

A (Schumpeterian?) Theory of Growth and Cycles

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- I have taken an historical perspective because I believe it helps us understanding the theoretical debate

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- 4 In spite of the very many efforts undertaken since the late 1970s we are still far from being able to study growth and cycles as outcomes of the same force within an integrated model
- 5 In my view this will become possible only if we start using non-stationary, high-dimensional models of technological innovation and imitation

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- Accumulation of Kapital driven by the return on K, which will eventually decline

- Social Planner's problem:

$$\max_{\{c_t, n_t, \ell_t\}_{t=0}^{\infty}} \sum_{t=0}^{\infty} \delta^t [u(c_t) + v(N - n_t)]$$

$$c_t + k_{t+1} = Y_t = F(k_t, n_t, \ell_t)$$
$$\ell_t \leq L.$$

- This is our "standard growth model" today ... it was also the Classical Growth Model
- It predicted convergence to a Stationary State, the Steady State

Steady State:

$$\text{For } \ell \leq L \text{ and some } n$$
$$u'(c) = \delta E u'(c) F_1(k, n, \ell)$$

Let us discuss and make sure we understand the conditions under which such SS exists

Classical Predictions - III

- The Stationary State is "stable" in the long run
- The Stationary State determines the level of N and of income per capita, depending on L
- Both L and N are essential in production and cannot be "substituted away"
- Growth in income per capita is bounded, while total income may grow (Natural and Warranted Growth Rates)

Understanding the Classical Predictions

- To do this we will use the black (well, white) board
- Use a CES Production function

-

$$Y = A(L)[aK^\rho + (1 - a)n^\rho]^{1/\rho}$$

- $A(L) > 0$ and bounded, $-\infty \leq \rho \leq 1$, $\rho \in [0, 1]$

Solow 1956 paper: re-discovering it

- Harrod-Domar and the instability of the market system
- Stability of the Stationary State
- Conditions for unbounded growth are in a footnote (number 5) of Solow 1956!
- Let's think about the meaning of $\rho > 0$ and substitutability

Back to 1911: Schumpeter's TED

- Empirical observation: the persistent growth we observe is NOT due to accumulation of K
- What is an "Innovation" from an economic point of view?
- Clearly the growth we observe is due to "economic innovation", which is almost continuous in a competitive system
- Innovations respond to economic incentive and, in turn, alter them

The Idea of "Balanced Growth" - John Von Neumann

- What would growth in a stationary economy look like?
- A primitive notion: an activity $a = (x_t, y_{t+1})$. Constant returns as an implication not an assumption
- What if different commodities have different growth rate, for given technology?
- Balanced growth: humans and rabbits.

Swinging around the Turnpike: Schumpeter's Theory of BC

- Constant technology + concavity + discounting \Rightarrow Turnpike
- But there are innovations and innovations push the economy away from the Turnpike
- Toward where? Well, toward a new, different Turnpike, obviously!
- It becomes then an empirical (historical) issue to measure the relevance of these two forces:
- *The pulling of the Turnpike or the pushing of Innovations?*

The Advent of TFP: from Ignorance to Panacea

- Why did we turn an aggregate measure of ignorance into a "theory" of everything the gods only know
- But we did. And this gave us the Macroeconomics of the last 60 years
- Fresh or Salty the waters are always alike: Steady State plus "random" shocks
- This is very practical, for writing papers ... quite useless to figure out what's going on

What did "New Growth Theory" Accomplish?

- It certainly brought the attention back to the determinants of growth
- It addressed a problem which had been solved between 60 and 80 years before
- It ignored the connection between innovation and economic fluctuations
- It provided a new story for getting on the Turnpike of Balanced Growth

The way I see it - Negatives

- Basically we do not understand the process of economic innovation
- What we understand about economic growth today is not much more of what was understood 50 years ago
- We have been barking at the wrong trees for decades
- The study of economic fluctuations and the study of growth are more separated now than in the 1970s
- We are obsessed with "policy prescriptions" and with "pleasing the constituencies"
- We build models backward: from policy conclusions to assumptions

The Way I see it - Positives

- We have got so much more data, especially micro, than in the past
=> study innovations at the micro level
- It is increasingly clear that growth and cycles are two sides of the same coin and are driven by the same forces
- Even if for the wrong reasons, the general recognition that factor shares do move over time should help us get rid of the worst virus affecting Macroeconomics worldwide: the *Cobb – Douglas Production Function*
- We have become much more capable than 30 or even 20 years ago to handle high dimensional Dynamic GE models