



A Mathematical Model for the Study of the Effects of the Economic Cycle on the Real GDP Growth Rate through the Expectations-Adjusted Phillips Curve

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ABSTRACT

In this paper is presented a theoretical model finalized to explain the effects of the economic cycle on the real GDP growth rate of a given country's economy towards a selected business partner. In other words, the present paper expose an innovative theoretical model, based on the expectations-adjusted Phillips Curve and on the Okun's law, which proposes the existence of a relationship between the difference in the effective inflation rate and in the expected inflation rate of the national economy of a generic country (inflation gap), and the growth rate of the real GDP of the national economy and of its corresponding commercial partner, both determined by the different phases of the economic cycle. The two economies examined, for the purpose of empirical verification, are Germany and the group of the countries belonging to the euro area, considered, as a whole, as a single economy. The under exam sample period ranges from the first quarter of 1999 to the first quarter of 2018. The result to which the authors arrive, appropriately verified with econometric models, indicates not only the existence, the significance and the robustness of the relationship established by it but also the ability of the model to predict, with good precision, the effects of the economic cycle on the real GDP growth rate, given the inflation gap.

Keywords: Expectations-adjusted Phillips Curve, Okun's Law, Business Cycle, Mathematical Models and Methods

JEL Classifications: C02, C32, E32, E37

1. INTRODUCTION

The international economy offers numerous theories to explain the effects of some variables, such as the nominal exchange rates, the interest rates and the inflation rates, on the competitiveness of a certain economy towards its partners. Most of these theories has been proposed in the literature during the XX century and has found wide diffusion in the academy thanks to their ability to explain rather exhaustively many phenomena of the economic reality for which adequate interpretations did not previously exist. Today these continue to be object of criticism and of research activity in order to perfect and to update them to the structural changes that have interested the economic systems during the time.

One of the main variables that influences the competitiveness of a certain economy, compared to the others, is the variation of the general price level, and that is, the inflation rate. Among the macroeconomic relations that involve the rate of inflation, the one of greatest interest for the academic community and for the political decision-makers is certainly the relationship, universally known as the "Phillips Curve," which, exposed for the first time by the New Zealander economist Phillips (1958), links the nominal salaries to the unemployment rate.

The Phillips's studies were taken up by Samuelson and Solow (1960), who, studying the period between 1934 and 1958 for the United States of America, explicated an inverse relationship between the inflation rate and the unemployment rate: for the