Scientific Research

The Eurozone 1999-2010 (Some Thoughts about the Long Term Dynamic Forces in the EMU)

Antonin Rusek

Department of Economics, Susquehanna University, Selinsgrove, USA
E-mail: *Rusek@susqu.edu*

Abstract

Detailed econometric analysis of the dynamics and variability of the 10 different economic variables is used to analyze the divergence-convergence processes in the Eurozone. These data, publicly available from the Eurostat and European Central Bank indicate that the current instability notwithstanding, in its first 11 years of existence the Eurozone was a reasonably cohesive political arrangement. However, significant cracks in its economic façade are clearly developing in the areas most important for the long run economic performances of individual countries – productivity and competitiveness. Unless addressed, these may constitute significant, and perhaps ultimate, threats to the Eurozone cohesion and perhaps to its existence.

1. Introduction

The objective of this paper is to analyze the long term dynamics of major economic indicators in the Eurozone. Today it is increasingly recognized that the divergences between the Eurozone member economies are at the root of the current crisis. But the dynamics of basic indicators during the common currency existence is seldom analyzed and compared, especially as far as fiscal, financial and competitiveness variables are concerned. This paper aims to contribute to fill this gap.

This paper is the step in this direction. Some historical and analytical perspectives of the Eurozone's performance are addressed in part 2. The methodological approach and data are discussed in part 3. Part 4 reports the empirical findings and part 5 concludes.

2. Eurozone in Historical and Analytical Perspective

The Eurozone (the group of countries using the common currency Euro) is, indeed, first and foremost the political creation [1]. Nevertheless, as an economic phenomenon the Eurozone is a subject of the economic analysis. Intellectually, the main tool for the analysis of currency unions is the Optimum Currency Areas (OCA) theory.

First postulated by the seminal work of Robert Mundell [2] and elaborated by Peter Kenen [3] and many others [4] the OCA considers the frequency and the nature of shocks impacting the individual countries as the one of major factors determining the success of a monetary union.

However, the application of the strict OCA criteria to the prospective Eurozone countries in the 1990's brought an unpleasant even if not unexpected surprise. Namely, the prospective European common currency area is not OCA [5].

This led to the development of the theory of an "endogenous OCA". This approach was originally based on the insights of Robert Mundell [6], who pointed out that in the real world the independent monetary policies, by attempting to influence exchange rates, are the major source of the observed asymmetric shocks. Hence, the simple act of the establishment of a common currency should bring the participating countries close to the OCA by eliminating the major source of asymmetric shocks. Moreover, Mundell argued that the establishment of the common currency area facilitates the liberalization of capital flows by eliminating the exchange risk for asset holders. This will tend to improve the asset allocations and to reduce the home bias of individual portfolios. But the more "cross country" the individual portfolios became, the more they can serve as a buffer (or an "insurance") against the impact of asymmetric shocks on individual incomes – hence again bringing the participating countries closer to an OCA.

In the run-up to the establishment of the Eurozone the Mundell ideas were expanded by Frankel and Rose [7], who, by the way, coined the term "endogenous OCA". In their analysis the establishment of a common currency area results in the expansion of the mutual trade and the financial connections due to an increased price (and returns) transparency and the reduction of the exchange risk. The intensification and increased volumes of mutual economic contacts among the common currency participants then increases their mutual interdependence, reducing the role of asymmetric shocks and increasing the role and impact of symmetric shocks. Introduction of a common currency then brings the participating countries closer to an OCA – hence the OCA is an endogenous phenomenon.

After the establishment of the Eurozone (January 1999), the ideas of an "endogenous OCA" were developed (and partially tested) by several economists, among them DeGrauwe and Mongelli [8] and Warin, Wunnawa and Janicki [9].

DeGrauwe and Mongelli investigate several "endogeneities" and conclude that the Eurozone in its first years came closer to an OCA in trade and financial markets areas where an increased integration implies an increased synchronization of outputs and hence the symmetry of shocks. However, a little progress is seen in the areas of product and labor market flexibilities.

Warin, Wunnawa and Janicki define the "OCA endogeneity" in terms of the convergence toward the "Maastricht Treaty criteria". They conclude that the Eurozone countries displayed a convergence in defined terms, thus demonstrating the validity of the "OCA endogeneity" ideas.

On the other side, Marco Buti, Director General of ECOFIN, expresses the concern about growing divergences in the areas of public debt, current account imbalances and competitiveness [10].

The variety of results concerning the conversion of the Eurozone into the OCA and, perhaps more importantly, the transformation of the political arrangement into a genuinely integrated economic area warranties the look at the actual historical dynamics in the Eurozone

3. Methodological Approach and Data

The goal is to evaluate the performance of the Eurozone as a whole, not of individual countries. And, indeed, we aimed at getting a broad picture of the Eurozone dynamics in a multidimensional economic space. Therefore, the following approach was adopted:

The definition of the Eurozone is limited and includes only the original 11 countries (Belgium, Germany, Austria, Netherlands, Luxemburg, Finland, France, Italy,

Spain Ireland, Portugal) plus Greece, which joined in 2001. Slovenia (which joined in 2007), Malta and Greek Cyprus (which joined in 2008), Slovakia (joining in 2009) and Estonia (joining in 2011) are excluded, given the short time series available.

The data analyzed include the GDP per capita, consumption per capita and the unemployment rate, all representing the general and observable economic conditions.

Nominal and real interest rates and the HICP inflation rate represent the dynamics of the pricing environment. Gross domestic government debt to GDP ratios reflect the dynamism of fiscal policy (remember, there is no national monetary policy in a currency union). The unit labor costs based real effective exchange rates (REER) and the labor productivity reflect the dynamics of the competitiveness within the Eurozone. Finally, the evolution of current account deficits (as a ratio to GDP) indicate both the evolution of the domestic fiscal stance and the competitiveness [10].

To measure the Eurozone wide dynamics, the variability (measured as the coefficient of variation) for each variable was calculated, over the 12 countries per each period. The resulting time series were then analyzed for their dynamic properties. If the variability declines over time, we observe the increasing convergence in the measured variable. And, indeed, the increasing variability indicates a rising and cumulative divergence.

The most of data used in the analysis were obtained from the Eurostat data bases, except for the REER which are available from the ECB. Depending on the variable, the data are available either in the monthly frequency, covering the period 1999:M1 to 2010:M5 and indicated as (m) in **Table 1**, or in the quarterly frequency, indicated by (q) in **Table 1** and covering the period 1999:Q1 to 2009:Q4.

4. Empirical Results

Analytical results are reported in **Figure 1** and **Tables 1** and **2**.

The data in **Figure 1** were normalized to get all in the same scale and hence graphically comparable. The formula used was $VM_{it} = (\sigma_{it}/\sigma_i(1999{:}1)) - 1.0$, where VM_{it} is the value of the normalized variable i at the period t, σ_{it} is the variability coefficient for the original variable i at the period t and the $\sigma_i(1999{:}1)$ is the value of the original variable i (variability coefficient) at the starting period (first quarter or month of 1999 respectively). i denotes individual variables as listed above.

Graphical results indicate that there was a very little of what could be called a "significant" decline in the variability (*i.e.* the graphs positioned below the zero line) in
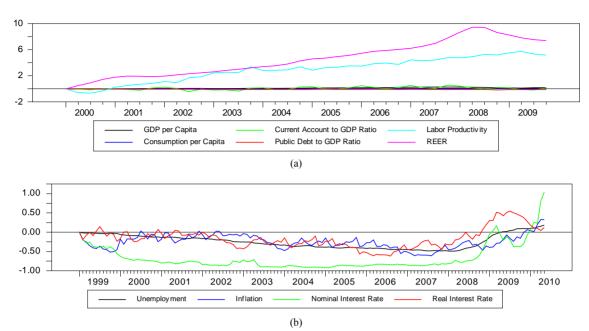
(a)

(b)

Figure 1. (a) Quarterly data; (b) Monthly data.

Table 1. Unit roots tests.

Variable	lags	ADF Test	5% Crit	Perron Test	5% Cri	Result
GDP per Capita(q)	1	−1.73	−2.93	−1.84	−2.93	Rejected
Consumption per Capita(q)	4	−2.00	−2.94	−2.30	−2.92	Rejected
Unemploymen (m)	1	−0.02	−2.88	0.69	−2.88	Rejected
Inflati(m)	1	−1.57	−2.88	−2.03	−2.88	Rejected
Long Term Interest Rates (m)	1	1.90	−2.88	2.08	−2.88	Rejected
Gov. Debt to GDP Ratios (q)	9	−2.14	−2.96	−2.68	−2.94	Rejected
Current Account To GDP Ratios (q)	0	−4.19	−2.93	−4.30	−2.93	Accepted
Person Labor Productivity (q)	1	−0.17	−2.93	−0.35	−2.93	Rejected
REER based On ULC (q)	2	−1.32	−2.93	−1.08	−2.93	Rejected
Real Interest Rates (m)	1	−1.69	−2.88	−1.83	−2.88	Rejected

Table 2. Estimates.

Variable	Constant	Trend	Coef. Of Serial Correlation (rho)	Rbar^2	Result
GDP per Capita	0.0018(6.305)	0.0001(2.798)	0.8860(10.49)	0.93	Increasing
Consumption per Capita	0.0011(22.62)	0.0001(1.485)	0.7234(6.151)	0.56	Steady
Unemploymen	1.5987(1.306)	0.0101(1.971)	0.9929(107.7)	0.99	Increasing
Inflati	0.5828(0.937)	0.0022(1.963)	0.9402(22.40)	0.82	Increasing
Long Term Interest Rates	−1.4736(1.808)	0.0106(2.616)	0.9872(36.03)	0.94	Increasing
Gov. Debt to GDP Ratios	32.809(5.433)	−0.0666(1.520)	0.2649(1.582)	0.57	Steady
Current Account To GDP Ratios	3.5740(2.103)	0.0440(1.643)	0.2794(1.672)	0.15	Steady
Person Labor Productivity	−5.0620(7.612)	0.1547(14.90)	0.5730(3.895)	0.96	Increasing
REER based On ULC	−5.9014(2.687)	0.1991(5.847)	0.9102(12.13)	0.98	Increasing
Real Interest Rates	0.5916(1.984)	0.0022(3.751)	0.9532(34.84)	0.92	Increasing

ME

any variable. Possible exemptions are the nominal interest rates and to a some degree the unemployment in the pre-recession period. But even here the variability increased with the onset of recession. The variability of REER's and the labor productivity increased significantly, indicating a steadily rising divergence in the competitiveness. Other variables' variability remained basically unchanged compared to the variability when Euro was introduced, with the inflation and the real interest rates variabilities remaining slightly below the zero line (*i.e.* the level at the Euro introduction) in the pre-recession period.

Next step was to conduct the more formal statistical inquiry. All variables (*i.e.* the time series for the variability indicators for all variables specified above) were first tested for unit roots. The results are reported in **Table 1** for both ADF and Perron tests.

The hypotheses of unit roots – *i.e.* the stationarity of the measured variable – are rejected in the all cases except one – the current account to GDP ratio. That indicates that nine out of ten of the analyzed variables were not truly stationary – *i.e.* with the both stationary mean and variance – during the whole common currency (*i.e.* the Euro) – period.

To get a better understanding of the time related dynamics of all analyzed variables, each variable was regressed against the constant and the time trend. Given the significant serial correlation displayed by the most variables, the Beech-McKinnon ML estimator was applied. Results are reported in **Table 2**.

None of the analyzed variables displays the statistically significant negative trend – indicating no observable convergence processes for the variables under inquiry.

Seven variables report a statistically significant positive coefficient for the time trend variable, indicating the rising variability (and hence increasing divergence) over the period of the Eurozone existence.

Of those the GDP per capita coefficient is very small, perhaps to be explained by a combination of socio-cultural values and demographic trends. The same can be said about a rather surprising positive coefficient for the unemployment, where differing demographic trends and retirement policies may result in rising cross-country differences.

Inflation and the nominal interest rates rising variability reflect the differing impacts of a single monetary policy on different countries, reflecting both their differing fiscal structures and (lately) their responses to the impacts of recession on their economies.

The rising variability of the labor productivity and especially the competitiveness (REER's) are not really surprising (European Commission 2010). But the rising

divergence here constitutes the major problem for the cohesion of the Eurozone – or perhaps even a threat for the Eurozone's survival in its current re-incarnation.

The variability of the consumption per capita, HICP inflation, current accounts to GDP ratios and government's debt to GDP ratios is estimated to be constant over the analyzed period. That may appear somewhat surprising, especially for the latter two.

But the estimates probably hide two different trends which cancelled one another – pre-crisis and post-crisis.

To summarize, both graphical and statistical analyses do not show any convergence trends and/or tendencies for any of the 10 variables chosen. But they confirm several divergent trends, most importantly in the competitiveness area.

5. Conclusions

In conclusion to this analysis, it has to be emphasized again that EMU is first and foremost a political arrangement, albeit with a significant economic impact. Its cohesion is therefore determined by the political will to remain the member of the arrangement. This in turn will be influenced by the impact of relative economic performances on the domestic political processes in individual Eurozone member countries. But it must be stressed here that economic considerations, even if they receive the most attention from both the economists and the general public, are only parts of the overall process of political decision making, and may be not the most important ones. Countries engagement in complicated structures of the global security and political and economic relationships goes far beyond a simple calculus of economic gains and losses. And it is with this in mind we should evaluate the above reported results.

Indeed, in its first 11 years of existence, the Eurozone was a reasonably cohesive political arrangement. However, significant cracks in its economic façade are clearly developing in the areas most important for the long run economic performances of individual countries – productivity and competitiveness. Unless addressed, these may constitute a significant, and perhaps ultimate, threats to the Eurozone cohesion and perhaps to its existence.

6. References

[1]   T. Waigel, "Introductory Statement for the Panel Discussion on the Occasion of the Forum: 10 Years of the European Economic and Monetary Union," 2008. http://ec.europa.eu/economy_finance/events/2008/bef/waigel_en.pdf

[2]   R. Mundell, "A Theory of Optimal Currency Areas," *American Economic Review*, Vol. 51, No. 4, 1961, pp. 657-665.

ME

[3] P. B Kenen, "The Theory of Optimum Currency Areas: An Eclectic View," In: R. Mundell and A. Swoboda, Eds., *Monetary Problems of the International Economy*, Chicago University Press, Chicago, 1969, pp. 59-77.

[4] G. S. Tavlas, "The 'New,' Theory of Optimum Currency Areas," *The World Economy*, Vol. 16, No. 6, 1993, pp. 663-685.

[5] T. Bayoumi and B. Eichengreen, "Shocking Aspects of European Monetary Unification," In: F. Giavazzi and F. Torres, Eds., *Transition to Economic and Monetary Union in Europe*, Cambridge University Press, New York, 1993, pp. 193-229.

[6] R Mundell, "Uncommon Arguments for Common Currencies," In: H. Johnson and A. Swoboda, Eds., *The Economics of Common Currencies*, Allen and Unwin, London, 1973, pp. 114-132.

[7] J. A. Frankel and A. K. Rose, "The Endogeneity of the Optimum Currency Area Criteria," 1996. http://www.nber.org/papers/w5700.pdf

[8] P. DeGrauwe and F. P. Mongelli, "Endogeneities of Optimum Currency Areas: What Brings Countries Sharing a Single Currency Closer Together?" 2005. http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp468.pdf

[9] T. Warin, P. V. Wunnava and H. P. Janicki, "Testing Mundell's Intuition of Endogenous OCA Theory," *Review of International Economics*, Vol. 17, No. 1, 2009, pp. 74-86.

[10] European Commission, "Quarterly Report on the Euro Area," *Economic and Financial Affairs*, Vol. 1, No. 1, March 2010, pp. 1-42.