Social status pursuit, distribution of bequests and inequality☆

Carmen Camacho a,*, Fatih Harmankaya b, Çağrı Sağlam b

a Paris School of Economics and CNRS, France
b Bilkent University, Turkey

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ABSTRACT

The quest for social status modifies lifetime decisions and as a consequence, the trajectory of the overall economy. Focusing on the relative wealth dimension of social status, we build a two-period overlapping generations model with heterogeneous agents to investigate the effects of status quest on the evolution of bequest distribution and household inequality. We show that the bequest motive and the concern for social status not only increase the stationary level of capital but also enhance the household equality.

1. Introduction

Household bequests alter a country’s income distribution permanently. Among the reasons of old agents to leave bequests, we find in the literature altruism (as in Barro, 1974, or Becker, 1974) and saving miscalculations, that is, accidental bequests (as in Hurd, 1987, 1989). In line with Wei and Zhang (2011), we believe that households also bequeath to improve their heirs’ social status. We focus on a society structured in families which behave as dynasties and which compete for social status and indirectly, for economic preeminence. This paper aims at studying the evolution of household wealth and the inequality among households in a setting where preferences are interdependent, hinging on social status. Here, social norms are endogenous and they evolve with families’ decisions and the overall economy.

Social status is understood as the “ranking of individuals based on their characteristics, assets and actions”, (p. 802, Weiss and Fershtman, 1998). The quest for social status explains much of human behavior since it provides overall favorable treatment which ranges from transfers of goods, natural leadership, and a myriad of symbolic gestures. It seems reasonable then to take into account the quest for social status in a model aiming at describing household decision making. And although social status may intervene in many dimensions, we restrict its benefits to the individual’s preferences. This has been the direction taken most frequently in the literature starting with Easterlin (1974, 1995) who asserted that individuals would not be happier if the income of all increased. In subsequent studies, it was proven that from the post-war US until the 90’s, there is no time trend in happiness although there is a clear trend for median national family income (Duncan, 1975; Maddison, 1991). Instead, it seems that the standards for a good life increase with income (Easterlin, 1995).

Social status is made of innate characteristics like being aristocrat, but also of household wealth and others like occupation or education. Worldwide, bequests determine to a great extent wealth. Kotlikoff et al. (1982) find that intergenerational transfers account for 80% of the US wealth, whereas it is a 20% for Modigliani (1988). In Japan, according to Hayashi (1986) they account for at least 9.6% and 20 years later, Horioka (2009) estimates that they account for 15%. Of all the social status features above, wealth or bequests are of particular interest. First, because they are economic decisions and second, they are not an immutable advantage. According to Kopczuk and Lupton (2007), three fourths of the elderly has a bequest motive and four fifths of the elderly wealth will be bequeathed. Along these lines, we simplify the notion of social status and identify it with transmissible wealth or bequests. The extension to a wider definition of social status is far from trivial since it requires an adequate indicator for social status encompassing

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* Corresponding author.
E-mail address:

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and weighting wealth, education, economic sector and the household history.

The literature on bequests proposes several motives. Altruism is the classical motive. As defined in Barro (1974) or Becker (1974), parents leave bequests because they earn utility from the resources of their children. Altruism has been challenged both applied and theoretically, being widely tested empirically (see for instance Wilhelm, 1996; Laitner and Juster, 1996). Results show that at best, altruism cannot explain all bequests. As Masson and Pestreau (1997) put it, if altruism was the reason to bequeath then the average age of a heir in developed countries would not be 45. Bequest should arrive earlier in life. Among other complementary motives, let us mention unintended and strategic bequests and egoism. Accidental bequests happen when the old agent does not manage her wealth adequately and leaves bequests unintentionally (see Hurd, 1987, 1989). In Kopczuk and Lipton (2007), at least part of the bequest is proven an accident and this after controlling for various family characteristics, all found insignificant. Among others, Blinder (1974) and Hurd (1989) put forward a powerful motive: egoism. Parents get utility from the quantity bequeathed to their children, not from the amount the children actually consume. Laitner and Ohlsson (2001) compare the empirical accuracy of the egoistic versus the altruistic model. While the accidental and egoistic motives are supported for the US and Sweden, the altruistic model seems to fit only Sweden. Parents may also bequeath strategically, exchanging bequests against received services. In Bernheim et al. (1985), it is found that children pay more attention to parents with bequeathable wealth. Another of the commonly invoked motives is risk aversion in the presence of incomplete annuity and health insurance markets. Joining risk aversion and the strategic motive, P erozek (1998) finds that the strategic behavior is not robust. For Wei and Zhang (2011), the main reason to bequeath in China is the quest for social status. In the context of a severely unbalanced sex ratio, only men with a high social status (wealth), will get married.

In this paper, we present an overlapping generations model where individual’s preferences depend on consumption in the young and old age, but also on the relative bequest left to the following generation. Note that we distinguish here savings for later consumption and savings for intentional bequests. As afore mentioned, our definition of social status only includes bequests, as a measure of transmissible wealth. This limitation enables us to underline the effects of competition on household wealth inequality. Furthermore, although we assume that individuals’ skills are heterogeneous, skills are not transmissible so the only channel to exacerbate inequality is the unequal accumulation of wealth. When all households share the same view on positional bequests, we find that both savings and bequests increase with household wealth and current income. Additionally, the society-wide average bequest level reinforces the bequest motive, inducing all households to increase their bequest, reducing inequality.

Our paper relates to the literature analyzing the effect of social status pursuit on economic decisions and inequality. Some authors associate the quest for social status with reference dependence preferences, where the household Welfare increases only when a given variable surpasses the referent value. If the referent only concerns consumption, then we enter the field of ‘keeping up with the Joneses’. Depending on the strength of the referent, on preferences, technology and inequality, looking up to the others may have different effects on growth in the long-run.1 Focusing on directional effects, Garcia-Penalosa and Turnovsky (2008) find that the will to ‘keep up with the Joneses’ enhances household equality. However, when households bequeath, Caballé and Moro-Egido (2014) find that habits increase average wealth although they reduce stationary wealth mobility. In other papers, the referent is average household wealth and individuals enter into a wealth race which fosters overall economic growth.2 There are fewer papers studying the link between bequest references and household inequality. Alvarez-Cuadrado and Van Long (2012) show that consumption envy can increase inequality among households. In a society made of altruistic households, caring about bequests in a prospect theoretic sense, Bogliacino and Ortoleva (2015) find that the society becomes more polarised and that the middle class disappears in finite time. Additionally, they prove that reference dependence does not harm growth. On the contrary, envy pushes agents to improve their relative situation. The paper closest to ours is Wei and Zhang (2011), where the Chinese gender imbalance induces parents to under-consume and accumulate wealth to bequeath as much as possible, to ensure their son's future marriage. Oversaving of just a part of the households can drive down interest rates, which pushes in turn all other households to oversave. In the end, like in the present paper, all households oversave which leads to household equality in the long-run.

The remainder of the paper is organized as follows. In Section 2, we present and discuss our model. In section 3, we analyze the dynamics of the overall economy while the stationary distribution of the household variables are analyzed in section 4. Finally, section 5 concludes.

2. The economy

This section presents the households, the firm and finishes with an analysis of the overall economy. As argued, in this section all households share the same preferences.

2.1. Households

We consider an economy made by N households, of constant and identical size, indexed by i. A household is made of a young adult and an old adult. When young, individuals income is made of bequests from their parents and their labor income. They decide how to allocate their resources. When old, the individual retires, consumes a part of his first period savings and bequeaths the rest. When young, individuals income is made of bequests from their parents and their labor income. They decide how to allocate their resources. When old, the individual retires, consumes a part of the first period savings and bequeaths the rest.

There are two potential sources of heterogeneity in the economy. First, households have different initial wealth. Second, individuals are endowed with varying ability. As a result, young individuals at time t differ with respect to their productive ability, it, and the bequest inherited from their parents, bt. That is, even if all families bequeathed equally, heterogeneity would persist since young individuals differ in their abilities. Each young agent draws it from an independent and identical distribution at the beginning of period t, with mean it = 1 and variance, vit = σ2. It results in a wage distribution with mean w = it and standard deviation σ = wt. Notice that the ability distribution is constant in time and identical across families. In this regard, we are not modelling here the transmission of human capital from one generation to another nor varying access to technology or education across families.

There is evidence that welfare depends on the relative situation of the family in the society and not only on absolute income (see Foster, 1998; Atkinson and Bourguignon, 2000; Ravallion, 2003; Gupta et al., 2018). In this paper, preferences reflect these two perspectives. While individuals care about their absolute levels of consumption, they also obtain satisfaction by the relative position of their family in the society, measured by the relative wealth of the family. As a result family preferences depend on the choices of all other families. The young adult acts as the family leader, taking all decisions, deciding on current and

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future consumption, and about the amount to bequeath to the following generation. We assume that preferences are transmitted from parent to child, without any parental effort required. The lifecycle utility function for family $i$, born in period $t$ is given by,

$$u(c'_t, d'_{t+1}, b'_{t+1}) = \ln c'_t + \beta \ln d'_{t+1} + \theta \ln (b'_{t+1} - \gamma R_{t+1})$$

(1)

where $\beta < 1$ is the time discount factor. $\theta$ governs the bequest motive and it also includes a discount factor. Our key behavioral assumption is that satisfaction from bequests does not depend only on the amount bequeathed, but rather depends on how it compares to the average that satisfaction from bequests does not depend only on the amount and it also includes a discount factor. Our key behavioral assumption is that satisfaction from bequests does not depend only on the amount bequeathed, but rather depends on how it compares to the average that satisfaction from bequests does not depend only on the amount bequeathed, but rather depends on how it compares to the average that satisfaction from bequests does not depend only on the amount bequeathed, but rather depends on how it compares to the average that satisfaction from bequests does not depend only on the amount bequeathed, but rather depends on how it compares to the average that satisfaction from bequests does not depend only on the amount bequeathed, but rather depends on how it compares to the average that satisfaction from bequests does not depend only on the amount bequeathed, but rather depends on how it compares to the average that satisfaction from bequests does not depend only on the amount bequeathed, but rather depends on how it compares to the average.

A larger $\theta$ implies that the individual cares more about her offspring or the prospective power of the family, whereas a larger $\gamma$ indicates a larger influence of the society on the individual’s welfare. For simplicity reasons, we assume that both $\theta$ and $\gamma$ are common to all families and constant in time. Both $\theta$ and $\gamma$ are crucial for our analysis, and their role is analyzed throughout the paper.

In the current period $t$, the household revenue is made of bequests from the previous generation and their labor revenue, $b'_t + w'_t = b'_t + w'_t$. Then, this revenue is split between consumption and savings, $c'_t \equiv c'_t$. Note that savings will provide the agent both with old age consumption and the possibility to bequeath to the following generation, that is

$$c'_t + s'_t = b'_t + w'_t$$

(2)

$$R_{t+1}s'_t = d'_{t+1} + b'_{t+1}$$

(3)

for every $t$, where $R_{t+1}$ is the return rate on investment. The adult maximizes (1) subject to (2) and (3). Using the first order conditions, one can derive optimal savings and bequests of agent $i$ in each period:

$$s'_t = \frac{\beta + \theta}{1 + \beta + \theta} (b'_t + w'_t) + \frac{\gamma}{\beta + \theta} R_{t+1} b'_{t+1}$$

(4)

$$b'_{t+1} = \frac{\beta}{1 + \beta + \theta} (b'_t + w'_t) + \frac{\gamma (1 + \beta)}{1 + \beta + \theta} R_{t+1} b'_{t+1}$$

(5)

Eqs. (4) and (5) show that an increase in received bequests, $b'_t$, or income raises savings and bequests to the next generation. If average future bequest increases, then all households increase savings that will allow for an increase in the level of future bequest.

The existence of a common social status definition and the fact that all households care equally about social status results in increasing rates of savings and bequests. From the point of view of a policy maker caring about inequality this is not necessarily good news if the rich accumulate wealth faster. We devote the next sections to study the underpinnings of inequality.

### 2.2. The firm

There exists a unique final good. Output $Y_t$ is produced by combining overall physical capital $K_t$ and total labor $L_t$ through a production function $F(K_t, L_t)$, homogenous of degree one. Taking the final good as the numeraire, let $w_t$ stand for the unit salary and $R_t$ the rate of return. At each period $t$, the firm maximizes net profits defined as

$$\max_{L_t, K_t} F(K_t, L_t) - w_t L_t - R_t K_t,$$

To investigate the effect of the status quest on household inequality, we need to examine the dynamic behavior of the household distribution of bequests. However, a complete analysis requires the dynamic analysis of the wage rate and the interest rate. To provide analytical results, following Alvarez-Cuadrado and Van Long (2012) and Caballé and Moro-Egido (2014), we consider a production technology linear in capital and labor,

$$F(K_t, L_t) = RK_t + wL_t$$

under which the factor prices are independent of the degree of positional concerns and constant over time, i.e. $w_t = w$, $R_t = R$, for all $t$.

#### 2.3. The overall economy

Individual optimal choices depend on the economy average bequest. We can rewrite (4) and (5) as a function of the household income, $y'_t = b'_t + w'_t$, and the economy average income, $\bar{y}_t$ given by:

$$\bar{y}_t = \frac{1}{N} \sum_{i=1}^{N} b'_i + w'_t = b'_t + w.$$  

(7)

Then, we reach the following average optimal savings, bequests, and consumption choices:

$$\bar{c}_t = \frac{1 - \gamma}{\theta + (1 + \beta)(1 - \gamma)} \bar{y}_t$$

(8)

$$\bar{b}_t = \frac{\theta + \beta (1 - \gamma)}{\theta + (1 + \beta)(1 - \gamma)} \bar{y}_t$$

(9)

$$\bar{s}_t = \frac{\theta (1 - \gamma)}{\theta + (1 + \beta)(1 - \gamma)} \bar{y}_t$$

(10)

Eqs. (4) and (5) show that an increase in received bequests, $b'_t$, or income raises savings and bequests to the next generation. If average future bequest increases, then all households increase savings that will allow for an increase in the level of future bequest.

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$$\max_{L_t, K_t} F(K_t, L_t) - w_t L_t - R_t K_t,$$

$$\bar{c}_t = \frac{1}{1 + \beta + \theta} \left[ (\beta + \theta) \bar{y}_t + \phi \bar{y}_t \right],$$

(11)

3 The family utility is well defined if and only if $b'_{t+1} > \gamma R_{t+1}$, which depends on $\gamma$, average bequests $b'_{t+1}$ as well as on the choice of $b'_{t+1}$.

4 Alternatively, we could have followed Duesenberry (1949) and modeled preferences as $u(c'_t, d'_{t+1}, R_{t+1})$. We opt here for the simplest preference representation in the overlapping generations literature.

5 Alvarez-Cuadrado and Van Long (2012) mentions that the numerical analysis of the dynamic behavior of bequests under a Cobb-Douglas production function is consistent with the analytical results obtained under the linear technology.
where \( \phi_2 = \frac{r \beta}{\theta + (1 + \beta)(1 - \gamma)} \). Similarly, using Eq. (11) with (4) and (5) we reach the remaining choices for the \( i \)th household:

\[
c^i_t = \frac{1}{1 + \beta + \theta} (y^i_t - \phi_j), \quad (12)
\]

\[
d^i_{t+1} = \frac{1}{1 + \beta + \theta} R (y^i_t - \phi_j), \quad (13)
\]

\[
b^i_{t+1} = \frac{1}{1 + \beta + \theta} (y^i_t + \phi_j), \quad (14)
\]

with \( \phi_1 = \phi_2 = \phi_3 = \frac{r \beta}{\theta + (1 + \beta)(1 - \gamma)} \), and \( \phi = \phi_i < \phi_j \).

From (12) and (13), it obtains that \( d^i_{t+1} = \beta R c^i_t \), showing that the model structural parameters affect \( c^i_t \) and \( d^i_{t+1} \) in the same direction. Future consumption will be larger than current consumption whenever future returns compensate for the sacrifice of current consumption, that is, whenever \( \beta R > 1 \). Consumption and bequests to the \( i \)th household are composed of two elements: her own lifetime income and the society average product. Note that inequalities in bequests can completely disappear when the society effect dominates, or they can grow when \( \gamma \) tends to zero, as in Alvarez-Cuadrado and Van Long (2012).

Although all variables depend positively on household income, aggregated income increases savings and bequests and it decreases current and future consumption. It is straightforward to compute the variables’ elasticity to income:

\[
e^i_t = \frac{1}{1 - \phi_j}, \quad (15)
\]

\[
e^i_{t+1} = \frac{1}{1 - \phi_j}, \quad (16)
\]

\[
e^i_s = \frac{\theta + \beta - \phi_j}{1 - \phi_j}, \quad (17)
\]

\[
e^i_{b+1} = \frac{1}{1 - \phi_j}. \quad (18)
\]

Hence, given the household preferences, elasticities verify that

\[ 0 < e^i_s, e^i_{b+1} < 1 < e^i_c = e^i_{d+1}. \]

Consumption is a luxury good, while bequests and savings are necessity goods. Indeed, consumption only becomes a necessity when \( \gamma \) or \( \theta \) tend to zero. A threshold arises for relative income. For households whose relative income, \( \frac{y^i_t}{\theta + (1 + \beta)(1 - \gamma)} \), the most necessary variable is bequests, followed by savings.

**Definition 1.** A sequence of household decisions \( \{c^i_t, d^i_{t+1}, b^i_{t+1}\}_{t=1}^{\infty} \), together with the unit salary and the interest rate \( w, R \) is an equilibrium if

i) Individual’s skills \( i^t \) are thrown from a skill distribution with \( \bar{I} = 1 \) and \( \text{var}(i^t) = \sigma_i^2 \).

ii) Households’ decisions are optimal, satisfying Eqs. (11)–(14) where household income is \( y^i_t = b^i_t + w^i \), and average income is defined by (6).

iii) Labor and capital markets clear, so that in particular, \( L_t = N_t \), for all \( t \).

iv) The firm maximizes profits at every period, and pays labor and capital at their marginal products.

3. The dynamics of the capital stock

Assuming that physical capital depreciates completely from one period to next, total capital available in the economy next period, \( K_{t+1} \), results from households’ savings, that is, \( K_{t+1} = \bar{b}_t \), or in per capita terms \( k_{t+1} = \bar{b}_t \). Note that the average wage in the economy at time \( t \) was defined as \( \bar{w} = w\bar{i}_t \), where the average ability \( \bar{i}_t \) is by assumption equal to 1. Then, using Eqs. (6), (8) and (9) along with the law of accumulation of physical capital, we obtain

\[
k_{t+1} = \bar{b}_t = \frac{\theta + \beta(1 - \gamma)}{\theta + (1 + \beta)(1 - \gamma)} \bar{w},
\]

where, by recursion, the average income can be written as

\[
\bar{w} = \left[ \frac{\theta + \beta(1 - \gamma)}{\theta + (1 + \beta)(1 - \gamma)} \right] R \bar{y}_0 + w \sum_{j=0}^{\infty} \left[ \frac{\theta - \beta}{\theta + (1 + \beta)(1 - \gamma)} \right]^j R^j.
\]

The sum of the geometric series on the right hand side of this equation can be recast as

\[
\sum_{j=0}^{\infty} \left[ \frac{\theta - \beta}{\theta + (1 + \beta)(1 - \gamma)} \right]^j R^j = \frac{1}{1 - \left[ \frac{\theta - \beta}{\theta + (1 + \beta)(1 - \gamma)} \right] R} \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} R \neq 1
\]

Note that if \( R < \frac{\theta + \beta(1 - \gamma)}{\theta + (1 + \beta)(1 - \gamma)} \), then the stock of physical capital converges to a unique steady state:

\[
k^* = \frac{\theta + \beta(1 - \gamma)}{1 + \beta(1 - \gamma) + \theta(1 - R)} \bar{w},
\]

at which the average income takes the value

\[
\bar{y}^* = \frac{\theta + (1 + \beta)(1 - \gamma)}{1 + \beta(1 - \gamma) + \theta(1 - R)} \bar{w}.
\]

In line with Wei and Zhang (2011), an increase in the bequest motive \( \theta \) induces all households to increase savings, which increases the stock of capital. Further, Proposition 2 in the upcoming Section 4 underlines the role of competition in the overall economy. When inter household comparisons increase by augmenting \( \gamma \), household bequests must increase to remain in the lead. Young agents in our economy save for two reasons. The first reason is to finance old age consumption and the second, to leave bequests to their offspring. The second motive includes positional concerns and it results affected by changes in the value of \( \gamma \). The aforementioned Proposition 2 shows that an increase in \( \gamma \) reinforces household competition, and it shifts savings from old-age consumption to bequests. In order to increase bequests, families need to save more, increasing this way the level of the steady state capital stock.

Using (6) together with Eq. (9), the following equation for the evolution of the average bequest is obtained:

\[
\bar{b}_{t+1} = \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} R (\bar{b}_t + w).
\]

The following Proposition shows that a stationary value for the average bequest is attained:

**Proposition 1.** If physical capital is at its steady state then average bequest \( \bar{b} \) also reaches a stable stationary state:

\[
\bar{b}^* = \frac{\theta}{\theta + (1 + \beta)(1 - \gamma) - \theta R} \bar{w},
\]

which is increasing in \( \gamma \) and \( \theta \).

---

6 See Appendix A for all computational details.
Proof. Average bequests reach a steady state value if and only if the steady state value of the interest rate is small enough,

\[ R < \frac{1}{\beta} + \beta \frac{1}{(1 - \gamma)} \theta, \]

which is exactly the condition we had imposed to obtain \( k^* \).

Taking the derivative of the \( b^* \) with respect to \( \theta \) and \( \gamma \) gives:

\[ \frac{\partial b^*}{\partial \theta} = \frac{R(1 + \beta)(1 - \gamma)}{\theta + (1 + \beta)(1 - \gamma)} \]

and

\[ \frac{\partial b^*}{\partial \gamma} = \frac{\theta R(1 + \beta)}{\theta(1 + \beta)(1 - \gamma) - \theta R^2} \]

which are positive. \( \square \)

4. Stationary distributions and household inequality

To analyze the influences of status quest on household inequality, we have to characterize the dynamic behavior of the distribution of bequest. To do so, consider that the stock of physical capital, the average income, and the factor prices take their steady state values so that the expected bequest increases with time in rich economies.

Beforehand and for tractability reasons, we need the following assumption:

**Assumption 1.** Individual’s abilities and inherited bequests are uncorrelated, that is \( \text{cov}(b_i, b_j) = 0 \), for all \( i \in \{1, 2, \ldots, N\} \).

Assumption 1 underlines that there is no skill transmission in our economy, and that abilities are independent of bequests.

Applying the variance operator on both sides of Eq. (14), the stationary value of bequest variance results:

\[ \nu[b^*] = \frac{\theta^2 R^2}{(1 + \theta + \beta)^2 - \theta^2 R^2 \sigma_i^2}. \] (21)

Indeed, the larger the spread of abilities, the larger the disparities in income, which induces a larger variance in bequests. Using these results together with Eqs. (11)-(13), the first and second moments of \( c' \), \( d' \) and \( s' \) obtain:

\[ c' \sim D(\nu[c'], \nu[c']) \quad \text{(22)} \]

\[ d' \sim D(\nu[d'], \nu[d']) \quad \text{(23)} \]

\[ s' \sim D(\nu[s'], \nu[s']) \quad \text{(24)} \]

Using (20) and (21), the stationary distribution of bequests follows:

\[ b^* \sim D(\nu[b^*], \nu[b^*]) \quad \text{(25)} \]

As a first measure of distributional disparities, we can make a direct comparison of the variables variances. If \( 1 < \beta + \theta \), then savings have a larger variance than first period consumption. Furthermore, if \( \beta < \theta \), then bequests are less equally distributed than consumption in old age, that is \( \nu[b^*] < \nu[b] \). In other words, when households preferences show a high concern about social status, then all households increase their bequests, which amplifies differences among families in the long-run in terms of wealth. The variable with the greater weight in preferences will hold increases with time. In order to provide robust results, let us use the coefficient of variation of a random variable \( X \) by \( CV(X) \).

The coefficient of variation of \( b_i^* \) is

\[ CV(b_i^*) = \frac{\sigma_{b_i^*} \left( \frac{1}{1 - \gamma} \right)^{1/2}}{\frac{1}{c_1} \sum_{j=0}^{c_2} \left( \frac{1}{c_1} \right)^{1/2} + \frac{\sigma_{b_i^*}}{\sigma_{c_2}} - c_3 \frac{\sigma_{b_i^*}}{c_2 - c_3}}. \]

We can prove that if \( b_i^* > c_2 + c_3 \), then the inequality in bequests increases with time.7 Let us summarize our results on the evolution of the bequest distribution. If an economy is initially poorly endowed on average, then the expected bequest will decrease with time and household inequality in bequests will consequently decrease. If on the contrary, the economy average bequest is high enough, then expected bequest will continuously increase. Nevertheless, although bequests increase on average, so does inequality. Therefore, bequests of the wealthier increase faster than bequests of the poor. Since the expected bequest increases in time, the distribution of bequests stretches. Hence our results show that the difference in bequests among any two households increases with time in rich economies.

Now we study the stationary distributions of the household’s variables. That is, we assume that physical capital has attained its steady state, which induces average variables to achieve their steady state values as well. The analysis of the stationary distributions is of particular interest because it enables us to identify the drivers of inequality. Beforehand and for tractability reasons, we need the following assumption:

**Assumption 2.** An increase in the reference dependence parameter, \( \gamma \), increases the mean values of household bequest, consumption and savings at the steady state. Focusing on the variables’ variance, a decrease in \( \sigma_i^2 \) decreases all variables variance. An increase in \( R \) increases the expected value and the variance of all variables.
Proof. See Appendix C for the results on $\gamma$ and $\sigma_g$. Results regarding $R$ can be proven taking the partial derivative of the expected value and variance of all variables with respect to $R$.

Proposition 2 shows that $\sigma_1$ is the unique exogenous parameter that can decrease the variance of all the endogenous variables at the same time. Hence, a first effective direction to reduce inequality would be to reduce $\sigma_2$. For instance, improving schooling attendance and quality and publicly subsidized professional training belong to this set of policies. The proposition also highlights the major role played by the interest rate in all long-term distributions. An increase in the interest rate magnifies the distance between rich and poor since the wealthier the more a household can benefit from the more advantageous market for capital.

Arising from individual household’s optimal decisions, the expected value of $c_i$ equals the present value of the expected value of $d_i$, that is

$$E[c_i] = \frac{1}{R} E[d_i].$$

Old age consumption variance is $(cR)^2$ times the variance of $c_i$. Hence if $R > 1$, then $d_i$ spreads more than $c_i$. Indeed, an increase in the rate of return, makes more profitable to postpone consumption.

Finally, let us underline that the weight of bequests in the utility function, $\theta$, as well as the time discount, $\beta$, increase the variables’ variance, exacerbating inequality. Again, the wealthier can benefit more from the capital market and augment further the future looking variables.

Inequality can be measured regarding different economic and social variables. Most surely, none of them will provide us with the same ordering or indicate the same magnitude. Next we use the coefficient of variation to measure relative inequality. It turns out that consumption in the young and in the old age are equally unequal. Bequests is the less unequal variable in contrast to savings, which is the most unequal variable. Straightforward computations lead to the following ordering $CV(\bar{d}) < CV(c) = CV(\bar{d}) < CV(\bar{s})$. Furthermore, household wealth is more unequal than consumption, $CV(c) < CV(\bar{y})$. If we had to provide a picture of the economy at a given time, bequests would be the more egalitarian variable of the economy. Note that this result is independent of the values of the bequest motive $\theta$ and of the interhousehold comparisons $\gamma$. Independently of the structure of the economy and the distribution of abilities, households devote their efforts to legate as much as possible. Indeed, households sacrifice young age consumption to increase savings in order to bequest at the maximum of their capacities. Worse endowed households save relatively more than wealthier families in order to leave a strong bequest and to improve their household social status. This explains that the coefficient of variation for savings is the most unequal variable: the wealthier will save relatively less than the poorer. The last inequality shows that, despite the poorer families efforts, household wealth will remain more unequally distributed than consumption and bequests.

We explore next how inequality varies with the weight of average bequests in the utility function and with the importance of positional bequests:

**Proposition 3.** Inequality of wealth, savings, consumption and bequest decrease with $\gamma$. An increase in $\theta$ also decreases inequality in all variables but only up to a threshold level $\theta^\prime$.

**Proof.** See Appendix D.

Together with Proposition 2, Proposition 3 proves that an increase of social status in preferences not only increases expected values of all variables but it also decreases inequality. Besides, augmenting the importance of bequests, fosters equality in wealth, consumption, and naturally, in bequests.

We find here the same underlying mechanism as underneath the covariance ranking. When the weight of social status increases (measured either as the weight of bequests in preferences or the weight of the group), all households will tend to increase bequests. In relative terms, less wealthy households will increase bequests further than wealthier households. Hence, in the short-term, inequality in consumption increases while bequests become more equal. This mechanism will be strong for a number of generations, which depends on preferences and productivity. Then, as the poorer accumulate wealth, improving their social status, they bequeath less strongly and increase their consumption. That is, in the transition period it is necessary to exacerbate inequality in consumption, while closing the gap in bequests and hence in social status.

Finally, if the weight of bequests in preferences increases beyond $\theta^\prime$, then the society will be segregated. Indeed, beyond $\theta^\prime$ a share of households will not be able to afford bequests, so that their optimal lifecycle decisions will not be directed by (1). In case of segregation, inequality will steadily grow since households leaving bequests will accumulate more wealth at all generations as in Bossman et al. (2007). Households which cannot bequeath at one generation, will not be able to catch up since the gap among the bequeathing and the non-bequeathing households will broaden.

5. Conclusion

This paper has proposed a simple benchmark to analyze the effect of social status pursuit on the evolution of the distribution of bequests and household inequality. In our model, households can modify the social position of their heirs leaving extensive bequests. We have shown that the larger the bequest motive and the social status concern, the less the household inequality.

There are some important issues worth studying in future research. First issue is the transmissibility of abilities. If ability to earn a wage is inherited, then initial agent heterogeneity will be three dimensional. In the absence of public policies, we wonder whether the less able could escape a sort of trap. Then building on this, we could introduce education as in Moav and Neeman (2008). There, at equilibrium, the rich have a better education and do not need to show their status with their consumption. Introducing education in our set-up could diversify equilibrium, and the role of a policy maker as education provider comes out as crucial for household decision making. In this regard Lu (2018) analyzes the effects of status concern based on the agent’s relative education level on economic growth, and Tourneanome and Tsoukis (2015) studies the effects of consumption envy on agents’ choice between public or private education. Second, we could use our framework to analyze the role of the bequest motive in a segregated economy suffering from group inequality. Charles et al. (2009) find that there exists a large difference in consumption patterns in the US. Regarding visible expenditures, Blacks and Hispanics consume roughly 30% more than Whites, although all three groups spend the same percentage in other goods. They also show that actually, rather than race, what drives differences is total income. A challenging project would be to apply our set-up to study the dynamics of rural-urban inequality in India as studied in Mallick (2014). Although there are powerful reasons to explain segregated behavior as access to high education or to fair mortgage markets, social referents may also play a role. In this regard, we would analyze the role of referents in group inequality and economic growth. Finally, we could also consider to introduce a financial sector into the model to study the roles of financial regulation, access to credit and of corruption. Financial development plays a key role in economic growth, although its consequences on inequality depend on a myriad other economic and social dimensions. In Agnello et al. (2012) it is found that inequality is reduced upon financial reforms, that the larger the government the more inequality is reduced and that trade could eventually hinder convergence. In the extended version of this model in a segregated economy, it could be utterly interesting to analyze the role of the financial markets (and its access and quality) in intra and inter group inequality and ultimately on overall economic growth.
A. Dynamics of physical capital

We have \( \bar{y}_t = \bar{b}_t + w \). Note that \( \bar{b}_t = \theta \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} R \bar{y}_{t-1} \). Then, \( \bar{y}_t = \theta \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} R \bar{y}_{t-1} + \theta \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} Rw + w \). As \( \bar{y}_{t-1} = \bar{b}_{t-1} + w \), we get \( \bar{y}_t = \theta \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} R \bar{y}_{t-2} + \theta \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} Rw + w \).

Again, replacing for \( \bar{b}_{t-1} \), we obtain that \( \bar{y}_t = \theta \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} R \bar{y}_{t-2} + \theta \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} Rw + w \).

Hence \( \bar{y}_t = \left( \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} R \right)^2 \bar{y}_{t-2} + \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} Rw + w \).

Iterating in the same way, we obtain \( \bar{y}_t = \left( \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} R \right)^3 \bar{y}_{t-3} + \theta \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} Rw + w \).

so that \( \bar{y}_t = \left[ \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} \right]^t R \bar{y}_0 + w \sum_{j=0}^{t-1} \left[ \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} \right]^j R^j \).

The sum of the geometric series on the right-hand side of this equation can be recast as

\[
\sum_{j=0}^{t-1} \left[ \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} \right]^j R^j = \frac{1 - \left[ \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} \right]^t R^t}{1 - \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} R}, \quad \text{if } \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} R \neq 1
\]

otherwise.

Substituting this in the equation: \( k_{t+1} = \bar{y}_t = \frac{\theta + \beta(1 - \gamma)}{\theta + (1 + \beta)(1 - \gamma)} \bar{y}_t \), leads to the evolution of the capital stock.

Note that if \( \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} R < 1 \), then the stock of physical capital converges to a steady state. Indeed, we have

\[
k^* = \lim_{t \to \infty} \frac{\theta + \beta(1 - \gamma)}{\theta + (1 + \beta)(1 - \gamma)} \left[ \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} \right]^t R^t \bar{y}_0 + w \sum_{j=0}^{t-1} \left[ \frac{\theta}{\theta + (1 + \beta)(1 - \gamma)} \right]^j R^j \bar{y}_0
\]

so that \( k^* = \frac{\theta + \beta(1 - \gamma)}{\theta + (1 + \beta)(1 - \gamma)} R^t \bar{y}_0 + \frac{1}{\theta + (1 + \beta)(1 - \gamma)} w \).

B. Evolution of inequality in time

Taking derivative of \( CV(b_t) \), we obtain that

\[
\frac{\partial CV(b_t)}{\partial t} = \frac{c_2 \sigma}{(1 - c_1^2)^{1/2}} \frac{1}{2(1 - c_1^2)^{1/2}} (-2c_1^2 \ln c_1) \frac{1}{c_1^{c_1} + (b_0^2 - c_2 - c_3)c_1^{c_1}} + \frac{c_2 \sigma}{(1 - c_1^2)^{1/2}} (1 - c_1^2)^{1/2} \frac{-(b_0^2 - c_2 - c_3)c_1^2 \ln c_1}{c_1^{c_1} + (b_0^2 - c_2 - c_3)c_1^{c_1}}.
\]

C. Proposition 2 proof

Taking derivatives of \( E(b_t), E(c_t), E(d_t) \) and \( E(s_t) \) given in Eqs. (27)-(30) with respect to \( \gamma \) will give following results:

\[
\frac{\partial \mu}{\partial \gamma} = \frac{(1 + \beta) R}{[\theta(R - 1) + (1 + \beta)(\gamma - 1)]} w > 0.
\]

\[
\frac{\partial \sigma}{\partial \gamma} = \frac{\theta(R - 1)}{[\theta(R - 1) + (1 + \beta)(\gamma - 1)]} w > 0.
\]

\[
\frac{\partial \bar{t}}{\partial \gamma} = \frac{\theta(R - 1)}{[\theta(R - 1) + (1 + \beta)(\gamma - 1)]} w > 0.
\]

\[
\frac{\partial \bar{s}}{\partial \gamma} = \frac{\theta(R - 1)}{[\theta(R - 1) + (1 + \beta)(\gamma - 1)]} w > 0.
\]
which are all positive. Let us compute the derivative of the variables’ variance with respect to \( \sigma_t^2 \):

\[
\frac{\partial \nu(c^n)}{\partial \sigma_t^2} = \frac{1}{(1 + \beta + \theta)^2 - \theta^2 R^2} > 0,
\]

\[
\frac{\partial \nu(b)}{\partial \sigma_t^2} = \frac{\theta^2 R^2}{(1 + \beta + \theta)^2 - \theta^2 R^2} > 0,
\]

\[
\frac{\partial \nu(s^n)}{\partial \sigma_t^2} = \frac{(\beta + \theta)^2}{(1 + \beta + \theta)^2 - \theta^2 R^2} > 0,
\]

\[
\frac{\partial \nu(d^n)}{\partial \sigma_t^2} = \frac{\beta^2 R^2}{(1 + \beta + \theta)^2 - \theta^2 R^2} > 0.
\]

D. Proposition 3 proof

Taking derivatives of CV’s that we found in the previous Proposition we prove that inequality decrease with \( \gamma \):

\[
\frac{\partial CV(b)}{\partial \gamma} = -\frac{(1 + \beta)}{\left[(1 + \beta + \theta)^2 - (\theta R)^2\right]^{1/2} \frac{\sigma_w}{w}} < 0,
\]

\[
\frac{\partial CV(c^n)}{\partial \gamma} = -\frac{\theta(R-1)}{(1-\gamma)^2 \left[(1 + \beta + \theta)^2 - \theta^2 R^2\right]^{1/2} \frac{\sigma_w}{w}} < 0,
\]

\[
\frac{\partial CV(d^n)}{\partial \gamma} = -\frac{\theta(R+1)\theta(\beta+\gamma)}{\left[(1 + \beta + \theta)^2 - \theta^2 R^2\right]^{1/2} (1 - \gamma) \frac{\sigma_w}{w}} < 0,
\]

\[
\frac{\partial CV(y^n)}{\partial \gamma} = -\frac{R\theta(\beta + 1)(1 + \beta + \theta)}{\left[(1 + \beta + \theta)^2 - \theta^2 R^2\right]^{1/2} (1 + \beta)(1-\gamma) \frac{\sigma_w}{w}} < 0.
\]

The impact of \( \theta \) on bequests and wealth inequality is proportional to its impact on consumption inequality. Hence, we prove here that an increase in \( \theta \) decreases inequality in consumption up to a threshold level. The results for the other variables follow then trivially. By definition, the coefficient of variation of consumption is:

\[
CV(c^n) = \frac{(1 + \beta)(1 - \gamma) - \theta(R - 1)}{\left[(1 + \beta + \theta)^2 - \theta^2 R^2\right]^{1/2} (1 - \gamma) \frac{\sigma_w}{w}}
\]

We have then

\[
\frac{\partial CV(c^n)}{\partial \theta} = \frac{(1 + \beta)(1 - \gamma)\theta R^2 + (1 + \beta + \theta)(\gamma - R)}{\left[(1 + \beta + \theta)^2 - \theta^2 R^2\right]^{1/2} (1 - \gamma) \frac{\sigma_w}{w}}
\]

This derivative is negative if and only if \( (1 - \gamma)\theta R^2 + (1 + \beta + \theta)(\gamma - R) < 0 \) which implies

\[
\theta < \frac{(R-\gamma)(1+\beta)}{(R-1)(R-\gamma(R+1))} = \theta^*.
\]

Furthermore,

\[
\frac{\partial \nu(b)}{\partial \gamma} = \frac{R^2(1 + \beta)}{(R-1)(R-1 + \gamma + \gamma^2)} > 0.
\]

References


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