



Emerging Markets Queries in Finance and Business

A model to estimate macroeconomic parameters for growth in EU

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Abstract

A main problem for macroeconomic studies continues to be the estimation of capital stock and some derived indicators like coefficient of capital, depreciation rate, etc. In this way we are proposing a simple and intuitively model in order to estimate such basic macroeconomic indicators but avoiding to knowing the amount of capital stock. By applying a simulation model in case of European Union data for a set of periods, we obtained some relevant result. One of them is referring to the negative impact of last global crisis on the coherence of a classic type model. Such model is adequate mostly for a period of continuous increasing in GDP as it was for EU during the period 2000-2007.

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1. Introduction

There is a long period of debating on how are included variables or factors in a production function and more important how they are evaluated based on available statistical data. Most of studies are coming from the classical theory initially developed by Solow (1957). Using basic variables and parameters in so-called classic model of economic growth a number of significant derived indicators were considered. Last years, under the impulse of the Conference Board (CB) meetings (and especially since 2008, when an annual global economic outlook starting to be published), some significant progress was registered. Last one is including projections for

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the medium term, 2013-2018, and for the long term, 2019-2025 (Chen et al, 2012). The supporting of limited but comparable data is already offered from long time ago by the Penn World Table (PWT). PWT is a standard source of data on real GDP across countries. At present, the last version (version 8) of PWT is already prepared by experts from the University of California, Davis and the University of Groningen, continuing the input from research made at the University of Pennsylvania. Using prices collected by the International Comparisons Program (ICP) and constructing PPP (Purchasing Power Parity) exchange rates, this version (like in version 7), is based on the 2005 benchmark. However, version 8 is developing previous versions of PWT in some significant aspects. Thus, there are changes to the measurement of real GDP that will be incorporated in this “next generation” of PWT (Feenstra et al, 2013). Despite of progresses in database, different opinions regarding the relevance of macroeconomic indicators related to stock of capital and its efficiency still exist. In order to avoid some ambiguity in estimating the amount of capital stock, we propose a simple model that, at least in case of a period of continuous growth in GDP, permits to simulate a classic type growth mechanism.

2. Empirical evidences in EU

According to the theory, investment in new fixed capital and in incorporated new technology is main factor of GDP growth. In a long term perspective, as income per capita is growing there are certain corresponding trends in case of some macroeconomic derived variables, as follows: coefficient of capital is increasing (or equivalent, efficiency of capital is decreasing), growth rate of GDP is decreasing, the amortisation (consumption of capital) is covering a higher proportion of total investment, etc.

As empirical evidence, using available data, we are presenting the spatial distribution in EU of some macroeconomic indicators usually regarded as being significant to describe the growth mechanism: GDP per capita (y) GDP growth rate (r), the investment share in GDP (α), computed as Gross Fixed Capital formation (including Acquisitions less disposals of valuables), and efficiency of investment (β). As graphical representation we are using stylised maps of EU, where LO is longitude (on its left side relating to the origin, 0 meridian, the Western longitude was changed in negative values) and LA latitude. In such stylised maps the two small island countries (Malta and Cyprus) were excluded from EU28 and the proportion between longitude and latitude was conserved like in geographical maps.

For a set of selected indicators we computed the annual average levels by countries in the last two decades (detailed computed data are presented in Appendix). In Fig. 1(a), first map of EU26, yM means GDP per capita, per year (in current USD), and in Fig. 1(b), second map of EU26, rM is annual GDP growth rate (as %). In Fig. 2, first map shows spatial distribution in EU26 of the investment share in GDP, αM (as %), and second map spatial distribution of investment efficiency, βM (as %), computed as the ratio between GDP growth and investment. On stylised maps of EU, like in geodesic maps, there are a number of contour lines, but transitions among regions are smoothed. Regions with darker colour mean lower level of indicators and those with lighter colour mean higher level of them.

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