

Macroeconomics I. – Supplementary Materials

Economic Convergence

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Definitions and Types of Economic Convergence

Part I

Economic Convergence – Definition

- The idea that poorer economies should converge/catch-up/get closer to more developed economies
- It is a long-term process that requires decades (in the best case)
- **Various variables are being examined (no single definition)**
- The differences in production factor accumulation and mainly in productivity techniques is what separates the leading developed nations from the developed nations
 - The process of catching-up continues as long as the less developed nations have something to learn from the leading nations

Types of Economic Convergence

- Depending on the variables and indicators of their convergence (mostly absolute levels or changes), we distinguish between several approaches to convergence:
 1. Real convergence (mainly productivity)
 2. Nominal convergence (inflation or price levels)
 3. Maastricht criteria, etc.

- Moreover, for real and nominal convergence we distinguish between three sub-concepts:
 1. Absolute (unconditional) convergence
 2. Conditional (beta) convergence
 3. Sigma convergence

Real Economic Convergence

Part II

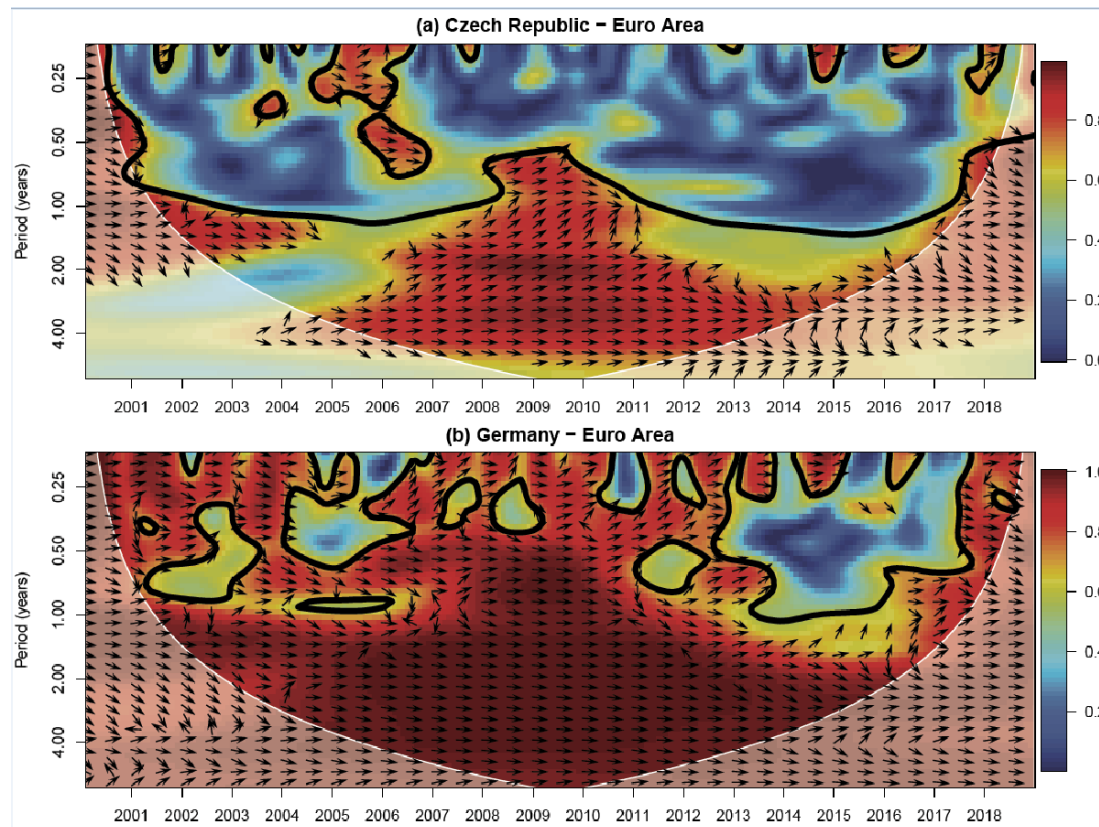
Real Convergence

— Various understandings:

- 1. Convergence of GDP per capita in the converging country's PPP to the reference territory**
- 2. Synchronisation of economic cycles of the converging country with the countries of the reference territory**
- 3. Increasing cohesion (cohesion) of individual countries (regions) within the given integration group**
 - I.e. economic, social and territorial
 - Reducing disparities between the regions

Synchronisation of Business Cycles

Wavelet Coherency Approach (Time-Frequency Analysis) – Index of Industrial Production



Simple correlations of GDP growths may be misleading

Real Convergence and the Research

- **Neoclassical growth model**
 - **Theoretical prediction that economies with identical or similar structural characteristics should converge in GDP per capita**
 - **= Process of real convergence**
 - Outlined in the 1950s, revived again in the 1980s
- **The model assumes that capital-increasing economies per capita will converge to a steady state and will show lower and lower economic growth rates per capita due to declining marginal product**
 - In the end, they should grow only because of exogenously given technological progress

Real Convergence and the Research

- **Real convergence means convergence of (absolute) economic level** of the country under comparison to the value of the reference country or to the value of group of countries
 - **I.e. narrowing the gap in economic levels**
- **In a broader context, narrowing the economic gap is seen in the context of a narrowing of the technology gap and adaptation of the production structure**

Absolute Convergence

- A hypothesis that all the economies should converge to **one permanent state** and their output growth should slow down over the time
 - I.e. the occurrence of the so-called **absolute convergence**
- It is a process in which countries converge to one steady state, regardless of the baseline and structural characteristics of economies
- However, it was not found in empirical studies for GDP growth
- **Among other things due to the fact that there are a large number of differences between economies**
(savings rates, population growth rates, capital wear, etc.)

Conditional Convergence

- **The assumption of a common steady state seems unrealistic:**
- In this case, we are talking about **conditional (beta) convergence**
 - **It corresponds to a situation in which countries with different initial levels of a given indicator (e.g. GDP) converge, but a single common state is not achieved if economies do not exhibit identical structural characteristics**
 - -> roughly similar economies should converge
 - In this approach, the so-called **beta and sigma convergence** is analysed

Conditional Convergence

- -> **It is necessary to examine relatively homogeneous units**
- Convergence is taking place and poorer countries are growing faster than wealthy in accordance with neoclassical theory only with some common constant factors
 - Demographic, economic, political and institutional
 - Moreover, the relative importance of these factors is constantly changing
- There also may be “**convergence clubs**” (groups of countries) where economies converge

Estimating Beta Convergence

— **Econometric specification for testing beta convergence:**

— Typical functional form:

$$\frac{1}{t} \ln(y_{i,t} - y_{i,t-n}) = \alpha + \beta \ln(y_{i,t-n}) + \gamma Z_{i,t} + \varepsilon_{i,t}$$

— Where:

- $\ln(\Delta y_{i,t})$ – explained growth differential between two entities
- α – steady state coefficient (if $\beta=1$ -> immediate leap to the steady state)
- **β – convergence coefficient**
- Z group of other factors supposedly affecting the growth rate

Estimating Sigma Convergence

- **Econometric specification for testing sigma convergence:**

- Various measures are used, e.g. standard deviation, coefficient of variation, or simple variance:

$$\sigma_{x_{ij,t}}^2 > \sigma_{x_{ij,t+n}}^2$$

-> **All countries converge to the same level => variability decreases**

- If there is Beta convergence, then Sigma automatically does, too
- **The two convergence concepts are closely related**

Factors of Real Convergence

- **Similar idea to the production function approach**
 - But here we are evaluating per capita measures
- **Two factors of real (per capita) convergence:**
 - 1. Higher (labour) productivity** (than in the reference country/group of countries)
 - For instance, because of better institutions, higher education etc.
 - 2. Higher rate of economic activity and employment rate**
 - As a result of, for example, demographic factors, increases in the share of working population to total population etc.

Nominal Economic Convergence

Part III

Nominal Convergence

- **Countries with lower economic level usually have lower price level**
 - In catching-up economies, labour productivity and wages are growing faster, and so their price level is gradually increasing with economic growth
- **Convergence of the converging country's price level to the reference territory through real exchange rate appreciation (exchange rate and inflation channel)**
- **A process in which price levels converge and affect basic economic indicators**

Nominal Convergence

- **Prices (or price levels) in the economy are changing over time due to:**
 - The occurrence of endogenous and exogenous shocks in the short or medium term
 - **Changes the economic level of the economy that are of a long-term nature (= Nominal convergence or divergence)**
- **There is no common (exact) understanding of nominal convergence:**
 - **Narrower concept:** only prices of goods and services
 - **Broader concept:** all prices in the economy (wages, pensions etc.)

Nominal Convergence

- Some people even refer to the **Maastricht convergence criteria**
 - It draws from it, but it is a slightly different concept
 - It is based on relative changes (price change), not on the absolute levels
 - When the changes are harmonised -> no convergence occurs

Inflation criterion: Shall not exceed the HICP reference value, which is calculated by the end of the last month with available data as the unweighted arithmetic average of the similar HICP inflation rates in the 3 EU member states with the lowest HICP inflation plus 1.5 percentage points.

Nominal Convergence

- As a result of the lower economic level, **price levels in less developed countries are also lower than in advanced economies**
 - Therefore, indicators converted using nominal exchange rates are "underestimated" when compared to indicators converted by purchasing power parities

Two methods of expressing the indicators of nominal convergence:

- 1. Variables in real terms in purchasing power parity**
- 2. Nominal variables (converted by exchange rate)**

International Comparisons

- Countries that are less economically developed usually have lower price levels because of lower price levels of non-market (generally non-tradable) goods and services
 - -> GDP expressed in nominal exchange rate is lower than in volumes (PPP)
 - Moreover, the market exchange rate is influenced by a number of demand and supply factors, including non-market influences (operations of central monetary and supranational authorities), which further distort recalculated values
- The conversion of national currencies and national prices to the common currency and comparable prices is done using conversion rates called **purchasing power parities**
 - Different approach to GDP comparison in volumes

Other Convergence Concepts

Part IV

Other Possible Convergence Concepts

- **Business cycle alignment**
- **Inflationary alignment**
- **Labour market alignment (flexibility)**
- **Financial markets alignment**
- ...



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