parent's age. Consequently, only the parent's asset holdings, a_p, enter the state space of the young household.

Old Retirees: From $t = 36$ to 70 (physical age 60 to 94), households are retired and receive Social Security benefits, τ_p, which are uniform across all individuals regardless of their occupation during their working years. Due to the demographic structure of the model, old households do not have living parents. Instead, they face a positive probability of death each period. Upon death, retirees derive utility from leaving bequests to their children, consisting of their remaining assets net of estate taxes.

$$
\begin{aligned}
V^r(a,t) &= \max\ u(c) + \beta\,(1-\Omega_{t+1})V^r(a',t+1) + \beta\,\Omega_{t+1}\nu(b') \\
s.t. \quad & (1+\tau_c)c + a' = y - T(y) + a \\
& a' \geq 0, \quad y = \tau_p + ra, \quad b' = a' - T_e(a')
\end{aligned}
$$

Young without Living Parents: From $t = 1$ to 35 (physical age 25 to 59), households are in their working years and survive with certainty to the next period. Young households who have already received their inheritance make decisions regarding their occupation, consumption, and savings based solely on their own state variables. The value function for a worker is denoted by $V_I^w(t, \kappa, s, q, a)$, while the value function for an entrepreneur is given by $V_I^e(t, \kappa, s, q, a)$, where *I* stands for "inherited."

$$
\begin{aligned}
V_I(t,\kappa,s,q,a) &= \max\ \left\{V_I^w(t,\kappa,s,q,a),\ V_I^e(t,\kappa,s,q,a)\right\} \\
V_I(t,\kappa,s,q,a) &= \max\ u(c) + \beta\,\mathbb{E}\left\{V_I(t+1,\kappa,s',q',a')|s,q\right\} \\
s.t. \quad & (1+\tau_c)c + a' = y - T(y) + a, \quad a' \geq 0 \\
& \text{If } V_I = V_I^w:\ y = w\omega + ra \\
& \text{If } V_I = V_I^e:\ y = Q\Big(k^\alpha(\omega+n)^{1-\alpha}\Big)^\eta - (r+\delta)k - wn + ra, \quad k \leq \lambda a
\end{aligned}
$$

Young with Living Parents: When the parents of young households are still alive, they are at least 60 years old and face a positive probability of dying in any given period. As a result, young households may receive a bequest at the beginning of the next period. The parents' asset holdings, a_p, enter the children's recursive problem, as the children form expectations about the bequest they may receive. This expectation influences their optimal decisions regarding occupation, consumption, and saving. Note that $\Omega_{t_p'}$ represents the probability of a parent dying in the next period at age t_p'. Since the age gap between parents and children is fixed at 35 years, the parent's age can be inferred from the child's age: $t_p = t + 35$. When parents die, the value function for the inherited household applies, and assets are augmented by the inheritance, net of the estate tax.

$$
\begin{aligned}
V(t,\kappa,s,q,a,a_p) &= \max\ \big\{V^w(t,\kappa,s,q,a,a_p),\ V^e(t,\kappa,s,q,a,a_p)\big\} \\
V(t,\kappa,s,q,a,a_p) &= \max\ u(c)+\beta\,(1-\Omega_{t'_p})\,\mathbb{E}\big\{V(t+1,\kappa,s',q',a',a'_p)|s,q\big\} \\
&\qquad\qquad +\beta\,\Omega_{t'_p}\,\mathbb{E}\big\{V_I(t+1,\kappa,s',q',a'+b')|s,q\big\} \\
s.t.\quad & (1+\tau_c)c+a' = y-T(y)+a, \quad a'\geq 0 \\
& \text{If } V=V^w:\ y=w\omega+ra \\
& \text{If } V=V^e:\ y=Q\Big(k^{\alpha}(\omega+n)^{1-\alpha}\Big)^{\eta}-(r+\delta)k-wn+ra, \quad k\leq\lambda a \\
& b'=a'_p-T_e(a'_p)
\end{aligned}
$$

4.7. Stationary Equilibrium

I focus on a stationary equilibrium concept where factor prices and distribution are constant over time. Define $x=(t,\kappa,s,q,a,a_p)$ as the state vector. A stationary equilibrium is defined by the household value function, their decision rules $c(x)$, $a'(x)$, $n(x)$, $k(x)$, corporate sector choices K_c and N_c, public policies $\{\tau_p,\tau_y,\tau_c,\tau_e,\underline{e}\}$, factor prices $\{r,w\}$, and a distribution over households $\Lambda(x)$, such that, given prices and government tax and transfer schedules:

1. policy functions $c(x)$, $a'(x)$, $n(x)$, $k(x)$ maximize household's value function;
2. the corporate firm maximizes profit
3. the government budget is balanced
4. the goods market clears

$$Y=\int c(x)d\Lambda(x)+K'-(1-\delta)K+\overline{G}+\int C_{entry}\cdot\mathbf{1}_{w\to e}\cdot\Lambda(x) \tag{12}$$

5. the labor market clears

$$N_e+N_c=\int s(x)\cdot\mathbf{1}_{occup=w}\cdot\Lambda(x) \tag{13}$$

6. the capital market clears

$$K_e+K_c=\int k(x)\Lambda(x) \tag{14}$$

7. the distribution of household over the state variables, $\Lambda(x)$, is stationary.

5. Quantitative Analysis

In this section, I describe the process of parameterizing the model in a stationary equilibrium. The model is calibrated through a two-step procedure using the simulated method of moments. In the first step, a subset of the parameters is externally calibrated, relying on estimates that are independent of the model or commonly used values in the literature. The parameters determined in this step are presented in Table 2. In the second step, the remaining 16 parameters are endogenously calibrated within the model to match key features of the U.S. economy during the late 1990s and early 2000s, a period during which the estate tax remained relatively stable. The parameters calibrated to match model-generated moments with those observed in the data are listed in Table 3.

5.1. Calibration

Demographics: Within the model framework, one model period corresponds to one year. Agents enter the economy at the age of 25 (model age $t = 1$) and retire at the age of 60. During their working years, agents transition to the next period with certainty. Upon reaching retirement at age 60, agents face a positive mortality rate increasing in age, denoted as $\{\Omega_t\}_{t=36,\dots,70}$. The mortality rates are taken from Bell and Miller (2005), and agents die by age 95 with certainty.

Preferences and Bequest: As in Attanasio et al. (1999), I set the coefficient of risk aversion σ to be 1.5. The discount factor, β, is calibrated to match a capital-output ratio of 2.65, as in Brüggemann (2021). The warm-glow bequest utility function includes two parameters, ϕ_1 and ϕ_2. The parameter ϕ_1, which reflects the importance of the bequest motive, is calibrated to replicate a targeted bequest-wealth ratio of 0.88% as reported by De Nardi and Yang (2016)[9]. The parameter ϕ_2 captures the extent to which bequests are luxury goods. When $\phi_2 > 0$, the marginal utility of bequests is bounded at the point where bequests are zero, thereby permitting certain households to leave no bequests. Given that ϕ_2 affects the upper tail of the inheritance size distribution, I choose ϕ_2 to match the 90th percentile of the bequest distribution scaled by income, which is estimated at 4.31 (see De Nardi and Yang (2016) and Guvenen et al. (2023)).

Entrepreneurial Productivity: Entrepreneurial productivity is composed of two components: an individual's innate fixed ability, denoted as κ, and an idiosyncratic business productivity shock, q_t, which evolves according to a Markov chain. The intergenerational correlation of the fixed ability effect is set to $\rho_\kappa = 0.5$, with a dispersion parameter of $\sigma_{\epsilon_\kappa} = 0.309$, following Guvenen et al. (2023). The ability inheritance process is discretized using the method of Tauchen (1986).

Business productivity, q, can take on five possible values: $q \in \{q_{dis}, q_1, q_2, q_3, q_4\}$. Following Brüggemann (2021), I assume that the lowest state is a disaster state, where $q_{dis} = 0$. Agents in this state always choose to work as employees rather than entrepreneurs, and once in the disaster state, they remain there permanently. The remaining four productivity levels are characterized by three parameters: $\bar{q}$, $\hat{q}$, and q_{max}, such that $\{q_1, q_2, q_3, q_4\} = \{\hat{q} \times (1 - \bar{q}), \hat{q}, \hat{q} \times (1 + \bar{q}), q_{max}\}$. Following Kitao (2008) and Brüggemann (2021), I calibrate the transition matrix for q under the assumption that business productivity evolves gradually over time. Specifically, productivity can only transition to adjacent grid points in the next period, restricting movements to neighboring states. Additionally, I assume that transition probabilities between adjacent states are identical for q_1, q_2, and q_3. This structure results in three key parameters governing the transition probability matrix, denoted as:

$$\Lambda = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ p_1 & p_2 & 1 - p_1 - p_2 & 0 & 0 \\ 0 & p_1 & p_2 & 1 - p_1 - p_2 & 0 \\ 0 & 0 & p_1 & p_2 & 1 - p_1 - p_2 \\ 0 & 0 & 0 & 1 - p_3 & p_3 \end{bmatrix} \tag{15}$$

[9] De Nardi and Yang (2016) also reported this figure as 1.18% when including college expenses in the computation of bequests. However, in the context of this analysis, which centers exclusively on inheritances subject to estate taxation, the target moment of 0.88% is employed, excluding college expenses from consideration.

The stochastic process for q is governed by six parameters: $\overline{q}$, $\hat{q}$, q_{max}, p_1, p_2, and p_3, which are jointly determined by targeting the characteristics of entrepreneurship and the steady-state wealth distribution, consistent with approaches commonly employed in the previous literature. However, in this paper, these parameters are additionally governed by the inheritance patterns documented in Fact 3 and Fact 4 of Section 3.2. As a result, this model not only captures fundamental patterns of wealth distribution and entrepreneurship but also integrates the role of inheritance in wealth concentration at the top.

To discipline these parameters, I target six empirical moments: (i) the fraction of entrepreneurs in the population (0.07), (ii) the annual entry rate into entrepreneurship (0.02), (iii) the wealth share of entrepreneurs (0.33), (iv) the wealth share of the top 1% (0.32), (v) the present value of inheritance relative to wealth for the richest 1% (0.13), and (vi) the fraction of the richest 1% with an inheritance-to-wealth ratio below 0.2 (0.87).

The fraction of entrepreneurs is determined using Survey of Consumer Finances (SCF) data, where entrepreneurs are defined as self-employed households that own a business. The entry rate into entrepreneurship is computed from the Panel Study of Income Dynamics (PSID) data. The calculated entry rate aligns closely with those reported in the existing literature (see, for example, Cagetti and Nardi (2006)). Wealth inequality statistics are also computed using SCF data. The final two moments related to inheritance patterns among wealthy households are detailed in Fact 3 and Fact 4 of Section 3.2. All model statistics are generated using the same methodologies applied to the data. Specifically, when calculating the last two moments concerning inheritance patterns, I focus exclusively on simulated households aged at least 60 years and calculate the present value of their inheritance using a 3% real interest rate.

Working Productivity: Working productivity consists of three components. The first component is an individual's fixed ability, denoted as κ, which is imperfectly inherited from parents, as previously discussed. The second component is a deterministic life-cycle productivity profile, $g(t)$, which is exogenously assigned to all agents and empirically estimated from data. This age-efficiency profile, sourced from Peterman and Sommer (2019), captures the evolution of productivity over the life cycle. The third component involves an idiosyncratic shock to working productivity, which follows an AR(1) process with persistence $\rho_s = 0.9$ and unconditional variance $\sigma^2_{\epsilon_s} = 0.2$, consistent with Guvenen et al. (2023). This stochastic process is discretized into five states, represented as $s \in \{s_1, ..., s_5\}$.

In this model, the capacity to generate large wealth concentration through inheritance is constrained by integrating new inheritance patterns documented from the data. Consequently, the model tends to overstate the role of entrepreneurship in wealth inequality, resulting in an overrepresentation of entrepreneurs among the top 1% of wealth holders. To address this issue, I introduce a sixth, superstar labor state, denoted as s_{star}, following Kindermann and Krueger (2022). Households in labor state s_5 can transition to s_{star} with probability p_{star}. However, this high-productivity state is risky, as individuals face a probability p_{drop} of reverting to the medium ability level, s_3. Therefore, the labor productivity process involves three parameters that require calibration: s_{star}, p_{star}, and p_{drop}. These parameters are selected to match three empirical moments: (i) the Gini coefficient of workers' income (0.52), (ii) the income share of the top 1% (0.21), and (iii) the fraction of entrepreneurs within the top 1% of the wealth distribution (0.53). All moments are computed using SCF data.

Production Technologies: Corporate productivity A_c is normalized to be one. The capital share of corporate firm's production function α is set to be 0.36 as in Cooley and Prescott (1995)[10]. For simplicity, I make the value of the capital share of the entrepreneurial sector equal to that of the corporate sector. The span of control parameter η is set to be 0.79, following Buera et al. (2011). This parameterization choice implies that the capital share in the entrepreneurial sector within my model is $\alpha\eta = 0.28$, a value that aligns closely with those employed in macroeconomic literature on entrepreneurship (see, for example, Buera et al. (2011), Cagetti and Nardi (2006)).

I set the capital depreciation rate δ to be 0.05, which is a standard value in the literature, as in Guvenen et al. (2023). Entrepreneurs can only borrow up to 50 percent of their assets, allowing for a maximum investment of $\lambda = 1.5$ times their assets. This borrowing limit is adopted from Kitao (2008) and is commonly used in the literature on entrepreneurship.

Parameter	Description	Value	Source
Demographics			
$\{\Omega_t\}_{t=36,\ldots,70}$	Mortality rate		Bell and Miller (2005)
Preferences			
σ	Risk aversion	1.5	Attanasio et al. (1999)
Endowments			
ρ_κ	Interg. corr. of ability fixed effect	0.5	Guvenen et al. (2023)
σ_{ϵ_κ}	Dispersion of ability fixed effect	0.309	Guvenen et al. (2023)
$\{g_t\}_{t=1,\ldots,35}$	Age-dependent working prod.		Peterman and Sommer (2019)
ρ_s	Working prod. shock: persistence	0.9	Guvenen et al. (2023)
σ_{ϵ_s}	Working prod. shock: std. dev.	0.2	Guvenen et al. (2023)
Production			
α	Capital's share of output	0.36	Cooley and Prescott (1995)
η	Span of control	0.79	Buera et al. (2011)
δ	Capital depreciation rate	0.05	Guvenen et al. (2023)
λ	Collateral constraint parameter	1.5	Kitao (2008)
A_c	Corporate productivity	1	
Taxes			
τ_p	Retirement benefit	$0.4\times$ave. inc.	Kotlikoff et al. (1999)
τ_c	Consumption tax rate	0.065	Bhandari and McGrattan (2021)
τ_y^1	Income tax: level shifter	0.091	Gao and Zhang (2024)
τ_y^2	Income tax: progressivity	0.142	Gao and Zhang (2024)

Table 2. Parameters Calibrated Outside of the Model

The last parameter related to entrepreneurial production is the one-time fixed cost of entry,

[10] In a more recent study, Gao and Zhang (2024) also estimate α to be 0.36 by matching to the labor income share of the corporate sector derived from the BEA-NIPA.

C_{entry}. Using PSID data, Hincapié (2020) documents that the average age at which individuals first enter entrepreneurship is approximately 32 to 35 years old. The timing of business initiation is important to my analysis, as it influences the interplay between inheritance and entrepreneurship in the accumulation of wealth. Given that a higher entry cost presents a significant barrier to entry, I introduce this one-time fixed cost to capture the stylized fact that individuals attempt entrepreneurship for the first time in their mid-30s.

Parameter	Value	Targeted Moment	Data	Model
Preferences				
β	0.92	Capital-to-wealth ratio	2.65	2.46
ϕ_1	-9.58	Bequest-to-wealth ratio	0.88%	0.88%
ϕ_2	3.99	90th percentile of bequest dist.	4.31	4.22
Endowments				
$\overline{q}$	0.76	Ent population share	0.07	0.07
$\hat{q}$	1.73	Ent entry rate	0.02	0.02
q_{max}	5.02	Ent wealth share	0.33	0.35
p_1	0.33	Top 1% wealth share	0.32	0.32
p_2	0.43	Richest 1%: inh-to-wealth ratio	0.13	0.11
p_3	0.29	Frac. richest 1%: inh-to-wealth ratio ≤ 0.2	0.87	0.88
s_{star}	6.06	Workers' income Gini	0.52	0.52
p_{star}	0.10	Top 1% income share	0.21	0.23
p_{drop}	0.02	Ent pop share in wealth top 1%	0.53	0.54
Production				
C_{entry}	6.58	Ave. age of first-time ents.	33	30
Taxes				
$\underline{e}$	59.11	Frac. of estates paying estate taxes	0.02	0.02
τ_e	0.68	Estate tax revenues-to-GDP ratio	0.33%	0.32%

Table 3. Parameters Calibrated (Jointly) Inside the Model

Government and Tax Systems: The government provides a uniform retirement benefit, τ_p, to all retirees, regardless of their occupation during their working years. The retirement benefit amounts to 40 percent of average income as in Kotlikoff et al. (1999). Following Bhandari and McGrattan (2021), I set the consumption tax rate τ_c to 0.065. Regarding the progressive income tax, Gao and Zhang (2024) estimate the two income tax parameters, τ_y^1 and τ_y^2, with PSID data using the tax functional form proposed by Benabou (2002) and Heathcote et al. (2017). I adopt their estimation results by setting τ_y^1 and τ_y^2 to be 0.0912 and 0.1416, respectively.

Estate taxation serves as another source of government income. Estates that exceed a specified threshold, denoted as $\underline{e}$, are subjected to a tax rate τ_e applied to the amount exceeding this threshold. I choose the tax parameters $\underline{b}$ and τ_b to match the fraction of estates subject to estate taxes (0.02, Gale and Slemrod (2001)) and the fraction of estate tax revenue as a percentage of total output (0.33%, Gale and Slemrod (2001)).

5.2. Model Performance

In this section, I compare key features of the actual data for the U.S. economy with the corresponding characteristics of the model-generated data. It is important to note that almost all statistics presented in this section are untargeted moments in the calibration process. A good alignment between the model and the aspects of the data that were not explicitly matched during the calibration procedure enhances my confidence in the policy projections generated by the model.

5.2.1. Wealth Distribution

Table 4 compares the wealth distribution of the U.S. economy, derived from the SCF data, with that generated by the model. Although my calibration specifically targeted the top 1% of the wealth distribution, the overall fit of the model's generated wealth distribution is quite good, effectively capturing the significant degree of wealth inequality. Furthermore, while I focused solely on the population share of entrepreneurs in the top 1%, the model accurately generates a wealth share for entrepreneurs that closely corresponds to the empirical data. In the observed data, entrepreneurs hold 54.3% of the wealth within the richest 1% group, whereas my model yields a figure of 57.8%. Accurate representation of the population share and wealth share of entrepreneurs, along with the inheritance patterns of wealthy households, is essential for subsequent policy counterfactuals. These elements directly influence the model's ability to reflect the complex interplay between inheritance and entrepreneurship in the context of wealth concentration. Understanding these dynamics is crucial for analyzing the aggregate and distributional effects of potential estate tax reforms.

	% of Wealth Hold by Wealth Percentile					Ents' Wealth Share
	Bottom 50	Next 40	90-95	95-99	99-100	in the Top 1%
Data	2.8	27.7	12.2	25.1	32.2	54.3
Model	0.4	22.2	16.9	28.4	32.1	57.8

Table 4. Wealth Distribution

5.2.2. Inheritance-to-Wealth Ratio

Table 5 presents the percent share of the richest 1% of households across various inheritance-to-wealth ratio categories. The data moments have been discussed in Figure 2 of Section 3.2. The model moments were generated using the same methodologies applied to the empirical data. In the calibration process, I focused only on the fraction of the richest 1% with an inheritance-to-wealth ratio below 0.2. This group includes 52.4% of households that receive no inheritance throughout their lifetime, as well as an additional 34.6% of households that do receive inheritance but have a ratio of no greater than 0.2. While this is the targeted moment, the model successfully generates the share of households in each inheritance-to-wealth ratio category that closely aligns with the data. Notably, in the data, less than 4% of these wealthy households receive substantial inheritances that exceed their current net worth. The model effectively mimics this feature. In the simulated economy, only 3% of the richest 1% of households display an inheritance-to-wealth ratio greater than 1.

	Inheritance-to-Wealth Ratio				
	0	(0, 0.2]	(0.2, 0.5]	(0.5,1]	> 1
Data	52.43	34.63	5.73	3.44	3.77
Model	55.14	33.12	6.42	2.28	3.04

Table 5. Share of Top 1% Households in Each Inheritance-to-Wealth Ratio Category

Notes: This table shows the share of the richest 1% households within each inheritance-to-wealth ratio bin. The data are taken from the last column of Figure 2 in Section 3.2 The moments generated by the model are computed using the same methodologies applied to the empirical data.

5.2.3. Wealth Mobility

Next, I assess the model's implications for both intragenerational and intergenerational wealth mobility. For intragenerational wealth mobility, I examine the wealth mobility of individuals over a 10-year period. Following Carroll and Hoffman (2017), I use PSID data to track household wealth from 1984 to 1994, focusing exclusively on households that were alive at the end of this period. The left panel of Table 6 presents the movement of wealth quintiles within this timeframe, indicating the percentage of households in a given wealth quintile that transitioned to each quintile after 10 years. Each row sums to 100 percent. According to the table, approximately 63% of households in the first quintile in 1984 remained in that quintile by 1994, while just under 2% experienced a significant upward shift, transitioning to the fifth quintile. The right panel displays the wealth mobility over the same period as generated by the model. Notably, the model successfully mimics the data patterns, particularly for the upper wealth quintile groups.

	PSID: 1994				
1984	**1**	**2**	**3**	**4**	**5**
1	62.9	23.4	8.7	2.6	1.8
2	22.9	41.3	21.4	9.8	4.7
3	10.0	27.6	32.6	20.6	9.2
4	5.3	8.3	26.3	37.1	22.9
5	1.7	3.4	8.8	25.2	60.9

	Model: After 10 Years				
	1	**2**	**3**	**4**	**5**
1	42.6	24.9	14.2	14.4	3.9
2	4.9	50.2	34.1	8.0	2.9
3	9.0	32.3	29.3	19.6	9.8
4	3.4	10.4	26.1	33.8	26.3
5	0.0	0.0	0.7	30.0	69.1

Table 6. Transition Matrices of Wealth Quintiles

Notes: The left panel displays the mobility matrix for U.S. households from 1984 to 1994, calculated using PSID data. In contrast, the right panel presents the mobility matrix over the same 10-year period, derived from model-generated data.

For intergenerational wealth mobility, I follow the methodology of Pfeffer and Killewald (2018) and use PSID data to estimate two-generation persistence in wealth based on a sample of parent-child pairs aged 25 to 64. In their analysis, Pfeffer and Killewald (2018) regress the child's wealth rank on the parental wealth rank, where the wealth rank is defined as the percentile rank within their respective net worth distributions. The rank slope serves as a measure of relative mobility and is estimated to be 0.32, which falls within the range reported by Pfeffer and Killewald (2018).[11] Using my model-generated data, the estimated rank slope is 0.26.

6. Policy Counterfactuals

In this section, I examine the effects of changing the estate tax rate. In the baseline economy, the effective estate tax rate is calibrated at 0.68. In my policy experiments, I vary the tax rate between 0 and 1, while keeping the tax exemption threshold at its calibrated level. Government expenditure is maintained as in the baseline economy. Any additional tax revenue generated is redistributed to all households via a lump-sum transfer, denoted as T, to maintain the government's budget balance. Consequently, a negative value of T acts as a lump-sum tax, compensating for decreased tax revenue. All policy counterfactuals are conducted in a general equilibrium context, and I focus on the steady-state comparison.

6.1. Aggregate Effects

Figure 5 reports the aggregate effects as the estate tax rate varies from 0 to 1. The upper left panel displays the lump-sum transfer required to balance the government budget. The upper right panel, along with the two middle panels, shows the percentage changes in aggregate output, labor, and capital compared to their counterparts in the baseline economy. The two bottom panels show the percentage changes in factor prices: wages and interest rates.

The figure indicating the lump-sum transfer necessary to balance the government budget when adjusting the estate tax rate exhibits a Laffer curve feature. The abolition of the estate tax necessitates collecting a lump-sum tax from households to compensate for the loss in government tax revenue. However, as the tax rate increases, the requirement for this lump-sum tax diminishes due to the decreasing deficit in estate tax revenue. Once the tax rate exceeds the baseline level, the government generates additional revenue, allowing for lump-sum transfers to households.

Nevertheless, excessively high tax rates can dampen the incentive for wealthy households to save, consequently reducing other forms of tax revenue for the government. The curve of lump-sum transfers peaks at a tax rate of 0.94, suggesting that the optimal revenue-maximizing estate tax rate is 0.94. The magnitude of these lump-sum transfers ranges from -0.021 to 0.005, translating to a value of approximately -133 to 31 dollars per year. This modest range results from the relatively minor role of estate taxes in the government's total tax revenue, contributing just 0.33% of GDP. Consequently, alterations in the estate tax rate have a limited impact on the overall balance of the government's budget.

[11] Pfeffer and Killewald (2018) report the rank slope to be in the range of 0.32 to 0.39.

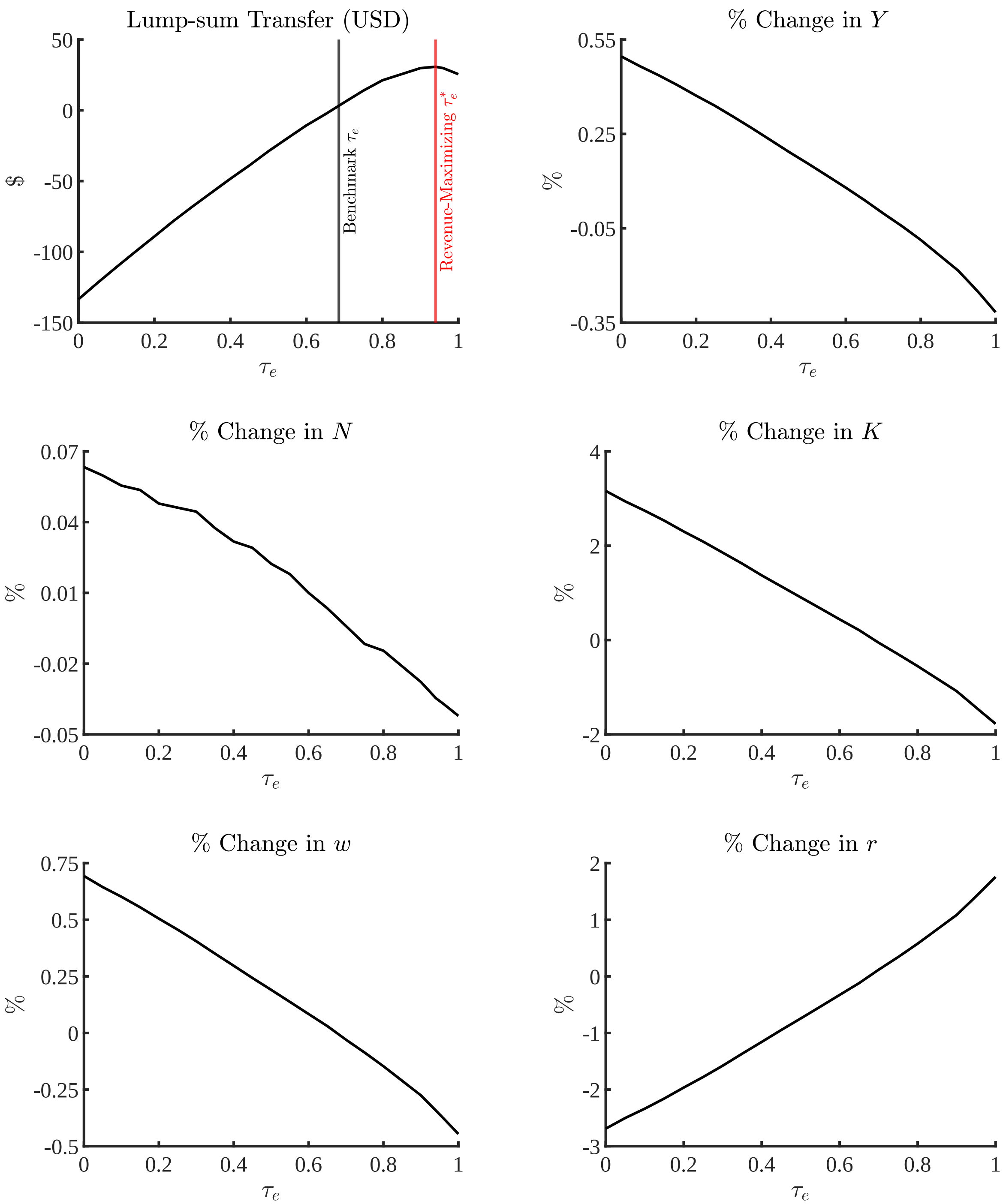

Figure 5. Aggregate Effects of Changing the Estate Tax Rate

Notes: This figure illustrates the aggregate effects of modifying the estate tax rate while maintaining the exemption value at its calibrated benchmark level. The upper left panel displays the lump-sum transfer required to balance the government budget. The upper right panel and the two middle panels show the percentage changes in aggregate output, labor, and capital compared to their benchmark economy counterparts. The two bottom panels present the percentage changes in factor prices: wages and interest rates.

Due to the assumption of an inelastic labor supply, the change in aggregate labor is minimal, ranging from an increase of 0.06% when the estate tax is repealed to a decrease of 0.04% when the tax rate is set to 1. The shift in aggregate labor primarily comes from occupational choice. As the estate tax rate rises, the wage rate declines, making entrepreneurship more attractive compared to wage work and encouraging more households to enter entrepreneurship. Moreover, while higher interest rates resulting from increased estate taxes make capital input more expensive, entrepreneurs offset this expense by hiring workers at lower wages. Consequently, as the estate tax rate increases, the number of entrepreneurs rises. This expansion in entrepreneurship reduces the labor pool available for wage work, ultimately leading to a decrease in aggregate labor.

Abolishing the estate tax increases the return to leaving bequests for wealthy households. This policy change results in an increase in the savings of the very rich, which is sufficient to counterbalance the decline in savings by other groups due to lower interest rates. As a result, the abolition of the estate tax leads to a 3.16% increase in the aggregate capital stock (K), which in turn derives a 0.50% rise in aggregate output. Conversely, higher estate tax rates lead to lower savings among wealthy households. This shift in savings behavior reduces the overall aggregate capital. In scenarios where the estate tax rate is particularly high, reaching confiscatory levels, aggregate capital experiences a decrease of 1.78%, corresponding to a reduction in aggregate output of 0.32%. When the estate tax is repealed, wages increase despite a rise in aggregate labor supply, as the substantial increase in capital results in a higher capital-labor ratio.

I also conducted a policy counterfactual exercise in partial equilibrium, where I fixed factor prices at the baseline level and calibrated the lump-sum transfer only to balance the government budget. This approach allows me to eliminate the indirect effects through adjustment in general equilibrium prices, thereby focusing exclusively on the direct effects of tax changes. Importantly, in this partial equilibrium scenario, the abolition of the estate tax leads to an increase in the number of entrepreneurs, while raising the tax rate results in a decrease in the number of entrepreneurs. This finding indicates the interaction between inheritance and entrepreneurship. Repealing the estate tax benefits households that inherit larger estates. Furthermore, if they opt for entrepreneurship, they can establish larger firms and generate higher profits. Conversely, a higher estate tax rate reduces the seed money available for starting businesses, leading to fewer households choosing entrepreneurship.

While this channel exists, its magnitude is notably small. The number of entrepreneurs increases by only 0.075% when the estate tax is abolished, while it decreases by 0.084% when the estate tax is set to 1. This limited response is due to the benchmark model being governed by new empirical findings on the inheritance patterns of the very wealthy. Half of the wealthiest 1% are self-made, having received no inheritance, and only 13% of this group inherits large sums resulting in an inheritance-to-wealth ratio exceeding 0.2. While it could be argued that some households in the richest 1% may receive substantial inheritances, their pronounced entrepreneurial abilities often generate even greater wealth, leading to a relatively small inheritance-to-wealth ratio. However, this scenario is unlikely, as the model is also guided by the empirical fact that the wealth share of the richest 1% is 32%. If significant inheritances were indeed common among them, the wealth share of this group would be even higher.

6.2. Comparison with an Alternative Model Not Governed by the New Inheritance Patterns

To highlight the significance of new empirical evidence regarding inheritance, I explore an alternative model. The structure of this alternative model is identical to that of my benchmark model. However, the calibration of the business quality process differs: unlike the benchmark model, the alternative model is calibrated only to match moments related to wealth distribution and entrepreneurship, without being governed by the moments associated with the inheritance patterns of wealthy households. Following the previous literature, I use only aggregate moments related to inheritance to calibrate the parameter values for the bequest motive and estate tax. Specifically, I use the bequest-to-wealth ratio and the 90th percentile of the bequest distribution normalized by income to determine the two bequest motive parameters. Additionally, I use the fraction of estate tax revenue relative to output and the fraction of estates subject to estate taxes to identify the two estate tax parameters. Detailed specifications and calibration results for this alternative model are available in Appendix C. Like the benchmark model, the alternative model effectively reproduces the key features of the U.S. economy and generates a realistically skewed wealth distribution.

In the alternative model, the estate tax rate is calibrated at 0.27. I then conduct a policy counterfactual within this framework, similar to the analysis performed in the benchmark model. Figure 6 illustrates the aggregate effects of varying the estate tax rate within the alternative model. To facilitate a clear comparison of the policy implications between the two models, the percentage changes in aggregate capital (K) and aggregate output (Y) from the benchmark model are also plotted in red on the same figure.

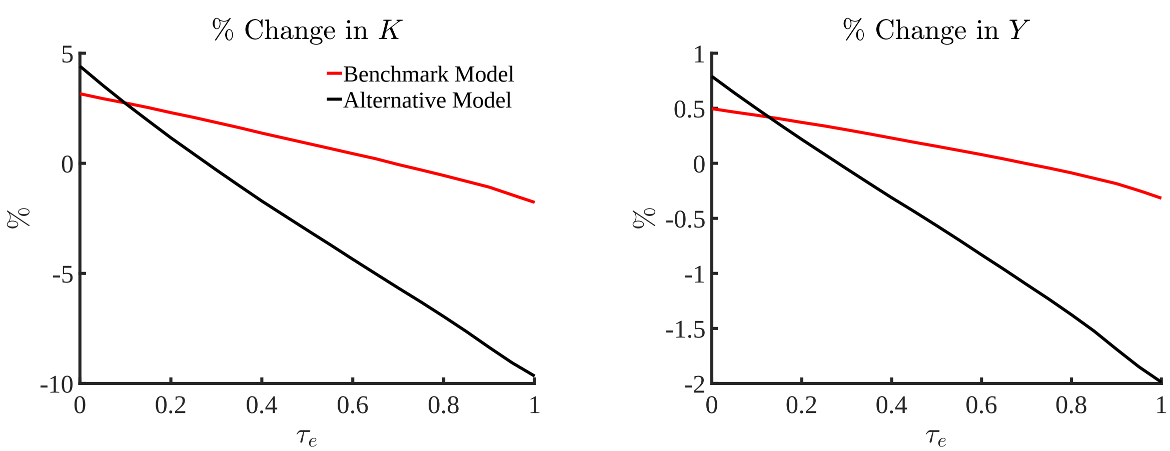

Figure 6. Aggregate Effects of Changing the Estate Tax Rate in the Alternative Model

Notes: This figure shows the aggregate effects of changing the estate tax rate within the alternative model, which is not guided by the new moments regarding the inheritance receipt patterns of the very wealthy.

A key result here is that, although both models exhibit similar trends, the magnitudes of these changes differ significantly. In the benchmark model, varying the estate tax rate from 0 to 1 results in a change in aggregate capital from 3.16% to -1.78%, which in turn leads to a change in aggregate output from 0.50% to -0.32%. In contrast, the effects in the alternative model are more pronounced: the changes in capital range from 4.41% to -9.67%, corresponding to a change in output from 0.79% to -1.99%. This substantial difference in magnitude is due to the different roles of inheritance in wealth generation within these two models.

Table 7 presents the share of wealth among the top percentile of households that can be directly attributed to inheritance. According to the data, inheritances directly account for approximately 13% of the wealth held by the richest 1%. The benchmark model closely aligns with the inheritance-to-wealth ratio observed among wealthy households. In contrast, the alternative model significantly overstates the role of inheritance in wealth accumulation, yielding an inheritance-to-wealth ratio of 0.66 for the top percentile, more than five times the observed value. Furthermore, in the alternative model, 16% of the wealthiest households receive inheritances that exceed their current wealth, while in the data, this figure is less than 4% for households in the top percentile. Notably, the benchmark model replicates this observation, despite not directly targeting it during the calibration process. Additionally, the data indicate that a substantial fraction of the richest 1% inherited little relative to their own wealth, with 87% of this group exhibiting an inheritance-to-wealth ratio of less than 0.2. In the benchmark model, this proportion is at 88%, whereas the alternative model reduces it to 77%. These findings suggest that the alternative model overstates the role of inheritances in wealth accumulation among the rich.[12] Consequently, the saving behavior of the very wealthy is more sensitive to changes in the estate tax in the alternative model.

	Richest 1%	Frac. of the Richest 1%	
	Inh-to-wealth Ratio	with Ratio ≤ 0.2	with Ratio > 1
Data	0.13	0.87	0.04
Benchmark Model	0.11	0.88	0.03
Alternative Model	0.66	0.77	0.16

Table 7. Present Value of Inheritance to Wealth Ratio

Notes: The calibration of the alternative model did not target any of these moments.

6.3. Distributional Effects

Turning to distributional outcomes, Figure 7 shows the share of wealth held by the richest 1% as the estate tax rate varies from 0 to 1. The left panel represents the benchmark model, while the right panel is the alternative model. The distributional effects in these two models differ significantly, not only in terms of trends but also in magnitude. In the alternative model, the wealth share of the richest 1% decreases monotonically as the estate tax rate increases, ranging from 32.6% to 28.8%. This finding is consistent with previous literature. In contrast, in the benchmark model, the overall trend shows that the wealth share of the richest 1% increases with the tax rate, except at the extreme tax rates.

[12] It is important to note that in the alternative model, the incorporation of entrepreneurship already mitigates the role of inheritance in generating wealth concentration at the top to some extent. I also explored a model without entrepreneurship but exclusively featured a superstar labor state, similar to Castaneda et al. (2003). In that model, more than half of the richest 1% possess inheritances larger than their own wealth, whereas in the data, only less than 4% of the wealthiest 1% report receiving inheritances that exceed their own wealth.

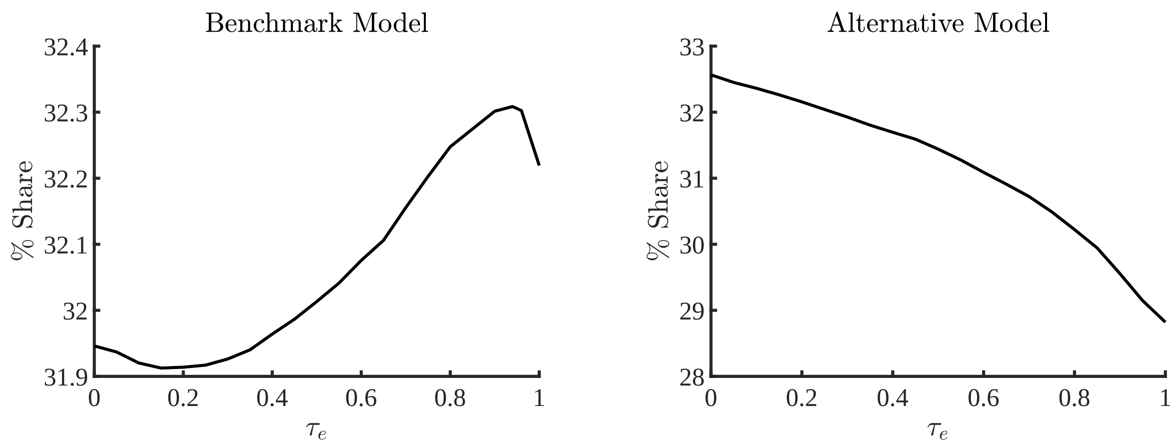

Figure 7. Distributional Effects of Changing the Estate Tax Rate

Notes: This figure shows the share of wealth held by the richest five percent. The left panel is the benchmark model. The right panel is the alternative model, which is not governed by the moments associated with the inheritance patterns of wealthy households in its calibration.

In both the benchmark model and the alternative model, all households in the top 5% of wealth are subject to the estate tax. Reducing the estate tax increases the return to saving for the richest 5% households, allowing them to accumulate even more wealth. This channel is present in both models. However, it is quantitatively more pronounced in the alternative model, where the inheritance-to-wealth ratio for the richest 1% is as high as 0.66.

In the alternative model, the abolition of the estate tax allows the top 1% households, who have accumulated their wealth primarily through inheritance, to become even richer. Additionally, some households from the 95th to 99th wealth percentiles in the old steady state with the baseline estate tax rate of 0.68, now enter the richest 1% group due to their substantial bequests. This influx of households with significant inheritances crowds out the initial steady-state households in the richest 1% that do not possess large inheritances but are wealthy due to entrepreneurship. Specifically, when the estate tax rate decreases from 0.27 to 0, the share of entrepreneurs in the richest 1% declines by 4 percentage points. Conversely, when the estate tax rate is increased to 1, the share of entrepreneurs in the richest 1% rises by nearly 8 percentage points. Therefore, in the alternative model, lowering the estate tax rate leads to greater wealth concentration at the top, whereas increasing the estate tax rate results in a decline in the wealth share of the richest 1%.

The aforementioned mechanism also exists in the benchmark model. Lowering the estate tax encourages households in the top 5% to increase their savings, enabling those in the 95th to 99th wealth percentiles with larger bequests to enter the richest 1% in the new steady state. However, this channel is quantitatively limited, as the significance of inheritance is constrained. Specifically, in the benchmark model, the inheritance-to-wealth ratio for the richest 1% is only 0.11, and for the 95th to 99th wealth percentiles, it is 0.22.

The benchmark model is governed by the fact that half of the wealthiest 1% received no inheritance, while an additional one-third of this group has a small inheritance. Together, this leads to approximately 87% of the richest 1% having an inheritance-to-wealth ratio of no greater than 0.2. Therefore, regardless of changes in the estate tax rate, a substantial fraction of the wealthiest 1% are self-made entrepreneurs. When the estate tax is reduced, households with larger bequests in the 95th to 99th wealth percentiles do not crowd out entrepreneurs in the top 1% to the same extent as in the alternative model. As a result, these households remain within the 95th to 99th wealth percentile group. However, as their savings increase due to the declining estate tax rate, this generates a rise in the wealth share of this group, leading to a slight decrease in the wealth share of the top 1%.

When the estate tax rate is 0.1 or lower, the increased savings of the very wealthy become substantial enough that the share of the top 1% begins to increase. The same logic applies at the upper end of the estate tax rates. When the estate tax rate reaches 0.96 or above, the net return on bequests becomes so low that it significantly reduces the savings of the very rich, resulting in a decrease in the share of the top 1%. This explains why the overall trend for the top 1% wealth share in the benchmark model increases with the estate tax rate, albeit with non-linear behavior at the extremes of the tax rate range.

6.4. Welfare Analysis

I compute the welfare of each new steady state using Consumption Equivalent Variation (CEV). Following McGrattan (1994), CEV is defined as the percentage change in the initial steady-state per-period consumption required for every newborn household to be indifferent between the initial and the new steady state, holding all other factors constant. Positive values of CEV indicate a welfare gain in the new steady state, suggesting that households would not be willing to stay in the benchmark steady state unless they were compensated with additional consumption.

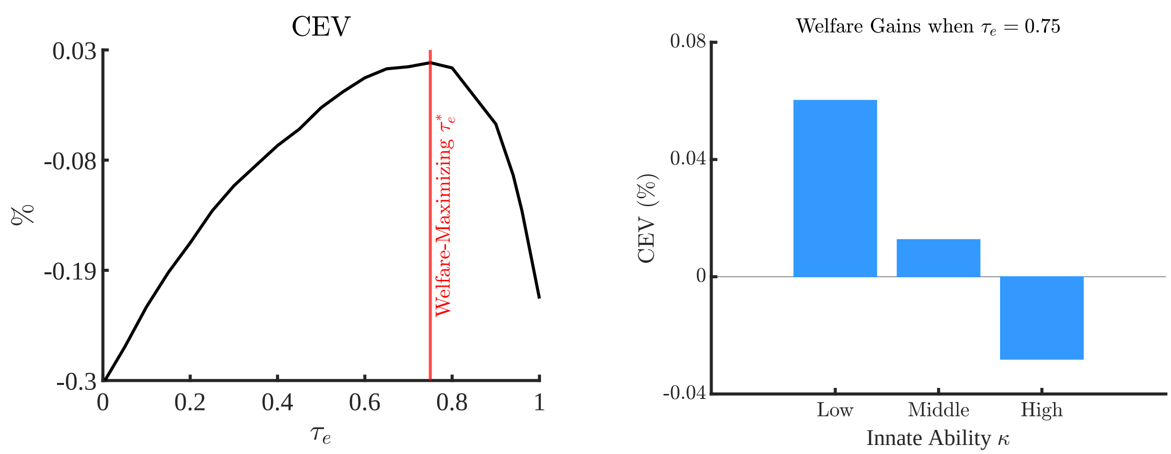

Figure 8. Welfare Effects of Changing the Estate Tax Rate

Notes: Welfare is calculated using consumption equivalent variation (CEV), which is defined as the percentage by which every newborn's initial steady-state per-period consumption would have to be permanently increased to be indifferent between the initial and the new steady state, keeping everything else constant. Positive values of CEV indicate a welfare gain in the new steady state, while negative values imply welfare loss.

The left panel of Figure 8 shows the CEV for estate tax rates ranging from 0 to 1. The welfare changes resulting from the tax reforms are relatively small. In the best-case scenario, where the CEV reaches its peak, newborns in the benchmark would need to increase their consumption by only 0.02% to be indifferent between the two steady states. The welfare-maximizing tax rate is at 0.75.

The right panel of Figure 8 presents the average welfare gains or losses conditional on a newborn's innate ability, categorized as low, middle, and high. The average welfare gains associated with being born with a fixed innate ability are generally positive, with the exception of the high ability group. For this group, the welfare loss from increased estate taxation is approximately 0.03%. This loss arises because newborns with high innate ability are likely to be born into wealthy families, where their parents also possess high innate ability due to intergenerational transmission of skills. Moreover, these high-ability newborns are expected to achieve significant wealth in the future owing to their high innate potential. Consequently, these households experience a loss of utility not only because they receive lower net estates but also due to the smaller utility they can derive from leaving bequests in the future.

7. Conclusion

In this paper, I investigate the efficiency and distributional implications of estate taxation within a quantitative model that incorporates occupational choices between wage work and entrepreneurship, a non-homothetic bequest motive, and the transmission of ability across generations. The overlapping generations framework allows children's decisions to be influenced not only by their own state variables but also by their expectations regarding potential inheritances from their parents. This rich model facilitates a comprehensive examination of the intricate relationships between inheritance, entrepreneurship, and estate taxation, yielding new insights into how these factors shape wealth distribution and economic behavior in the U.S. economy.

My empirical findings indicate that while inheritances are concentrated in wealthy households, their relative importance is less significant for wealthy heirs, as they inherit less compared to their wealth. Notably, the present value of the inheritance to wealth ratio for the richest 1% is less than 0.13, with half of this group receiving no inheritance throughout their lifetimes. This observation holds profound implications for policy formulation. In my benchmark model, wealth inequality, measured by the share of wealth held by the richest 1%, generally increases with rising estate tax rates. Conversely, in an alternative model with a similar structure but without calibration to the new empirical moments regarding inheritance receipt, the wealth share of the top 1% decreases as the estate tax rate rises. This discrepancy arises because the alternative model tends to overstate the role of inheritance in driving wealth concentration.

These results underscore the importance of accurately incorporating empirical evidence on inheritance patterns into economic models. Whether or not new moments are included to inform the underlying interaction between entrepreneurship and inheritance can lead to markedly different conclusions regarding policy implications.

The primary goal here is to develop a model calibrated to match these new moments on the direct link between inheritance and wealth, and to study the implications of estate taxation in this model. Therefore, I have focused specifically on the value of inheritances received by the wealthy. However, there are numerous interesting avenues for future research that could extend my model. For instance, wealth transfers in the form of human capital investment, such as college tuition payments, could be explored. While I assume exogenous transmission of innate ability across generations in this study, endogenizing human capital investments from parents to children may further enhance children's wealth, potentially leading to greater wealth dispersion in the future. Investigating these indirect links offers a promising direction for future research.

References

Attanasio, O. P., Banks, J., Meghir, C., and Weber, G. (1999). Humps and bumps in lifetime consumption. *Journal of Business & Economic Statistics*, 17(1):22–35.

Bach, L., Calvet, L. E., and Sodini, P. (2020). Rich pickings? risk, return, and skill in household wealth. *American Economic Review*, 110(9):2703–47.

Bell, F. C. and Miller, M. L. (2005). *Life tables for the United States social security area, 1900-2100*. Social Security Administration, Office of the Chief Actuary.

Benabou, R. (2002). Tax and education policy in a heterogeneous-agent economy: What levels of redistribution maximize growth and efficiency? *Econometrica*, 70(2):481–517.

Benhabib, J., Bisin, A., and Luo, M. (2019). Wealth distribution and social mobility in the us: A quantitative approach. *American Economic Review*, 109(5):1623–47.

Bhandari, A. and McGrattan, E. R. (2021). Sweat equity in us private business. *The Quarterly Journal of Economics*, 136(2):727–781.

Brown, J. and Weisbenner, S. (2004). *Intergenerational Transfers and Savings Behavior*, pages 181–204. University of Chicago Press.

Brüggemann, B. (2021). Higher taxes at the top: The role of entrepreneurs. *American Economic Journal: Macroeconomics*, 13(3):1–36.

Buera, F. J., Kaboski, J. P., and Shin, Y. (2011). Finance and development: A tale of two sectors. *American economic review*, 101(5):1964–2002.

Cagetti, M. and De Nardi, M. (2008). Wealth inequality: Data and models. *Macroeconomic Dynamics*, 12(S2):285–313.

Cagetti, M. and De Nardi, M. (2009). Estate taxation, entrepreneurship, and wealth. *American Economic Review*, 99(1):85–111.

Cagetti, M. and Nardi, M. D. (2006). Entrepreneurship, Frictions, and Wealth. *Journal of Political Economy*, 114(5):835–870.

Cao, D. and Luo, W. (2017). Persistent heterogeneous returns and top end wealth inequality. *Review of Economic Dynamics*, 26:301–326.

Carroll, D. R. and Hoffman, N. (2017). New data on wealth mobility and their impact on models of inequality. *Economic Commentary*.

Castaneda, A., Diaz-Gimenez, J., and Rios-Rull, J.-V. (2003). Accounting for the us earnings and wealth inequality. *Journal of political economy*, 111(4):818–857.

Castañeda, A., Díaz-Giménez, J., and Ríos-Rull, J. (2003). Accounting for the u.s. earnings and wealth inequality. *Journal of Political Economy*, 111(4):818–857.

Cooley, T. F. and Prescott, E. C. (1995). *Economic Growth and Business Cycles*, pages 1–38. Princeton University Press, Princeton.

Davies, J. and Shorrocks, A. F. (2000). The distribution of wealth. In Atkinson, A. and Bourguignon, F., editors, *Handbook of Income Distribution*, volume 1, chapter 11, pages 605–675. Elsevier, 1 edition.

De Nardi, M. (2004). Wealth Inequality and Intergenerational Links. *The Review of Economic Studies*, 71(3):743–768.

De Nardi, M. and Yang, F. (2016). Wealth inequality, family background, and estate taxation. *Journal of Monetary Economics*, 77:130–145.

de Nicola, F. and Giné, X. (2014). How accurate are recall data? evidence from coastal india. *Journal of Development Economics*, 106:52–65.

Elinder, M., Erixson, O., and Waldenström, D. (2018). Inheritance and wealth inequality: Evidence from population registers. *Journal of Public Economics*, 165:17–30.

Fagereng, A., Guiso, L., Malacrino, D., and Pistaferri, L. (2020). Heterogeneity and persistence in returns to wealth. *Econometrica*, 88(1):115–170.

Feiveson, L. and Sabelhaus, J. (2018). How does intergenerational wealth transmission affect wealth concentration? Feds notes, Washington: Board of Governors of the Federal Reserve System.

Gale, W. G. and Scholz, J. K. (1994). Intergenerational transfers and the accumulation of wealth. *Journal of Economic Perspectives*, 8(4):145–160.

Gale, W. G. and Slemrod, J. B. (2001). Rethinking the estate and gift tax: Overview. Working Paper 8205, National Bureau of Economic Research.

Gao, H. and Zhang, L. (2024). Uncover "gazelles": The macroeconomic implications of uncertainty and learning for entrepreneurship. *Working Paper*.

Guvenen, F., Kambourov, G., Kuruscu, B., Ocampo, S., and Chen, D. (2023). Use it or lose it: Efficiency and redistributional effects of wealth taxation. *The Quarterly Journal of Economics*, 138(2):835–894.

Guvenen, F., Kaplan, G., Song, J., and Weidner, J. (2022). Lifetime earnings in the united states over six decades. *American Economic Journal: Applied Economics*, 14(4):446–79.

Heathcote, J., Storesletten, K., and Violante, G. L. (2017). Optimal tax progressivity: An analytical framework*. *The Quarterly Journal of Economics*, 132(4):1693–1754.

Hincapié, A. (2020). Entrepreneurship over the life cycle: Where are the young entrepreneurs? *International Economic Review*, 61(2):617–681.

Hubmer, J., Krusell, P., and Jr., A. A. S. (2020). *Sources of US Wealth Inequality: Past, Present, and Future*, pages 391–455. University of Chicago Press.

Hurd, M. D. and Mundaca, B. G. (1989). *The Importance of Gifts and Inheritances Among the Affluent*, pages 737–764. University of Chicago Press, 1989.

Kaymak, B., Leung, D., and Poschke, M. (2022). Accounting for wealth concentration in the united states. *Working Paper*.

Kindermann, F. and Krueger, D. (2022). High marginal tax rates on the top 1 percent? lessons from a life-cycle model with idiosyncratic income risk. *American Economic Journal: Macroeconomics*, 14(2):319–66.

Kitao, S. (2008). Entrepreneurship, taxation and capital investment. *Review of Economic Dynamics*, 11(1):44–69.

Korom, P., Lutter, M., and Beckert, J. (2017). The enduring importance of family wealth: Evidence from the forbes 400, 1982 to 2013. *Social Science Research*, 65:75–95.

Kotlikoff, L. J., Smetters, K., and Walliser, J. (1999). Privatizing social security in the united states—comparing the options. *Review of Economic Dynamics*, 2(3):532–574.

Kotlikoff, L. J. and Summers, L. H. (1981). The role of intergenerational transfers in aggregate capital accumulation. *Journal of Political Economy*, 89(4):706–732.

Kuhn, M. and Rios-Rull, J.-V. (2020). 2019 update on the u.s. earnings, income, and wealth distributional facts: A view from macroeconomics. Report, University of Mannheim.

McGrattan, E. R. (1994). The macroeconomic effects of distortionary taxation. *Journal of Monetary Economics*, 33(3):573–601.

Modigliani, F. (1988). The role of intergenerational transfers and life cycle saving in the accumulation of wealth. *Journal of Economic Perspectives*, 2(2):15–40.

Nishiyama, S. (2002). Bequests, inter vivos transfers, and wealth distribution. *Review of Economic Dynamics*, 5(4):892–931.

Peterman, W. B. and Sommer, K. (2019). How well did social security mitigate the effects of the great recession? *International Economic Review*, 60(3):1433–1466.

Pfeffer, F. T. and Killewald, A. (2018). Generations of advantage. multigenerational correlations in family wealth. *Social Forces*, 96(4):1411–1442.

Quadrini, V. (2000). Entrepreneurship, saving, and social mobility. *Review of economic dynamics*, 3(1):1–40.

Tauchen, G. (1986). Finite state markov-chain approximations to univariate and vector autoregressions. *Economics letters*, 20(2):177–181.

Wolff, E. and Gittleman, M. (2014). Inheritances and the distribution of wealth or whatever happened to the great inheritance boom? *The Journal of Economic Inequality*, 12(4):439–468.

Appendices

A. SCF Data

I obtained data on income, wealth distributions, and intergenerational wealth transmission statistics from the Survey of Consumer Finances (SCF). The SCF conducts regular cross-sectional surveys every three years to provide comprehensive information on the finances of U.S. families. Each survey year includes a core representative sample. Due to variations in the interviewee group each survey year, I computed statistics on an annual basis and then averaged them across years to derive the statistics presented in the Appendix.

Household wealth is defined as the net worth of a household, calculated by deducting the current value of all debts from the current value of all marketable assets. Assets encompass both financial and nonfinancial types. Financial assets include liquid assets, certificates of deposit, directly held pooled investment funds, bonds, stocks, quasi-liquid retirement assets, whole life insurance, other managed assets, and various financial instruments. Nonfinancial assets consist of vehicles, houses, businesses, and other tangible goods. Total liabilities comprise the sum of mortgage debt, consumer debt, and any other outstanding debts.

The SCF also provides information on bequests and gifts received by individual households, with data collected retrospectively. Households are asked to report the amount of the transfer they received, the year it was received, and the type of the transfer (bequest or inter vivos). The survey additionally queries participants about their expectations regarding substantial future transfers. To analyze the cumulative inheritance a household might receive over its lifetime, I focus on households that are at least 60 years old and indicate that they do not expect to receive substantial wealth transfers in the future.

In the main text, I argue that a significant portion of the wealthy received relatively small inheritances. To define what constitutes "small," I computed additional statistics presented in Table 8. Using the 2019 SCF, Kuhn and Rios-Rull (2020) report that the average earnings for the entire economy amount to \$77,800. Using this figure as a benchmark, I find that only 44% of the top one percent by wealth received transfers exceeding this amount. This suggests that more than half of the top one percent either inherited nothing or received inheritances smaller than the average earnings of the overall economy.

Guvenen et al. (2022) estimate the threshold value for the 99th percentile of the lifetime earnings distribution to be \$9,335,650. Treating the lifetime earnings of the top one percent earners as a proxy for those at the top of the wealth distribution, I find that less than 25% of the super-rich inherited more than 10% of the lifetime earnings of a typical top one percent by lifetime earnings. This indicates that a considerable portion of the top one percent by wealth inherited only a relatively small fraction of their lifetime resources. Moreover, using the cutoff value for the top one percentile of the wealth distribution as a criterion for what is considered "small," only 27% of the top one percent by wealth received wealth transfers greater than one-tenth of the cutoff value for the 99th percentile of the wealth distribution.

Inheritance $>$ average earnings of the whole economy	44%
Inheritance $> 0.1\times$cutoff for the 99^{th} percentile of lifetime earnings distribution	24%
Inheritance $> 0.1\times$ wealth top percentile cutoff value	27%

Table 8. Fraction of the Richest One Percent

Notes: $1989 - 2019$ SCF data. This table shows the percentage share of households in the top one percent of wealth distribution who are at least 60 years old and do not expect to receive a substantial inheritance or transfer of assets in the future and with wealth transfers that satisfy the requirement.

B. PSID Data as a Robustness Check

In this section, I utilize an alternative data source, the Panel Survey of Income Dynamics (PSID), to examine inheritance patterns among the very wealthy. This serves as a robustness check to cross-validate the results obtained using SCF data in the main text. As will be demonstrated, the findings from the PSID are remarkably consistent with the SCF results reported in Section 3.

The PSID is a longitudinal survey of a representative sample of U.S. individuals and the families they reside in. Data were collected annually until 1997 and have been collected biennially since then. Data prior to 1984 do not include information on wealth. Importantly, starting in 1984, questions about inheritances were also introduced to help understand the origins of family assets. Specifically, in 1984, respondents were asked if they had *ever* received an inheritance, the year it was received, and its value at that time. Although questions about inheritance continued in later years, they were revised to inquire only about inheritances worth \$10,000 or more, resulting in less comprehensive information than in 1984. Therefore, the following analysis utilizes only the 1984 PSID data, where a complete history of inheritances is available. Note that in the PSID, questions are asked only about inheritances, not on *inter-vivo* transfers, so the results presented are exclusively for *inheritance*.

Following the same approach as outlined in Section 3, I apply a 3% real interest rate to calculate the present value of each inheritance based on the reported inheritance values and the year of receipt. I then sum all inheritances received by each household and compute the ratio of inheritance to wealth for each household.

Approximately 19% (21% in the SCF) of households in the U.S. have received an inheritance at some point in the past, contributing to roughly 44% (43% in the SCF) of their total wealth. To investigate inheritance received over a lifetime, I focus exclusively on households that are at least 60 years old and do not expect to receive any future inheritances. Over the lifetimes, 30% (30% in the SCF) of the U.S. households may receive an inheritance, which contributes to 42% (49% in the SCF) of their wealth.

Fact 1. The distribution of inheritances received over a lifetime is highly skewed.

Table 9 presents the size distribution of inheritances received over a lifetime. Consistent with findings from the SCF, the PSID data shows that 70% of households do not receive any inheritance during their lifetime. Conversely, the top 10% of households receive substantial inheritances that account for nearly 90% of the total dollars inherited.

	Decile			
	1-7	8	9	10
SCF	0	1.5	7.9	90.6
PSID	0	1.9	8.5	89.6

Table 9. Inheritance Size Distribution

Fact 2. The majority of inheritances predominantly flow to rich households.

Figure 9 shows the share of total dollars inherited by households across different wealth percentile groups. Consistent with the findings from the SCF, the PSID data exhibits a similar pattern, revealing that a significant portion of inheritances is concentrated among rich households. Specifically, 54.9% (61% in the SCF) of the total inherited dollars are held by households in the top decile of the wealth distribution, whereas the inheritances received by households in the bottom 50% account for only 8.6% (5% in the SCF) of the total inherited dollars.

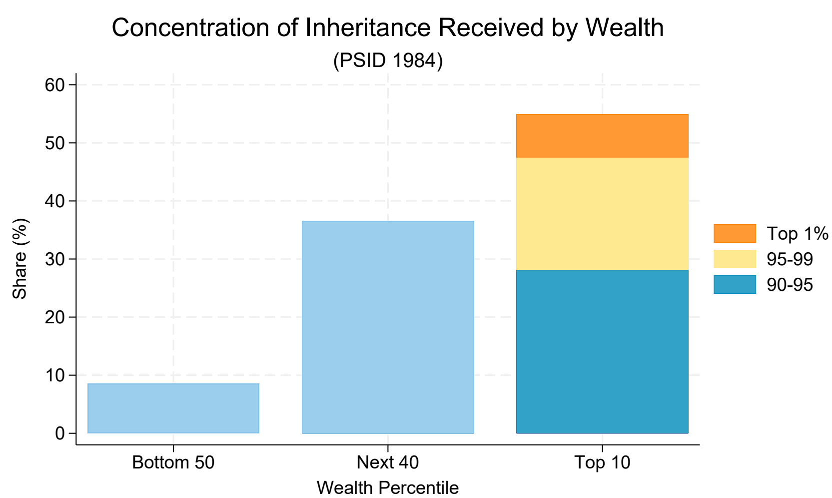

Figure 9. PSID: Concentration of Inheritances Received by Wealth

Notes: This figure shows the percentage of aggregate inheritances received by different household groups, categorized according to percentiles of the wealth distribution.

Fact 3. Inheritances received by rich households account for a small fraction of their wealth holding.

As in the main text, I calculate the ratio of the present value of inheritance to current wealth. For all households, this ratio is nearly 50%, indicating that almost half of household wealth can be directly attributed to inheritance. I then compute this ratio specifically for households in the top wealth group. Table 10 presents these results, computed using both SCF and PSID data. Consistent with the SCF findings, the PSID data indicates that the inheritance-to-wealth ratio is relatively low for affluent households. For households in the top decile of the wealth distribution, the present value of the inheritance-to-wealth ratio is approximately 0.2. For the wealthiest 1% of households, this ratio is even lower, at 0.08.

	Wealth top decile	Sub-groups in top decile		
		$90-95$	$95-99$	Top 1%
SCF	0.18	0.24	0.22	0.13
PSID	0.20	0.37	0.19	0.08

Table 10. Ratio of Inheritances to Current Net Worth

Notes: This table presents the ratio of inheritance to the current net worth for households in each top wealth group. Inheritances are calculated as their present value, applying a 3% real interest rate, and based on both the reported value and the date of receipt.

Fact 4. Half of the rich households do not receive any inheritances over their lifetime.

Figure 10 presents the number of households within each inheritance-to-wealth ratio bin, reported as a fraction of the total number of households in each wealth group, based on the PSID data. The findings are similar to the results from the SCF data. However, in the PSID data, all households in the wealthiest 1% have an inheritance-to-wealth ratio of less than or equal to 0.2, with 63% of them reporting a ratio of zero. In contrast, the SCF data indicates that 52% of the wealthiest 1% have zero inheritances, with an additional 7% receiving large inheritances that result in an inheritance-to-wealth ratio above 0.5. This divergence between the PSID and SCF results may stem from the fact that the PSID does not oversample the very wealthy and focuses exclusively on inheritances, excluding inter vivos transfers.

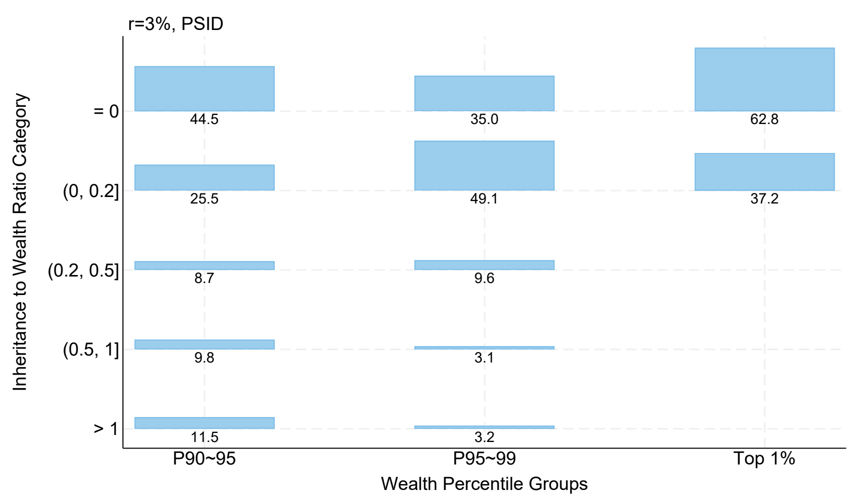

Figure 10. PSID: Share of Households in Each Inheritance-to-Wealth Ratio Category

Notes: This figure shows the number of households within each inheritance-to-wealth ratio bin, reported as a fraction of the total number of households in different wealth groups.

C. Alternative Model

This section explores an alternative model to highlight the significance of new empirical evidence regarding inheritance. The setup of this alternative model is the same as that of my benchmark model; however, the calibration of the business quality process differs. In contrast to the benchmark model, the alternative model is calibrated only to match the moments related to wealth distribution and entrepreneurship, without being further governed by the moments associated with the inheritance patterns of wealthy households.

C.1. Model Calibration

Similar to the benchmark model, I assume that the business quality level can take on four different values: $q \in \{q_{dis}, \hat{q} \times (1-\overline{q}), \hat{q}, \hat{q} \times (1+\overline{q})\}$, where q_{dis} represents the disaster state, consistent with the benchmark economy. The remaining three business quality states are characterized by the two parameters, $\overline{q}$ and $\hat{q}$. The transition matrix for q is governed by three parameters:

$$\Lambda = \begin{bmatrix} 1 & 0 & 0 & 0 \\ p_1 & p_2 & 1-p_1-p_2 & 0 \\ 0 & p_1 & p_2 & 1-p_1-p_2 \\ 0 & 0 & 1-p_3 & p_3 \end{bmatrix} \tag{16}$$

Parameter	Value	Targeted Moment	Data	Model
Preferences				
β	0.96	Capital-to-wealth ratio	2.65	2.90
ϕ_1	-464.41	Bequest-to-wealth ratio	0.88%	0.88%
ϕ_2	402.61	90th percentile of bequest dist.	4.31	4.81
Endowments				
$\overline{q}$	0.47	Ent population share	0.07	0.07
$\hat{q}$	2.49	Ent entry rate	0.02	0.01
p_1	0.20	Ent exit rate	0.20	0.18
p_2	0.80	Ent wealth share	0.33	0.30
p_3	0.85	Top 1% wealth share	0.32	0.32
Production				
C_{entry}	3.55	Ave. age of first-time ents.	33	30
Taxes				
$\underline{e}$	61.18	Frac. of estates paying estate taxes	0.02	0.02
τ_e	0.27	Estate tax revenues-to-GDP ratio	0.33%	0.33%

Table 11. Parameters Calibrated (Jointly) Inside the Alternative Model

Therefore, The stochastic process for q is governed by five parameters, $\overline{q}$, $\hat{q}$, p_1, p_2, and p_3. Unlike the benchmark model calibration, I use only the moments related to entrepreneurship and wealth distribution to estimate these parameter values, excluding moments associated with inheritance patterns. Specifically, I choose these five parameters to match five empirical targets: (i) the share of entrepreneurs in the population (0.07), (ii) the annual entry rate into entrepreneurship (0.02), (iii) the annual exit rate from entrepreneurship (0.20), (iv) the share of entrepreneurs' wealth (0.33), and (v) the wealth share of the top 1% (0.32).

Furthermore, since the influence of inheritance is not constrained by the new inheritance pattern moments, in the alternative model, inheritance and entrepreneurship together can generate wealth concentration at the top without overrepresenting entrepreneurs. Thus, there is no need to assume the existence of a superstar labor state. Consequently, all six labor states in this alternative model are discretized from the AR(1) process, resulting in a total of 11 parameters to be calibrated within the model. The parameter calibration results, along with their targeted moments, are presented in Table 11. The externally calibrated parameters retain the same values as those in the benchmark model, as listed in Table 2.

The alternative model, incorporating both inheritance and entrepreneurship, effectively reproduces the key features of the U.S. economy and generates a realistically skewed wealth distribution, as presented in Table 12. Although my calibration only targeted the wealth share of the top 1%, the model successfully approximates the entire wealth distribution, aligning closely with the observed data.

	% of Wealth Hold by Wealth Percentile				
	Bottom 50	Next 40	90-95	95-99	99-100
Data	2.8	27.7	12.2	25.1	32.2
Model	1.1	24.5	15.3	27.1	32.0

Table 12. Wealth Distribution in the Alternative Model

C.2. Changing the Estate Tax

In this section, I conduct a policy counterfactual within the framework of the alternative model. Similar to the analysis performed in the benchmark model, I adjust the estate tax rate while maintaining the exemption level at its calibrated value. The additional tax revenue is redistributed through a lump-sum transfer to all households (T) to restore government budget balance. The policy experiment is conducted in general equilibrium.

The two panels in the bottom of Figure 11 show the effects on factor prices, r and w, as the estate tax rate varies from 0 to 1. The upper right panel together with the two panels in the middle presents the percentage changes in aggregate output, capital, and labor under the same conditions. Both figures display patterns consistent with those observed in the benchmark model; however, the magnitudes of the effects are larger.

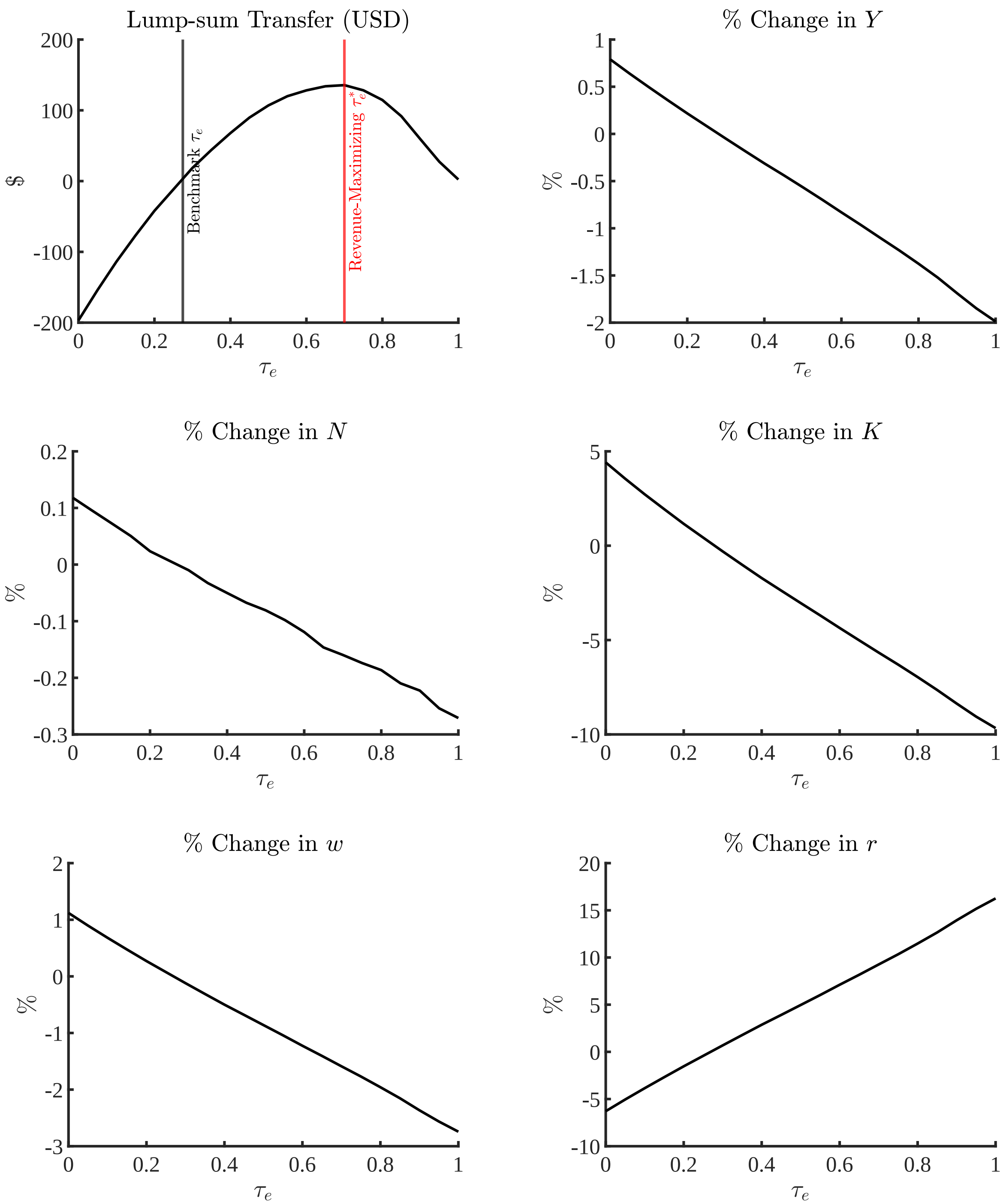

Figure 11. Alternative Model: Aggregate Effects of Changing the Estate Tax Rate

Notes: This figure shows the aggregate effects of changing the estate tax rate while maintaining the exemption value fixed at its calibrated benchmark level. The upper left panel displays the amount of lump-sum transfer per household required to balance the government budget while keeping government purchases G at the benchmark level. The upper right panel shows the percentage changes in aggregate output. The two panels in the middle represent the percentage changes in aggregate capital and aggregate labor, compared to their counterparts in the baseline economy. The two panels in the bottom show the percentage changes in interest rate and wage.

Abolishing estate taxation ($\tau_e = 0$) increases the return on savings for affluent and older households. The enhanced return from leaving a bequest outweighs the disincentive posed by the lower interest rate. At the aggregate level, the increased savings among the wealthiest households are sufficient to offset the decreased savings of other groups, resulting in an overall increase in aggregate capital of nearly 5% upon the repeal of estate taxation. Since I assume an exogenous labor supply, aggregate labor is not significantly affected by changes in the estate tax. Following the abolition of the estate tax, aggregate labor in the economy rises by only 0.1%. This slight increase arises from changes in occupational choice, as marginal entrepreneurs opt to become workers due to the higher wage rates.

Wages increase despite the rise in aggregate labor supply, as the substantial increase in capital leads to an overall rise in the capital-labor ratio. Consequently, eliminating the estate tax results in an increase in aggregate output of almost 1%. In contrast, setting the estate tax to a confiscatory level of 100% ($\tau_e = 1$) results in a 2% decrease in aggregate output.

Turning to distributional outcomes, Figure 12 presents the Gini coefficient and the share of wealth held by the top 1% as the estate tax rate varies from 0 to 1. Both measures of wealth inequality exhibit a monotonically decreasing trend as tax rates increase. The wealth Gini coefficient declines from 0.85 to 0.82. Notably, the wealth share of the top 1% rises to 32.6% upon the abolition of the estate tax, while it decreases to 28.8% when the tax rate is set to 1. This outcome contrasts with the findings from the benchmark model.

This divergence arises because the alternative model does not incorporate the new empirical evidence regarding inheritance receipt patterns among the very wealthy. Consequently, the model tends to overstate the role of inheritance in wealth accumulation. As such, increasing the estate tax rate reduces the wealth held by the very rich, resulting in a lower wealth share at the top and promoting greater equality within the economy. As a result, the Gini coefficient declines.

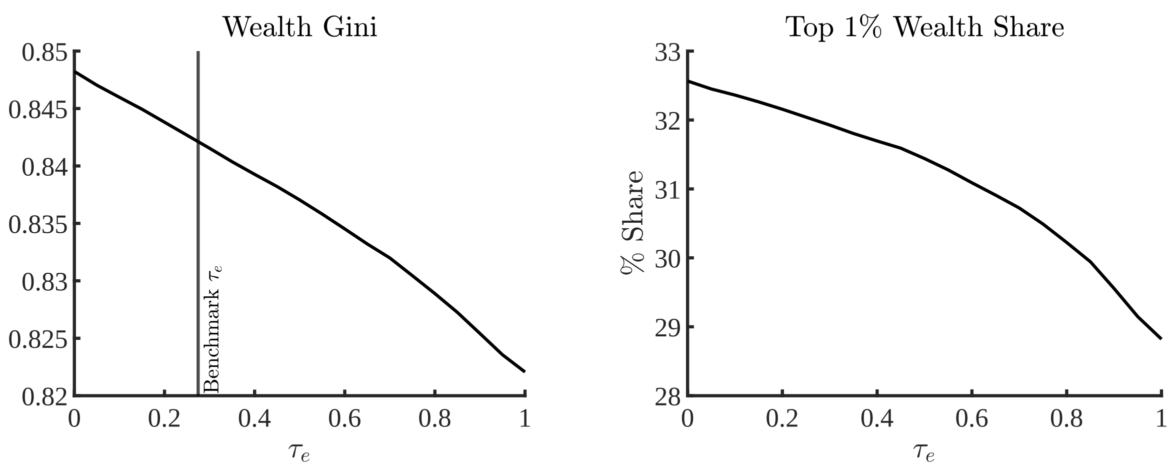

Figure 12. Alternative Model: Distributional Effects of Changing the Estate Tax Rate

Notes: The left panel displays the wealth Gini coefficients as the estate tax rate varies from 0 to 1. The right panel shows the share of wealth held by the top 1%. A lump-sum transfer to all households is employed to balance the government budget when changing the estate tax rate.