WHEN ECONOMIC DEPRECIATION IS NON-GEOMETRIC, THE COST OF ASSETS IS NON-GEOMETRIC?

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ABSTRACT

This paper extends the Q-theory of investment to capital product with arbitrary potency profiles. Once potency is non-geometric, the firm's capital stock and also the cost of its assets are essentially totally different aggregates of the firm's investment history. If capital product has constant potency over a finite helpful life, easy proxies are promptly offered for each the cost of assets in situ and capital stock. Underneath this assumption, we have a tendency to decompose the full investment rate on 2 dimensions: into its web and replacement parts, and into its money and non-cash parts. We have a tendency to show these parts exhibit considerably totally different economic determinants and behavior. Most assets are in hand by the firms that use them, in order that the costs and volumes of capital services don't seem to be directly discovered. Growth accountants use mensuration models for imputing values to those variables. They construct each productive stocks – that's, stocks of assets expressed in new equivalent units – and web stocks – that's, stocks of assets valued at second-hand costs. The volumes of capital services are taken proportional to the productive stocks. Internet stocks yield the amounts of depreciation and of interest on the cash endowed, which are the prices of owning and exploitation, the assets for one year. The imputed rental costs simply cowl these prices.

Keywords: Stocks, Geometric, Economic.

INTRODUCTION

Productive and net stocks are constructed from time series of investment with the Perpetual Inventory Method (PIM): From one year to the next, investments are added to the stocks, losses of efficiency or value are subtracted. An asset loses efficiency through wear and tear as it ages, a physical process called decay. Concurrently, the asset loses value, a nominal process called depreciation Fraumeni (1997). Decay and depreciation are dual notions, linked through the assumption that the price of an asset equals the present value of the future stream of the asset's rental prices.

The simplest and so most well-liked PIM assumes geometric decay: Assets loose a relentless fraction of their efficiency in annually, until the tip of your time. As is well-known, geometric decay implies geometric depreciation, and vice versa; the decay rate equals the charge per unit. Though the productive stock and also the web stock square measure totally different notions, their numerical values square measure identical within the geometric model. As a result of the charge per unit of associate degree plus is constant, freelance of the assets age, the typical charge per unit of the stock of assets the typical charge per unit for brief is adequate this rate. The imputed rental worth equals the value of a replacement plus times the total of the important rate of come back and also the average charge per unit Hulten & Wykoff (1981). This expression is convenient as a result of it provides the split of the rentals into depreciation and also the web come back to capital. None of those results is true for the other PIM.

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For any non-geometric age efficiency profile and its dual age-price profile, the decay rates and depreciation rates are age specific. Define the mean depreciation rate as the depreciation rate averaged across an asset's service life. In general, the mean depreciation rate, which is a constant, differs from the time-varying average depreciation rate. The exception occurs in the steady state with zero growth of investment Jorgenson & Griliches (1967). In a growing economy, however, the average rate will deviate systematically from the mean rate. Still, whatever the form of the age-price profile, in a stable environment the average depreciation rate tends to a stable value, where the discussion concerns decay Kanas (1997). Stability of the average depreciation rate is a sufficient condition for a model with geometric depreciation of the stock of assets to be a good approximation to a world with non-geometrically depreciating assets (Schreyer et al., 2003).

CONCLUSION

The hyperbolic model may be extended with distributions of the service lives per asset type. In such a model, assumptions about (mean) service lives, survival functions and efficiency losses due to wear and tear have a natural place. If deemed too sophisticated for application, this model may still be used for generating a set of informed guestimates of average depreciation rates also dependent on the growth rates of investment to be used as parameters in geometric models.

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