Belief and Deterministic Randomness in a One-Sector Discrete Time Optimal Growth Model: The Case of Hong-Kong

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Abstract

It is now well established that fears or arbitrary beliefs may become self-fulfilling economic prophecies. Given the oscillatory behavior displayed by the Hong-Kong economy since 1985, a constraining exogenous belief is modelled into a one-sector discrete time optimal growth model, which purports to mimic capital accumulation there. It shows that revisions of agents' expectations, stemming from that belief, suffice to change the nature of the equilibrium point from fixed points to limit cycles of every integer period. In fact, as the real or imaginary but credible constraint is being approached, the economic system begins to display totally aperiodic trajectories which are indistinguishable from the realization of a stochastic process.

I. Introduction

During the decade preceding 1985, the Hong-Kong economy grew in nominal terms at a yearly average rate of over 40%. This extraordinary performance came to an abrupt stop in 1985, and is fluctuating since 1. More specifically, in real terms, the rate of growth of the Gross Domestic Product in 1985 was zero. In 1986, investment outlays rose by some 7%, exports by 16%, the rate of unemployment declined by about 1/3 to 2.2%. The inflation rate rose somewhat, but GDP grew at 11.1%. In 1987, private consumption jumped 16%, fixed investments by 30%, exports by 37%, the unemployment rate fell to 1.8%, GDP grew by 13.6%. In early 1988, only a 6% rate of growth was forecasted, but there has been in the meantime a feverish attempt by people and capital to

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emigrate. In 1989, mostly after the political events in China, there is a legitimate fear that the economy might go into a tailspin.

Clearly, these ups and downs in economic performance cannot be explained solely by the Government’s monetary policy. It should be recalled that in 1985, the Hong-Kong dollar was officially linked to U.S. dollar. It was then argued in some quarters that the zero growth rate in 1985 was due to a loss of price competitiveness of Hong-Kong’s goods in non US markets as the exchange rates of both currencies rose to high levels. However, 1985 was also the year when the Agreement (between the UK and China) to return the whole of Hong-Kong to China in 1997 was ratified. As one observes the obvious correlation between the approaching deadline, recent political developments in China and price movements in the H-K property market, the gigantic swings in the Hang Seng Index and the outward flow of people and investments, it seems more likely that the explanation has more to do with agents’ expectations. Anyway, this is what will be argued below.

Indeed, there now exists an extensive literature on how revisions of agents’ expectations, based on exogenous beliefs, can generate economic fluctuations (e.g. Shell, 1977; Cass and Shell, 1983, Azariadis and Guesnerie, 1986, among others). Further, and despite some counterclaims to that effect, it has been shown that such phenomena may occur in economies with capital accumulation and infinite lived agents (Guesnerie, 1986; Woodford, 1986). However, here it is not a question of how expectations are formed nor of sunspot equilibria per se. The objective is much more modest. That is, suppose, after abstracting from the real world complexities, it is admitted that the growth path of the H-K economy is describable by a simple neoclassical discrete time optimal growth model\(^2\). Then it suffices to introduce to that formulation a growth inhibitive factor, expressed in the form of an exogenous constraining belief, to surprisingly explain more realistically the observed violent swings in economic performance.

Such an approach is partly justified by the fact that difference equations are more appropriate tools for growth analyses, and partly due to the ease with which it can be demonstrated that the closer the economy gets to a given reckoning date, the more chaotic is its behavior. As it will be shown below, this last point is the crux of our thesis.

\(^2\) Of course such a formulation is predicated on a few additional assumptions, namely price and interest rate flexibility, linearly homogeneous technology, and full employment of resources. But the H-K capital market is free and well developed, and in 1987, the unemployment rate of labor was only 1.8%. As there is no reason for not assuming a Cobb-Douglas technology, the necessary conditions seem to be met.