"Non-Convergence So far: Which Lessons from the US for Euro Area Re-Convergence?"

FP Mongelli (ECB and Goethe University), M. Nikiforos (Levy Economics Institute) and W. Semmler (New School for Social Research)

CompNET Conference: "Enhancing competitiveness and fostering sustainable growth: methodological issues and empirical results"
25th and 26th June 2015
European Central Bank, Press Centre
*Frankfurt am Main*

Introduction

We extend empirical tests of convergence versus divergence among US States and regions, to euro area countries. We use a hybrid/crossbreed methodology from the growth convergence literature that is based on Quah (1997) and others.

- **First**, we estimate the distribution of the relative per capita income using a stochastic kernel estimator to explore single peak or double peak distributions.
- **Second**, we assume that the evolution of the relative income follows a homogenous Markov process and we then derive the ergodic distribution of the Markov transition matrix as well as the long run steady state distribution, which is able to indicate a bi-model distribution
- **Third**, we test for a break and regime change in the data before and after the Global Financial Crisis/Great Recession and then the sovereign crisis of the euro area. The test is based on a Vector Smooth transition (VSTAR) model.
- **Fourth**, we ask how euro area countries would re-converge. We compare findings about distribution and convergence of relative income across US States and what lessons the US can provide for Euro Area re-convergence.
- **Fifth**, as to the long run, we introduce the role of two relevant factors for the change of competitiveness in the Euro Area: The development of technology and the real wage per employee. This allows us to discuss also the issue of wage convergence.

A model to look at convergence/divergence

The Brezis and Krugman (1993) model is:

$$\frac{A_2(0)}{A_1(x(T_2))} > \frac{w^*}{w} \quad \Rightarrow \quad \frac{A_2(0)}{w^*} > \frac{A_1(x(T_2))}{w}$$

Then using the Brock and Mirman (1972) stochastic growth Model:

$$\max_{u_t \in U} \sum_{t=0}^{N-1} \beta^t g(u(t)),$$

$$x_1(t+1) = x_2(t) A_1 x_1(t)^\alpha - u(t)$$
$$x_2(t+1) = \exp(\rho \ln x_2(t) + z_k)$$

and scaling the output equs. of two countries by the relative wage level, we get :

$$\frac{A_2(0)}{w^*} x(t)^\alpha > \frac{A_1(x(T_2))}{w} x(t)^\alpha$$

With w* the wage of the catching up country. We can observe that competitiveness is given by technology and wage level per unit of labor. We can write in short:

$$z_2 x(t)^\alpha > z_1 x(t)^\alpha$$

Where z_i refers to the ratio of technology to the real wage per unit of labor. The model above is then solved solved using NMPC (Gruene, Semmler and Stieler 2014) and the results are shown in the next figures

Preliminary evidence of convergence/divergence

Stochastic model, convergence, came technology /wage ratio red lines the shocks
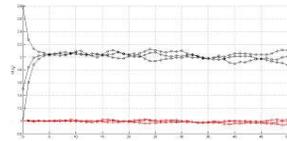
Stochastic model, non-convergence, different technology/wage ratio
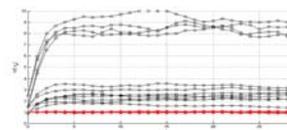
Note that when the technology is superior and/or the relative wage is lower, the country's competitiveness increases, exchange rates become favorable, trade account improves and external liabilities decrease. Yet it is not only relative wages that matter but also technology. So empirically, on would look at both factors, see below.

Some Preliminary Comparisons
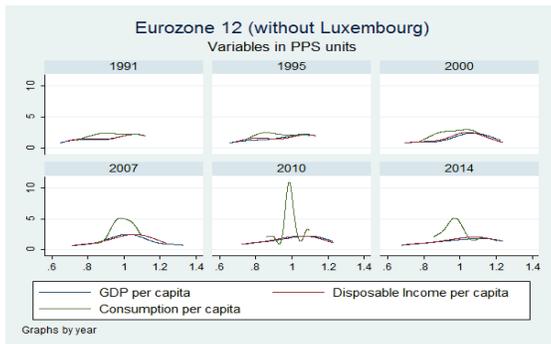
Some Preliminary Comparisons
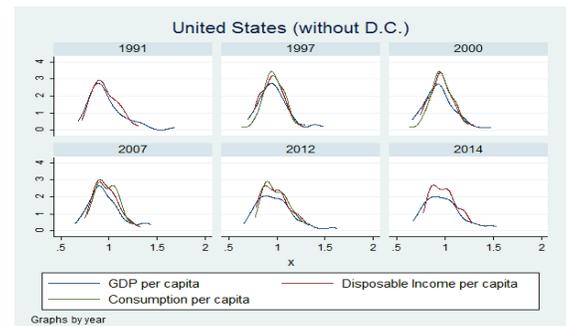
Findings – Euro Area: GDP, Disposable Income & Consumption

1. The distribution of the GDP per capita and disposable income per capita are very close over the whole period.
2. There is a convergence process which is interrupted by the crisis.
3. In the 1990s consumption also follows relatively closely the distribution of GDP and disposable income.
4. This changes upon the launch of the euro; we then see a rapid convergence of relative consumption. Much more rapid compared to GDP or disp. income.
5. This is a manifestation of the imbalances that were developed in the Eurozone after the adoption of the Euro.
6. The process of convergence reversed also in the case of consumption after the crisis.

Some Final Remarks and Ways Forward

- Kernel estimations show that in the EU there was convergence until the crisis 2008/9, then there was divergence and trends toward bi-modality with respect to major macroeconomic variables
- The Brezis and Krugman (1993) measure of long run competitiveness of EU countries show that technology (productivity) and real wage per employee have played a crucial role for catching up: Some countries gained (lost) competitiveness because of technology, some because of low (high) real wage increase.
- Though similar results holds across US states, wage convergence in the US took more than 100 years, but this was a result of technology and skill differentials, which only slowly showed convergence, mainly through fiscal federalism.
- The lack of fiscal federalism seems to point to a very slow wage and welfare convergence of countries and regions, since fiscal federalism for supporting human capital formation, federal R&D spending, educational and university standards and support is weak in the EU (though its partly done through the EU commission)