Bequests, Fertility and Barriers to Entrepreneurship *

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Abstract

This paper studies how parental fertility and bequest decisions influence children's ability to become entrepreneurs in the presence of financial frictions. Entrepreneurs often face borrowing constraints, which can be alleviated by intergenerational transfers. Previous empirical evidence suggests that high-income parents typically have fewer children and leave larger bequests, reducing their children's financing barriers relative to those from low-income families. However, most existing work on intergenerational transfers and entrepreneurship has emphasized bequests, giving less attention to fertility as a key dimension of parental resource allocation. To address this gap, I develop an overlapping-generations model with endogenous fertility, bequest, and occupational choices, calibrated to US data. The model reveals that parental fertility and bequest decisions, when combined with financial frictions, distort children's occupational choices and reduce efficiency. Counterfactual analysis shows that reducing financial frictions increases income per capita but reduces the entrepreneurship rate, raises income inequality, and lowers intergenerational mobility. These findings suggest that financial policy should aim to promote development while addressing income concentration.

Keywords: Entrepreneurship, Financial Frictions, Bequest, Fertility

JEL Classification: O16, E24

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1 Introduction

Entrepreneurship is crucial for economic development, but many entrepreneurs face borrowing constraints that limit their ability to start or grow businesses (Buera, 2008; Evans and Jovanovic, 1989). Intergenerational transfers can help alleviate financial stress, but access to such support is highly unequal. Individuals with high-income parents typically encounter fewer financial barriers, as wealthier households tend to have fewer children (Becker, 1960; Borg, 1989; Docquier, 2004; Jones et al., 2008) and can concentrate more resources and leave larger bequests on each child. These patterns contribute to unequal access to entrepreneurship under financial frictions.

Heterogeneity in family support for entrepreneurship has important implications for efficiency, inequality, and intergenerational mobility. First, the interaction between parental resource allocation and financial frictions can generate a misallocation of entrepreneurial talent. Individuals with high ability but limited parental transfers may be unable to access sufficient capital, forcing them to either forgo entrepreneurship or operate at a suboptimal scale, both of which reduce aggregate productivity. Second, intergenerational decisions about fertility and bequests jointly shape the next generation's income distribution. While previous research has incorporated bequest behavior when investigating entrepreneurship and income distribution, it typically abstracts from the fertility channel. By modeling fertility as an endogenous choice alongside bequests, this paper offers a more comprehensive understanding of how intergenerational decisions influence income distributions and inequality. Third, disparities in family support impact social mobility. Since entrepreneurship is a major pathway to wealth accumulation and many of the wealthiest individuals are business owners (Cagetti and De Nardi, 2006), those from low-income families face structural barriers to moving up the income ladder.

This paper examines how parents' decisions regarding fertility and bequests impact their children's ability to become entrepreneurs when financial markets are imperfect. I build an overlapping generations (OLG) model where parents choose how many children to have and how much wealth to transfer to each child. These choices determine the financial resources that each child inherits. High-income parents, who face higher costs of child-rearing, tend to have fewer children and leave larger bequests. As a result, their children have more startup capital and are more likely to become entrepreneurs when they reach adulthood. At the aggregate level, financial frictions prevent some talented individuals from accessing enough capital. As a result, they either do not start a business or operate below the optimal scale.

This misallocation lowers productivity.

I begin with a benchmark model without financial frictions. Individuals live for two periods: childhood and adulthood. During childhood, they do not make decisions and consume passively. Upon reaching adulthood, they learn their entrepreneurial talent and receive an inheritance from their parents. Talent is partially inherited and follows an AR(1) process. Adults choose between becoming workers or entrepreneurs based on their talent and assets. In the absence of financial constraints, all individuals can access the capital needed to operate at their optimal scale. After determining their occupation and income, adults choose how much to consume, how many children to have, and how much to bequeath. The model adopts a warm-glow framework in which parents derive utility from both raising children and leaving bequests, but face increasing marginal costs of having children.

I next introduce financial frictions arising from the limited enforceability of the credit market. Following Buera et al. (2011), individuals who borrow capital from banks can default, retaining a fraction $(1-s)$ of their profits net of labor costs. To prevent default, banks impose borrowing limits that ensure repayment is more attractive than default. These limits depend on the individual's assets, entrepreneurial talent, and the bank's ability to seize the profits. If the capital limit exceeds the entrepreneurs' optimal capital level, they operate efficiently. Otherwise, they are credit-constrained and produce at a suboptimal scale. Individuals choose the occupation that yields the highest income, given these constraints. As a result, some highly talented but poorly endowed individuals either exit entrepreneurship or operate inefficiently, generating misallocation and inefficiency. As in the benchmark model, individuals then choose fertility, bequests, and consumption to maximize utility.

After solving the model, I calibrate the parameters using data from the Panel Study of Income Dynamics (PSID). I begin by estimating individual-level income and consumption profiles over the life cycle through regressions, which allows me to construct expected lifetime earnings and consumption. I also use asset holdings at age 25 as a proxy for bequests received. Macro-level parameters are calibrated using the General Method of Moments (GMM), targeting the entrepreneurship rate and the income distribution. In the second stage, I use the estimated income to calibrate utility parameters by matching the distributions of consumption and fertility.

I conduct counterfactual exercises to evaluate the effects of relaxing financial frictions and shutting down the endogenous fertility channel. Reducing financial frictions, relative to the baseline model, boosts economic development by enabling highly talented individuals to scale large firms and absorb more capital. However, this also raises interest rates, which crowds out smaller entrepreneurs and amplifies returns to existing wealth. As a result, income inequality increases and intergenerational mobility declines. These findings underscore the importance of designing financial policies that account for both development and the concern of income concentration. Moreover, the fertility counterfactual shows that excluding endogenous fertility decisions, as is common in the existing literature, can lead to overestimation in inequality and mobility under current U.S. financial conditions.

This paper makes a central contribution by introducing endogenous fertility decisions into a structural model of entrepreneurship under financial frictions. By modeling parental choices over family size and intergenerational transfers, the analysis captures how these decisions shape children's occupational outcomes, income distribution, and intergenerational mobility. The results show that omitting fertility behavior can lead to inaccurate measures of inequality and mobility, thereby underscoring the importance of considering the fertility channel in policy evaluations.

The remainder of the paper is structured as follows. Section 2 reviews the related literature and outlines the paper's contribution. Section 3 presents the frictionless benchmark model. Section 4 introduces financial frictions into the framework. Section 5 describes the data and calibration strategy. Section 6 reports the counterfactual analysis. Section 7 concludes.

2 Related Literature

This paper contributes to the literature on intergenerational transfers as a mechanism for overcoming financial barriers to entrepreneurship. Existing studies emphasize that family transfers can serve as informal credit, enabling individuals from wealthier backgrounds to start businesses despite borrowing constraints (Brüggemann, 2021; Cagetti and De Nardi, 2006). My work extends this strand by modeling how parents endogenously allocate financial resources among children and how fertility decisions shape the scale of these transfers. By linking family size to entrepreneurial outcomes, the model captures the demographic channel that has been largely overlooked in existing literature.

This paper also relates to the literature on entrepreneurship and demographic change.

Karahan et al. (2024) shows that an exogenous slowdown in labor supply contributes to the decline in U.S. startup rates. Engbom et al. (2019) studies the effects of population aging on firm and worker dynamics, finding that aging reduces firm formation. Liang et al. (2018) similarly examines aging but focuses on how it affects entrepreneurial traits such as creativity and risk tolerance. These studies treat demographic changes as exogenous factors influencing entrepreneurship. In contrast, my model endogenizes demographic decisions by allowing parents to choose fertility, linking demographic change directly to the allocation of family resources across children and their likelihood of entrepreneurial entry.

Finally, this paper contributes to the literature on entrepreneurship and income distribution. A growing body of work documents the rise in income and wealth inequality in the United States (Saez and Zucman, 2020), with entrepreneurship identified as a key channel (Brüggemann, 2021; Scheuer, 2014; Terajima, 2006). De Nardi (2004) emphasizes the role of bequest motives in shaping wealth dispersion. This paper is closely related to Quadrini (2000) and Cagetti and De Nardi (2006), which model endogenous occupational choice under borrowing constraints and capture intergenerational transmission through discount factors, without explicitly modeling bequest behavior. More recently, Ivanova (2023) introduces endogenous bequest decisions, but ignores the fertility channel. This paper extends that line of work by modeling both fertility and bequest choices, allowing for a more comprehensive analysis of how the interaction between intergenerational transfers and fertility choices impacts entrepreneurship, inequality, and mobility under financial frictions.

3 Frictionless model

I build a model without financial frictions as the benchmark first. I adopt a discrete-time OLG model where people experience two stages of life: child and adult. The adults make occupational choices and maximize their utility. The children consume passively.

3.1 Utility maximization

After knowing their income, parents choose consumption c_{it}, total bequest to all children m_{it} and the number of children n_{it} to maximize their utility:

$$\max_{\{c_{it},n_{it},m_{it}\}} \left(\theta_1 c_{it}^{1-\frac{1}{\epsilon}} + \theta_2 m_{it}^{1-\frac{1}{\epsilon}} + (1-\theta_1-\theta_2) n_{it}^{1-\frac{1}{\epsilon}}\right)^{\frac{\epsilon}{\epsilon-1}} \tag{1}$$

$$\text{Subject to:} \quad c_{it} + m_{it} + \tau y_{it} n_{it} = y_{it}$$

Parameter ϵ is the elasticity of substitution between consumption, total bequest, and fertility. θ_1 and θ_2 represent how much people value consumption and bequest respectively. y_{it} is individual i_t's income. τ is the time cost of having one child. To raise n_{it} children, the parent needs to pay $n_{it} \times \tau$ fraction of their income y_{it}.

The solution to the utility maximization problem is listed as follows:

$$c_{it}^{*} = \frac{1}{1 + (\frac{\theta_2}{\theta_1})^{\epsilon} + (\frac{1-\theta_1-\theta_2}{\theta_1 \tau y_{it}})^{\epsilon}} \times y_{it} \tag{2}$$

$$m_{it}^{*} = \frac{(\frac{\theta_2}{\theta_1})^{\epsilon}}{1 + (\frac{\theta_2}{\theta_1})^{\epsilon} + (\frac{1-\theta_1-\theta_2}{\theta_1 \tau y_{it}})^{\epsilon}} \times y_{it} \tag{3}$$

$$n_{it}^{*} = \frac{(\frac{1-\theta_1-\theta_2}{\theta_1 \tau})^{\epsilon}}{1 + (\frac{\theta_2}{\theta_1})^{\epsilon} + (\frac{1-\theta_1-\theta_2}{\theta_1 \tau y_{it}})^{\epsilon}} \times y_{it}^{1-\epsilon} \tag{4}$$

Consumption and bequest are increasing in an individual's income. The monotonicity of the number of children depends on the value of ϵ. When $\epsilon \leq 1$, n_{it} increase in y_{it}. However, if $\epsilon > 1$, n_{it} will first increase in income when $y_{it} < (\frac{1-\theta_1-\theta_2}{\theta_1 \tau})(\frac{1+(\frac{\theta_2}{\theta_1})^{\epsilon}}{\epsilon-1})^{\frac{1}{\epsilon}}$. As income increases above the threshold, the number of children will decrease in income due to the increased child cost. Figure 1 indicates the relationship between income and the number of children for different values of ϵ.

I define $b_{it} = \frac{m_{it}}{n_{it}}$ as the average bequest within the family. Each child within the family obtains the same amount of bequest. When the child grows up and becomes an adult, they will inherit the amount of b_{it} as their asset. In aggregate, for the next generation $t+1$, a fraction of $\frac{n_{it}}{\sum_{i_t}(n_{it})}$ people will receive b_{it} amount of bequests as their assets. Parents' optimal bequest and fertility choices determine the distribution of assets for the next generation.

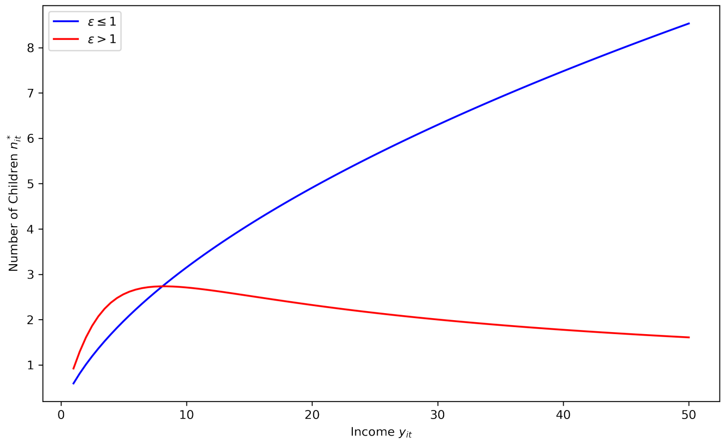

Figure 1: Relationship between Income and Number of Children

3.2 Individuals' setup

When the children grow up, they inherit bequests from their parents as assets:

$$a_{\text{children},t} = b_{\text{parent},t-1} \tag{5}$$

At the same time, entrepreneurial ability is given by the following equation:

$$\log(z_{it+1}) = \rho \log(z_{it}) + \bar{z} + \epsilon_{it} \tag{6}$$

$\epsilon_{it} \sim N(0,1)$. Each individual's talent is partially inherited from the parent and $0 < \rho < 1$. In the long run, the individual level talent would converge to $e^{\frac{\bar{z}}{1-\rho}}$.

3.3 Occupation

After knowing the asset level a_{it} and entrepreneurial ability z_{it}, the individual i_t first faces the following firm production problem:

$$\max_{\{K_{it},L_{it}\}} \pi_{it} = (A \times z_{it})^{1-\alpha-\beta}(K_{it})^{\alpha} L_{it}^{\beta} - R_t K_{it} - W_t L_{it} \tag{7}$$

After solving the previous problem, the individual knows their optimal capital level, labor level as well as the profit:

$$K_{it}^{*} = (\frac{\alpha}{R_t})^{\frac{1-\beta}{1-\alpha-\beta}}(\frac{\beta}{W_t})^{\frac{\beta}{1-\alpha-\beta}}Az_{it} \tag{8}$$

$$L_{it}^{*} = (\frac{\alpha}{R_t})^{\frac{\alpha}{1-\alpha-\beta}}(\frac{\beta}{W_t})^{\frac{1-\alpha}{1-\alpha-\beta}}Az_{it} \tag{9}$$

$$\pi_{it}^{*} = Az_{it}(\frac{\alpha}{R_t})^{\frac{\alpha}{1-\alpha-\beta}}(\frac{\beta}{W_t})^{\frac{\beta}{1-\alpha-\beta}}(1-\alpha-\beta) \tag{10}$$

As an entrepreneur, the individual can also earn interest on the asset from the bank. As a result, the total income of an entrepreneur should be:

$$y_{it}^{\mathrm{E}} = \pi_{it}^{*} + R_t a_{it} \tag{11}$$

On the other hand, an individual provides one unit of labor inelastically as a worker. Workers are matched with the entrepreneurs randomly, and each worker earns the average expected wage in the labor market. The income of a worker is:

$$y_{it}^{\mathrm{W}} = W_t + R_t a_{it} \tag{12}$$

By comparing y_{it}^{E} and y_{it}^{W}, the individual makes an occupation choice which is summarized in equation (13). An individual chooses to become an entrepreneur if and only if $y_{it}^{\mathrm{E}} \geq y_{it}^{\mathrm{W}}$. After solving the inequality, we can get the entrepreneurial cutoff z_t^e in equation (14).

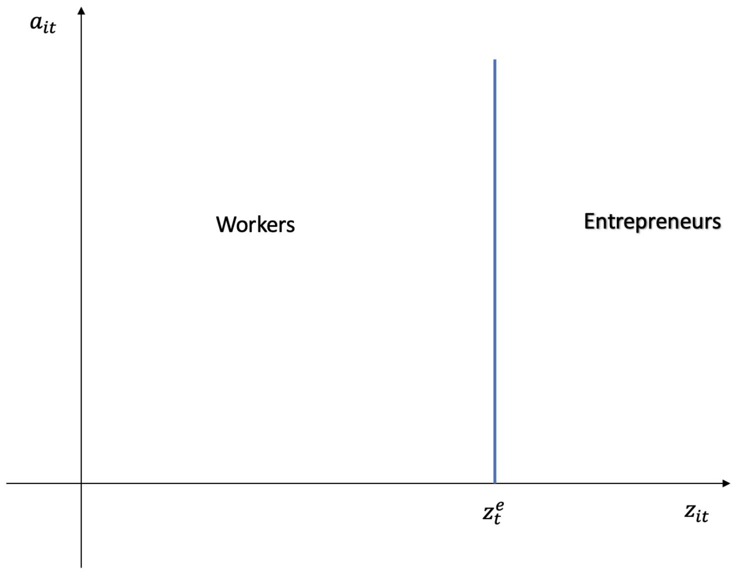

Figure 2: Occupation Choices in the Frictionless Model

$$o_{it} = \begin{cases} 1 & \text{if} \quad y_{it}^{\mathrm{E}} \geq y_{it}^{\mathrm{W}} \\ 0 & \text{if} \quad y_{it}^{\mathrm{E}} < y_{it}^{\mathrm{W}} \end{cases} \tag{13}$$

$$z_t^e = \frac{1}{A}\frac{\beta}{1-\alpha-\beta}(\frac{R_t}{\alpha})^{\frac{\alpha}{1-\alpha-\beta}}(\frac{W_t}{\beta})^{\frac{1-\alpha}{1-\alpha-\beta}} \tag{14}$$

I ignore the subscript i here because the cutoff doesn't depend on individual-level characteristics. Individuals with entrepreneurial talent higher than z_{it}^e choose to become entrepreneurs with income y_{it}^E. Those beneath the threshold will become a worker with income y_{it}^W. Picture 2 indicates individuals' occupation choices in a frictionless model.

3.4 Equilibrium

Let $\mathbf{x} = (a, z)$ be the state variable in the economy. Following the decision rules to occupation and income, the solutions to the utility maximization problem, and the random process for entrepreneurial talent, we can calculate the transition function $p(\mathbf{x}'|\mathbf{x})$, which governs the conditional probability of the next state based on the current state.

The stationary equilibrium is defined by a stable distribution $d^*(\mathbf{x})$ of individuals over state variables $\mathbf{x}$; the occupational choice $o(\mathbf{x})$; optimal decision rules $c(\mathbf{x})$, $n(\mathbf{x})$ and $m(\mathbf{x})$; entrepreneurial optimal solutions $K(\mathbf{x})$ and $L(\mathbf{x})$; interest rate R, wage W. In equilibrium, the following conditions must be satisfied:

(a) Adults maximize utility subject to budget constraints.
(b) Individual makes the optimal occupational choices based on (13).
(c) Entrepreneurs maximize profits.
(d) Labor and capital markets clear. The labor supplied by all workers should be equal to all labor employed by entrepreneurs. The total assets equal all capital employed by entrepreneurs:

$$\int_{i_t \in W} di_t = \int_{i_t \in E} L_{it}^* \, di_t \tag{15}$$

$$\int_{i_t} a_{it} \, di_t = \int_{i_t \in E} K_{it}^* \, di_t \tag{16}$$

(e) d^* is stable.

4 Model with Financial Frictions

The structure of the model with financial frictions is similar to the benchmark model. I add the possibility of default, and the bank will set up the limit on the amount of capital they will lend to each individual to prevent them from defaulting.

Parents solve the utility maximization problem in (1) by choosing the optimal consumption, bequest, and fertility choices. When children grow up, they inherit the bequest from their parents as an asset, following equation (5), and get entrepreneurial talent, as specified in equation (6).

4.1 Bank and credit market

After knowing their asset and entrepreneurial talent, individuals go to the bank and assess their financial situations. On the one hand, individuals save their money in the bank to earn interest. On the other hand, they can borrow money from the bank to start a firm. However, the credit market is not perfect due to the imperfect enforceability of contracts. Following Buera et al. (2011), I assume that individuals can renege on their contract and keep a $1-s$ fraction of revenue net of labor cost. The only punishment is that they will lose the assets deposited in the bank.

The bank earns zero profit. The interest rate the bank pays is the same as the interest rate the bank lends. To further simplify the model, I assume people put all their assets in the bank and borrow the capital to start a firm. Under the model's assumption, this is equivalent to the case that adults use their assets to start a firm and save the rest in the bank if they have excess assets or borrow from the bank if they don't have sufficient capital.

If $s \geq \frac{\alpha}{1-\beta}$, the economy doesn't experience any financial friction, and the credit market is perfect, we are back to the benchmark model. When $0 \leq s < \frac{\alpha}{1-\beta}$, being aware that individuals can default without paying any interest, the bank will set up a capital limit K_{it}^{limit} to prevent individuals from defaulting. The bank wants to ensure that when utilized capital is smaller than or equal to K_{it}^{limit}, the default profit is always not larger than the profit of non-default. Mathematically, the bank sets up K_{it}^{limit} for each individual i_t such that:

$$\begin{aligned} &\max_{\{K_{it}\in[0,K_{it}^{limit}],L_{it}\}}(1-s)\{(Az_{it})^{1-\alpha-\beta}(K_{it})^{\alpha}L_{it}^{\beta}-W_tL_{it}\}-a_{it} \\ &\leq \max_{\{K_{it}\in[0,K_{it}^{limit}],L_{it}\}}\{(Az_{it})^{1-\alpha-\beta}(K_{it})^{\alpha}L_{it}^{\beta}-R_tK_{it}-W_tL_{it}\}+R_ta_{it} \end{aligned} \tag{17}$$

To make it easier to compare, I define $\tilde{s} \in [0,1]$ where $s = \tilde{s} \times \frac{\alpha}{1-\beta}$.

Figure 3 and figure 4 illustrate the capital limit for unbounded and bounded individuals separately. In both figures, the bank wants to set up K_{it}^{limit} such that the default profit is not larger than the production profit. The highest level of K_{it}^{limit} would be given by the intersection of π_{default} and $\pi_{\text{production}}$. In figure 3, the capital limit that the bank is willing to lend is higher than the individual's optimal capital level given by equation (8). So this individual will not be bound by the bank, and they can produce at the optimal capital level.

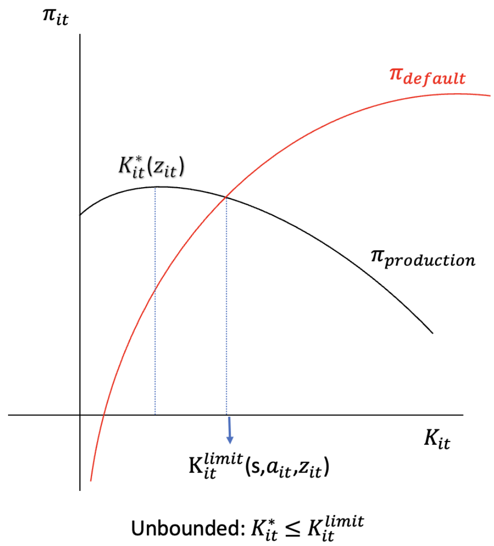

Figure 3: Capital Limit for Unbounded Individual

In this case, we assume that the highest amount of capital the bank will lend would be K_{it}^{*} to simplify the model. However, in figure 3, we can notice that $K_{it}^{limit} < K_{it}^{*}$. In this case, the capital individuals can borrow is less than the optimal amount they need. They can only produce at a suboptimal capital level if they become entrepreneurs. Individuals are unbounded if and only if:

$$\frac{a_{it}}{Az_{it}} \geq \frac{\alpha - s(1-\beta)}{1+R_t}(\frac{\alpha}{R_t})^{\frac{\alpha}{1-\alpha-\beta}}(\frac{\beta}{W_t})^{\frac{\beta}{1-\alpha-\beta}} \tag{18}$$

In equilibrium, no one will default. What's more, K_{it}^{limit} is a function of contract enforceability s, personal assets a_{it} and entrepreneurial ability z_{it}. $K_{it}^{limit}(s, a_{it}, z_{it})$ is increasing in s, a_{it} and z_{it}. $K_{it}^{limit}(s, a_{it}, z_{it})$ is concave in a_{it} and z_{it}.

4.2 Occupation, income, and utility

Individuals can consider their occupations after knowing their capital limit K_{it}^{limit} from the bank. They first face the following production problem with capital limit K_{it}^{limit}

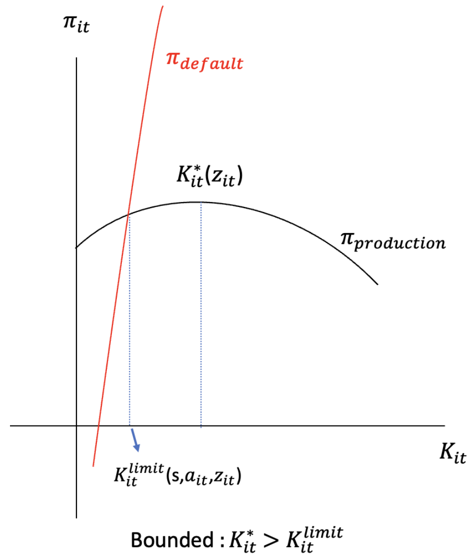

Figure 4: Capital Limit for Bounded Individual

$$\max_{\{K_{it} \le K_{it}^{limit}, L_{it}\}} \pi_{it} = (Az_{it})^{1-\alpha-\beta}(K_{it})^{\alpha} L_{it}^{\beta} - R_t K_{it} - W_t L_{it} \tag{19}$$

For unbounded people, they will produce at the optimal capital level K_{it}^* based on equation (8) and earn profit π_{it}^* given in equation (10). For bounded individuals, they can only produce at a suboptimal level K_{it}^{limit}, which is the solution to (17). More specifically, one's capital limit K_{it}^{limit} is given implicitly by equation (20). The production profit of bounded entrepreneurs would be (21).

$$s(1-\beta)(Az_{it})^{\frac{1-\alpha-\beta}{1-\beta}}(K_{it}^{limit})^{\frac{\alpha}{1-\beta}}(\frac{\beta}{W_t})^{\frac{\beta}{1-\beta}} - RK_{it}^{limit} + (1+R_t)a_{it} = 0 \tag{20}$$

$$\pi_{it}^B = (Az_{it})^{\frac{1-\alpha-\beta}{1-\beta}} K_{it}^{limit\,\frac{\alpha}{1-\beta}}(\frac{\beta}{W_t})^{\frac{\beta}{1-\beta}}(1-\beta) - R_t K_{it}^{limit} + R_t a_{it} \tag{21}$$

As in the benchmark model, entrepreneurs can earn interest on their assets from the bank in addition to production profits. As a result, the total income of an entrepreneur would be:

$$y_{it}^{\mathrm{E}} = \begin{cases} y_{it}^{\mathrm{UE}} = \pi_{it}^{*} + R_t a_{it} & \text{if unbounded} \\ y_{it}^{\mathrm{BE}} = \pi_{it}^{B} + R_t a_{it} & \text{if bounded} \end{cases} \tag{22}$$

The worker's income is the same as the benchmark model given by equation (12). Individuals choose the occupation that earns the highest income following equation (13). For unbounded individuals, the entrepreneurial cutoff is the same as the benchmark model given by equation (14). For bounded individuals, their entrepreneurial cutoff will be decided by equation (23). Bounded individuals with entrepreneurial ability higher than or equal to z_{it}^{BE} become bounded entrepreneurs.

$$z_{it}^{BE} = \frac{1}{A}\left(\frac{W_t + R_t K_{it}^{limit}}{(1-\beta)(K_{it}^{limit})^{\frac{\alpha}{1-\beta}}(\frac{\beta}{W_t})^{\frac{\beta}{1-\beta}}}\right)^{\frac{1-\beta}{1-\alpha-\beta}} \tag{23}$$

Figure 5 shows individuals' occupational choices under financial frictions. The Y-axis shows the asset level, while the X-axis indicates the entrepreneurial ability. The orange line indicates the bound status given by equation (18). Individuals above the line are unbounded, while those under the line are bounded. The vertical blue line is the entrepreneurial cutoff for unbounded individuals given in equation 14. Unbounded individuals with talent equal to or higher than the cutoff will become entrepreneurs. The green curve line demonstrates the entrepreneurial cutoff for bounded people according to equation (23). Bounded people above the line choose their occupation as entrepreneurs.

One comparative static analysis we could do here is to check the influence of contract enforceability s. In a model without financial frictions, individuals with lower entrepreneurial ability choose to become workers because the labor income is higher than entrepreneurial income: $y_{it}^{W} > y_{it}^{UE}$. When we add financial frictions, we know that bounded entrepreneurial income must be no greater than unbounded entrepreneurial income: $y_{it}^{UE} \geq y_{it}^{BE}$. As a result, we should have $y_{it}^{W} > y_{it}^{UE} \geq y_{it}^{BE}$. Individuals left to the unbounded entrepreneurial cutoff still choose to become workers in a world with financial frictions. For those who are entrepreneurs in a frictionless world, there are three situations. Those with small amount of assets now become workers since $y_{it}^{UE} \geq y_{it}^{W} > y_{it}^{BE}$. Individuals with middle-level of assets now become bounded entrepreneurs because $y_{it}^{UE} \geq y_{it}^{BE} > y_{it}^{W}$. Finally, individuals

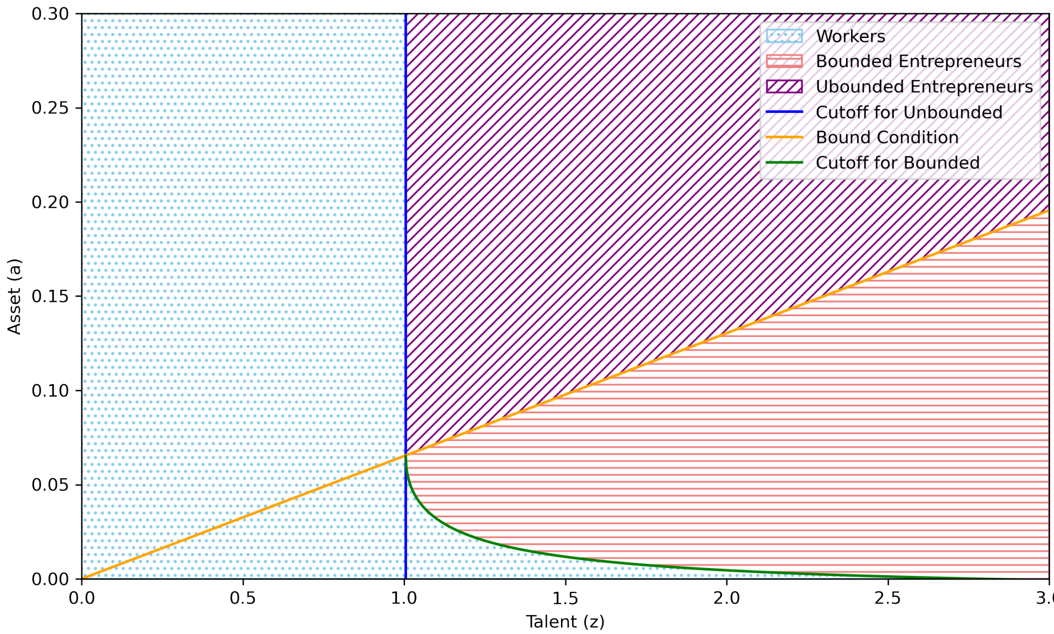

Figure 5: Occupation Choices in the Model with Frictions

with the highest level of assets remain unbounded entrepreneurs. Comparing the frictionless model with the model considering financial frictions, we can see occupation distortions and mismatches between entrepreneurial ability and capital.

After knowing the occupation and corresponding income, an individual maximizes their utility based on (1). The optimal decision rules are precisely the same as those in the benchmark model listed in equation (2), equation (3), and equation (4).

4.3 Equilibrium

We have $\mathbf{x} = (a, z)$ as the state variable. We can calculate $P(\mathbf{x}'|\mathbf{x})$ as the transition function. In equilibrium, given the law enforcement s, we should have a invariant distribution of the state variable $d^*(\mathbf{x})$; occupational choice $o(\mathbf{x})$; optimal solutions to utility maximization problem $c(\mathbf{x})$, $n(\mathbf{x})$ and $m(\mathbf{x})$; bound status of individuals $B(\mathbf{x})$ and corresponding capital and labor usage $K(\mathbf{x})$ and $L(\mathbf{x})$; interest rate R and wage W. In equilibrium, we should have:

(a) Adults maximize utility subject to the budget constraint.
(b) The bank sets up capital limits for each individual solving (17).

(c) Entrepreneurs maximize profits given bound status and K_{it}^{limit}.

(d) Adults make optimal occupational choices based on (13).

(e) Labor and capital markets clear:

$$\int_{i_t \in W} di_t = \int_{i_t \in E\&Unbounded} L_{it}^{*} \, di_t + \int_{i_t \in E\&Bounded} L_{it}^{limit} \, di_t \tag{24}$$

$$\int_{i_t} a_{it} \, di_t = \int_{i_t \in E\&Unbounded} K_{it}^{*} \, di_t + \int_{i_t \in E\&Bounded} K_{it}^{limit} \, di_t \tag{25}$$

(f) d^* is stable.

5 Calibration

In this section, I use PSID (The Panel Study of Income Dynamics) data to calibrate the model's parameters under financial frictions. I will first describe the calibration plan and then show more details about the calibration method and results.

5.1 Calibration Summary

The inputs of the calibration would be the asset and talent distributions. I estimate these distributions based on the PSID dataset. After knowing the talent and asset distributions, I will first calibrate four macro-level parameters: the TFP shifter A, the capital share α, the labor share β, and the seizure rate s. The targeted moments would be the entrepreneurship rate, the top 5% income share, the log mean of income, and the log median of income.

After calibrating the macro-level parameters, I will use the estimated parameter values and the distribution of talent and assets to generate the estimated income. Then I will calibrate the utility parameters using the estimated income to target the log mean of consumption and the histogram of fertility. The estimated utility parameters includes: consumption weight θ_1, bequest weight θ_2, elasiticity ϵ and time cost per child τ.

5.2 PSID Data

PSID is longitudinal data from a representative sample of U.S. households. It includes intergenerational data on income, consumption, fertility, and occupation over a long period. Before 1999, the survey was conducted annually. After the 1999 wave, it switched to a biennial cycle. My sample consists of the 1968 to 2011 waves of the PSID and keeps the data for the household head. However, the consumption data regarding detailed categories is not included until the 1999 wave. To extend the dataset, I use the consumption data from Attanasio and Pistaferri (2014), which uses socioeconomic variables, prices, and food consumption consistently available in PSID to impute the consumption data before 1999.

One concern is that PSID provides income and consumption data at the year level, although some years may be missing. It may not encompass an individual's income and consumption data throughout their life cycle. Therefore, I estimate the income and consumption data for one particular year using the following equation. For y_{it} and c_{it}:

$$\ln y_{it} = \beta_0 + \beta_1 \times age_{it} + \omega_i + \sigma_c \tag{26}$$

$$\ln c_{it} = \gamma_0 + \gamma_1 \times age_{it} + \omega_i + \sigma_c \tag{27}$$

t indicates the year when the individuals are aged between 25 and 65. σ_c captures the cohort fixed effect and ω_i is the individual fixed effect. After running the regression, I store the value of individual and cohort fixed effects and estimate the yearly income and consumption based on the regression coefficients. To get the lifetime income, I use a constant interest rate $R = 5\%$ to discount all the yearly incomes from age 25 to age 65. I use the same method to calculate the expected lifetime consumption.

Figure 6 shows the estimated and real log income levels. Similarly, Figure 7 indicates the relationship between the estimated and real consumption data.

In my model, the asset level refers to the bequest inherited from the parent. Since the bequest data from the PSID contains a lot of missing values, I define the inherited asset as the asset level at age 25 and estimate it using the following equation, where a_{it} is estimated for each i and t is the year when the individual is 25 years old.

$$a_{it} = \sigma_0 + \sigma_1 \times \text{age} + \omega_i + \delta_c \tag{28}$$

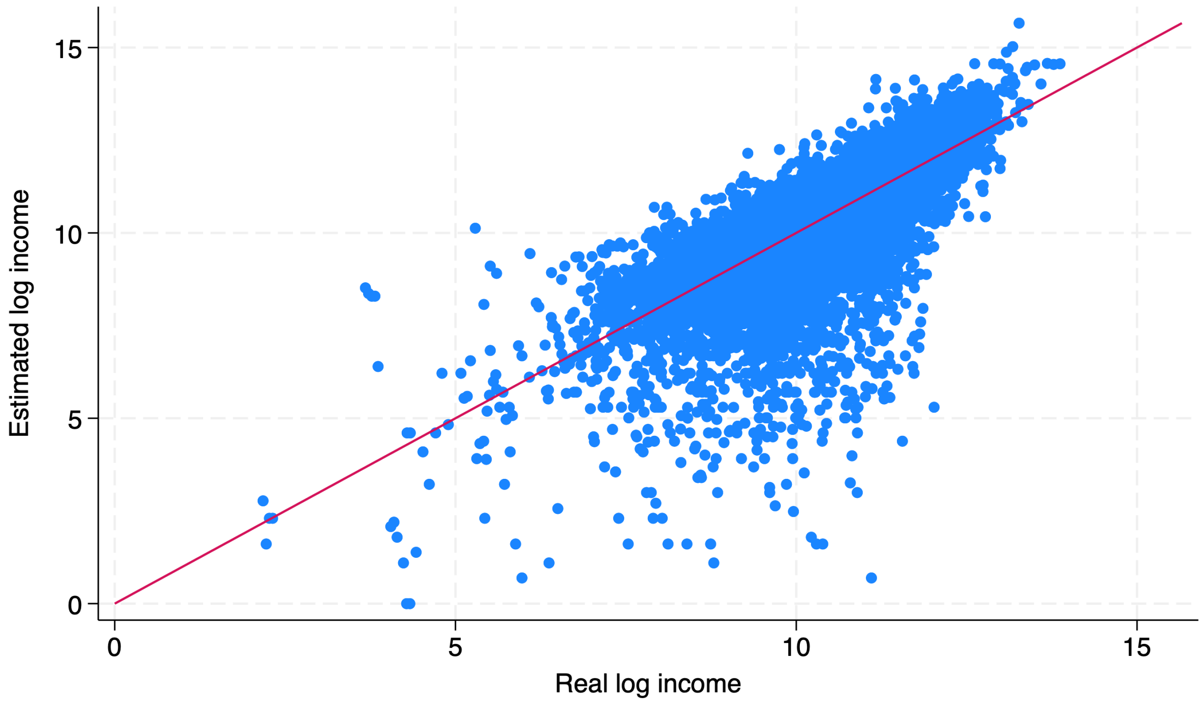

Figure 6: Real log income and estimated log income

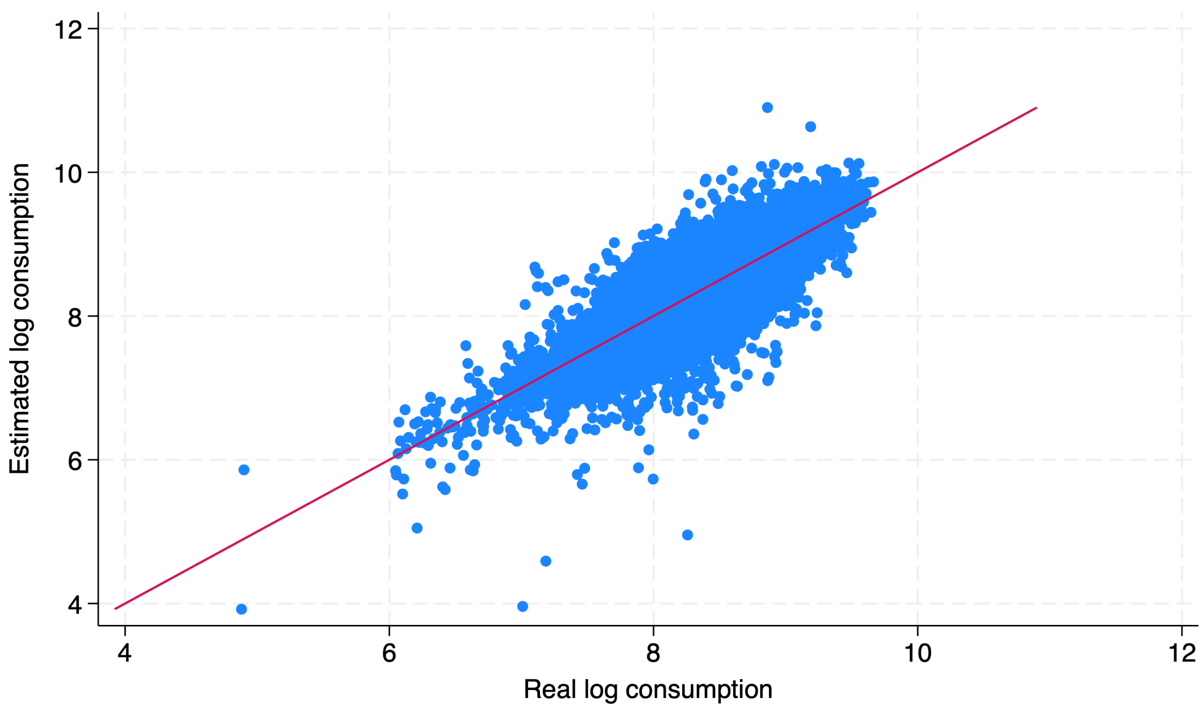

Figure 7: Real log consumption and estimated log consumption.

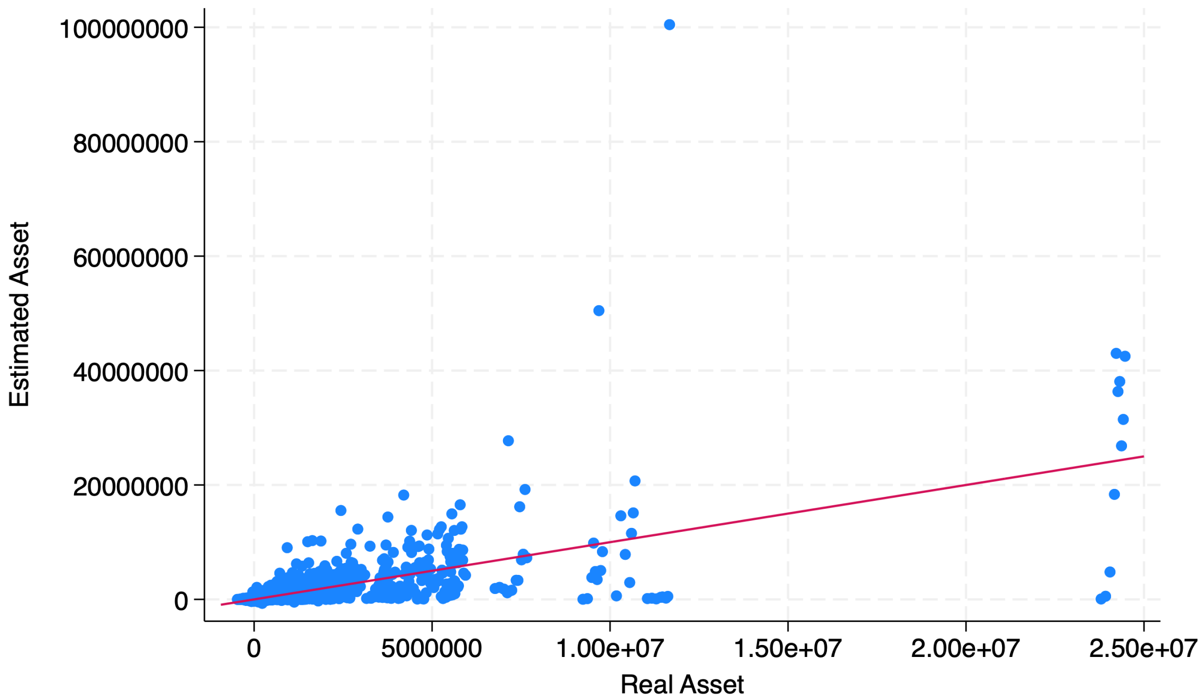

Figure 8: Real log consumption and estimated log consumption.

Figure 8 shows the relationship between estimated and real asset levels. After calculating the lifetime income, lifetime consumption, and asset at 25, I discount all the values back to the year 1980 using the interest rate $R = 5\%$.

Another important point to discuss is how to identify entrepreneurs in the dataset. I use two variables in the PSID dataset. The first variable relates to whether the household head is reported as self-employed. This question could capture whether the individual is working for someone else or themselves. The second variable regards whether the family owns a business or has a financial interest in any business enterprise. This question provides information about the ownership of a business. If the answers to both questions are yes, we say the individual is an entrepreneur in that particular year. If the person is an entrepreneur for two consecutive years and they are an entrepreneur for at least half of the years observed in the PSID dataset, I define this person as an entrepreneur.

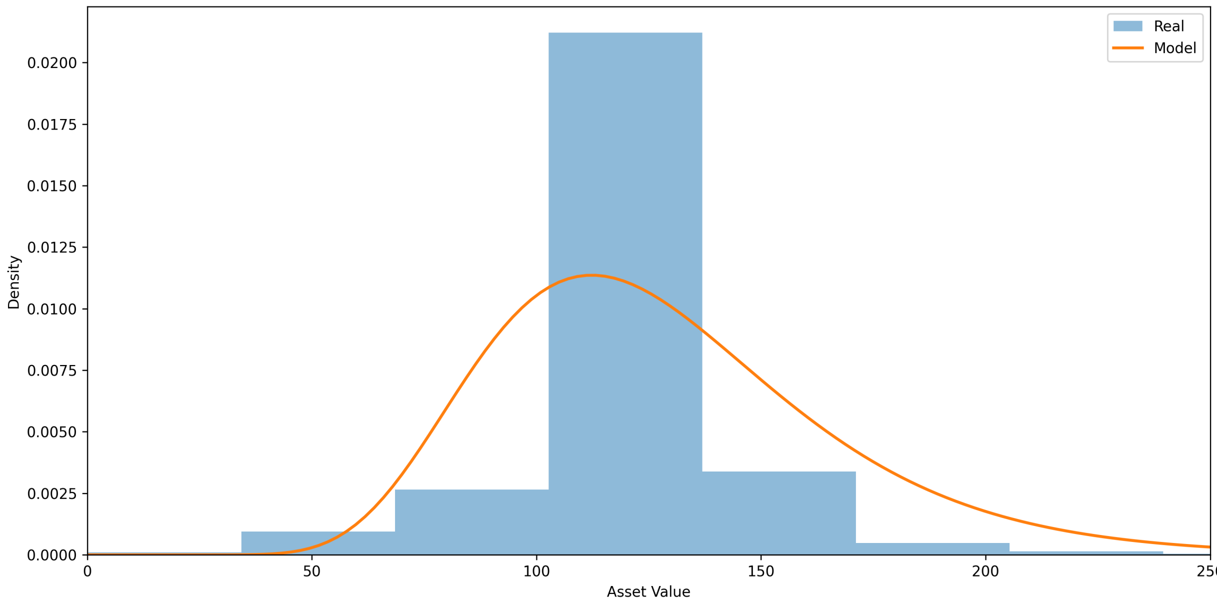

Figure 9: Asset Distribution

5.3 Asset and Talent Distributions

Following the literature, we assume the asset follows the lognormal distribution. The asset distribution is based on the asset level at age 25 in the PSID dataset. Figure 9 shows the estimated and real asset distributions.

As for the talent distribution, I first use the following equation to get the residues of lifetime income as the talent measure:

$$
\begin{aligned}
\ln(\mathrm{y}_i) \ &= \omega_0 + \boldsymbol{\omega}_1^\top \, \textbf{asset\_quantile}_i + \boldsymbol{\omega}_2^\top \, \textbf{race}_i + \boldsymbol{\omega}_3^\top \, \textbf{disability}_i \\
&+ \boldsymbol{\omega}_4^\top \, \textbf{sex}_i + \boldsymbol{\omega}_5^\top \, \textbf{birthyear}_i \\
&+ \boldsymbol{\omega}_6^\top \, (\textbf{asset\_quantile}_i \odot \textbf{race}_i) + \boldsymbol{\omega}_7^\top \, (\textbf{asset\_quantile}_i \odot \textbf{disability}_i) \\
&+ \boldsymbol{\omega}_8^\top \, (\textbf{asset\_quantile}_i \odot \textbf{sex}_i) + \boldsymbol{\omega}_9^\top \, (\textbf{asset\_quantile}_i \odot \textbf{birthyear}_i) + \varepsilon_i
\end{aligned}
\tag{29}
$$

In the equation, $\textbf{asset\_quantile}_i$ indicates the wealth quantile of the individual in the society, and $\textbf{disability}_i$ indicates whether the individual is handicapped. I treat the residue as the log value of the talent.

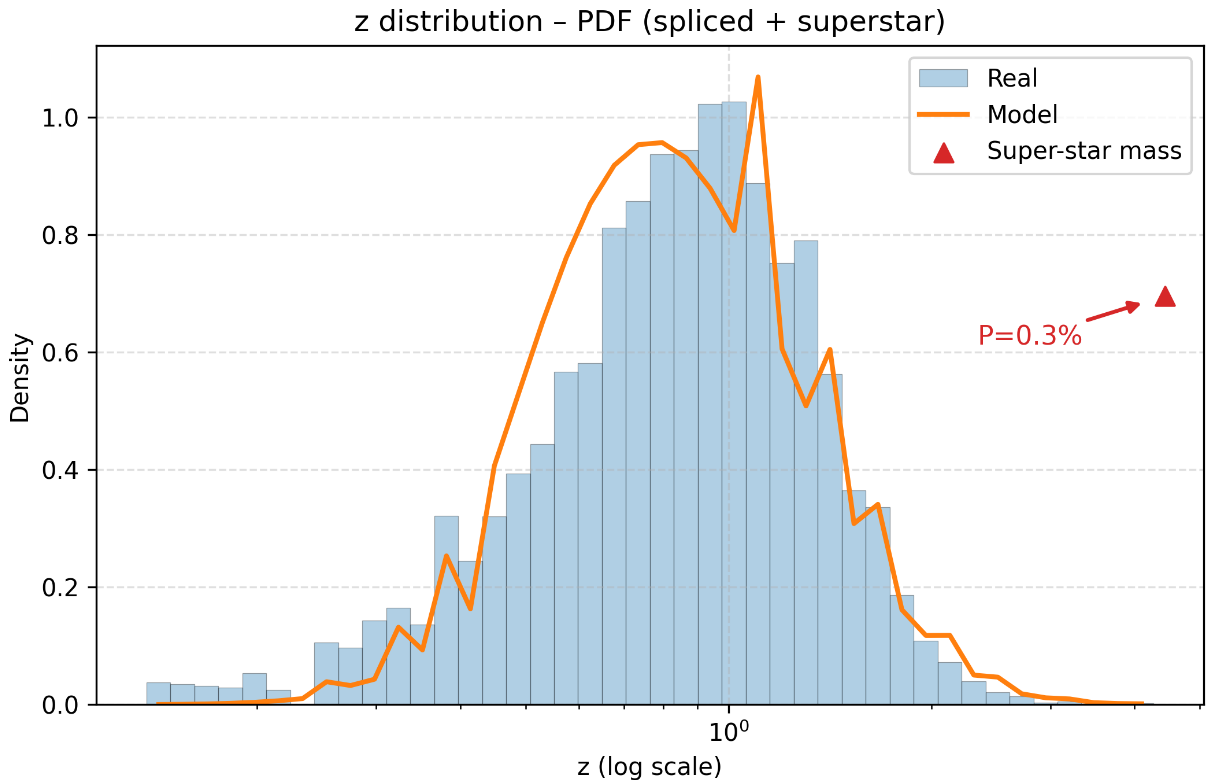

Figure 10: Talent distribution

I need to estimate both the initial distribution and the AR(1) process parameters. For the initial distribution, I use the log normal distribution to simulate the left tail, use the Pareto distribution to simulate the right tail, and assume there exists a small fraction of super-talented individuals on the far right end. Figure 10 shows the comparison between the real data and simulated talent distribution.

I assume the intergenerational talent transmission follows the AR(1) process. Since in the dataset we only keep the observations for the household head and most of the households are males, I link the relationship between the father and the children and run the regression in equation (30). In the dataset, we have 746 pairs.

$$\ln z_{it+1} = \overline{z} + \rho \ln z_{it} + \epsilon_{it} \tag{30}$$

After running the regression in equation (30), I get the parameter accordingly. Table 1 lists the estimated parameters for the AR(1) process of z.

Parameter	Value
ρ	0.29
$\overline{z}$	- 0.1
$\delta_{\epsilon_{it}}$	0.43

Table 1: Estimated parameters for talent inheritance

5.4 Macro parameters

After estimating the distribution of assets and talent, I have four parameters to be estimated at the macro level: the TFP shifter A, the capital share α, the labor share β, and the bank's seizure rate s. The four main targets are the fraction of entrepreneurs within the U.S., the top 5% income share, the log mean of income, and the log median of income.

5.5 Utility parameters

After calibrating the macro-level parameters, I use the estimated income to calibrate the following four parameters in the utility maximization problem: the weight of consumption θ_1, the weight of total bequest θ_2, the elasticity of substitution ϵ, and the time cost per child τ.

From the solution to the utility maximization problem in (1), we know the optimal decision for consumption and fertility. I use GMM (General Method of Moments) to target the following moments: the log mean of consumption and the distribution of the number of children.

5.6 Calibration results

Table 2 shows the calibrated parameter values. For the macro-level parameters, the standardized bank seizure rate $\tilde{s}$ is very close to 1, indicating that the US financial market is near perfect.

As for the utility parameters, the consumption weight θ_1 is around 0.13 and the total bequest weight θ_2 is around 0.22. We can notice that the elasticity $\epsilon = 4.49$, which is larger than 1, indicating that the number of children and the income level exhibit a hump-shaped

Parameter	Note	Calibrated Value
$\tilde{s}$	Standarized seizure rate	0.98
A	TFP shifter	136
α	capital share	0.62
β	labor share	0.28
θ_1	consump. weight	0.13
θ_2	bequest weight	0.22
ϵ	elasticity	4.49
τ	per-child time cost	0.19

Table 2: Calibrated parameters

Moment	Target Value	Achieved Value
Entrepreneurship rate	0.099	0.097
Top 5% share	0.14	0.12
Log mean income	3.55	3.37
Log median income	3.43	3.29
Log mean consumption	0.85	0.62
Histogram of n	See Figure 13	

Table 3: Targeted Moments

relationship. The time cost of raising one child is 0.19.

Table 3 lists the comparison between the model's prediction and real data for the targeted moments. For all the target moments, the model fits the real data well.

Figure 11 represents the comparison of income between the model's prediction and the real data, while Figure 12 and 13 represent the comparison of consumption and the number of children, respectively.

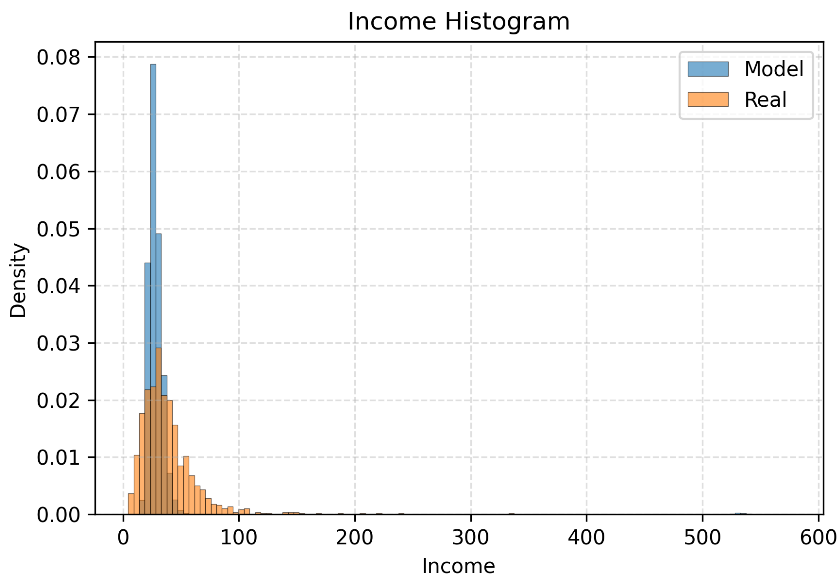

Figure 11: Income: Model vs Real Data

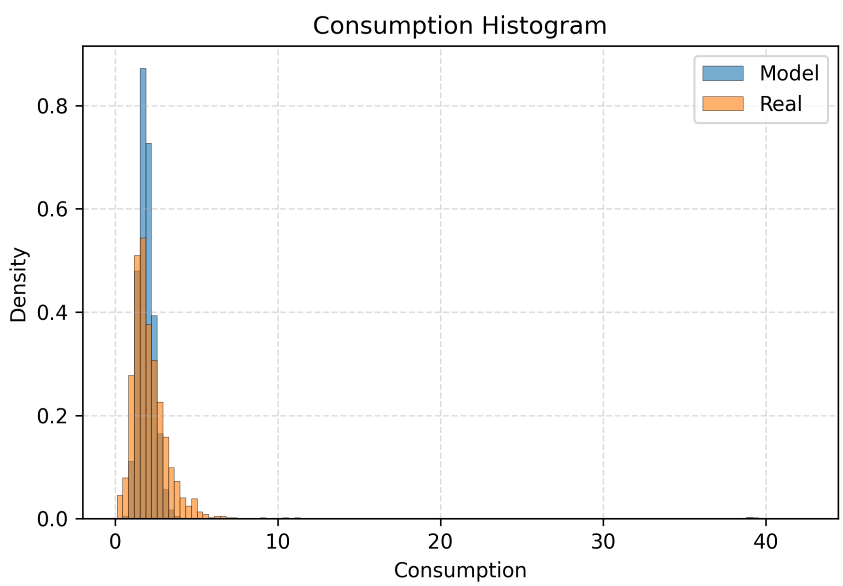

Figure 12: Consumption: Model vs Real Data

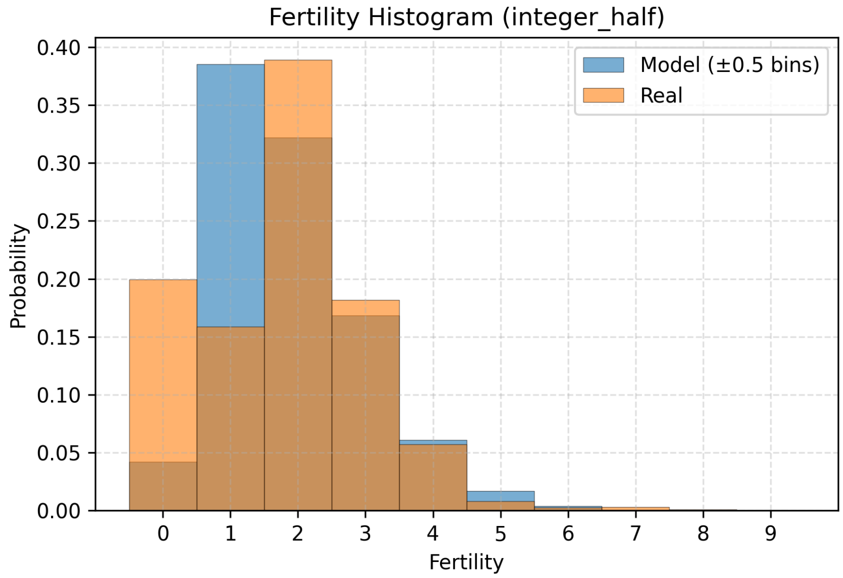

Figure 13: Fertility: Model vs Real Data

Entrepreneurship rate	endogenous ferility	$n = 1$
$\tilde{s} = s^{baseline}$	0.216	0.218
$\tilde{s} = 1$	0.200	0.214
$\tilde{s} = 0$	0.114	0.170

Table 4: Counterfactual Analysis for the entrepreneurship rate

6 Counterfactual Analysis

In this section, I present the counterfactual analysis for changing the financial frictions and shutting down the fertility channel. I want to examine how the entrepreneurship rate, income inequality, and mobility change under different conditions.

Table 4 shows the results for the entrepreneurship rate. We can see from the table that both an increase and a decrease in financial frictions from the baseline model would decrease the entrepreneurship rate. What's more, if we shut down the fertility channel, we would overestimate the entrepreneurship rate.

Next, Table 5 and Table 6 show the results for the Gini Coefficient and the income top 5% share. They are both indicators of income inequality. We can see similar patterns in

The Gini coefficent	endogenous ferility	$n = 1$
$\tilde{s} = s^{baseline}$	0.560	0.623
$\tilde{s} = 1$	0.609	0.627
$\tilde{s} = 0$	0.643	0.634

Table 5: Counterfactual Analysis for the Gini Coefficient

The top 5% income share	endogenous ferility	$n = 1$
$\tilde{s} = s^{baseline}$	0.555	0.632
$\tilde{s} = 1$	0.594	0.637
$\tilde{s} = 0$	0.630	0.641

Table 6: Counterfactual Analysis for the Top 5% income share

both tables. Compared with the baseline model, both an increase and a decrease in financial frictions would lead to increased income inequality. Shutting down the fertility channel would overestimate income inequality, except in the case that when $\tilde{s} = 0$ and forcing $n = 1$ would underestimate the Gini coefficient.

Table 7 presents the result for the mobility, which is the probability that a child's income quantile is higher than that of the parent. If we increase or decrease the financial frictions, we would see a drop in the mobility. If we shut down the fertility channel, we would see an overestimate in the mobility except for the case when $\tilde{s} = 0$.

Next, Table 8, Table 9, and Table 10 show the results for income per capita, consumption, and utility, respectively. Decreasing financial frictions would increase income per capita, con-

Mobility	endogenous ferility	$n = 1$
$\tilde{s} = s^{baseline}$	0.119	0.167
$\tilde{s} = 1$	0.115	0.152
$\tilde{s} = 0$	0.0009	0.0002

Table 7: Counterfactual Analysis for the mobility

Income per capita	endogenous ferility	$n = 1$
$\tilde{s} = s^{baseline}$	0.457	0.962
$\tilde{s} = 1$	0.523	0.976
$\tilde{s} = 0$	0.391	0.267

Table 8: Counterfactual Analysis for income per capita

Consumption	endogenous ferility	$n = 1$
$\tilde{s} = s^{baseline}$	0.012	0.043
$\tilde{s} = 1$	0.013	0.044
$\tilde{s} = 0$	0.009	0.012

Table 9: Counterfactual Analysis for consumption

sumption, and utility. If we force $n = 1$, we would overestimate consumption and utility. As for income per capita, forcing $n = 1$ would overestimate income per capita for the baseline model and when $\tilde{s} = 1$. However, in the collateral case when $\tilde{s} = 0$, it would underestimate income per capita.

Finally, I want to check the influence of financial frictions on fertility. Table 11 shows the results. Reducing financial frictions would increase fertility.

7 Conclusion

This paper examines how income-driven parental choices regarding fertility and bequests impact children's entry to entrepreneurship under financial frictions. To study these dynam-

Utility	endogenous ferility	$n = 1$
$\tilde{s} = s^{baseline}$	0.204	0.686
$\tilde{s} = 1$	0.236	0.687
$\tilde{s} = 0$	0.184	0.625

Table 10: Counterfactual Analysis for utility

Fertility	endogenous fertility
$\tilde{s} = s^{baseline}$	0.299
$\tilde{s} = 1$	0.345
$\tilde{s} = 0$	0.274

Table 11: Counterfactual Analysis for fertility

ics, I propose an OLG model with endogenous fertility, bequest, and occupational choices, and calibrate the model using U.S. data. The model indicates that the interaction between parental decisions and financial friction could lead to the misallocation of entrepreneurial talent. Counterfactual analysis indicates that reducing financial frictions relative to the baseline model would increase income per capita but slightly reduce entrepreneurship, leading to less equality and mobility. These findings underscore the importance of designing financial policies considering oth efficiency and equality.

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