STRUČNI RAD

RELATIONSHIP BETWEEN INFLATION AND ECONOMIC GROWTH; COMPARATIVE EXPERIENCE OF ITALY AND AUSTRIA

dr. sc. Mario Švigir, Josipa Miloš, struč. spec. oec.[1]

SUMMARY: Economic growth of a country is the result of monetary, fiscal and other economic policies undertaken by its policy makers. Economic growth is affected by a number of factors, one of which is inflation. The relationship between economic growth and price growth is complex one. Empirical studies have shown that the relationship between economic growth and inflation may be positive, negative and neutral. Today, there are no doubts that high inflation has a negative effect on economic growth. The subject of newer empirical research is the lower threshold rate of annual inflation can have a significant negative effect on economic growth.

This paper investigates the relationship between economic growth and inflation in Italy and Austria, countries featured by long-term low inflation. Statistical and econometric comparative analysis conducted for Italy and Austria for period between 1980 – 2016 showed that low inflation is important but not sufficient factor for economic growth.

Key words: inflation, economic growth, relationship between price growth and economic growth

JEL: E20, E31, E32

1. INTRODUCTION

Economic growth of a country is the result of monetary, fiscal and other economic policies undertaken by its policy makers. Economic growth is affected by a number of factors, one of which is inflation. The relationship between economic growth and price growth is complex one. The complexity of relationship between inflation and economic growth has been investigated in the course of many studies. Empirical studies conducted for industrial and developed countries found a negative relationship between inflation and economic growth. In contrary, studies focusing on developing countries sample found a positive relationship between inflation and economic growth.

[1] Mario Švigir, University College Effectus – College for Finance and Law, Trg J.F.Kennedy 2, 10000 Zagreb
Josipa Miloš, University College Effectus – College for Finance and Law, Trg J.F.Kennedy 2, 10000 Zagreb

2. THEORETICAL FRAMEWORK – RESEARCH ON THE RELATIONSHIP BETWEEN PRICE GROWTH AND ECONOMIC GROWTH

It is often emphasized in the course of more recent economic history (Mervar, 1999) that the economic growth is endogenous result of the economic system. Based on evaluation of regressions performed for a large number countries (Mervar, 1999) growth was linked with the following economic preconditions: high level of savings and investment, well educated labour force and other arrangements that allowed abridgement of existing technology gaps.

Yet investigating ties between economic growth and the rate of inflation (Mamo, 2012) was also treated as one of the central subjects of macroeconomics research and policy. There is no clear-cut definition about the relationship between economic growth and inflation. There are many controversial issues and findings about this relationship. Different studies (Mamo, 2012) showed that the relationship between economic growth and inflation may be positive, negative and neutral.

Sidrauski (1967) suggested there is no relationship between inflation and economic growth. A study conducted by Fisher (1993) shows that the relationship between inflation and economic growth is negative one. Mallik and Chowdhury (2001) found a positive relationship between inflation and economic growth. Today the question is not only is there any relationship between the two phenomenon but (Mamo, 2012) which level of inflation can affect economic growth positively or negatively. Barro (1995) stressed the fact that high inflation reduces the level of investment and such reduction adversely affects economic growth. Mamo (2012) outlines the importance of forecasting of inflation for economic growth. Empirical studies performed to investigate the nature of relationship between inflation and growth indicated: bidirectional causality, a unidirectional causality and no causality between inflation and economic growth. A study perfomed by Paul, Kearny and Chowdhury (1997) shows no causality relationship between inflation and economic growth in 40% of the countries, bidirectional causality in about 20% of countries and a unidirectional relationship in the rest of the countries. The complexity of the relationship between inflation and economic growth was tested for industrial and developed countries where a negative relationship was found between inflation and economic growth. In the contrary in developing countries a positive relationship was found between inflation and economic growth. Ghosh and Phillips (1998) studying relationship between inflation and economic growth for 145 countries found a positive relationship between inflation and economic growth when inflation is low yet this relation turned negative for high inflation.

Fisher (1993) explains the causality between the two proceeding from inflation to economic growth. Umaru i Zubariu (2011) claimed that GDP causes inflation. Empirical studies also showed that this causality is different in the short and in the long run. Datta

(2011) when investigating growth and inflation in Malaysia has shown that causality exist between inflation and economic growth in the short run thus inflation affecting economic growth but in the long run economic growth affected inflation. In paper entitled ''Role of macroeconomic factor in growth", Fisher (1993) has investigated relationship between inflation and economic growth for 93 countries. In this paper he used data set consisting of several macroeconomic variables including inflation. He has found out that the inflation negatively affected growth by reducing investment, and by reducing rate of productivity growth. Barro (1997) used 30 years data from 1960 to 1990 for 100 countries and concluded the importance of other determinants of economic growth additional to inflation. He emphasized that an increase in average inflation for 10% per year leads to reduction of the growth rate of real GDP per capita by 0.2%-0.3% per year and that a decrease in the ratio of investment to GDP by 0.4%-0.6%. Mubarik (2005) estimated threshold level of inflation for Pakistan. He has found that inflation above threshold level affects economic growth negatively. But inflation below the estimated level is conductive for economic growth. Mallik and Chowdhury (2001) using data collected from Bangladesh, India, Pakistan and Sirlank and concluded that there is a positive relationship between inflation and economic growth in the long run. Authors also concluded that moderate inflation is helpful to faster the economic growth. Ghosh and Phillips (1998) indicated that a very low inflation rates (less than 2-3%) inflation and growth are positively related. Empirical studies that have been conducted shown that the causality relationship between economic growth and price growth is complex. Mamo (2012, p.8) states that ''inflation and economic growth are the main concern of most countries of the world." Macroeconomists, policy makers and central monetary authorities of all the nations need to know whether inflation is beneficial to growth or detrimental to growth.

3. COMPARATIVE STATISTICS AND REGRESSION ANALYSIS OF RELATIONSHIP BETWEEN INFLATION AND ECONOMIC GROWTH IN ITALY AND AUSTRIA

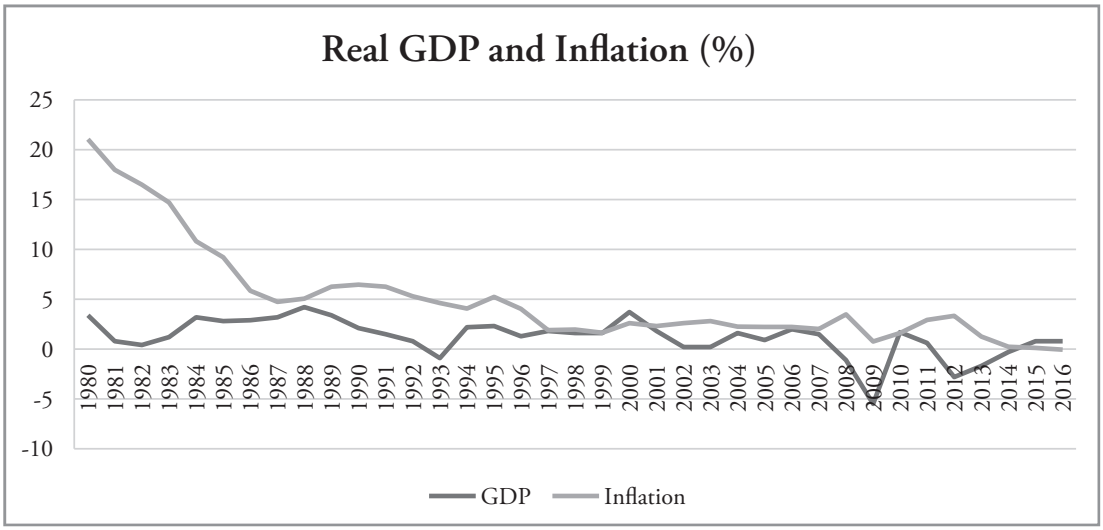
We have tested relationship between inflation on the economic growth for Italy and Austria so we can determine possible relation and direction or nature of relationship between the two. Literature and empirical studies investigating this phenomenon suggest that relationship between these two variables may be positive, negative or neutral. The choice of Italy and Austria is related to the fact that both belong to European monetary union and feature low inflation. Is that enough as precondition for growth for both of these countries? Before Italy and Austria joined the euro area they had to meet these so-called convergence criteria set by EU Maastricht Treaty. These convergence criteria are concerned with price stability, interest rates, exchange rate, budget deficit and public debt stability. As for the price stability, the ECB has determined that annual inflation measured by HICP should be under, but close to 2% over the medium term. Recently Italy and Austria have reached inflation rates which are substantially under this ECB's target. In 2016

inflation in Italy reached record low level equal to -0.05%. By contrast Austria scored low positive inflation rate. Through comparative analysis between these countries we tried to find out whether a long-term low inflation does classify as sufficient factor for economic growth of a country. In order to prove this hypothesis we have conducted regressive analyses for both countries.

4. ITALIA – COMPARATIVE ANALYSIS

The data used for the comparative analysis and identification of a longer trend and movements of inflation and growth in Italy are historical data covering 1980 – 2016 period. Movements of growth and inflation are presented in Graph 1.

Graph 1 Real GDP and inflation in Italy; 1980 – 2016



Source: Authors according to https://www.imf.org, Accessed 16 February 2017

Graph 1 shows period of high inflation in Italy in period from 1980 to 1984. Inflation rate has exceeded 20% which coincided with slowing down of economic growth which has not turned negative in this period. Inflation started to decrease gradually since mid 1980s. In period between 1985 – 1998 inflation rate stabilized moving in range from 4% to 9%. In that period real GDP has been picked up. In 1993 Italian GDP reached the lowest rate of -0.9% for the observed period of time in the last century, while the inflation rate at a time was 4.63%. Conversely the highest recorded GDP rate in the period was 4.2% and was reached in 1988. Inflation rate in that year reached 5.06%. In period from 1997 to 2016 Italy gradually reached the low inflation rate. In 2008 the inflation rate scored highest amounting to 3.49%. The lowest inflation rate was that of -0.05% recorded in 2016. The trends of GDP has been range from -5.5% to 3.7%. After global economic crisis inflation rate has been continuously decreasing and the last few years it has been under of 1% which is far under target level set by ECB. In spite of slightly recovery,

the real GDP does not reached its 2008 pre-crisis levels. Therefore, according to the above data we can conclude the following:

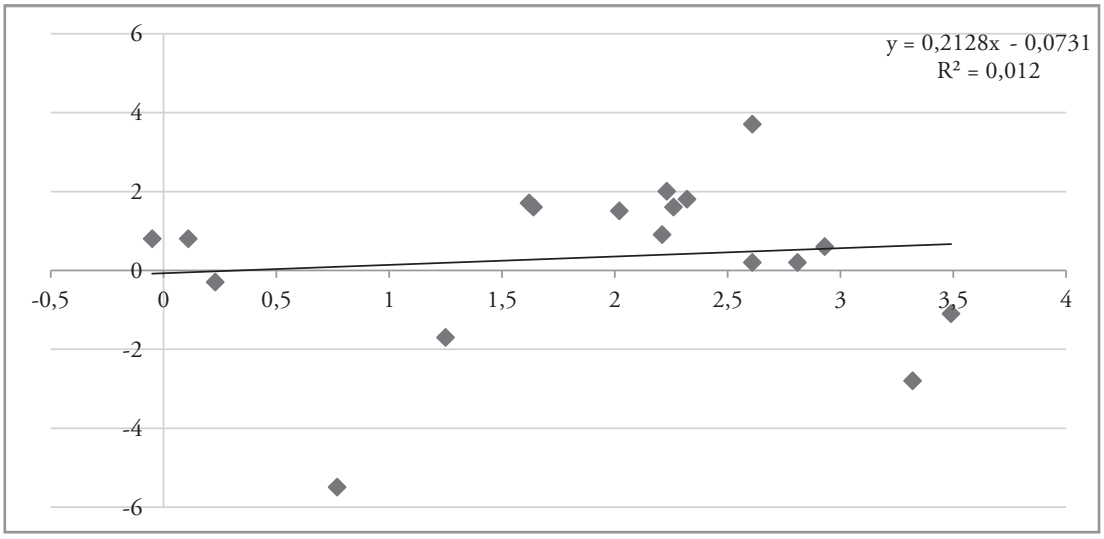
- in the period between 1980 – 1984 high inflation rates existed with low level economic slowing down
- in period between 1985 – 1996 moderate inflation rates coexist with relatively low growth rates of the economy
- in period between 1997 – 2016 low inflation rate was not a sufficient factor to launch the growth of the Italian economy which has been experiencing negative growth rates since 2009.

The results of statistical analysis of historical data are therefore consistent with findings of empirical studies conducted during 90s of the last century (Fisher, Barro).

5. ITALIA – REGRESSIVE ANALYSIS

Through regressive analysis between inflation rate and real GDP rate we have focused on data related to years covering period between Italy' entry into EMU and latest 2016. A dispersion diagram has been used to determine correlation between variables.

Graph 2 Scatter plot inflation and real GDP; 1999 – 2016



Source: Authors according to https://www.imf.org, Accessed 16 February 2017

Graph 2 clearly shows that the correlation between inflation and real GDP rates is weak. Than regressive analysis between inflation and economic growth in Italy was conducted.

Table 1 Regressive analysis of price growth and economic growth; Italy 1999 – 2016

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0,109529656
R Square	0,01199675
Adjusted R Square	-0,049753458
Standard Error	2,137642405
Observations	18

ANOVA						
	df	SS	MS	F	Significance F	
Regression	1	0,887759178	0,887759178	0,194278642	0,665276535	>0.05
Residual	16	73,11224082	4,569515051			
Total	17	74				

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-0,073095245	1,050764312	-0,069563883	0,945402793	-2,300616078	2,154425587	-2,300616078	2,154425587
Inflation (%) x	0,21278983	0,482767852	0,440770509	0,665276535	-0,810632295	1,236211958	-0,810632295	1,236211958

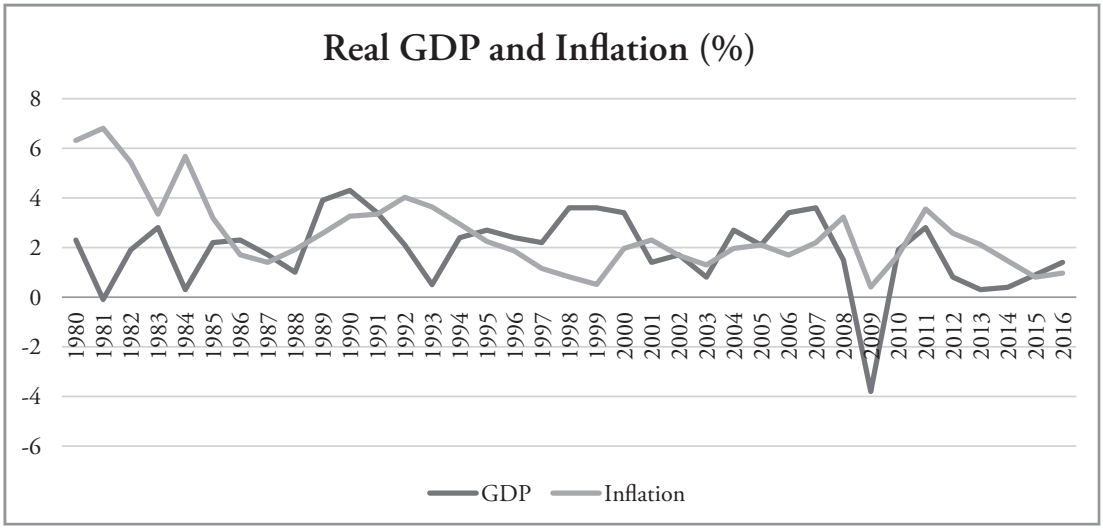
Source: Authors according to https://www.imf.org, Accessed 16 February 2017

Results suggest that statistically significant effect of inflation on GDP in Italy does not exist. One per cent increase in inflation results in 0.213 per cent increase in economic growth. The variation of 1.20% in GDP is explained by the impact of inflation.

6. AUSTRIA – COMPARATIVE ANALYSIS

Comparative analysis of real growth and inflation in Austria is based on 1980 – 2016 range historical data. These are presented within Graph 3 as follows.

Graph 3 Real GDP and inflation in Austria, 1980 – 2016



Source: Authors according to https://www.imf.org, Accessed 16 February 2017

One can state that Austria have had a moderate type of inflation before country entered the euro area. According to presented graph highest rates of inflation in Austria have been recorded beginning of 1980s. In period from 1980 to 1996 the inflation rate ranged within 1.4% to 6.8% rates. After Austria joined EMU immediate and medium term effects have been visible in low and stable inflation rates. In period between 1997 – 2016 inflation rate has been in range from 0.51% to 3.55%. Comparative analysis of dynamics of inflation and real GDP rates in Austria provides basis for following conclusions:

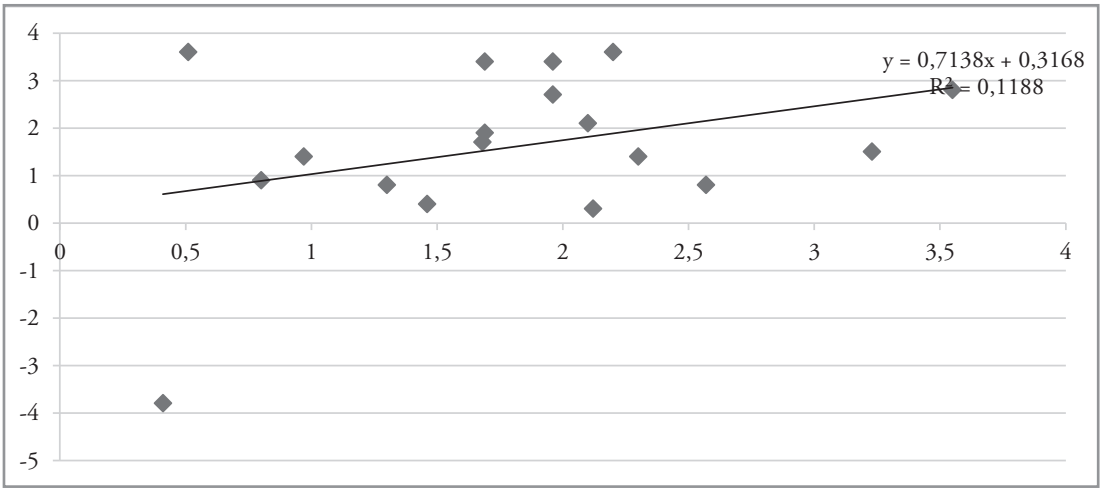
- while inflation rate was in decline and or has been maintained low it coincided with positive economic growth rates in the mid 1980s and 1990s
- decrease in prices coincided with real GDP growth recovery more recently.

Comparative analysis for Austria has thus confirmed consistency of empirical studies conducted during the last twenty years.

7. AUSTRIA – REGRESSIVE ANALYSIS

We have performed regressive analysis to investigate the nature of relationship between inflation and real economic growth rates for the historical period between Austria' entrance to EMU till 2016. Dispersion of phenomena; inflation and real GDP is shown in the diagram below.

Graph 4 Scatter plot inflation and real GDP; Austria 1999 – 2016



Source: Authors according to https://www.imf.org, Accessed 16 February 2017

As Graph 4 shows the correlation between inflation and economic growth was not significant. The regressive analysis of inflation and GDP growth in Austria for period from 1999 to 2016 is presented in Table 2.

Table 2 Regressive analysis of price growth and economic growth; Austria 1999 – 2016

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0,344713808
R Square	0,118827609
Adjusted R Square	0,063754335
Standard Error	1,686239177
Observations	18

ANOVA						
	df	SS	MS	F	Significance F	
Regression	1	6,135003449	6,135003449	2,15762746	0,161250051	>0.05
Residual	16	45,494441	2,843402562			
Total	17	51,62944444				

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0,316839232	0,963169989	0,328954635	0,746456479	-1,724989931	2,358668396	-1,724989931	2,358668396
Inflation (%) x	0,713750579	0,485912692	1,468886469	0,161250051	-0,316338312	1,74383947	-0,316338312	1,74383947

Source: Authors according to https://www.imf.org, Accessed 16 February 2017

The regressive analysis has confirmed that a statistically significant effect of inflation on GDP does not exist. One per cent increase in inflation would lead to an average growth GDP increase for 0.714 per cent. Inflation explains 11.88% variation of real GDP growth rates in Austria.

8. CONCLUSION

Macroeconomic policy is concerned achievements of notable so called macroeconomic goals. These goals are: increase of real GDP rates, achievements of high levels of productivity and internal and external competitiveness also export creation, achievements of high levels of employments (and attainment of low unemployment) last but no least achievement and maintenance of financial and in the course that a price stability. Analysing trends of inflation and real economic growth in two of comparable economies, Italian and Austrian, we have confirmed hypothesis that low inflation is important but not is the sufficient condition for economic growth.

In period for 1980 – 1984 historical data high inflation rates coexisted with low level of economic growth in Italy. In period between 1985 and 1996 a moderate inflation rate coexisted with relatively low growth of the economy and in period between 1997 and 2016 low inflation rate was not sufficient factor to launch the growth of the Italian economy which has been experiencing negative growth rates since 2009. Comparatively in Austria decline in inflation rates namely coincided with positive impact on the economic growth for period between 1980s and 1990s. Decrease in inflation rates coexisted with recovery of Austrian economy. But regressive analysis confirmed that a statistically significant effect of inflation on GDP does not exist. Economic growth a country is not determined only by the low inflation rate. It also depends on numerous of factors and it is result of the implementation of the national economic policies. Long-lasting implementation of the optimal monetary, fiscal and other economic policies is cumulatively a way towards stable and sustainable economic growth in an non-inflationary environment. Other factors important for GDP growth for example are: high saving and investment rates, educated labour force, technology progress, export orientation and political stability. Likewise continuous increase of R&D expenditures, a quality education system, implementation of the efficiency labour market policy, social and political stability mix is one way towards optimal growth.

REFERENCES

1. Andolfatto, D., 2005. Macroeconomic theory and policy. Simon Fraser University, Burnaby.
2. Barro, R. J., 1995. Inflation and economic growth. NBER Working Paper No. 5326.
3. Barro, R. J., 1997. Determinants of economic growth: a cross-country empirical study. NBER Working Paper 5698.
4. Busetti F., Forni L., Harvey A. and Venditti F., 2007. Inflation, convergence and divergence within the European Monetary Union. International Journal of Central Banking, Vol. 3, No. 2.
5. Cuaresma J. C. and Gnan E., 2006. ''Stubborn" Inflation in Austria? Proceedings of OnNB Workshops No. 8, pp. 11-27.
6. Datta, K., 2011. Relationship between inflation and economic growth in Malaysia. IPEDR Vol. 4.
7. European Commission, 2015. Macroeconomic imbalances, Country report – Italy 2015. Occasional papers 219.
8. European Commission staff working document, 2016. Country Report Austria 2016. SWD 88 final.
9. European Commission staff working document, 2016. Country Report Italy 2016. SWD 81 final.
10. Europska komisija, 2015. Preporuke po državama članicama. COM 250 final.
11. Europska komisija, 2016. Preporuka za PREPORUKU VIJEĆA o Nacionalnom programu reformi Austrije za 2016. i dostavljanju mišljenja Vijeća o Programu stabilnosti Austrije za 2016. COM 340 final.
12. Felice, E. and Vecchi, G., 2013. Italy's growth and decline, 1861. – 2011., Available at: http://papers.ssrn.com/paper.taf?abstract id=2339177 [Accessed 15 February 2017].
13. Fischer, S., 1993. The role of macroeconomic factors in growth. NBER Working Paper, No. 4565.
14. Ghosh, A. and Phillips, S., 1998. Warning: Inflation may be harmful to your growth. IMF Working Papers Vol. 45, No.4.
15. International Monetary Fund, Available at: https://www.imf.org. [Accessed 16 February 2017].
16. Istituto nazionale di statistica, Available at: https://www.istat.it. [Accessed 15 December 2016].

17. Krueger, D., 2009. Makroekonomika, Available through: Faculty of Economics and Business University of Zagreb Library website www.efzg.unizg.hr/default.aspx?id=12418 [Accessed 18 December 2016].

18. Mallik, G. and Chowdhury, A., 2001. Inflation and economic growth: Evidence from South Asian Countries. Asian Pacific Development Journal, Vol. 8, No.1.

19. Mamo, F. T., 2012. Economic growth and inflation. Master's Thesis, Södertörns University.

20. Mervar, A., 1999. Pregled modela i metoda istraživanja gospodarskog rasta; Available at: http://www.hrcak.srce.hr/indeks.php?show=clanak&id clanak jezik=30331 [Accessed 22 December 2016].

21. Morsy, H. and Sgherri, S. 2010. After the crisis: Assessing the damage in Italy. IMF, WP 10/244.

22. Mubarik, Y. A., 2005. Inflation and growth: An estimate of the threshold level of inflation in Pakistan. SBP-Research Bulletin, Volume 1, No. 1, pp .35-43.

23. Oesterreichische Nationalbank, Available at: https://www.oenb.at [Accessed 12 December 2016].

24. Paul, S., Kearney, C. and Chowdhury, K., 1997. Inflation and economic growth: a multi-country empirical analysis. Applied Economics, vol. 29, pp. 1387-1301.

25. Savin, D., 2008. Globalizacijski procesi i inflacija, Ekonomija - časopis za ekonomsku teoriju i praksu, 15(2), pp. 527-542, Zagreb.

26. Sidrauski, M., 1967. Rational choice and patterns of growth in a monetary economy. American Economic Review 57(2), pp. 534-544.

27. Statistik Austria, Available at: http://www.statistik.at [Accessed 10 December 2016].

28. Subacchi, P. and Tentori, D., 2013. Breaking the vicious circle: Restoring economic growth and flexibility in Italy. International Economics, IE BP 2013/02.