NOTA ECONÔMICAS

ARGENTINO PESSOA
MULTINATIONAL CORPORATIONS, FOREIGN INVESTMENT, AND ROYALTIES AND LICENSE FEES: EFFECTS ON HOST-COUNTRY TOTAL FACTOR PRODUCTIVITY

ORLANDO GOMES
TIME PREFERENCE AND CYCLICAL ENDOGENOUS GROWTH IN AN AK GROWTH MODEL

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A REFORMA DE 2007 DO SISTEMA PÚBLICO DE PENSÕES EM PORTUGAL – UMA ANÁLISE CRÍTICA DAS ESCOLHAS NORMATIVAS IMPLÍCITAS
### Time Preference and Cyclical Endogenous Growth in an AK Growth Model

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**resumo**

O artigo desenvolve um modelo de crescimento endógeno tipo AK com uma taxa de preferência intertemporal endogenamente determinada. Seguindo a literatura relacionada com este tema, assume-se que o grau de impaciência revelado pelo agente representativo, no que respeita ao consumo futuro, depende do rendimento. Para ser preciso, o modelo proposto estabelece uma relação entre o hiato do produto e a taxa de desconto associada à sequência futura de funções de utilidade. São analisadas quer a dinâmica local quer a dinâmica global. Do ponto de vista da análise local, vários resultados de estabilidade podem ser obtidos, dependendo dos valores de parâmetros. O estudo de dinâmica global permite encontrar ciclos econômicos endógenos na circunstância em que o agente representativo não considera um requisito fundamental de optimilidade. Numa segunda etapa, o modelo é alargado ao papel do lazer e, neste caso, as flutuações endógenas já serão compatíveis com um cenário de completa racionalidade.

**résumé / abstract**

Cet article développe un modèle de croissance endogène de type AK avec un certain niveau de préférence intertemporelle déterminée endogènement. Dans la littérature se rapportant à cette question, en ce qui concerne la consommation future, il est supposé que le degré d'impatience manifesté par l'agent représentatif dépend du revenu. Pour être précis, le modèle propose d'établir une relation entre l'intervalle du produit et le taux d'escompte associés à la séquence future de fonctions d'utilité. Sont analysées à la fois la dynamique locale et la dynamique globale. Du point de vue de l'analyse locale, plusieurs résultats de la stabilité peuvent être atteints, selon les valeurs des paramètres. L'étude de la dynamique globale permet de trouver des cycles économiques endogènes, quand l'agent représentatif ne tient pas compte d'un principe fondamental de rationalité. Dans une deuxième étape, le modèle comprendra aussi le rôle des loisirs et, dans ce cas, les fluctuations endogènes sont déjà compatibles avec un scénario complet de la rationalité.

The paper develops an AK endogenous growth model with an endogenously determined rate of intertemporal preference. Following some of the related literature, we assume that the degree of impatience that is revealed by the representative agent, regarding future consumption, depends on income. To be precise, the proposed framework establishes a link between the output gap and the discount rate attached to the sequence of future utility functions. We analyze both local and global dynamics. From a local analysis point of view, a variety of stability results is possible to obtain, depending on parameter values. The study of global dynamics allows finding endogenous business cycles in the circumstance in which the representative agent overlooks one essential requirement for optimality. On a second stage, the model is extended to include the role of leisure and, in this case, endogenous fluctuations are compatible with full rationality.

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**Classificação JEL:** O41, C61, E32.
1. Introduction

The paper studies the implications of assuming an endogenous rate of time preference when assessing the dynamics of a simple AK endogenous growth model. The proposed setup is developed in discrete time and takes, as the central assumption, the dependence of the utility discount rate on the economy’s output gap. We consider that a representative agent chooses her rate of time preference by evaluating how the economy performs relatively to a potential output time trend. Typically, one should expect a low discount rate when the economy performs well (the representative agent becomes more patient) and a high discount rate when the economic performance falls short of its potential (impatience rises).

The model has its inspiration in earlier studies concerning endogenous time preference and growth, in the tradition of Uzawa (1968) and Epstein (1987). Three features distinguish our model from other approaches. First, we focus solely on endogenous growth, i.e., relevant variables (output, capital and consumption) will grow at a same constant rate in the long term (see Dolmas, 1996, Drugeon, 1996, and Palivos et al., 1997 for alternative approaches to the endogenous growth – endogenous time preference analysis).

Second, we concentrate solely on the role of output as an influence over the way the future is discounted. Typically, consumption is the central variable, i.e., the discount rate is influenced by the level of consumption; this relation tends to have a positive sign, that is, individuals tend to become increasingly impatient (higher discount rate) with a rise in the present level of consumption. Here, we neglect consumption and take income as the single determinant of the discount rate. In this respect, we follow relevant empirical work by Hausman (1979), Lawrance (1991) and Samwick (1998), who study the relation between utility discounting and income levels; they unanimously agree that the evidence strongly points to a rate of time preference that varies inversely with the agent’s income. Building on this evidence, Becker and Mulligan (1997) develop a model where the positive relation between wealth and patience is explored.

Third, we are not directly concerned with the level of income, but with a relative measure: we consider that the discount rate is a function of the output gap. Thus, our focus is not on the statement ‘the wealthier are more patient’ but with the idea that ‘if my present level of wealth is above the expected / potential level, then I am more patient’. This seems a reasonable perspective, in the sense that the representative agent reacts to business cycles and formulates a subjective appreciation of the value of future consumption on the grounds of a more or less optimistic view of the future, which is given by a comparison between effective and potential output. Therefore, a two step procedure is adopted: first, the agent evaluates how the economy performs and this has impact over her sentiment or confidence to the future; second, optimistic sentiment tends to be translated on a more patient attitude towards consumption, while a pessimistic sentiment will lead to a more pronounced impatience. All things considered, we might say that our assumption is basically that patience is procyclical.

The idea that patience is procyclical is also present in Meng (2006), who develops a model of a socially determined discount rate. Under his analysis, indeterminacy is found when, in a single agent intertemporal utility maximization problem, the agent becomes more willing to defer consumption as a result of an increasingly wealthier economy. The indeterminacy result arises if along with the previous living standard – patience relation, it is also established a positive relation between the value of the discount rate and the economy wide level of consumption. Besides the indeterminacy result, the referred relations also allow to measure how lifetime utility is influenced by society. If one takes as reasonable the idea that individual patience rises with aggregate income and falls with aggregate consumption, then it is straightforward to perceive that the agent’s lifetime utility rises when the economy becomes wealthier and falls when average consumption rises. In the words of Meng (2006),