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GIIPS AND INFLATION CONVERGENCE, TWO DECADES AND FEW CRISIS LATER

Abstract

Paper analysis inflation convergence in Greece, Italy, Ireland, Portugal and Spain (GIIPS). These countries were severely hit by financial and debt crisis and had to undertake deflationary adjustment programs, thus we wanted to understand weather those conditions reduced imbalances in Eurozone. We used statistical indicators and indicators of σ-convergence to study the diversity of their inflation processes. Unit root test on the series of standard deviations of inflation differentials was used to check statistical significance of inflation convergence. Data was divided in two subperiods, from 1997-2008, and 2009-2022, to understand the influence of crisis and austerity measures on asymmetries and divergence of inflation. Results showed significant convergence until the crisis, than differences started to increase. This findings are important while inflation rises since 2021, and it again brought significant divergence between members' inflation rates. Should we fear of a new debt crisis, were the differences sufficiently reduced and imbalances removed?

Key words: *GIIPS, inflation, nominal convergence, inflation dispersion*

JEL classification: *E310, E520, E580.*

ГИИПС ЗЕМЉЕ И ПРОЦЕС КОНВЕРГЕНЦИЈЕ, ДВЕ ДЕЦЕНИЈЕ И ПАР КРИЗА КАСНИЈЕ

Апстракт

Рад анализа процес конвергенцији инфлације у Грчкој, Италији, Ирској, Португалу и Шпанији (GIIPS). Ове земље су биле озбиљно погођене финансијском и дужничком кризом и морале су да предузму програме дефлаторног прилагођавања. Зато смо желели да утврдимо да ли су ти услови смањили неравнотеже у еврозони. У раду смо користили статистичке показатеље и индикаторе σ-конвергенције за анализирање хетерогености њихових инфлационих процеса. За проверу статистичке значајности конвергенције инфлације урађен је тест јединичног корена на серији стандардних девијација инфлаторних диференцијала. Подаци су подељени у два подпериода, од 1997-2008 и 2009-2022, да би се утврдио утицај кризе и мера штедње на асиметрије и дивергенцију инфлације. Резултати су показали значајну конвергенцију до кризе, али су након тога разлике почеле да се повећавају. Ови налази су значајни јер инфлација расте од 2021. године

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и поново је донела значајну дивергенцију стопа инфлације чланица. Да ли треба да се плашимо нове дужничке кризе, да ли су разлике довољно смањене и уклоњене неравнотеже?

Кључне речи: GIIPS, инфлација, номинална конвергенција, дисперзија стопа инфлације

Introduction

Until 2022, 19 European countries gave up their independent, national monetary policy, exchange rate and interest rate policy. Their monetary policy is now being managed by one supranational central bank, which goal is monetary stability, defined like annual inflation rate below but close to 2%. Inflation rate is significant criteria for joining EMU. This criteria is defined like the inflation rate which can not be higher than 1.5 percentage points than average inflation in three best performing member states (unweighted arithmetic average of inflation in 3 countries with the lowest inflation rate). So individual country must have sustainable, low and stable inflation rate measured by harmonized consumer price index. Although this is entry criteria, it has substantial meaning for successful membership both at individual country level and Eurozone level. It is very important for members to reach high level of convergence of their economic performances, so that common monetary policy can suit them. On the other side managing monetary policy for 19 economically heterogeneous countries with different needs is very problematic, it will be less successful and crisis might occur more often. For individual countries, economic convergence means higher benefits than costs of joining EMU. Monetary policy for 19 countries is common, meaning that European central bank can not adjust it to target specific needs of individual countries. It is managed at the average level. So inflation rate of given country should be very close to average inflation, and move in coordination with it to respond to different shocks and ECB policy measures. If a country has significantly higher or lower inflation, its interest rates significantly departure from other countries' interest rates, it has very active fiscal policy (higher government and public debt), its growth rates do not move in coordination to growth rates of other countries, than common monetary policy might bring series economic problems. Crisis that started in 2008 brought to the light built macroeconomic imbalances of some Eurozone members (Popović & Janković, 2016). In Eurozone financial crisis lasted longer, and it grew into economic, banking and sovereign debt crisis showing that original design of Eurozone had serious flows which led to pilling of serious imbalances.

This analysis is significant due to few reasons. It is possible to draw conclusions from previous experience of the first member countries that faced hard crisis because of lack of convergence process. It seems that there is a tendency for some countries to treat joining EU/EMU like political success and to expect to be flooded with a plenty of cheap money and just spend. So there is not substantial understanding what membership actually means and which consequences might occur if country doesn't fully respond to its obligations according to EU/EMU rules and economic laws. Beside, there are

countries that tend to join EMU like Croatia, which plans to become member from 2023 (Ammann, 2022). Which trap should be avoided, which reforms should be introduced, which path to follow, how to substantially satisfy convergence criteria and not just formally, so that membership is sustainable in a long term and will bring more benefits than costs? Beside this, inflation in 2021 and especially at the beginning of 2022 was very high, reaching unprecedented levels and there is still rising tendency. Will this lead to sizeable divergence of individual inflation rates which will even more complicate the management of common monetary policy? Should we fear of new debt crisis?

The old theory of optimal currency area identified criteria that countries wishing to join monetary union must fulfil to enjoy long-term net benefits of membership. Practice chose a bit different criteria- related to convergence of inflation rates, interest rates, budget deficit, public debt and exchange rate stability. However, all countries did not fully satisfy even these criteria. New theory of optimal currency area stressed that the environment of monetary union will gradually lead to higher integration and convergence of economic performances. So it is important that countries that joined monetary union move towards optimal currency area. But have those expectations really been met?

Paper analyses characteristics of inflation in peripheral or south Eurozone member countries, popularly called GIIPS (Greece, Italy, Ireland, Portugal and Spain). It builds further on the complex analysis of convergence process from Popović (2013), with focus on inflation rates. How different are inflation processes in those countries? They had very high inflation rates before joining EMU. Did membership bring some positive changes? Was there a progress since financial crisis, since they were forced to undertake deflationary measures to restore competitiveness lost due to higher inflation rates? Are there some positive news related to convergence towards EMU average? Do they form relatively homogenous group or differences tend to be even higher?

To answer those questions we will conduct statistical analysis of historical inflation rates to understand behaviour of average and median inflation rates. Analysing standard deviations and coefficient of variations (indicators of sigma convergence) will indicate if countries have inflation rates which are converging and respond in the similar way to different shocks and monetary policy measures or there is significant dispersion. Additionally Unit root test on series of standard deviation of inflation rates in comparison to EMU average will help us to check statistical significance of nominal convergence-towards average inflation and if there is a tendency for this group of countries to be more homogenous.

Literature review

According Popović (2013) all countries that formed euro area (in 1999 + Greece) did not fully satisfy convergence criteria set in the Maastricht agreement, so we can not say that Eurozone was an optimal currency area even in the moment of creation. It was expected that Monetary union will facilitate convergence of their economic performances. However although in some areas there has been progress towards higher convergence, destabilizing process of polarization occurred. Monetary union is divided on two group of countries, richer core countries, mostly from Northern Europe and poorer peripheral countries mostly from Southern Europe, popularly called GIIPS (Bošković, Popović &

Njegovan, 2013). These are countries with higher inflation rates, with consumption–driven model of growth, with strong rise in unit labour costs and indebtedness, constant decrease in competitiveness and rise in external debt.

Brinke, Enderlein, & Fritz-Vannahme (2015) stressed that euro area needs three types of nominal sigma convergence to avoid drifting apart: convergence in prices, competitiveness and external balance. Inflation convergence is necessary because ECB determines reference interest rate on the basis of average inflation for the whole EMU. If inflation rates are very diverse among member countries, they will be too low for countries with higher inflation and too high for countries with very low inflation, which means that single interest rate destabilizes Eurozone. That is why it is important that inflation differentials are very small. Besides, devaluations are no longer available as the tool of increasing or restoring competitiveness so exchange rates must be on a par with other member countries. It is also important that wages rise in correlation with the growth of productivity and not to be the source of lower competitiveness. Loss of competitiveness because of higher inflation and higher labour costs leads to large external imbalances, and that is not sustainable in the long term. The governance of convergence was not successful. Although a number of rules focused on nominal convergence, it appears that the architecture of euro area was not appropriate. Maastricht criteria are entry criteria, so there are strict rules to become a member. However when a country becomes a member, differences in inflation and long-term interest rates are not in the focus any more. The Stability and growth pact does not particularly deal with price stability and inflation differentials. But persistent inflation differentials lead to capital misallocation, boom-and-bust cycles and recessions. Some countries had export driven growth and they became net lenders while in others economy declined and they became net borrowers.

Since high inflation peripheral countries made significant effort to combat inflation to candidate for the membership in Monetary union, a number of papers studied the influence of the establishment of Monetary union on further convergence process. According Mongelli (2008) until 2007 inflation dispersion has been significantly reduced, especially having in mind short-term and long-term inflation expectations. Estrada, Gali & Lopez-Salido (2013) found that there are no proves that introducing euro lead to higher nominal convergence among member states, since there has been strong nominal convergence before 1999 among EMU members, but also among the group of advanced non-member countries. Franks at al. (2018) pointed out that prior the EMU significant convergence of inflation occurred, but after the establishment of Monetary union there was no further progress. Especially problematic is the fact that peripheral countries have very persistent inflation differentials, which reduced their competitiveness and increased real exchange rate gaps. Consolo (2021) discovered not just that process of nominal convergence since 1999 was insufficient, but also differences in price levels increased. Problematic South countries had inflation higher than average during 2000s. Auray & Eyquem showed that although there was significant inflation convergence until 1999, that process was not finished in following period, which led to significant differences in real interest rates. Barigozzi, Conti & Luciani (2013) stressed that monetary transmission mechanism is more homogenous with the single currency, but there are differences in transmission of monetary policy to prices and unemployment between core and periphery countries.

Weber & Beck (2005) discovered that β-convergence occurred before and after the advent of Monetary union, however convergence process is non linear and decreases with time. Beside, β-convergence does not mean also σ-convergence, overall dispersion of inflation rates was reduced in the first half of 1990s, in the second half no further progress occurred, while in the first half of 2000s it even increased. Authors also discovered that mean inflation rate should not fall below 1% while the significant part of the region will be under a large risk of deflation.

García-Hiernaux, González-Pérez & Guerrero (2020) found different price level patterns and lack of long-run price level convergence for majority of member countries. So common monetary policy does not affect all EMU members equally. Large and persistent inflation differentials could lead to increase in real interest rate differentials, influence the cost of credit and bring economic difficulties to firms and countries with low productivity. It can also influence the segmentation of financial markets in Eurozone.

Landmann (2011) stressed that weak currencies appear to be high-inflation currencies. Until 1999 inflation rates and interest rates converged towards levels in German, and GIIPS countries got more favourable access to long-term capital markets and stable long-term borrowing in Eurozone. They were more attractive investment destination also thanks to elimination of exchange risk which created asymmetric demand shock. There has been a divergence between spending and growth of output as well as divergence between production costs and price levels. While in Germany unit labour costs remained stable and demand was lower, in GIIPS countries they rose significantly, so although ECB managed its monetary policy to target inflation close but lower than 2% in GIIPS inflation rates were higher, leading to the loss of competitiveness.

Beker-Pucar & Glavaški (2021) showed that peripheral Eurozone economies had unstable economic growth and are more prone to sharp decline, they have higher unemployment and current account deficit and their fiscal position is worse, even in the period 2007-2018. So also in the period after the outbreak of crisis asymmetries and divergences are persistent.

According to Sinn (2010) introducing euro was not beneficial for all EMU members. Because of the lack of effective private and public debt constrains it facilitated growth in peripheral countries and caused overheating, while in Germany opposite was happening. Domestic saving was channelled towards peripheral countries and as consequence Germany had the smallest net investment rate. The root of economic problems in Eurozone are external imbalances between core and periphery. Interest rates in peripheral countries were higher before the advent of EMU reflecting inflation and devaluation risk, as well as higher transaction costs. Since exchange rate risk and transaction costs would be eliminated with joining euro area, interest rates started to converge towards rates in Germany when investors expected for certain country to become a member of Eurozone. It was also expected that members' inflation would be tied to German, bringing monetary stability. Inflow of cheap credit facilitated growth especially in construction, higher inflation and current account deficits.

According to Cesaratto (2014) debtor countries (GIIPS) are not the only side to blame, creditor countries are equally guilty. Germany applied the strategy of keeping inflation lower than in trading partners (low wages in comparison to productivity and somewhat more restrictive fiscal policy) which together with fixed exchange rates brought higher competitiveness that boosted German economy. Flows of cheap credit

provided purchasing power to peripheral countries so that they could purchase the surplus of products from the core economies, which increased their indebtedness. Blanchard & Giavazzi (2002) stated that capital flows between core and periphery mean that richer core countries are lending money to poor peripheral countries to help them in catching up process, so integration must have effects on current account balance. However this growth was not sustainable, import grew with income, wages tended to converge to levels in core countries, demand rose as well as inflation reducing competitiveness of export. Thus Monetary union environment created significant imbalances among members, largely due to differences in productivity and inflation.

Research Design and Methodology

The establishment of European monetary union brought very law inflation rates for GIIPS countries. Figure 1. shows that observed countries struggled with very high inflation rates in 1970s, 1980s and significant part of 1990s. EMU membership brought very low inflation rates, consistency and credibility of monetary policy which their national central banks did not enjoy. Obviously, in the second half of 1990s they made considerable effort to satisfy this Maastricht criteria and join Eurozone.

Figure 1: Inflation rates in GIIPS since 1960
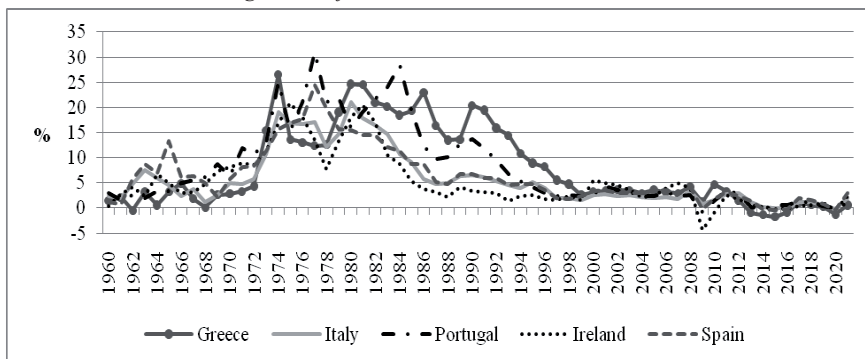
Source: Worldbank, Data for 2021: ECB, 21.03.2022

At first glance it also seems that their inflation rates tend to move together. So ECB was successful in achieving monetary stability. That is why key hypothesis of this research is: common currency and monetary policy managed to reduce inflation differentials among peripheral member countries. Auxiliary hypothesis is: Financial crisis and austerity measures led to convergence of inflation rates among GIIPS countries.

ECB was very successful in achieving low inflation rates and inflation differentials among member countries are significantly reduced. On the other side, inflation differentials still exist and they seem to be very persistent, which brings problems with managing common monetary policy and it will not suit countries with inflation significantly higher or lower than EMU average inflation. In the following part of the paper we will analyse if premises of new theory of optimal currency area proved in

practice, to understand if the environment of Monetary union facilitated the convergence process. Since peripheral countries had to undertake deflationary adjustment programs, we will also test the influence of financial crisis (and its consequences) on inflation convergence. After the analysis of statistical characteristics of inflation processes in GIIPS countries and indicators of sigma convergence we will conduct the Unit root test on the series of standard deviations of inflation rates to understand if there was a progress towards average inflation rates and if this group of countries has relatively homogenous characteristics and needs.

Research results and Discussion: Analysis of inflation differentials and convergence process

Figure 2. shows average inflation differentials and their standard deviations. Inflation differentials are calculated as the difference between inflation rate in a given country and EMU inflation rate for periods between January 1997 and February 2022, for which data are available on the monthly basis. Convergence occurred if average inflation differentials have decreasing tendency, and the optimal situation is a lack of significant differences between members 'inflation rates. If differences would tend to zero and if their variations would be correlated that would ease the conduct of common monetary policy and it will suit member countries. Outliers would face significant problems and economic disbalances. In economic literature sigma convergence is measured in different ways, standard deviations and coefficient of variation are most commonly used (Petrović & Gligorić Matić, 2021, p.53).

Figure 2: Inflation differentials in GIIPS countries
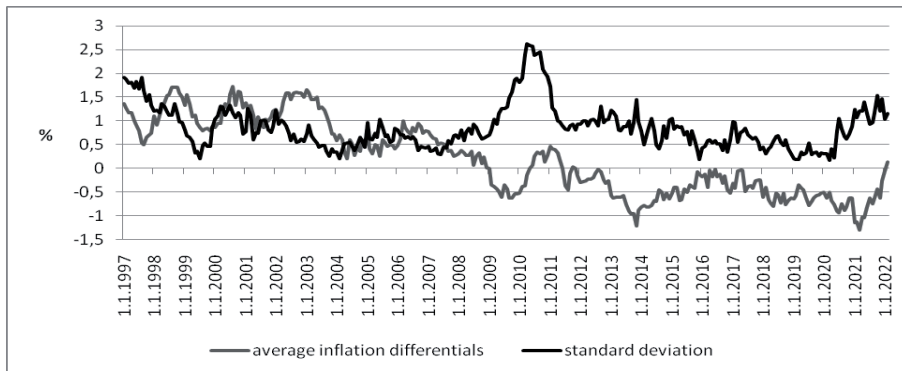
Source: Author's calculation based on data from ECB, 21.3.2022

Data for average inflation differentials (Figure 2) show diminishing tendency until the outbreak of financial crisis. After that average inflation differentials turned negative, showing that these countries have lower inflation rates than average. That is the consequence of deflationary adjustment measures they had to undertake to restore competitiveness. However if those countries face significantly lower inflation than the rest of Monetary union in longer term, common monetary policy might be too restrictive,

causing further contraction in demand and thus business activity and employment. So their business cycle might diverge from the rest of Eurozone. This data should be analysed together with standard deviations to understand if variability of inflation rates in GIIPS countries decreased so that they tend to be homogenous group of countries. Unfortunately, although there was some mild decreasing tendency until crisis, differences rose after 2008 and we can not say that they tend to diminish again. Statistical characteristics of inflation processes in given countries are presented in the Table 1.

Table 1: Descriptive statistics of inflation rates in GIIPS countries, January 1999-February 2022

	Greece	Ireland	Italy	Portugal	Spain	EMU
Mean	1.8	1.7	1.7	1.8	2.1	1.7
Median	2.2	1.7	2.0	2.0	2.4	1.9
Maximum	6.3	5.9	6.2	5.1	7.6	5.9
Minimum	-2.9	-2.9	-1.0	-1.8	-1.5	-0.6
Standard deviation	2.0	2.0	1.2	1.5	1.7	1.0
Coefficient of variation	110.9%	119.1%	68.0%	82.9%	80.7%	61.3%

Source: Author's calculation based on data from ECB, 21.3.2022

Mean inflation in observed countries with exception of Spain is in line with the goal of ECB, it is lower but close to 2%. However median inflation is higher except in Ireland. This means those countries still struggle with higher inflation, because the value that is "in the middle" of data is higher than ECB goal, but in some periods inflation rates were very low, negative, decreasing average values. Variability of inflation rates is very large. Standard deviations and coefficients of variation are significantly higher than EMU average, especially in Ireland and Greece. Besides, coefficient of variation does not shows decreasing tendency. This brings higher inflation risk and unpredictability in long-term businesses. To understand variability of inflation rates in individual countries we conducted frequency analysis, which results are given in Figure 3.

Figure 3: Frequency analysis of inflation rates

Source: Author's calculation based on data from ECB, 21.3.2022

ЕКОНОМИКА
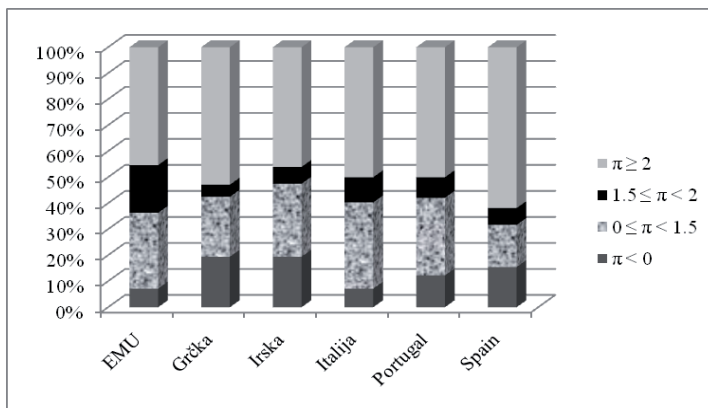
Figure 3 reveals some very problematic developments. It is not precisely defined what the goal of ECB means, but we assumed that is the inflation rate equal or higher than 1.5% but lower than 2% (black part of columns). Even ECB was not successful with its goal! In only 18% of cases inflation was within the goal limits. In more than 45% of observed periods it was equal or higher than 2%, in 7% of cases it was negative and in slightly less than 30% very low, but positive. Spain and Greece were the least successful in maintaining inflation within goal boundaries. In Spain inflation was above goal in almost 62% of cases, while in 15.5% it faced deflation. In only 6.5% it was at the goal boundaries. Greece was successful in less than 5% of time, while it struggled with deflation in almost 20% of period. Inflation was higher in 53% of time. In half of observed period Italy and Portugal had inflation higher than targeted. Portugal faced deflation in 12% and Italy in 7% of cases. Inflation was at targeted level in less than 10% of cases in Italy and less than 8% in Portugal. In Ireland in 46% of periods inflation was higher and in only 6.5% at the goal level. This country faced deflation in almost 20% of cases. We can not say that inflation indicators for GIIPS tend to follow indicators for European monetary union. This means that they are not close to average so that common monetary policy does not suit them. It might even cause departure of their economic performances away from Monetary union.

We conducted Unit root test on the series of standard deviations of inflation differentials. Unit root test show weather two or more variables are in the process of converging. If there was convergence process, inflation differentials will diminish over time and tend to zero. If inflation differentials between two or more countries present stationary process, it is converging to some value (it should tend zero) and its variance is finite (it should also diminish over time). If there is unit root, series does not have constant mean and finite variance. So inflation rates are not converging. Since our analysis showed that outbreak of financial crisis led to divergence of inflation rates we will conduct our analysis on two sets of data. The first is series of standard deviations of inflation differentials between January 1997 and end of 2008, and the second is the series of standard deviations of inflation differentials in period January 2009 to February 2022. So we will be able to test the significance of financial crisis to inflation convergence among GIIPS countries. Results are given in Table 2. and Table 3.

Table 2: Unit root test in levels for the series: Standard deviation of inflation differentials in GIIPS countries

Null Hypothesis: STANDARD_DEVIATION has a unit root Exogenous: Constant Lag Length: 0 (Automatic - based on SIC, maxlag=13)		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.376303	0.0134
Test critical values:	1% level	-3.476472	
	5% level	-2.881685	
	10% level	-2.577591	
*MacKinnon (1996) one-sided p-values. Augmented Dickey-Fuller Test Equation			

Dependent Variable: D(STANDARD_DEVIATION)
Method: Least Squares
Date: 03/22/22   Time: 18:26
Sample (adjusted): 1997M02 2008M12
Included observations: 143 after adjustments

Source: Author's calculation in Eviews, based on data from: ECB, 21.3.2022

Table 3: Unit root test in levels for the series: Standard deviation of inflation differentials in GIIPS countries, 2009-February 2022

Null Hypothesis: STANDARD_DEVIATION has a unit root			
Exogenous: Constant			
Lag Length: 0 (Automatic - based on SIC, maxlag=13)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.376303	0.0134
Test critical values:	1% level	-3.476472	
	5% level	-2.881685	
	10% level	-2.577591	
*MacKinnon (1996) one-sided p-values.			
Augmented Dickey-Fuller Test Equation			
Dependent Variable: D(STANDARD_DEVIATION)			
Method: Least Squares			
Date: 03/22/22 Time: 18:26			
Sample (adjusted): 1997M02 2008M12			
Included observations: 143 after adjustments			

Source: Author's calculation in Eviews, based on data from: ECB, 21.3.2022

Obtained results show that there is no unit root test in the series of standard deviation of inflation differentials for the period 1997-2008. The decision was made on the basis of Dickey-Fuller test, which tests the null hypothesis that a time series has a unit root. DF τ statistics was found to be equal to -3.38, while the critical value (with intercept) was $\tau^k = -2.88$ at 5% confidence level. Also p=0.0134, so the probability that we will reject correct null hypothesis is very small. Model confirmed our previous analysis, GIIPS countries indeed made significant effort to reach monetary stability, fulfill nominal convergence criteria and maintain relatively low inflation rates after joining EMU.

Results of unit root test for the period January 2009 until February 2022 are given in the Table 3. Obtained results for the second period differ, we found that there is a unit root in the series of standard deviations of inflation differentials. DF τ statistics is -2.3, while the critical value $\tau^k = -2.88$, and p= 0.1726 which means that there is high probability that we will reject correct null hypothesis. So there was no statistically significant convergence of inflation rates in GIIPS countries after 2009. It appears that financial crisis has jeopardized the good results initially achieved. Those countries do not follow average EMU inflation path.

Conclusion

European central bank is responsible for the common monetary policy in 19 countries that differ in size, economic development, economic and political structure, while there is no fiscal union and fully integrated single market. It was expected that the environment of monetary union will lead towards higher convergence of economic performances among members, which is of crucial importance for the long-run success of monetary union. In the second half of 2000s there was a process of economic divergence and polarization, among two groups of countries according their economic results. This is a great challenge for the common monetary policy while it doesn't suit all member countries and might be the source of further destabilisation and imbalances.

We analysed the convergence of inflation rates among a group of peripheral countries (GIIPS), to understand if there was some progress towards monetary stability and larger homogeneity. These countries had significant macroeconomic problems before joining EMU and made significant effort to fulfil the entry criteria. Statistical analysis showed that although their average inflation rates decreased significantly, still they were above average, and there is no tendency of diminishing dispersion. Both standard deviation and coefficient of variations do not show long-term convergence- a reduction of inflation rates dispersion among observed countries. According to frequency analysis in majority of cases their inflation was not close to ECB goal, or average. Unit root test confirmed that the advent of Monetary union and common monetary policy facilitated reduction of inflation differentials in the period before the advent of Monetary union and at the very beginning of 2000s, but until the 2008 crisis it seems that the progress has stopped. For the following period test did not indicate further convergence process. Contrary these group of countries seems to be pretty heterogeneous and ongoing rise in inflation rates tends to foster further divergence. These results show that euro did not bring benefits to all member countries and structural reforms especially in product and labour markets are needed, as well as better governance of convergence.

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