Economic development and convergence clubs: the role of inherited tastes and human capital

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Abstract

We present an overlapping generations model with endogenous growth in which children inherit from the previous generation human capital and life standard aspirations. Adults evaluate their own consumption with respect to a baseline requirement which depends on their parents past consumption. The presence of bequeathed tastes changes significantly the dynamic properties of the model. First, starting with too high aspirations or with too low education spendings lead the economy to a poverty trap. Second, the economy can be characterized by oscillations because inherit human capital may not be sufficient to cover the bequest in terms of higher aspirations. Third, the endogenous growth steady state can be surrounded by a repelling cycle which delimits an attraction basin.

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Introduction

In a growing economy, each generation on reaching adulthood normally has more resources at its commands. These additional resources result on the one hand from the increase in productivity linked to the accumulation of physical capital by the previous generation. They result, on the other hand, from the accumulation of human capital because children inherit knowledge and skills from their parents and enhance their bequeathed abilities by training and education. In that case education is an important factor of economic growth and the inter-generational knowledge spill-overs are essential to economic development. This is consistent with the fact that a large fraction of growth is attributed to improvements in the quality of labour services (see Denison (1974), Goldin (1994) and Nehru, Swanson and Dubey (1995)). In such a framework, the crucial element for explaining permanent endogenous development[1] is the presence of a *positive* externality that makes individual-specific human capital increasing in aggregate human capital (Azariadis and Drazen, 1990) and/or in the human capital of the previous generation (Michel, 1993).

However, as stressed by Easterlin (1971), income growth from one generation to each other is a two-edged sword. His argument is that "in a steadily growing economy successive generations are raised in increasingly affluent households and hence develop successively higher living aspirations." This "intergeneration taste effect" is a *negative* externality making the future generations more and more demanding along the growth process. The idea that tastes can be involuntary passed from one generation to the next has, up to our knowledge, not been formalized in economics. One exception is in Jones (1984) who analyses traditions of behaviour within the context of a workplace. Jones analyses a model in which "It is through conformism between neighbouring generations that we generate traditions passed down from one generation to the next." Besides its intergenerational aspect, the idea of bequeathed tastes reflects the fact that past decisions affect the perception of current outcomes. In the context of consumption, this clearly refers to the models of habit formation initiated by Duesenberry (1949) and developped afterwards by many others.[2]

One empirical implication of the "bequeathed aspirations" hypothesis is that reported satisfaction levels do not increase over time in line with economic development (Easterlin, 1995). The fact that "an Indian will, on average, be twice as well off as his grandfather" (Lucas, 1988) does not mean that his satisfaction level has increased, because life standard norms could have raised too.

How these two externalities interact seem an important topic for long-run development. Indeed, the interaction of inherited higher skills but also higher aspirations could explain why development and economic growth are not as succesful and widespread as the standard theory predicts. For instance, if aspirations are rising too fast compared to productivity, households could be tempted to lower savings and/or education spendings in order to maintain the growth of their consumption. Could this slow down the accumulation of human capital, lead to stagnation and be responsible for poverty traps and

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[1]And hence the observed lack of unconditional convergence in per capita income at the worldwide level (Barro, 1991).

[2]Moreover, there is a strong experimental support for supposing an habituation mechanism by which the most salient events are progressively absorbed into the new baseline against which further events are judged. (see Brickman, Coates and Janoff-Belman, 1978).

convergence clubs? Moreover, if long-term growth is not steady, but fluctuating, temporary disparities can result between the growth of resources and that of aspirations with consequent swings in utility. What is the consequence of these swings on the optimal plans of the households and on the ability of an economy to reach a balanced growth path?

To assert the potential relevance of this question, one has to build a small prototype model including both types of intergenerational spill-overs (section 1) and analyse its dynamic properties (section 2). Conclusions from the model are drawn in section 3.

1 The model

The model is an extension in two directions of the basic example of a Diamond (1965) economy without outside money. On the one hand, human capital accumulation is introduced to account for endogenous growth. In the growth process, a part of the human capital is transmitted from the parents to their children. On the other hand, children inherits life standard aspirations from their parents. This means that they evaluate their own consumption with respect to a baseline requirement which depends on their parents past consumption.

1.1 The households' life cycle

At each date a single good is produced. This good can be either consumed during the period or accumulated as capital for future production or spend on education. Population growth at a rate n. Each generation lives three periods. At time $t-1$, the young generation does not consume but spend e_t in order to improve its stock of human capital. This amount is borrowed on the capital market. The young generation also inherits a part of their parents human capital. The human capital of this generation is given by:[3]

$$h_t = h_{t-1}^{1-\beta} e_t^{\beta}, \qquad \beta \in [0, 1[\tag{1}$$

The young generation also inherits aspirations a_t from their parents. These aspirations are based on the life standard of the adult of the previous generation. This reflect the idea that children becomes habituated to a certain life standard when they are still living with their parents. Thus,

$$a_t = c_{1t-1} \tag{2}$$

The adult generation sells h_t units of efficient labour inelastically at a real wage w_t, consumes the quantity c_{1t}, pays back its debt linked with education spending, and saves s_t for next period consumption by holding capital. The old generation spends all its savings from the previous period and consumes c_{2t+1}. The inter-temporal utility of the typical adult has a specific functional form of the Stone-Geary type:

$$u(c_{1t}, c_{2t+1}) = (c_{1t} - \gamma a_t)^{\theta} \; c_{2t+1}^{1-\theta} \tag{3}$$

$\theta \in]0, 1[$ is a parameter of the utility function and $\gamma \in]0, 1[$ measures the intensity of the effect of the inter-generational spill-over. We thus assume that bequeathed tastes

[3] See Hercowitz and Sampson (1991) for a discussion of a similar rule for physical capital.

determine a frame of reference against which consumption when adult is judged and that the depreciation rate of aspirations (i.e. forgetting) is high so that they no longer affect the evalution of consumption when old. This last assumption is supported by the empirical observation that reported satisfaction increases from the age of 30 onwards. On the basis of their empirical study on job satisfaction, Clark, Oswald and Warr (1994) concludes that "the rise in job satisfaction at these ages could come from *reduced aspirations*, due to a recognition that there are few alternative jobs available once a worker's career is established (...). Alternatively, aspirations themselves could remain the same but older workers might put less weight on such comparisons (...)."

A typical adult faces the following problem:

$$\begin{aligned}
\max \quad & (c_{1t} - \gamma a_t)^{\theta} \;\; c_{2t+1}^{1-\theta} \\
\text{s.t.} \quad & c_{1t} \geq \gamma a_t \\
& c_{2t+1} \geq 0 \\
& c_{1t} + s_t = h_t w_t - (1 + r_t) e_t \\
& c_{2t+1} = (1 + r_{t+1}) s_t \\
& h_t = h_{t-1}^{1-\beta} e_t^{\beta}
\end{aligned}$$

r_t is the real rate of interest. h_{t-1}, w_t, r_t, r_{t+1} and a_t are given to the consumer.

The consumer chooses education spendings e_t when young, and savings s_t when adult. We solve the problem backward.

Step 2: When adult, the consumer chooses s_t given the level of e_t.

$$\max_{s_t} (h_t w_t - (1 + r_t) e_t - s_t - \gamma a_t)^{\theta} \;\; ((1 + r_{t+1}) s_t)^{1-\theta}$$

Assuming an interior solution, the above decision problem has a unique solution characterized by the following saving function:

$$s_t = (1 - \theta)(h_t w_t - (1 + r_t) e_t - \gamma a_t) \tag{4}$$

Savings do not depend on the interest rate r_{t+1}, [4] because of the specific form of the utility function, because there is no wage income in the last period of life and because aspirations are fully forgotten after one period. We thus avoid the potential negative effect of the interest rate on savings as a source of complex dynamics. Equation (4) shows also that aspirations affect savings negatively. When aspirations are low, the adult generation has a sober lifestyle and savings are high. When aspirations are high compared to wage income, adults spend much on consumption to maintain a life standard similar to the one of their parents and their propensity to save is low. Using (4) and the household budget constraint, the consumption when adult is given by:

$$c_{1t} = \frac{\theta}{1 - \theta} s_t + \gamma a_t \tag{5}$$

[4] Notice however that, since e_t is borrowed on the financial market, the current interest rate r_t does affect savings.

The indirect utility function is given by:

$$\theta^\theta(1-\theta)^{1-\theta}(1+r_{t+1})^{1-\theta}(h_t w_t-(1+r_t)e_t-\gamma a_t) \tag{6}$$

Step 1: When young, the consumer chooses e_t that maximises the indirect utility (6) subject to the accumulation rule of human capital (1). This problem can be restated as:

$$\max_{e_t} h_{t-1}^{1-\beta}e_t^\beta w_t-(1+r_t)e_t$$

The first order condition leads to:

$$e_t = h_{t-1}\ \left(\beta\frac{w_t}{1+r_t}\right)^{\frac{1}{1-\beta}} \tag{7}$$

Spendings on education depends positively on the future wage per unit of efficient labour w_t and negatively on the interest rate applied to their loan. Due to the specific functional forms used, they do not depend directly on life cycle aspirations, which simplifies subtantially the analysis. However, notice that parents' aspirations may affect education spendings of their children negatively by reducing savings and increasing the interest rate.

1.2 The firms

Production is made through a Cobb-Douglas constant return to scale technology. The physical capital is assumed to be fully depreciated after one period. The profits of the firms are given by

$$Y_t = K_t^\alpha(N_{t-1}h_t)^{1-\alpha}-w_t N_{t-1}h_t-(1+r_t)K_t, \qquad \alpha\in]0,1[$$

The production function in intensive form is thus

$$y_t = k_t^\alpha \quad \text{with} \quad k_t=\frac{K_t}{N_{t-1}h_t} \tag{8}$$

The competitive behavior of firms leads to the equalization of the marginal productivity of each factor to its cost:

$$w_t = (1-\alpha)k_t^\alpha \tag{9}$$

$$1+r_t = \alpha k_t^{\alpha-1} \tag{10}$$

Replacing in (7) the factor prices by their value given by (9) and (10), the choice of education spendings satisfy:

$$K_t=\frac{\alpha/\beta}{1-\alpha}N_{t-1}e_t \tag{11}$$

Using (7), (9), (10) and (11) in (4), optimal savings are

$$s_t=(1-\theta)\mu h_t^{1-\alpha}e_t^\alpha-(1-\theta)\gamma a_t \tag{12}$$

in which $\mu=(1-\alpha)^{1-\alpha}(\alpha/\beta)^\alpha(1-\beta)$ is a parameter.

1.3 The capital market

The clearing condition of the capital market implies that savings equal investment in physical and human capital:

$$N_{t-1}s_t = K_{t+1} + N_t e_{t+1}$$

Using (11), it can be shown that:

$$s_t = \nu e_{t+1} \tag{13}$$

in which $\nu = (1+n)\left(\frac{\alpha/\beta}{1-\alpha} + 1\right)$ is a parameter.

2 The equilibrium

The dynamics of this economy can be summarized by two difference equations of the first order. Equating (12) and (13) and dividing both sides by h_t, we find

$$\nu \frac{e_{t+1}}{h_t} = (1-\theta)\mu \left(\frac{e_t}{h_t}\right)^{\alpha} - (1-\theta)\gamma \frac{a_t}{h_t} \tag{14}$$

(14) is the clearing condition of the asset market, given that the labor market is in equilibrium (i.e. that (9) holds).

Using (2), (5) and (12), and dividing both sides by h_t we obtain

$$\frac{a_{t+1}}{h_t} = \theta\mu \left(\frac{e_t}{h_t}\right)^{\alpha} + (1-\theta)\gamma \frac{a_t}{h_t} \tag{15}$$

(15) is the aspiration rule, given that the other markets are in equilibrium.

Let us denote $\hat{a}_t = a_t/h_{t-1}$ and $\hat{e}_t = e_t/h_{t-1}$. Notice that the growth of human capital satisfies $h_t/h_{t-1} = (\hat{e}_t)^{\beta}$. We now define the equilibrium as follows. At date 0, the economy is endowed with a fixed quantity of education spendings per unit of human capital $\hat{e}_0$ and a level of aspirations per unit of human capital $\hat{a}_0$. A perfect foresight equilibrium is a sequence $(\hat{e}_t)_{t\geq 0}, (\hat{a}_t)_{t\geq 0}$ verifying at each date $t \geq 0$

$$\nu \hat{e}_{t+1} = (1-\theta)\mu \hat{e}_t^{\alpha(1-\beta)} - (1-\theta)\gamma \hat{a}_t \hat{e}_t^{-\beta} \tag{16}$$

$$\hat{a}_{t+1} = \theta\mu \hat{e}_t^{\alpha(1-\beta)} + (1-\theta)\gamma \hat{a}_t \hat{e}_t^{-\beta} \tag{17}$$

Before considering the general case let us first analyse two special cases for which it is possible to characterize the dynamics by using only analytical methods.

2.1 Case 1: $\gamma = 0$

When $\gamma = 0$, there is no inter-generational spill-over due to aspirations, and the model reduces to the one presented in Michel (1993). The dynamic system has two fixed points, one with $\hat{e} = 0$ and one with

$$\hat{e} = \left(\frac{(1-\theta)\mu}{\nu}\right)^{1/(1-\alpha(1-\beta))}$$

which is related to the (endogenous) long-term growth rate of the economy. The positive fixed point is always stable. The dynamics around this steady-state displays monotonous convergence.

2.2 Case 2: $\beta = 0$

When $\beta = 0$, the human capital stock is a constant, there is no endogenous growth. This simple Diamond economy with bequeathed tastes is analyzed in de la Croix (1996). In that case, the dynamic system redefined in terms of k and a has two fixed points, one at $(0, 0)$ and one at $(\bar{k}(\gamma), \bar{a}(\gamma))$, which depends on the parameter of interest γ and is defined by:

$$\begin{aligned} \bar{k}(\gamma) &= \left(\frac{\tau(1-\theta)(1-\alpha)(1-\gamma)}{(1+n)(1-\gamma(1-\theta))} \right)^{\frac{1}{1-\alpha}} \\ \bar{a}(\gamma) &= \tau(1-\alpha)\bar{k}^{\alpha} - \bar{k}(1+n) \end{aligned}$$

It can be checked that $\partial\bar{k}/\partial\gamma < 0$ implying that the stationary capital stock per head is lower in the economy with bequeathed tastes than in the standard Diamond economy. This is essentially due to the fact that aspirations affect savings negatively. Moreover, it can be shown that the fixed point $(\bar{k}(\gamma), \bar{a}(\gamma))$ is hyperbolic if $\gamma \neq \hat{\gamma}$ where

$$\hat{\gamma} = \frac{1 + \alpha - \sqrt{(1+\alpha)^2 - 4\alpha(1-\theta)}}{2\alpha(1-\theta)}.$$

It is stable if $\gamma < \hat{\gamma}$ and it is unstable if $\gamma > \hat{\gamma}$. This means that if the effect of aspirations on utility is strong enough, this makes the fixed point of the map unstable. In addition, it can be shown that for large intervals of the parameters, the dynamics around the positive fixed point is characterized by oscillations. When we analyse the properties of the model at the non-hyperbolic equilibrium, it is possible to establish that a Naimark-Sacker[5] bifurcation arises when $\gamma = \hat{\gamma}$. This implies that, in a neighbourhood of the bifurcation point, a limit cycle around $(\hat{k}, \hat{a})$ appears either on the low or on the high side of the critical parameter value. In addition, it is analytically not possible (in our case) to check whether the limit cycle appears on the unstable side of the fixed point and is attracting or whether it encircles the fixed point on the stable side and is repelling.

The rationality for oscillations in this case is the following: The spill-over from one generation to the next has two components: (a) savings of the old generation finance the capital stock required to produce and to pay the wages of the young generation; this process that transforms income/savings of the old into income for the young displays decreasing returns; (b) past consumption levels of the parents generate life standard aspirations for the young generation, leading them to spend more on consumption; this process displays constant returns. At one point, due to the decreasing returns in the production process, the bequest in terms of higher wages is not sufficient to cover the bequest in terms of higher aspirations. This leads to a drop in savings to maintain the life standard and induces a recession. When the consecutive impoverishment is strong enough, aspirations have reverted to lower levels, allowing a rise in savings and the start

[5]This bifurcation is often called “Hopf bifurcation for maps”.

of an expansion period. Depending on the relative strength of the two effects and on the current state of the economy compared to its stationary state, this process could either converge, or explode.

2.3 General case

Let us represent the dynamics of the model by drawing its phase diagram. We may first notice that the constraint $c_{1t} \leq \gamma a_t$ which is necessary for an interior solution can be written

$$\hat{a}_t \leq \gamma \hat{a}_{t-1} \hat{e}_{t-1}^{-\beta}$$

Using the difference equation (17), this inequality can we rewritten

$$\hat{a}_t \leq \frac{\mu}{\gamma} \hat{e}_t^{\alpha(1-\beta)+\beta} \tag{18}$$

This defines a monotonous increasing function $\hat{a} = q(\hat{e})$ in the space $\{\hat{a}, \hat{e}\}$. It can be checked that $q(.)$ is concave and has an infinite slope at the origin.

Second, the phaseline corresponding to $\hat{e}_{t+1} = \hat{e}_t$ can be written using (16) as

$$\hat{a}_t = \frac{\mu}{\gamma} \hat{e}_t^{\alpha(1-\beta)+\beta} - \frac{\nu}{\gamma(1-\theta)} \hat{e}_t^{\beta+1} \tag{19}$$

This defines a function $\hat{a} = j(\hat{e})$. It can be checked that $j(x) < q(x)$ for all $x \geq 0$, that $j(.)$ is concave, continuous, has an infinite slope at the origin and decreases unboundedly when $\hat{e} \to \infty$.

Third, the phaseline corresponding to $\hat{a}_{t+1} = \hat{a}_t$ can be written using (17) as

$$\hat{a}_t = \frac{\theta \mu \hat{e}^{\alpha(1-\beta)+\beta}}{\hat{e}^{\beta} - (1-\theta)\gamma} \tag{20}$$

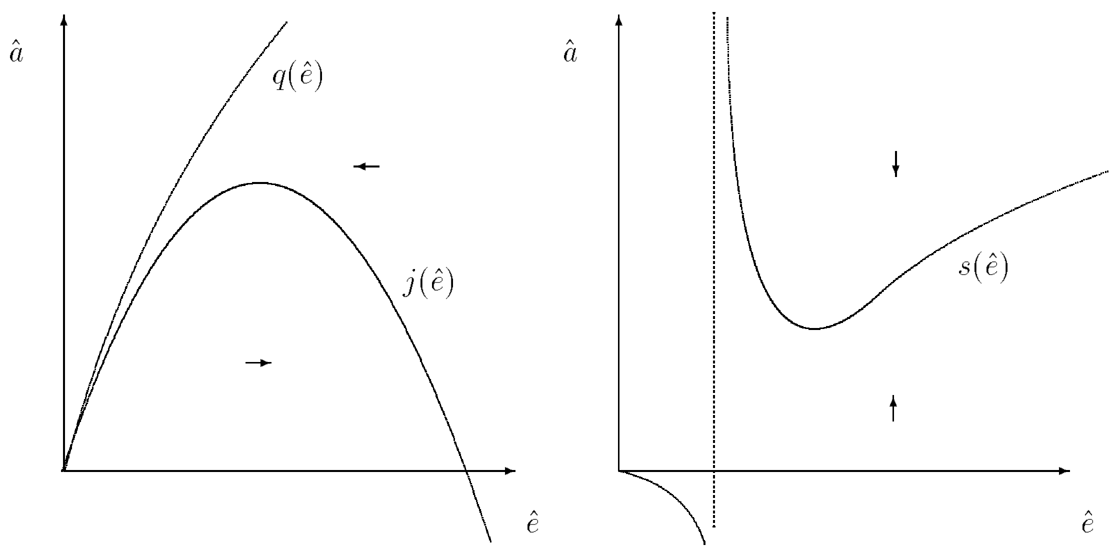
This defines a function $\hat{a} = s(\hat{e})$. This function has a vertical asymptote at $\hat{e} = ((1-\theta)\gamma)^{1/\beta}$. It is negative between 0 and the asymptote and positive after. At the right of this asymptote, $s(.)$ reaches a minimum at the point $\hat{e} = ((1-\theta)\gamma(1+\beta/(\alpha(1-\beta)))^{1/\beta}$ and then starts increasing unboundedly.

These informations can be gathered in Figure 1 in which the arrows indicates the direction of motion. From this Figure it appears that our qualitative analysis is not sufficient to determine if the two phaselines intersect twice, are tangent or do not intersect at all. This depends crucially on the different parameters.

To characterize further the dynamics of the model we have thus to rely on numerical methods applied to parametrized examples of the model. We adopt a strategy that consists in calibrating the model using what we view as plausible parameters value and then tracing the associated equilibrium trajectories using numerical methods.

We shall analyse two examples in turn. For both examples we use the same values for α, θ and n, which are: $\alpha = 1/4$, $\theta = 0.71$, $n = 0$. The value for α is reasonable given what we know on the share of labour in value-added, and the value of θ is in accordance with an annual discount factor of 0.96. Population growth is set to zero. In the first example we consider, we take a value for β of 0.25 and analyse the properties of the equilibrium for different values of γ. In the second example, β is set to 0.1.

Figure 1: The phaselines



2.3.1 example 1: the poverty trap

With $\beta = 0.25$, the phase diagram for $\gamma = 0.2$ is presented in Figure 2. There are two intersections of the phaselines in the positive orthant indicating the presence of two non-zero fixed points. The vertical asymptote of $s(.)$ is not visible on the chart because it is very close to 0.

The computation of the eigenvalues of the linearized system indicates that the lower stationary state is locally unstable while the higher stationary state is stable. For the higher stationary state, Table 1 presents the value of $\hat{a}$ and $\hat{e}$, the value of the corresponding eigenvalues and the type of dynamics around this equilibrium. As long as γ is lower than 0.238846 the stationary state is stable. In the case of Figure 1, the dynamics displays damped oscillations since the eigenvalues are complex with a modulus lower than 1. When $\gamma = 0.238846$ the Table suggests the presence of a fold bifurcation: the first eigenvalues is equal to 1. At this point the lower and the higher stationary state merge in one point and when γ increase beyond this critical value, the positive stationary state disappear. In that case, the only stationary state is (0,0).

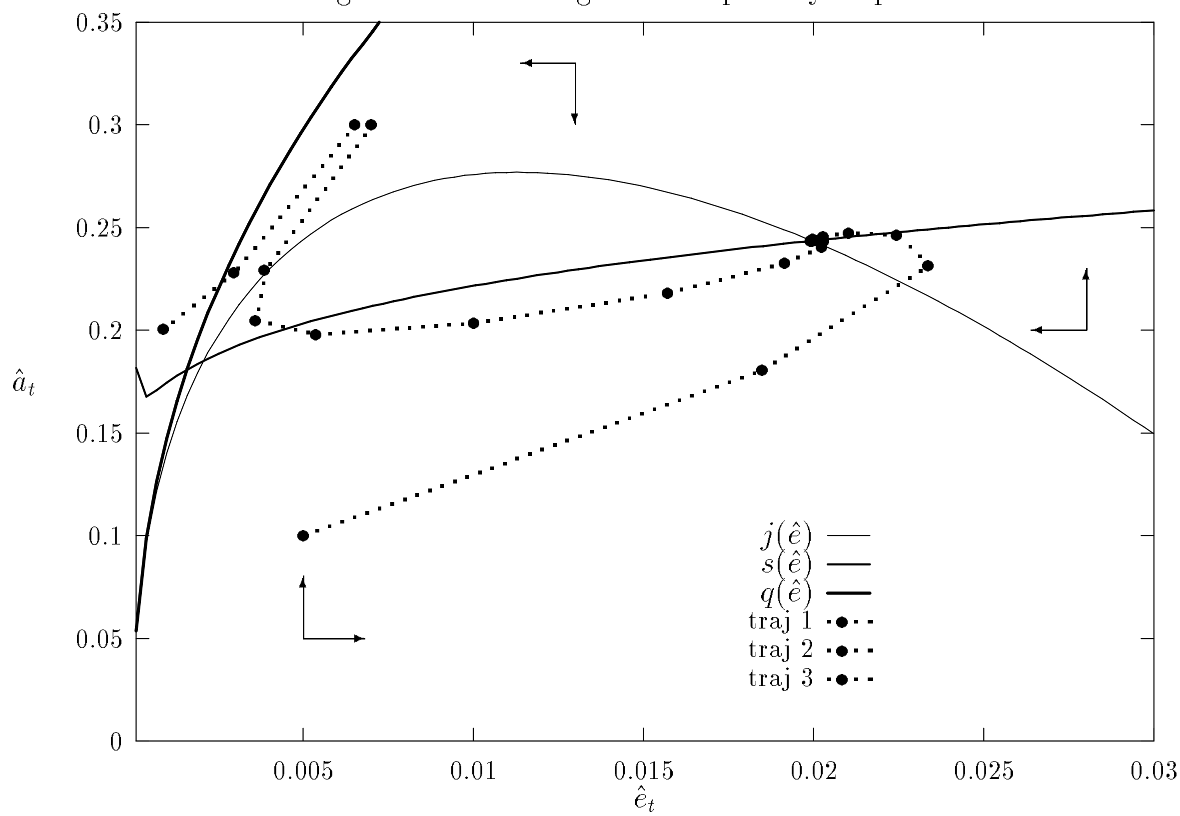
Taking the intermediate case of $\gamma = 0.2$ presented in Figure 1, we see that the dynamics is characterised by the presence of a poverty trap and by oscillations. Looking at the trajectories starting from the top left corner, we see that the one which is characterized by slighly lower education spendings follows first nearly the same path as the other one, but, after two periods diverges from the path leading to the stationary state and ends by violating the constraint $c_{1t} \geq \gamma a_t$.[6] In that case, starting with too high aspirations or

[6] In this case, the resources of the economy are not sufficient for the adult to consume at least γa_t. What is happening then depends on what we assume about preferences in this state. For instance, if the consumer is indifferent between all consumption levels that are below the minimum threshold γa_t, the solution is indeterminate. A complete description of the possible cases is beyond the scope of this paper.

Table 1: *the poverty trap*

γ	$\hat{a}$	$\hat{e}$	Eigenvalues	modulus	comment
0.001	0.2362	0.0413	$0.1866, 0.0022$	$0.1866, 0.0022$	stable node
0.200	0.2436	0.0199	$0.3476 \pm 0.2440i$	$0.4247, 0.4247$	stable spiral
0.237	0.2336	0.0109	$0.6278 \pm 0.1111i$	$0.6375, 0.6375$	stable spiral
0.238	0.2320	0.0102	$0.7389, 0.5927$	$0.7389, 0.5927$	stable node
0.238846	0.2283	0.0088	$1.0000, 0.5140$	$1.0000, 0.5140$	fold bifurcation
0.23885	N.A.	N.A.	N.A.	N.A.	no fixed points

Figure 2: Phase diagram: the poverty trap



with too low education spendings may lead the economy to a poverty trap. This ty of dynamics is characterized by sudden take-off episodes leading to a growing gap between economies that were similar at some points.

Considering now the converging trajectory, the Figure illustrates the damped oscillations mentionned above. This implies that, before reaching its stationary state (balanced growth path), the economy experiences a period with higher growth rates. There is thus overshooting in the growth rate. Notice that such oscillations are consistent with the stylized fact that growth rate are weakly correlated across decades while country characteristics are stable (Easterly, Kremer, Pritchett and Summers, 1993).

The interpretation of these oscillations is the following: higher education spendings imply higher productivity and higher consumption levels. For the following generation, this leads to higher aspirations that may in turn lead to lower savings in order to maintain life standards. Lower savings will rise the interest rates. When the effect on interest rates dominates the initial effect of euducation on wages, education spendings may fall after a growth period. This lasts until aspirations have reverted to lower levels.

2.3.2 example 2: the unstable limit cycle

With $\beta = 0.1$, the phase diagram for $\gamma = 0.48$ is presented in Figure 2. Again, there is two intersections of the phaselines in the positive orthant indicating the presence of two non-zero fixed points. The computation of the eigenvalues of the linearized system indicates that the lower stationary state is locally unstable while the higher stationary state is stable.

Table 2 presents the value of $\hat{a}$ and $\hat{e}$ at the higher stationary state, together with the value of the corresponding eigenvalues and the type of dynamics around this equilibrium. As long as γ is lower than 0.482 the stationary state is stable. When $\gamma = 0.482$ the Table suggest the presence of a Neimark-Sacker bifurcation. Indeed the modulus of the complex conjugate eigenvalues is 1. This implies that, in a neighbourhood of the bifurcation point, a limit cycle appears either on the low or on the high side of the critical parameter value. When we increase γ beyond this bifurcation point, the stationary state looses its stability and the dynamics is characterised by an unstable spiral. For a higher value of γ we retrieve a fold bifurcation after which the stationary state disappears.

In the case of Figure 3, the local dynamics displays damped oscillations since the eigenvalues are complex with a modulus lower than 1. Moreover, the example shows the presence of an unstable limit cycle around the stationary state, which is consistent with the presence of the Neimark-Sacker bifurcation at $\gamma = 0.482$. This limit cycle is repelling: it defines an attraction basing for the high growth stationary state implying that if the initial conditions are located outside the basin, the economy will not reach the high stationary state. This is a kind of generalized poverty trap: the range of favourable initial conditions is very limited in this example.

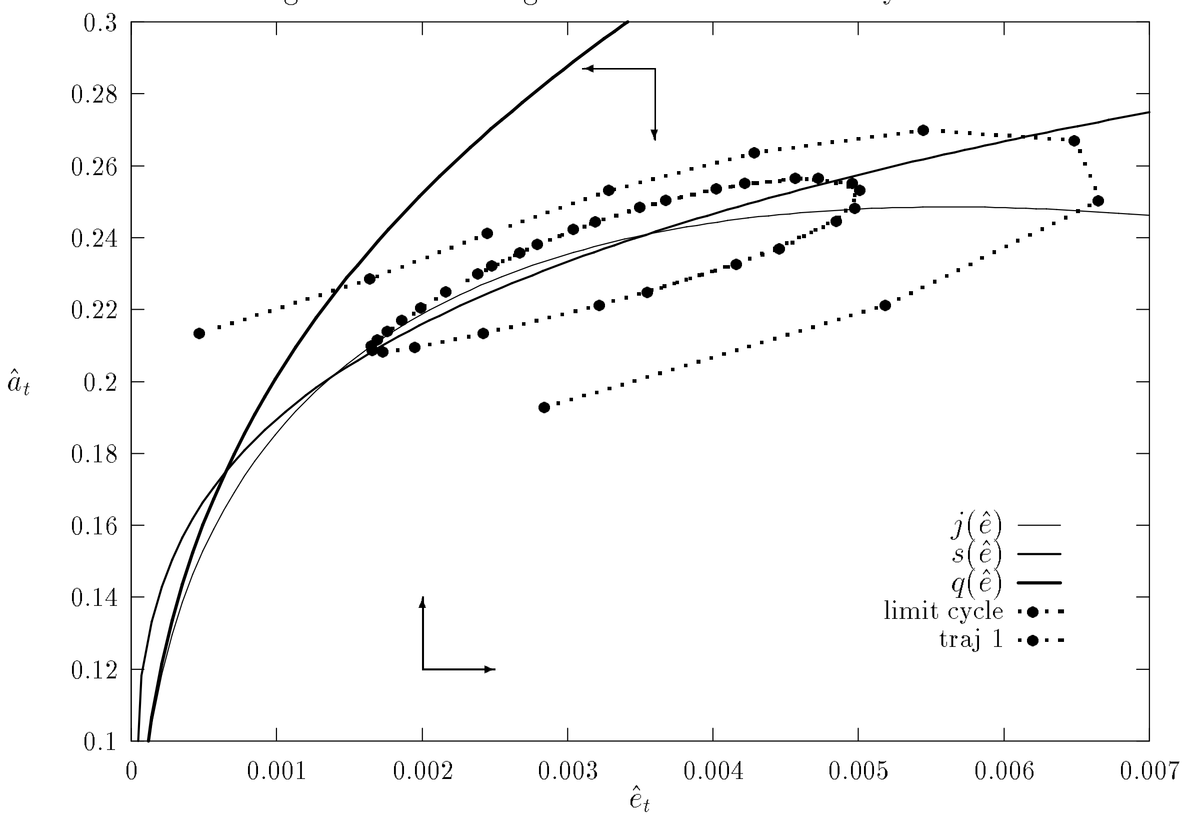
2.4 Discussion

Obvioulsy, one implication of our model is the existence of a poverty trap: for some initial conditions, the economy is led to a low or no-growth steady state. This model

Table 2: *the unstable cycle*

γ	$\hat{a}$	$\hat{e}$	Eigenvalues	modulus	comment
0.001	0.2876	0.0271	$0.2243, 0.0014$	$0.2243, 0.0014$	stable node
0.480	0.2409	0.0035	$0.8585 \pm 0.4261i$	$0.9586, 0.9586$	stable spiral
0.482	0.2370	0.0032	$0.9176 \pm 0.3961i$	$1.0000, 1.0000$	Neimark-Sacker bif.
0.484	0.2312	0.0028	$1.0155 \pm 0.3179i$	$1.0641, 1.0641$	unstable spiral
0.48498	0.2235	0.0024	$1.2817, 1.0370$	$1.2817, 1.0370$	unstable node
0.48499	0.2226	0.0023	$1.3525, 1.0000$	$1.3525, 1.0000$	fold bifurcation
0.485	N.A.	N.A.	N.A.	N.A.	no fixed points

Figure 3: Phase diagram: the unstable limit cycle



could thus explain differences in income levels and growth rate across countries in terms of (slight) differences in fundamentals and initial conditions. The difference with the existing literature on the subject, surveyed by Benhabib and Gali (1995), is that the initial conditions include, in addition to the standard levels of human and/or capital stock variables, an initial level for the stock of norms/aspirations. This model implies that the economies will be divided into two classes as a function of their initial combination of aspirations - human capital: one class experiencing a positive growth rate (that may furthermore oscillate over time) and one class characterized by low or no growth. As our example shows, this dualisation may take place even if the initial distribution of initial conditions is concentrated. This is in accordance with the description of convergence proposed by Quah (1996) in which two converge clubs emerge with their own basin of attraction. The presence in one of our example of a repelling limit cycle reinforce the idea of small basins of convergence around endogenous growth stationary states. Notice that the picture proposed by Quah (1996) does not exclude the transition of a poor country to the club of the riches; in our model this would be explained by a favorable initial mix of aspirations and human capital in this poor country.

Finally, it is worth pointing two limitations of our approach. First, the way bequeathed tastes are formalized is a bit too drastic: children inherit aspirations, but parents do not care about their children. Presumably, such a spillover comes from social interaction which involves other forms of bequests. In this sense, this would resemble the habit formation literature (see e.g. (Abel, 1990)). If parents care about their children they may restrict consumption to induce their children to save more and avoid recessions. However, the non-negative bequest constraint could be binding. Second, since the initial conditions are crucial, we may wonder what kind of history can give rise to combinations in which aspirations are high but the stock of human capital is low. Was the economy perturbed by a huge shock, but still individuals did not adjust their aspirations ? A model with several countries and possible interactions between them through norms (envy) would be helpfull in this respect.

3 Conclusion

We have presented an overlapping generation model in which human capital accumulation is central to account for endogenous growth. One pecularity is that, in the growth process, a part of the human capital is transmitted from one generation to the other. In addition to human capital, children inherit life standard aspirations from their parents. This means that they evaluate their own consumption with respect to a baseline requirement which depends on their parents past consumption.

The presence of bequeathed aspirations changes significantly the dynamic properties of this endogenous growth model.

First, starting with too high aspirations or with too low education spendings can lead the economy to a poverty trap. This is consistent with the fact that an important number of countries seem to stagnate in low levels of economic development (Barro and Sala-I-Martin, 1995) and with the existence of growing income gap between certain economies that were similar at some points (Lucas, 1993).

Second, if the mechanism of bequeathed aspirations is strong enough, the economy is characterized by oscillations. Indeed, in a phase of expansion, there is one point at which the bequest in terms of higher human capital and wages is not sufficient to cover the bequest in terms of higher aspirations. This leads to a drop in savings to maintain the life standard and induces a recession. When the consecutive impoverishment is strong enough, aspirations have reverted to lower levels and savings may rise again, starting an expansion period. Depending on the relative strength of the two effects and on the current state of the economy compared to its stationary state, this process could either converge, or explode or lead to ever lasting cycles.

The above conclusions are based on an example and are not general. However, it appears clearly that the hypothesis of bequeathed aspirations, which does not seem us unrealistic, may have important consequences. Further work is needed to assess its influence, both theoretically and empirically.

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