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Endogenous labour supply, habits and aspirations

Discussion Paper n. 143

2012
Discussion Paper n. 143, presentato: settembre 2012

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Abstract

Motivated by the increasing literature on endogenous preferences, this paper investigates the implications of the introduction of habit and aspiration formation when labour supply is endogenous, in an OLG small open economy. In contrast with models with exogenous labour supply where aspirations always reduce economic performance, we show that in a model with endogenous labour supply greater aspirations lead to a higher long run savings and economic performance, through their impact on the labour/leisure choice.

Keywords  Endogenous preferences; Fertility; OLG model

JEL classification  J22; O41
1. Introduction

An increasing economic literature has recently analysed both the theoretical and empirical implications of the existence of endogenous preferences, in particular those displaying habits or aspirations. When habits and aspirations are formed, utility depends not only on the present and future consumptions, but also on a reference consumption level with respect which current own consumption is compared to, and it is given, in general, by a certain level of past consumption.

According to the economic literature, individuals form habits when utility of their current consumption depends also on their own past experience of consumption, while for an individual with aspirations, utility depends also on the consumption experience of his predecessors.

The implications of endogenous preferences on saving, capital accumulation and dynamic stability in overlapping generations (OLG) models have been investigated by many authors (e.g. De la Croix, 1996; Lahiri and Puhakka, 1998; De la Croix and Michel, 1999; Wendner, 2002, Artige et al., 2004; Alonso-Carrera et al., 2004, 2007; Abel, 2005; Nakata, 2007). Most part of this studies analyse separately either habits or aspirations, and all of them neglect the endogenous labour/leisure choice issue. So far the standard results of the above cited literature, based on fixed labour supply, have established a positive relationship between habits and savings and, thing more relevant for the purpose of the present paper, a negative relationship between aspirations and savings, as well resumed by De la Croix (1996, p. 91): “When aspirations are high compared with 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.” Things are sharply different if we introduce an endogenous leisure/labour choice: in this case, we show that as a consequence of greater aspirations savings are increased and labour supply is higher.

A discussion of the role of labour supply in evaluating the impact of endogenous preferences and in particular the effects of aspirations on long run savings in a small open economy is the object of this paper. Using an OLG model we want to answer the
following question: what are the effects of the interaction of habits and aspirations with the leisure/labour choice of individuals as regards economic performances?

For obtaining manageable results, we focus on the usual case, in which the utility function is assumed to be logarithmic in consumption and linear in leisure and the production function is assumed to be logarithmic as well. For steady state results, the effects of greater aspirations can be summarised as follows: (i) domestic savings increase, (ii) labour supply increases, (iii) national output increases\(^1\) and in this sense the effect on economic performance may be considered as positive.

The intuition lying behind the previous results is the following: higher aspirations for young people imply higher young consumption, which in turn implies, owing to the presence of habits, a higher consumption reference for old people. This means that savings required for sustaining the increased desired old consumption is increasing with higher both habits of old people and aspirations of young people. Therefore when labour supply is exogenously given, also the income to be used either for consumption or for savings is given and cannot be altered by individuals’ choices, and then the higher young consumption for accomplishing with the higher aspirations of young people always leads to a reduction rather an increase in savings, despite the need of also sustaining a higher old-age consumption induced by habits formed by the old people. By contrast, when leisure is valued and the labour supply may be endogenously chosen, then a contemporaneous increase of both young-age consumption (satisfying a higher aspirations intensity) and savings (needed to satisfy a higher consumption reference for old people) as a consequence of an increase in the aspiration intensity may occur thanks to a reduction in the leisure time and a rise in working time. Since consideration of a labour/leisure choice is a generalization of the standard OLG model, then we may argue that the effect of the aspiration intensity on long-run savings is generally always positive, and the conventional view holds only for the special case of fixed labour supply. Moreover an increase in labour supply has a twofold positive effect on domestic

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\(^1\) This occurs as a consequence of the increased labour supply, through two channels: the first one directly through the increased labour input in production, the second one indirectly through the higher stock of installed capital owing to the increased marginal productivity of capital induced, in turn, by the same increase in labour supply.
production: directly because the labour input is augmented, and indirectly because the installed capital is increased owing to the higher marginal productivity of capital induced, in turn, by a higher labour supply. Therefore, we conjecture that also the effect on foreign debt is positive but for ascertaining this it needs to assume a specific technology and to investigate whether and how the positive effect of the increased labour supply on the affluence of foreign capital is lower than the positive effect on domestic savings. The same reasoning holds as regards the welfare analysis of the effects of greater aspirations. These issues are left for future research. Overall, it follows that both higher savings and labour supply imply that greater aspirations play a positive role on the economic performance. This finding seems, to the best of our knowledge, rather novel in the OLG growth literature and shed a new light on the role played by endogenous preferences on long run savings, the labour supply and ultimately on the economic performance.

The remainder of the paper is organised as follows. Section 2 presents the model and the main steady-state results, as regards the cases of both exogenous and endogenous labour supply. Section 3 concludes.

2. The model

2.1. The production sector

The production sector in a small open economy context is the following: we assume (i) a constant-returns-to-scale production function – which is constant through time, twice continuously differentiable, strictly monotonic increasing and concave, and satisfies the Inada condition; (ii) the output produced at time $t$, $Y_t$, is: $Y_t = G(K_t; L_t) = L_t g(k_t, 1-l_t)$, with $k_t = K_t / N_t$, where $N_t$ is the number of individuals in working age, $K_t$ and $L_t = (1-l_t)N_t$ are the capital and labour employed at time $t$; (iii) the economy is perfectly competitive so that production factors are paid their marginal product: $1+r_t = g'(k_t, 1-l_t)$, and $w_t = g(k_t, 1-l_t) - k_t g'(k_t, 1-l_t)$, where $1+r_t$ is the gross rate of return on physical capital and $w_t$ the wage rate per efficiency unit of labour.
For simplicity we suppose that the world rental rate is fixed at a level \( r \). Since the small economy allows unrestricted lending or borrowing, its rental rate is set equal to the world rental rate, \( r \). Therefore, the wage rate is treated as constant over time.\(^2\)

2.2. Individuals with fixed labour supply

First, we consider the case of exogenously given labour supply, which is assumed to be constant and normalised to unity. Moreover we assume also that the working population is constant and normalised to unity. Agents are assumed to belong to an overlapping generations structure with finite lifetimes, and life is separated into two periods: youth and old-age (Diamond, 1965). Individuals belonging to generation \( t \) have a homothetic and separable utility function defined over young-aged and old-aged consumption, \( c_{1,t} \) and \( c_{2,t+1} \), respectively, which, as usual for having more manageable solutions, is assumed of the Cobb-Douglas-type. In the first period they work and receives wage income at the competitive rate \( w_t \), which is used to finance current consumption and savings. During old-age agents are retired and live on the proceeds of their savings (\( s_t \)) plus the accrued interest at the rate \( r_{t+1} \). Moreover, we suppose old individuals survive to the second period with (constant) probability \( 0 < \pi < 1 \). Therefore, the existence of a perfect annuity market implies old survivors will benefit not only from their own past saving plus interest, but also from the saving plus interest of those who have deceased.

As regards habits and aspirations, we will assume that in each period individuals derive utility from the comparison of their consumption with a consumption reference. This consumption reference will be given, during young age, by the aspirations consisting in the past consumption inherited from own parents at the corresponding young age, and, during old age, will be determined by the consumption level they have reached in the previous period.

Furthermore, following the most part of the authors, such as, for instance, Lahiri and

\(^2\) It is worth noting that individual savings are no more relevant for determining capital and output, but only for the balance of payments. A balance of payments analysis is beyond of the scope of the paper.

Thus, the representative individual born at time $t$ is faced with the following programme:

$$
\max_{t_i} U_t = \ln(c_{1,t} - qc_{1,t-1}) + p \beta \ln(c_{2,t+1} - \nu c_{1,t})
$$

subject to

$$
c_{1,t} + s_t = w \\
c_{2,t+1} = \frac{1+r}{p} s_t
$$

where $r$ is the expected interest rate, $c_{1,t-1}$ is the past consumption inherited from own parents when they were in young age, $0<\nu<1$ and $0<\gamma<1$ are a measure of the intensity of aspirations and habits, respectively, and $0<\beta<1$ is the subjective discount factor.

Maximisation of programme (P) gives the following savings function:

$$
s = \frac{\pi w[(1+\beta \pi (1-q))\gamma + \beta (1+r)(1-q)]}{(1+r+\gamma \pi)(1+\beta \pi (1-q))}.
$$

**Result 1.** Savings are increased by stronger habits and reduced by greater aspirations.

Result 1 straightforwardly follows by differentiating Eq. (2) with respect to the habit parameter

$$
\frac{\partial s}{\partial \gamma} = \frac{pw(1+r)}{(1+r+\gamma \pi)^2 1+\beta \pi (1-q)} < 0
$$

(3)

and the aspiration parameter,

$$
\frac{\partial s}{\partial q} = -\frac{q pw(1+r)}{(1+r+\gamma \pi)(1+\beta \pi (1-q))^2} < 0
$$

(4)

The economic intuition behind Result 1 is that: (i) an increase in the habit intensity increases the amount of old-age consumption because a stronger preference for habits
reduce the overall utility accruing from early consumption, and since a higher old-age consumption can be achieved by means of an increasing saving rate, the amount of savings always increases; (ii) an increase in aspiration intensity drives young adults to increase their current consumption, causing a reduction in savings.

To sum up, greater aspirations reduce, as expected, the saving rate and thus the economic performance. These findings are in accord with the previous literature.\(^3\)

2.3. Endogenous labour supply

In this section we extend the preceding model assuming that the working time, \(l\), (as a fraction of the endowment of time normalised to one) is endogenously chosen by the young people.

Thus, the representative individual born at time \(t\) is faced with the following programme:

\[
\max_{(c_t,l)} U_t = \ln(c_{1,t} - qc_{1,t-1}) + p\beta \ln(c_{2,t+1} - y_{1,t}) - \lambda l, \quad (P1)
\]

subject to

\[
c_{1,t} + s_t = wl_t, \\
c_{2,t+1} = \frac{1 + r}{p}s_t
\]

where \(\lambda>0\) is simply a taste parameter that determines the importance of the disutility of labour.\(^4\)

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\(^3\) For instance, as regards the role of aspirations, de la Croix (1996, p. 91) argues 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 with 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.»

\(^4\) The introduction of the disutility of labour in a linear way, for obtaining clear-cut analytical results, is rather usual, e.g. Sommacal (2006).
Maximisation of programme (P1) gives the following fertility and savings functions:

\[ s = \frac{wp[(1 + \beta p(1 - q))\gamma + \beta(1 + r)(1 - q)]}{\lambda(1 + r + \gamma\pi)(1 - q)} \]

(6)

\[ l = \frac{1 + \beta p(1 - q)}{\lambda(1 - q)} \]

(7)

Eq. (7) reveals that, if the total endowment of time is normalised to one, for ensuring economic meaning to the \( l \) variable (i.e. \( l \leq 1 \)) the following technical condition has to hold:

\[ \lambda > \beta p + \frac{1}{1 - q} \]

(8)

From Eq. (7) the following results hold:

**Result 2.** 1) labour supply is not affected by habits; 2) aspirations increases fertility.

While the part 1) of Result 2 is self-evident by the simple observation of (7), part 2) is easily derived from:

\[ \frac{\partial l}{\partial q} = \frac{1}{\lambda(1 - q)^2} > 0 \]

(9)

In particular, from Eq. (9) we observe that the higher is the existing level of aspirations and the less painful is the work time, the more prolonged the work time chosen is.

As regards the effects of endogenous preferences on the long-run savings, the following result holds:

**Result 3.** 1) savings are positively affected by habits; 2) greater aspirations always increase savings.

Result 3 straightforwardly follows by deriving Eq. (2) with respect to the habits parameter

\[ \frac{\partial s}{\partial \gamma} = \frac{pw(1 + r)}{\lambda(1 + r + \gamma^2)(1 - q)} > 0 \]

(10)

and the aspirations parameter
\[
\frac{\partial s}{\partial q} = \frac{p\, w}{\lambda(1 + r + \gamma)(q - 1)^2} > 0 \quad (11)
\]

The novelty of Result 3 is that greater aspirations always increase savings. Moreover, note that if habits are absent, aspirations always reduce savings.

Moreover, from Eq. (11) we observe that the larger the existing level of aspirations, the future discount factor and longevity are, the more intense is the positive response of savings to greater aspirations. This means that an increase in the aspiration intensity could raise savings in a more significant way in developed rather than in either developing or less-developed economies.

To sum up Result 3 overturns the conventional view (i.e., Result 1) as regards the role of greater aspirations on long run savings and thus economic performance. Such a sharp contrast depends on the possibility of a leisure/labour choice: when such a choice is allowed, individuals response to the formation of greater aspirations by increasing both labour supply and savings, thus providing a twofold engine for enhancing the long run economic performance.

### 3. Conclusions

This paper, motivated by the increasing literature on endogenous preferences, has investigated the interaction of habit and aspiration formation with the endogenous determination of labour supply, in an OLG small open economy. According to the conventional view emerging from the previous literature in models with exogenous labour supply, aspirations always reduce economic performance. Our results show, in contrast with the previous literature, that greater aspirations always increase the economic performance through a twofold positive effect on the capital accumulation and on the individual work time.

In particular, the proposed model found in the standard labour/leisure choice the mechanism through which individuals with greater aspirations are able to increase not only young consumption but also the saving rate thanks to a sufficient increase in the working time. The value added of our results is that, since the labour supply is generally
endogenously chosen, then aspirations can be considered, also as regards policy design, as an engine instead of a restrain for savings and economic performances. Therefore this study may be considered a contribution to the literature on economic growth of a small open economy generalising previous studies with endogenous preferences. Finally, we note that for getting some analytical insight on the role played by the interaction of endogenous preferences with labour/leisure choices we assumed a simple, although usual, utility function and focused only on the small open economy context: an extension to more general utility functions as well as a closed economy context may be useful for checking the robustness of our findings. Moreover this paper focused only on a “positive” point of view, although aspirations might generate an intergenerational taste externality also requiring a “normative” analysis. This represents a promising direction of our future research agenda.

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