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THE CYCLICAL CHARACTER OF ECONOMIC POLICY IN SERBIA 2001-2012

ABSTRACT: *This paper investigates the cyclical character of economic policy in Serbia in the period 2001-2012. For this purpose the cyclical movement of the following monetary and fiscal variables have been analysed: M2 money supply, the retail price index, the consumer price index, and the real effective exchange rate as the monetary policy indicators, and budget revenues and budget expenditures as the fiscal policy indicators. In the evaluation of the cyclical character of the economic policy, cross-correlation between the cyclical component of economic policy indicators and the gross domestic product at various lags has been observed. The results of cross-correlation analysis suggest that the budget expenditures are countercyclical and lead the aggregate cycle while the budget revenues are procyclical. The cyclical character of M2 money supply in the Serbian economy is somewhat contradictory, so further investigations of the cyclical character of monetary policy and mutual interdependence of money and output are required. The real effective exchange rate is countercyclical. The prices are procyclical and lag behind the cycles in aggregate economic activity. The procyclical character of prices indicates that the causes of the cyclical fluctuations of aggregate economic activities in Serbia in the period from 2001 to 2012 were on the demand side.*

KEY WORDS: *growth cycles, countercyclical economic policy, Serbia*

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1. INTRODUCTION

This paper presents the results of research the objective of which was to investigate the cyclical character of economic policy in Serbia in the period from 2001 to 2012. The research involved the analysis of the cyclical movement of the most important macroeconomic variables – the indicators of monetary and fiscal policies. The investigation of whether the economic policy in the observed period was countercyclical or procyclical was based on the analysis of the cyclical movement of these variables and cross-correlation with the aggregate cycle. The research analysed of the following economic policy variables: M2 money supply, the retail price index, the consumer price index and the real effective exchange rate as the monetary policy indicators, and budget revenues and budget expenditures of the Republic of Serbia as the fiscal policy indicators.

The research was carried out in the tradition of the following empirical research on business cycles and economic policy in developing and emerging market economies and in Central and Eastern European (CEE) countries: Agénor, McDermott, and Prasad (2000) on a sample of 15 countries; Rand and Tarp (2001) on a sample of 50 developing countries of several regions; Lane (2003) on a sample of 5 East Asian countries and 19 Latin American countries; and finally, Benczúr and Rátfai (2005) on a sample of 12 Central and Eastern European countries. These studies analysed the cyclical movement of the most important macroeconomic variables as well as the indicators of economic policy in order to determine the main features of business cycles and investigate the effects of economic policy on macroeconomic fluctuations. The methodology used in these studies included the identification of trend in the series, the extraction of the cyclical component from the series, and the identification of turning points and phases of cycles in the cyclical component extracted. This is the "growth cycle approach" in the analysis of business cycles, which observes cyclical fluctuations in macroeconomic time series around the long-term trend, and is different from the "classical approach", which observes fluctuations in the level of economic time series. Upon the identification of cycles, the cross-correlation of the cyclical component of macroeconomic variables with the aggregate cycles (i.e., with the cyclical component of GDP) is analysed in order to determine the main features of business cycles and investigate the cyclical character of economic policy. The same procedure – the trend estimation, the extraction of cyclical component, and the cross-correlation analysis – has been used in this paper.

Up until the global economic crisis (2007-2009) and its spillover to the Serbian economy in 2008, economic policy in Serbia was not conducted in the context

of cyclical fluctuations. In the first years following the change in economic and political system in 2000, economic policy in Serbia was conducted as a function of macroeconomic stabilization. The economic policy measures should have enabled full functioning of market economy institutions, the affirmation of private property, the reduction of state regulation in the economy, and the operationalization of economic laws. The transition towards a market economy also included important structural reforms which had been postponed for years in the Serbian economy, such as privatization, the adoption of important laws, the creation of a favourable business environment, the reform of the banking system, and the development of a financial market.

After the first years of transition, during which the attention of economic policy creators was primarily focused on macroeconomic stabilization and structural reforms, economic policy shifted towards the other objectives. In 2007 the Ministry of Finance of the Republic of Serbia proclaimed the following economic policy objectives: "Economic policy objectives for the year 2008 and the two subsequent years will be macroeconomic stability, dynamic economic growth, higher employment and better standard of living, expedited EU Stabilization and Association Process, expedited economic reforms, more balanced regional development" (The Republic of Serbia, the Ministry of Finance, 2007, p. 14). So, up until the global economic crisis, the economic policy in Serbia was a mixture of stabilization and development policy. When the global economic crisis spilled over into Serbia in late 2008 and the beginning of 2009, economic policy changed to a certain extent, and although economic policy measures remained undefined in the context of cyclical fluctuations, they were already aimed at maintaining macroeconomic and financial stability and mitigating the impact of the global economic crisis: "Economic policy in 2010 and in the following two years will be focused on maintaining macroeconomic and financial stability and economic recovery, while mitigating the unfavourable impact of the global economic crisis on the Serbian economy" (The Republic of Serbia, the Ministry of Finance, 2009, p. 2).

Although the economic policy in Serbia in 2001 to 2012 was not conducted in the context of cyclical fluctuations, this paper shows that it is possible to identify its cyclical character and its effects on economic activity and macroeconomic fluctuations. After the Introduction the second part of the paper presents the data and methods used in the research. In the third part of the paper the turning points and the phases of growth cycles in Serbia are identified. The fourth part of the paper is about fiscal policy. The budget revenues and the budget expenditures of the Republic of Serbia have been analysed as well as "the fiscal impulse", defined as the ratio of budget expenditures to budget revenues. The fifth part of

the paper analyses the M2 money supply, the real effective exchange rate, and the price indices – the retail price index and the consumer price index. Finally, at the end of the paper, the research results are summarized.Special attention in the paper is dedicated to the cyclical movement of prices and the correlation of prices with aggregate cycle. It was expected that positive or negative correlation might suggest if the causes of cyclical fluctuations in economic activity in Serbia in the observed period were on the supply side or on the aggregate demand side. It is known from economic theory that "the price level will be countercyclical if real disturbances cause an aggregate supply curve to shift along a given aggregate demand curve" and that "fluctuations brought about by shifts of the aggregate demand curve generate observations of a procyclical price level." (Snowdon and Vane, 2005, p. 330) For the developed market economies the most frequent result in empirical studies is that prices are procyclical and that they lag behind the cycles in economic activity (cross-correlation coefficients are positive at positive lags), while for the developing economies and the emerging market economies the prices are most often countercyclical, although they may be procyclical as well, depending on the types of shocks that hit these economies. The purpose of the research was to examine whether these theoretical guidelines might be used to determine the causes of cyclical fluctuations in Serbia as well.

2. DATA AND METHODS: THEORETICAL CONCEPTS OF COUNTER CYCLICAL ECONOMIC POLICY.

The research analysed the cyclical properties of several important macroeconomic variables, that is, of monetary and fiscal policy indicators which are representative of Serbian economic policy. Based on the analysis of cross-correlations with the aggregate cycle, we examined whether economic policy from 2001-2011 was pro-cyclical or counter-cyclical and in which areas (monetary policy, fiscal policy, etc.). The following variables were examined: money supply M2, the retail price index, and the real effective exchange rate as the monetary policy variables, and a series of public revenues and public expenditures – budget revenues and budget expenditures of the Republic of Serbia - as the fiscal policy variables. The turning points and phases of the aggregate cycle were dated on the cyclical component of the series of quarterly gross domestic product (the series of gross domestic product is in million dinars, in constant prices of the previous year, the referent year being 2010). The variables were chosen so that they would first be representative of a certain policy, and then, for the purpose of comparability, so that the research results could be compared to the results of empirical research on business cycles and economic policy in developing and emerging market economies as well as in the CEE countries, in which these variables have also been used.

The research uses data from the Statistical Office of the Republic of Serbia, the Ministry of Finance, and the National Bank of Serbia. Quarterly, seasonally adjusted data of the series were used. The analysed period includes the first quarter of 2001 through the fourth quarter of 2012.[1] This is the period of transition, in which for the first time in Serbia a relatively consistent macroeconomic policy was conducted, so that the character and the results of the implementation of this policy may be summarized. In respect of the cycles, this period encompased the 2001 recession and the 2007-2009 recession in the developed market economies which were of global importance, the second having a particularly large impact on Serbia.

The cyclical component of the series is obtained by dividing seasonally adjusted data of the series by trend and then multiplying by 100. In this way the obtained cyclical component of the series oscillates around the value 100 and becomes comparable with the cycles in the series of gross domestic product. The trend is estimated using the Hodrick–Prescott (HP) filter ($\lambda=1600$). Due to the well-known fact that HP trend gives unreliable estimates of the long-term component at the end of the sample, the estimation of trend in the series was carried out, whenever possible, on a somewhat longer sample that included the available data from the year 2013. After the extraction of the cyclical component from the series, the data for 2013 were left out and the sample was adjusted to the desired period of analysis, in other words until the end of 2012.

In the process of identifying growth cycle and the phases of cycles the OECD methodology for identifying cycles in the OECD System of Composite Leading Indicators (OECD, 2012) is used.[2] The OECD methodology consists in estimating trend by applying the HP filter, extracting the cyclical component by dividing the value of the series by trend and multiplying by 100, and identifying turning points of cycles on cyclical components extracted by applying certain criteria. Similar methodology has been used in empirical studies of cycles and economic policy for developing countries and emerging market economies. In the OECD methodology cyclical analysis is based on the descriptive statistics of the growth cycle, which includes determining the peak and the troughs (the so-called "reference chronology"), determining the length and the individual phases of the cycle and calculating the amplitude of the cycle (given as percentage deviation

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[1] Due to the change in calculation methodology of gross domestic product, there are no comparable data for gross domestic product before 2001.

[2] OECD determines the chronology of turning points for member countries and the other countries and calculates Composite Leading Indicators as a tool for short-term forecasting of business cycles. See http://www.oecd.org/std/leading-indicators/ .

from trend), so these indicators have also been used in the cyclical analysis of the Serbian growth cycle.

The cross-correlation between the cyclical component of the variables and the aggregate cycles was analysed to evaluate the cyclical character of the variables and the economic policy represented by a variable. The literature analyses the following: correlation at zero lag (in Rand and Tarp, 2001), and cross-correlation coefficient at lags up to t ± 4 (in Benczúr and Rátfai, 2005) or only at the fourth and the eighth lag (in Agénor at al, 2000). The lag when the cross-correlation coefficient is the highest suggests whether the variable leads or lags behind the aggregate cycle: if this coefficient is the highest at negative lags, the series leads the aggregate cycle and the economic policy measures which the variable represents precede the changes in aggregate economic activity; if the time lag is positive then the series lags behind the aggregate cycle. If the correlation coefficient is the highest at zero lag, the series coincides with the aggregate cycle. The negative cross-correlation coefficient suggests the countercyclical character of the variable and the economic policy the variable represents, while the positive cross-correlation coefficient suggests the procyclical character of the variable, or the economic policy. However, the macroeconomic variables show inconsistent behaviour at various lags, with the cross-correlation coefficient changing sign from lag to lag, which is difficult to explain. This is a consequence of the fact that in developing countries and emerging market economies, as well as in the Central and Eastern Europe economies which used to be or still are in transition, the macroeconomic variables are affected by various shocks which influence their cyclical movement and the relationships between variables. In addition to this, economies like Serbia's are undergoing structural change and their economic policy is not consistent over time, which together influence the relationships between variables. This is why in this paper the cross-correlation over a longer time period has been carefully observed and analysed, at lags up to t ± 8 for fiscal variables and up to t ± 12 for monetary variables. The fact that correlation by itself does not imply causality has also been taken into consideration during the analysis and interpretation of the obtained results.

Finally, after the analysis of correlation of prices with the aggregate cycle and after determining the causes of cyclical fluctuations, research was carried out to try to find recommendations for conducting theoretical countercyclical economic policy in Serbia. Theoretical concepts concerning macroeconomic policies and cyclical fluctuations are well known from economic policy and business cycle theory, starting from the Keynesian approach to business cycles and economic policy based on aggregate demand management, through the monetarist view on

business cycles, the concept of targeting monetary aggregates, and the monetarist approach to economic policy summarized in a famous monetarist maxim, "rules versus discretion". Then there are the tenets of the New Classical Macroeconomics on inefficiency of economic policy under the conditions of rational expectations and Robert Lucas' Equilibrium Model of the Business Cycle in which the key concept is an unanticipated monetary shock. According to the Real Business Cycle Theory, business cycles are not only a temporary deviation from a long-term trend, but the changes in output and employment are permanent. The fluctuations of economic activity represent a continuous state of equilibrium in which there is no need for government intervention and stabilization. The fluctuations are stochastic in nature, and the main cause of fluctuations lies in the productivity shocks, which are the consequence of technological changes. The goal which economic policy should strive for is better understanding of the factors which influence the technological progress. The Political Business Cycle theories highlight the influence of political decisions in the creation of economic policy, whereby the goals and measures of economic policy regarding inflation and unemployment depend on the opportunistic and ideological orientation of the government. Finally, the New Keynesian Theory emphasizes the importance of nominal and real rigidities in contemporary economies and the imperfection of market mechanisms as the key causes of cyclical fluctuations, which is why government intervention in the economy as well as countercyclical economic policy is reaffirmed through management of aggregate demand and aggregate supply.

After determining the causes of cyclical fluctuations and carrying out cyclical analysis, the elements of these macroeconomic theories regarding the causes, manifestation, and consequences of cyclical instability were looked for in the cyclical movement of economic activity of Serbia. It was pointed out that in the future, economic policy in Serbia should be formulated in the context of cyclical fluctuations, taking into account recommendations of economic theory.

3. TURNING POINTS AND PHASES OF CYCLES IN AGGREGATE ECONOMIC ACTIVITY

Having identified the trend in the series of gross domestic product by applying the HP filter, the cyclical component of gross domestic product is obtained by dividing the series by trend and multiplying by 100. Then the turning points and phases of growth cycles in aggregate economic activity were identified in the cyclical component extracted. The cycle is defined as a time span between

two turning points of the same nature (in this paper, between two troughs). The expansion phase is the period between trough and peak, in which economic activity rises above the trend, while the slowdown phase is the period between peak and trough, in which the economic activity declines below the trend. The criteria for identification of turning points and the phases of growth cycle prescribed by the Organization for Economic Development and Cooperation (OECD) were used to identifiy the turning points. These criteria include (OECD, 2012, p. 12): the phase duration (from peak to trough or trough to peak) must be at least 5 months; the cycle duration (from either peak to peak or trough to trough) must be at least 15 months; in case of a flat turning point zone or a double peak or trough in the turning point zone, the most recent value is selected as the turning point; extreme values are ignored if their effect is short-lasting and fully reversed. The purpose of the criteria is to ensure the alternation of peaks and troughs and duration of the phases of not less than 9 months, and, for the whole cycle, not less than 2 years.

Figure 1 presents the cyclical movement of the Serbian economy in the period 2001 to 2012. The shaded fields represent slowdown phases in the GDP growth cycle.

Figure 1 - Growth Cycles in Serbian Economic Activity 2001-2012

Cyclical component of Gross Domestic Product
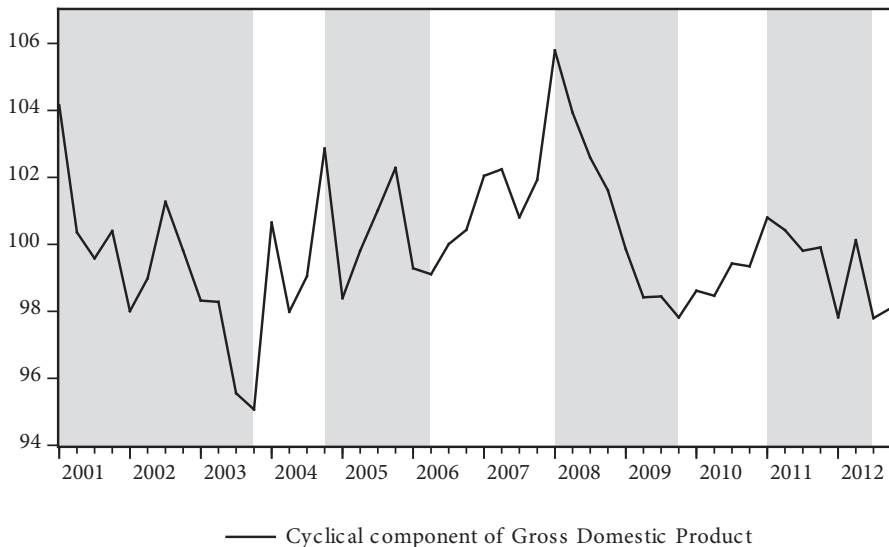
Source: Author's calculation

Observed from trough to trough, it is possible to identify three whole cycles in the economic activity of Serbia for the period 2001-2012, the slowdown phase of the cycle which started before 2001, and the expansion phase of the cycle which started after the trough in the third quarter of 2012. The first peak, dated in the first quarter of 2001, should be treated with caution, considering that the entire slowdown phase at the beginning of the observed period could only be part of the slowdown phase of a longer cycle, which began before 2001. The last trough in the third quarter of 2012 should also be treated with caution.

Although Serbia did not experience a transitional recession like other countries of Central and Eastern Europe, due to privatization and restructuring in the first phase of transition there was a slowdown in growth, which manifested as a slowdown phase at the beginning of the observed period. The second slowdown, which started at the end of 2004, can be explained by a decline in aggregate demand due to structural changes in the economy and the introduction of value added tax (VAT) into the fiscal system of Serbia in 2005. The third slowdown, which started after the peak at the beginning of 2008, is obviously a consequence of the spilling over of the global economic crisis to Serbia. The last slowdown, which started in the first quarter of 2011, also reflects what was happening in both the world and European economies: after a short recovery from the global economic crisis in 2010 the developed market economies and Serbia's most important foreign-trade partners recorded another slowdown phase in the second half of 2011 and in the course of 2012.

Table 1 summarizes the peaks and troughs of the cycles and the phase duration per quarter.

Table 1. Turning points of cycles and duration of phases

	Turning points of cycles			Duration (quarters)		
	Trough	**Peak**	**Trough**	**Expansion**	**Slowdown**	**Cycle**
Cycle No 1	-	2001Q1	2003Q4	-	11	-
Cycle No 2	2003Q4	2004Q4	2006Q2	4	6	10
Cycle No 3	2006Q2	2008Q1	2009Q4	7	7	14
Cycle No 4	2009Q4	2011Q1	2012Q3	5	6	11
Cycle No 5	2012Q3	-	-		-	
Average[1]				5,3	6,3	11,7

1) For entire cycles only (from trough to trough)
Source: Author's calculation

It can be seen from Table 1 that the average duration of the expansion phases was 5.3 quarters, and the average duration of slowdown phases was 6.3 quarters. The average duration of the cycles was 11.7 quarters (three years). The oscillations in the growth cycles can be described as moderate. The standard deviation of the cyclical component of gross domestic product is 2.05, which is approximately at the level of other Central and Eastern European countries (the average standard deviation for those countries determined in Benczúr and Rátfai, 2005, was 2.18).

Let us now consider the effects of economic policy. Are fluctuations in economic activity somehow related to economic policy measures? The question of how to qualify the causes of macroeconomic fluctuations is also significant, considering that the consequences of shocks on both the supply and aggregate demand sides respectively can be recognized in these fluctuations.

4. FISCAL POLICY

Until 2005, fiscal policy in Serbia was predominantly restrictive, but since 2006 with the beginning of the National Investment Plan (NIP) it has become expansive and salaries in the public sector have grown. How did fiscal policy correspond with the cyclical movement of aggregate economic activity in the period 2001-2012? Fiscal expansion after 2006 coincided with the general economic expansion in this period, so at first sight the fiscal policy looks procyclical. This impression, however, should be verified statistically.

The cyclical character of fiscal policy was analysed using quarterly seasonally adjusted data of the Serbian budget revenue and budget expenditure series. The budget revenue and expenditure data are published by the Serbian Ministry of Finance in its Public Finance Bulletin, available from January 2003.

Empirical research dealing with developing and emerging market economies use goverment revenue and expenditure as the indicators of fiscal policy in the form of real growth rates (Agénor at al, 2000), or use real revenue and real expenditure obtained by deflation of nominal values (Rand and Tarp, 2001) and public revenue and public expenditure expressed in constant prices (Benczúr and Rátfai, 2005). In this paper the Serbian budget revenue and expenditure are deflated by price indices in the following manner: until the end of 2010 deflation was carried out by dividing the series by the base retail price index (RPI) (2005=100), and from 2010 on by the base consumer prices index (CPI)(2006=100). Deflation was carried out in this way since in January 2011 the Statistical Office of the Republic

of Serbia stopped using the retail price index as a measure of inflation and started using the consumer price index (the consumer price index has been published since January 2007). Analyses have shown that the movement of the consumer price index is similar to the that of the retail price index: "Historical data on the consumer price index since January 2006 show similarity in movement and level of volatility of the CPI and RPI in the period observed" (National Bank of Serbia, 2007, p. 11).

After deflation and estimation of trend using the HP filter, the series was divided by the trend and multiplied by 100 to obtain the cyclical component of the series. Then it was compared with the aggregate cycle and the coefficients of cross-correlation on positive and negative lags were analysed.

The cyclical component of real budget expenditures shows a cyclical pattern which at first sight looks procyclical (the graphs representing the cyclical component of the series are given in the Appendix). However, the final effect of budget expenditure on economic activity is counter-cyclical: government expenditures lead in comparison to the aggregate cycle and the coefficient of cross-correlation is the highest and negative at t-6 and t-7, whereas it is $r = -0.51$ at t-7.

Table 2 shows the coefficients of cross-correlation between cycles of gross domestic product and real budget expenditure at lags up to t±8 together with the corresponding probabilities.

Table 2. Cross-correlation between GDP and real budget expenditure.

Lag	t	t-1	t-2	t-3	t-4	t-5	t-6	t-7	t-8
r	0,04	0,13	0,12	-0,09	-0,16	-0,14	-0,38	-0,51	-0,16
p-value	0,80	0,42	0,47	0,59	0,21	0,40	0,03	0,00	0,37
Lag	**t**	**t+1**	**t+2**	**t+3**	**t+4**	**t+5**	**t+6**	**t+7**	**t+8**
r	0,04	0,04	0,01	0,03	0,01	0,05	-0,08	-0,11	0,01
p-value	0,80	0,80	0,96	0,87	0,93	0,76	0,63	0,50	0,93

Note: The interval confidence at a 5% significance level is in the range of_
Source: Author's calculation

The results obtained are consistent with predictions of the IS-LM model of the effects of fiscal expansion under a regime of flexible exchange rates with imperfect capital mobility. According to the IS-LM model, fiscal expansion under a regime of flexible exchange rates with imperfect capital mobility results in an inflow of capital and leads to an appreciation of the exchange rate and decline in output

(i.e., a slow-down of growth). In a situation of capital inflow and appreciation of domestic value, fiscal policy loses its efficiency: "In this situation fiscal policy will be less effective in influencing output and employment as exchange rate appreciation will partly offset the effects of fiscal expansion on aggregate demand" (Snowdown and Vane, 2005, p.132). Exchange rate appreciation offsets the effects of fiscal expansion on aggregate demand since, due to strengthening of the domestic currency, the foreign demand for domestic products declines, while at the same time the demand for foreign products and imports rises, so there is a so-called 'leakage' effect through exports, whereas part of the growth in aggregate demand which is the result of fiscal expansion is 'lost' through import growth. This is exactly the case of Serbia, where in the period from 2001 to 2009 the inflow of some 12.3 bilion EUR of foreign direct investment and some 17.0 bilion EUR of credit were recorded. The true expansion of foreign capital inflow happened after 2005 and 2006, which coincided with the fiscal expansion of 2006.

In the countries of Central and Eastern Europe fiscal policy was most often procyclical: "Government consumption tends to be procyclical, though often just weakly so. Croatia and Latvia are countercyclical, Estonia and Hungary acyclical" (Benczúr and Rátfai, 2005, p. 14). In Croatia the coefficient of cross-correlation is the highest at t-4 and in Latvia at t-3, and if Hungary and Estonia, where government expenditures are acyclical, are left out, in the remaining six Central and Eastern European countries government expenditures are procyclical. In the emerging market economies, "Non-counter-cyclical government consumption is typical in all regions. Government seems to have a limited stabilizing role on the economy" (Rand and Tarp, 2001, p. 32). The procyclical character of fiscal policy in these economies is in most cases the consequence of a lack of fiscal discipline and the growth of government expenditure in the phases of expansion, although sometimes it can be caused by the characteristics of the tax system. Moreover, "Procyclical tendencies are likely to be most pronounced in countries characterized by political systems with multiple fiscal veto points and where output volatility is higher" (Lane, 2003, p.98).

The budget revenues of the Republic of Serbia are, as expected, procyclical: the coefficient of correlation at zero lag is positive and is $r = 0.37$, while at t-3 it is somewhat higher and is $r = 0.41$. Hence, budget revenues lead the aggregate cycle. This is not logical at first sight, but it can be explained in several ways. For instance, it is possible that such a result was influenced by increased inflow into the budget due to increased fiscal discipline in the first phase of transition. Alternatively it could be the consequence of the growth of tax rates, which also

occurred in this period; and finally, it could be caused by the characteristics of Serbia's tax system.

Table 3 shows the coefficients of cross-correlation between GDP and real budget revenue at lags up to t±8, together with the corresponding probabilities.

Table 3 Cross-correlation between GDP and real budget revenue.

Lag	t	t-1	t-2	t-3	t-4	t-5	t-6	t-7	t-8
r	0,37	0,27	0,30	0,41	0,11	0,22	0,26	0,36	0,01
p-value	0,02	0,09	0,06	0,01	0,50	0,18	0,14	0,16	0,96
Lag	t	t+1	t+2	t+3	t+4	t+5	t+6	t+7	t+8
r	0,37	0,17	0,00	-0,03	-0,05	-0,13	-0,17	-0,12	0,44
p-value	0,02	0,29	0,99	0,85	0,77	0,44	0,29	0,48	0,01

Note: The interval confidence at a 5% significance level is in the range of_
Source: Author's calculation

Finally, the 'fiscal impulse'was analysed, defined as the ratio of budget expenditures to budget revenues. In the developing economies Agénor at al. (2000) found that the fiscal impulse was negatively correlated with the business cycle, either contemporaneously or at short lags. For Serbia the fiscal impulse is countercyclical and the coefficient of cross-correlation is the highest at t-6 and is $r = -0.66$.

Table 4 presents the coefficients of cross-correlation between GDP and fiscal impulse at lags up to t±8, together with corresponding probabilities.

Table 4. Cross-correlation between GDP and fiscal impulse

Lag	t	t-1	t-2	t-3	t-4	t-5	t-6	t-7	t-8
r	-0,46	-0,32	-0,37	-0,60	-0,45	-0,50	-0,66	-0,41	-0,33
p-value	0,00	0,051	0,02	0,00	0,01	0,00	0,00	0,02	0,06
Lag	t	t+1	t+2	t+3	t+4	t+5	t+6	t+7	t+8
r	-0,46	-0,23	-0,09	0,04	0,03	0,12	0,11	0,07	0,31
p-value	0,00	0,16	0,57	0,83	0,86	0,50	0,53	0,71	0,08

Note: The interval confidence at a 5% significance level is in the range of_
Source: Author's calculation

Generally speaking, what would be a desirable character for fiscal policy? First of all, it is desirable for fiscal policy to be countercyclical and have negative

correlation coefficients. How high and at which lags depends on the size of the automatic stabilizers and capital investments (countercyclical influence, negative correlation coefficient, and public expenditures either lead or coincide) and on the measures of discretionary policy undertaken at the moment when the crisis sets in (negative correlation coefficient and public expenditures either coincide or lag). In studies for developed market economies these two components are often analysed separately. Moreover, in developed market economies the availability of public revenue and expenditure series over a long period of time allows for more complex analysis, such as the analysis of cyclically adjusted balance (budget balance adjusted for the effects of automatic stabilizers), with the same logic: negative correlation is a sign of countercyclical policy character and positive correlation is a sign of procyclical policy character. Fiscal policy in developed market economies is somewhat more favourable: "Cyclically-unadjusted balances are positively correlated with the output gap or GDP growth, implying an improving balance during an expansion and a worsening balance during economic slow-downs. In other words, overall fiscal policy (including automatic stabilisers and discretionary actions) was counter-cyclical", although "Discretionary fiscal policy, as measured by cyclically-adjusted balances, are less well correlated with the output gap or GDP growth: discretionary fiscal policy was neutral or at best weakly counter-cyclical. Nevertheless, at the individual country level, discretionary fiscal policy was strongly counter-cyclical in Australia, Canada, Denmark and the United States and strongly pro-cyclical in Austria, Belgium, Hungary, the Netherlands, Poland, Portugal and the United Kingdom over the period from 1970 to 2008" (Egert, 2010, p. 5).

According to National Bank analyses using a somewhat different methodology based on the analysis of structural deficit (cyclically adjusted deficit, i.e., deficit adjusted for the effects of automatic stabilizers), the character of fiscal policy in Serbia in the first years of transition was procyclical and then became countercyclical after the spillover of the global economic crisis in 2008. In addition, "it seems that the shift in the character of fiscal policy is not a consequence of discretionary changes, but rather of the budget being in permanent deficit, which inevitably makes fiscal policy countercyclical in times of economic slow-down" (National Bank of Serbia, 2010, p. 32). However, so far the Government of the Republic of Serbia has only reacted using measures of discretionary fiscal policy in the form of loans and subventions (in the course of the latest economic crisis and recession of 2009-2010), so it is unlikely that this would manifest in the cross-correlation coefficients. This is why the results presented here speak more about the national economy's manner of functioning and the transmission mechanisms operating

in the economy than about the manner in which the government responds in critical conditions with measures of discretionary fiscal policy.

5. MONETARY POLICY

Although the recent studies of the cyclical character of monetary policy in developed economies are increasingly based on the analysis of the interest rate (see OECD, 2010), the importance of M2 money supply in these analyses remains very large. M2 money supply is used as an indicator of monetary policy in empirical studies of cycles in developing and emerging market economies, as well as in developed market economies, in which empirical research records higher correlation between M2 and GDP than between other monetary aggregates. M2 money supply has the function of means of payment and determines the level of liquidity of an economy, i.e., the possibility of realization of nominal gross domestic product. It represents liquidity from domestic sources and is an indicator of domestic credit activity, which influences economic activity. Procyclical M2 money supply that leads in relation to economic activity, the most frequent result for developed market economies, suggests the positive influence of this liquidity and credit activity on economic activity and implies the possibility of using monetary policy for countercyclical purposes. The time lag by which M2 money supply leads in relation to economic activity is interpreted in literature as an indicator of the speed at which the changes in monetary policy transfer into real economic activity.

The results of correlation between M2 money supply and aggregate cycle in developing and emerging market economies are versatile, and the correlation at zero lag is most often positive, although low (Agénor at al., 2000). In 7 out of 12 observed countries of Central and Eastern Europe, M2 money supply is procyclical, and in 5 of the 7 it leads in relation to the aggregate cycle (Benczúr and Rátfai, 2005). In some of these countries high coefficients of both signs at various lags are observed. In Serbia the situation is somewhat specific: the coefficient of cross-correlation is significant from t-4 to t-11 at negative lags and from t+3 to t+9 at positive lags, while the sign of the coefficient of cross-correlation at negative lags is negative, and at positive lags is positive and approximately of the same value. This implies certain symmetry in the movement of money supply in relation to the movement of the cycle and the symmetry of M2 money supply cycles themselves. The cycle symmetry is even more visible if the movement of real M2 money supply is observed (see graphs in the Appendix). The highest values of the coefficient of cross-correlation are at t-8 ($r = -0.50$) and t+6 ($r = 0.54$).

Table 5 presents the cross-correlation coefficients of the cycles of GDP and M2 money supply at lags up to t±12, together with the corresponding probablities.

Tabela 5. Cross-correlation between GDP and M2

Lag	t	t-1	t-2	t-3	t-4	t-5	t-6	t-7	t-8	t-9	t-10	t-11	t-12
r	0,20	0,06	-0,11	-0,26	-0,40	-0,48	-0,46	-0,48	-0,50	-0,46	-0,44	-0,40	-0,29
p-value	0,17	0,68	0,46	0,08	0,01	0,00	0,00	0,00	0,00	0,00	0,01	0,02	0,09
Lag	t	t+1	t+2	t+3	t+4	t+5	t+6	t+7	t+8	t+9	t+10	t+11	t+12
r	0,20	0,19	0,24	0,34	0,40	0,48	0,54	0,47	0,44	0,41	0,28	0,17	0,06
p-value	0,17	0,20	0,10	0,02	0,00	0,00	0,00	0,00	0,00	0,01	0,07	0,30	0,69

Note: The interval confidence at a 5% significance level is in the range of_
Source: Author's calculation

The results obtained illustrate the movement of money supply and monetary policy since 2001. On the one hand we had the central bank, which in the first years of transition remonetized money supply and boosted economic acitivity, which was declining due to layoffs, privatization, and restructuring of the economy, and then we have a growth of money supply under conditions of capital inflow after 2005, as a result of strong credit activity in the phase of economic expansion. Within one sample there is money supply that acts countercyclically in the first years of transition and money supply that adjusts to the general expansion after 2006, which is reflected through cross-correlation.

The Granger causality test was applied to further investigate the mutual interdependence of M2 money supply and output, i.e., GDP. However, the results of the Granger causality test differ depending on the number of lags in the VAR model. At the 5% level of significance for k=2 the zero hypothesis is rejected that there exists no causality between the money supply cycle and GDP, and the alternative hypothesis is accepted, that money causes cycles in GDP in the sense of Granger. The zero hypothesis that cycles in GDP do not cause cycles in money supply is accepted. However, for k=3 the zero hypothesis that the GDP cycles do not cause the money supply cycles is rejected, and the alternative is accepted, that the GDP cycles cause the M2 money supply cycles in the sense of Granger, while the zero hypothesis that the money supply cycles do not cause the GDP cycles cannot be rejected (for k=4, nor do the money supply cycles cause the cycles in GDP or the cycles in GDP cause the cycles in money supply). The application of multi-dimensional AIC and SC criteria suggests that two is an optimum number of lags for which the causality is determined; however, for the time being we shall cautiously conclude that further investigation is required on the mutual

relationship between these variables. The results of the Granger causality test for k=2 and k=3 are shown in Table 6.

Tabela 6. Granger causality test: the cycles of GDP growth and the cycles of M2 money supply

Zero hypothesis, k=2	F statistics	*p*-value
Cycles in M2 do not cause cycles in GDP	3,28458	0,04752
Cycles in BDP do not cause the cycles in M2	2,47514	0,09664
Zero hypothesis, k=3	**F statistics**	***p*-value**
Cycles in M2 do not cause cycles in GDP	2,32737	0,08998
Cycles in GDP do not cause cycles in M2	3,20819	0,03373

Note: Critical F statistics value for the 5% significance level amounts to _, while the critical value for _. The total scope of the sample is 48 observations (effectively T-2=46, in other words T-3=45, depending on the number of lags).

Source: Author's calculation

The series real effective exchange rate is the index series and is in a form suitable for cyclical analysis: real exchange rate is around value 100, whereas the index below 100 suggests the depreciation of real effective exchange rate, and the index above 100 suggests the appreciation of real effective exchange rate. The cross-correlation analysis suggests that the real effective exchange rate is countercyclical in character. The sign of the coefficient of correlation is negative and significant at the lags from t-8 to t-10, and the highest is at t-10 and is $r = -0.41$.

Table 7 presents the cross-correlation coefficients of the GDP and real effective exchange rate cycles at lags up to t±12, together with the corresponding probabilities.

Table 7. Cross-correlation between GDP and real effective exchange rate

Lag	t	t-1	t-2	t-3	t-4	t-5	t-6	t-7	t-8	t-9	t-10	t-11	t-12
r	0,19	0,07	0,01	-0,06	-0,16	-0,08	-0,08	-0,20	-0,33	-0,35	-0,41	-0,30	-0,08
p-value	0,20	0,65	0,95	0,67	0,30	0,63	0,60	0,20	0,03	0,03	0,01	0,07	0,63
Lag	**t**	**t+1**	**t+2**	**t+3**	**t+4**	**t+5**	**t+6**	**t+7**	**t+8**	**t+9**	**t+10**	**t+11**	**t+12**
r	0,19	0,26	0,25	0,17	0,10	0,02	-0,08	-0,13	-0,13	-0,20	-0,13	0,05	0,05
p-value	0,20	0,07	0,09	0,26	0,52	0,89	0,62	0,41	0,44	0,21	0,44	0,76	0,79

Note: The interval confidence at a 5% significance level is in the range of_
Source: Author's calculation

The results obtained are consistent with predictions of the IS-LM model, according to which the exchange rate appreciation under a regime of flexible exchange rates with imperfect capital mobility results in the decline of the output in time. The results support the fact that Serbia's foreign trade partners perceive the changes in the real effective exchange rates and in the prices of export products, which indicates how important the exchange rate policy is for Serbian exports.

The cross-correlation of exchange rate with aggregate cycle for developing and emerging market economies is diverse at various lags, or shows an inconsistent pattern which cannot be easily explained. In addition to an unsystematic relationship, it can be observed that the correlation is often very low. "The absence of a systematic relationship between real exchange rates and the business cycle is consistent with the notion that this relationship is affected by an amalgam of supply, real demand, and nominal shocks, each of which could affect this correlation in different ways" (Agénor at al., 2000, p. 278).

Finally, let us see what the cyclical movement of prices looks like. It has already been said that the retail price index was calculated until the end of 2010, and that starting from 2011 consumer price index has been used as a measure of inflation. This is why in this paper a series of prices was used which was formed in such a way that the series of the retail price index (2005=100) has been extended as of 2011 with the consumer price index (2006=100). HP trend was identified on such a formed series and a cyclical component of the series was extracted. The sample was then adjusted to the desired length: in other words, the movement of the cyclical component of the price series was observed until the end of 2012. It was expected that the results of the correlation analysis would suggest not only the cyclical character of prices but also the causes of cyclic fluctuations in Serbia. Namely, in the literature the sign of the coefficient of correlation between prices and aggregate cycle (GDP) is used to determine the causes of cyclic fluctuations: if this sign is negative, the prices are countercyclical and the causes of fluctuations are on the supply side; otherwise, the causes of fluctuations are on the side of aggregate demand.

Based on the analysis of cross-correlation between the aggregate cycle and prices, it was found that the prices were procyclical. The coefficient of cross-correlation is positive at positive lags and it is outside the confidence interval for the 5% level of confidence at lags from t+4 to t+9, whereas it is the highest at t+8 and is $r = 0.44$. Therefore, the prices are procyclical and lag behind the cycles in the aggregate economic activity. The procyclical character of prices suggests that the

causes of cyclic fluctuations of aggregate economic activity in Serbia in the period from 2001 to 2012 were on the side of aggregate demand.

Table 8 shows the coefficients of correlation between growth cycles in GDP and prices at lags up to t±12 together with the corresponding probabilities.

Table 8. Cross-correlation between GDP and prices

Lag	t	t-1	t-2	t-3	t-4	t-5	t-6	t-7	t-8	t-9	t-10	t-11	t-12
r	-0,17	-0,09	-0,08	-0,13	-0,08	-0,25	-0,18	-0,13	-0,05	-0,02	-0,09	-0,09	-0,24
p-value	0,23	0,53	0,56	0,39	0,61	0,20	0,26	0,40	0,76	0,92	0,58	0,60	0,17
Lag	t	t+1	t+2	t+3	t+4	t+5	t+6	t+7	t+8	t+9	t+10	t+11	t+12
r	-0,17	0,06	0,13	0,20	0,30	0,32	0,34	0,43	0,44	0,36	0,22	0,03	-0,23
p-value	0,23	0,69	0,38	0,17	0,04	0,03	0,02	0,00	0,00	0,02	0,17	0,87	0,16

Note: The interval confidence at a 5% significance level is in the range of_
Source: Author

The relation between prices and the aggregate cycle can be seen in Graph 2.

Graph 2. Gross domestic product and prices 2001-2012, cyclical movement

Source: Author's calculation

Prices in the majority of countries in Central and Eastern Europe are countercyclical and shortly precede or coincide with the aggregate cycle: they are procyclical in Russia and acyclical in Lithuania and Poland. In the majority of developing and emerging market economies the correlation of prices with aggregate cycle is negative at negative lags or at zero lag, which suggests that the causes of the cycles are primarily on the supply side. However, there is a deep-rooted belief in the literature that in developing and emerging market economies the source of economic fluctuations can be found only in supply shocks, but studies have shown that there are countries where this correlation is positive, such as some countries of Asia and North Africa (India, Morocco, Pakistan), so that in these countries demand shocks should not be a priori rejected as the causes of cyclical oscillations: "Our empirical results provide a more composite and complex picture of reality. On this basis, we would hesitate to rule out demand driven models a priori in analyzing business cycle features in developing countries. The choice of model should depend on country specific insights and circumstances" (Rand and Tarp, 2001, p. 33).

What has contributed the most to fluctuations in aggregate demand in Serbia? Final consumption expenditure is the most important component of aggregate demand in Serbia. The most important part of final consumption expenditure is the final consumption expenditure of households, then the final consumption expenditure of government, so that the causes of fluctuations can for the most part be assigned to changes in these components. The changes in household consumption are the consequence of increased credit demand and the growth of consumption, followed by a sudden drop in consumption at the beginning of the global economic and financial crisis. As for government sector consumption, Praščević (2008) determined that in the period from 2001 to 2008 it was possible to identify political budget cycles which manifested as an expansive fiscal policy in the periods preceding parliamentary elections (held in December 2003, January 2007, and May 2008): "Presented movements in fiscal policy show that there are clear indicators of the existence of so-called budget political cycles… It can be observed that fiscal policy in the period preceding parliamentary elections was expansive" (Praščević, 2008, p. 53). If the periods of fiscal expansion are compared to growth cycles in economic activity in Serbia, it can be concluded that the phases of expansion of budget political cycles precede or coincide with (in the case of the 2008 elections) the phases of expansion in growth cycles of economic activity. Although the general character of fiscal policy was countercyclical, it would be interesting to research how the components of aggregate demand, i.e., final consumption behaved, and what their contribution was to growth in the phases of expansion of economic activity. Some future research might show what the contribution of certain components of aggregate demand to cyclical fluctuations is and what their cyclical character looks like.

6. CONCLUSIONS

Economic policy in Serbia in the period from 2001 to 2012 was not conducted in the context of cyclical fluctuations. However, this paper has shown that it is possible to identify its cyclical character and the effects on economic activity and macroeconomic fluctuations. The results of cross-correlation analysis suggest that fiscal policy over the observed period acted countercyclically. The budget expenditures of the Republic of Serbia are countercyclical and lead, relative to the aggregate cycle, while the budget revenues are procyclical. The countercyclical character of government expenditures corresponds to the IS/LM model predictions of the effects of fiscal expansion under a regime of flexible exchange rates, according to which fiscal expansion under the conditions of capital inflow is followed by the appreciation of domestic currency, which in time results in

slowing down growth and a drop in output. Fiscal impulse constructed as the ratio of budget expenditures to budget revenues also shows a countercyclical character.

The cyclical character of monetary policy was analysed based on the cyclical movement of M2, price indices, and real effective exchange rate. The cross-correlation between the output and M2 is negative at negative lags and positive at positive lags, which indicates a certain ambiguity in the cyclical character of M2. The results of the Granger causality test as to whether money causes outputs (or vice versa) depend on the choice of the lag order in the VAR model, so further research on this topic is needed. Real effective exchange rate is countercyclical, which is compatible with the predictions of the IS-LM model that appreciation of the exchange rate accompanied by capital inflows and fiscal expansion eventually leads to a fall in output. Prices are procyclical and lag behind the aggregate cycle. The procyclical character of prices implies that the causes of cyclical fluctuations in Serbia in the period 2001 to 2012 have been on the demand side. Thus future economic policy in Serbia should be formulated in the context of cyclical fluctuations. In this regard Serbia should follow the example of developed market economies: "Policy-making should be informed by a more accurate assessment of cyclical developments. For example, for fiscal policy, better measures of the cyclically-adjusted balance as well as accounting for the impact of asset prices on revenues would help ensure that windfall gains during an upswing are not used for permanent tax cuts or spending increases. Concerning monetary policy, the measurement of consumer price inflation can be improved in many countries." (OECD, 2010, p.7) The formulation of economic policies would then follow: given the causes of cyclical fluctuations on the demand side, countercyclical economic policy in Serbia should be focused on aggregate demand management, reducing fluctuations in aggregate demand and extending the phases of expansion.

This paper has only provided preliminary results on the cyclical character of economic policy and the cyclical characteristics of some of the most important macroeconomic variables. Therefore it is necessary to continue the research on business cycles and economic policy. This is of particular importance since the data series are relatively short and the results obtained are indicative rather then definitive. Future research will show what the contribution of certain components of aggregate demand to the cyclical fluctuations was, what their cyclical character was, and what measures of countercyclical economic policy should be.
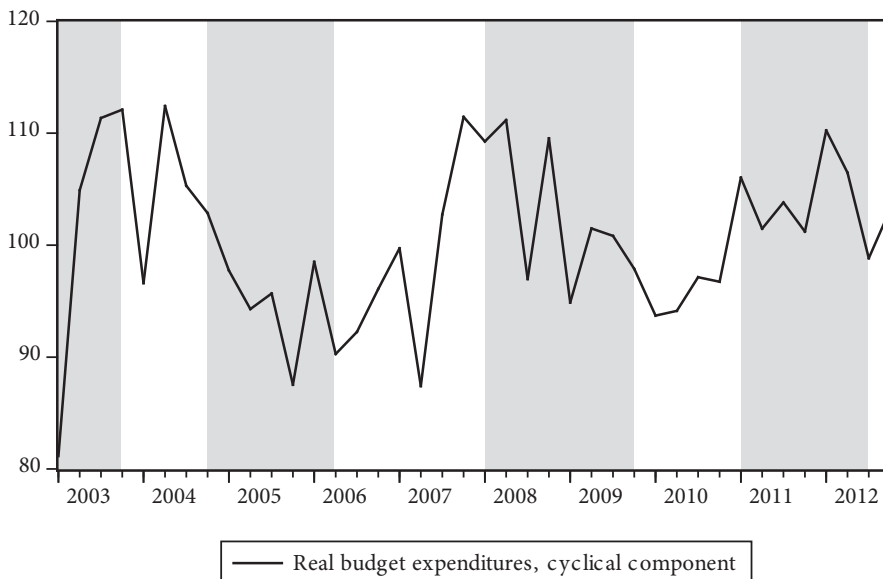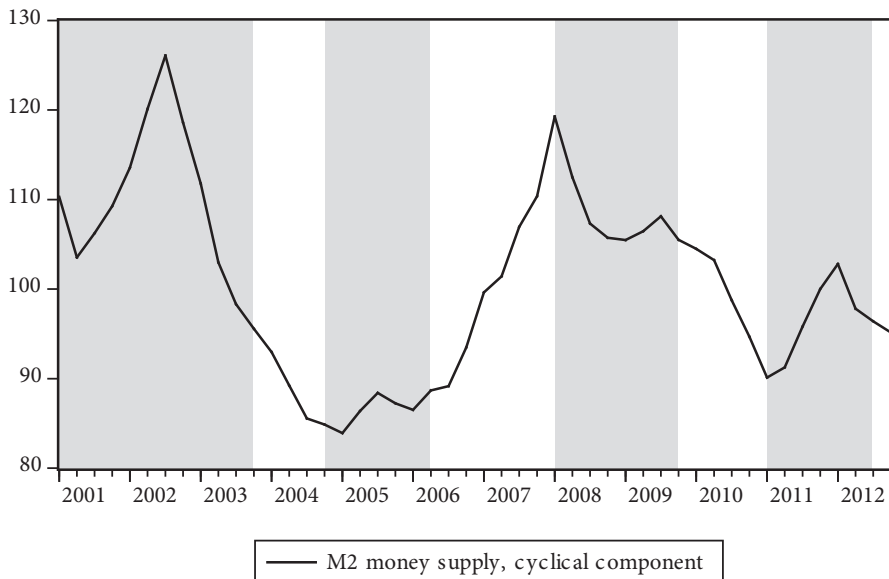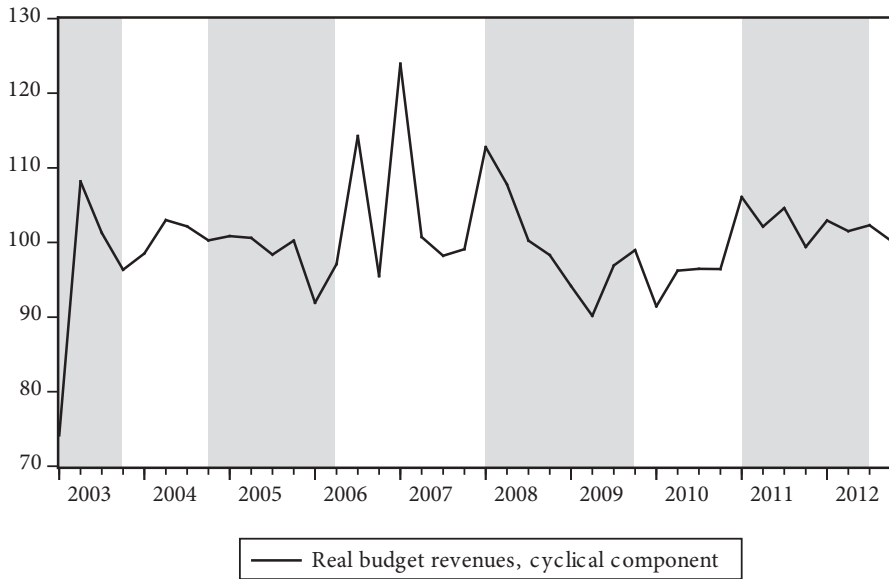
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APPENDIX

The Appendix to the paper presents cyclical components of the series used in the empirical research: the budget expenditures of the Republic of Serbia, the budget revenues of the Republic of Serbia, M2 money supply (nominal and real), real effective exchange rate, and series of price indicies. The data on the budget revenues and the budget expenditures of the Republic of Serbia are available starting from January 2003. All the other series are available from January 2001.
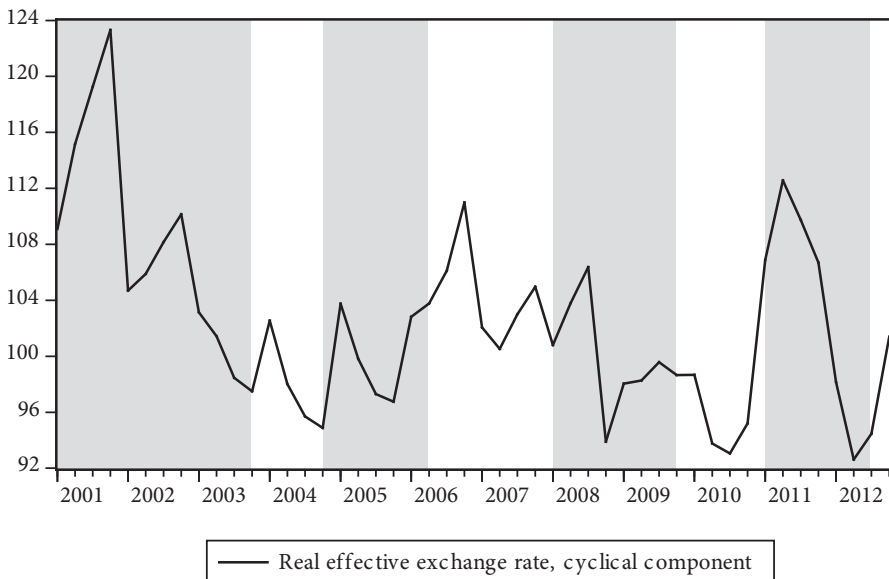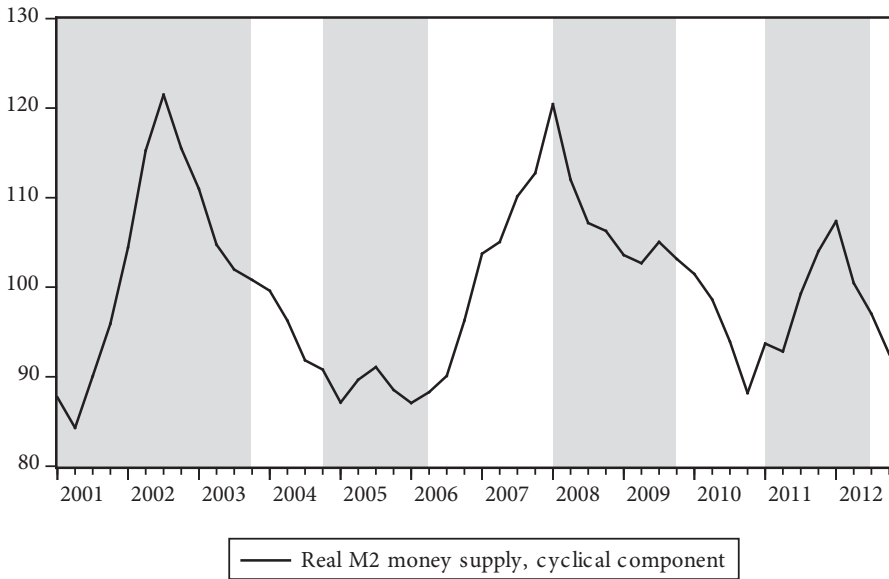
The sources of the series include the Statistical Office of the Republic of Serbia, the Ministry of Finance of the Republic of Serbia, and the National Bank of Serbia. Quarterly seasonally adjusted data series were used. The trend is estimated using the Hodrick–Prescott (HP) filter (λ=1600). The cyclical component of the series was obtained by dividing the series by the trend and multiplying by 100. The shaded areas in the graphs represent the slowdown phases of growth cycles, in other words the decline in economic activity measured by gross domestic product.
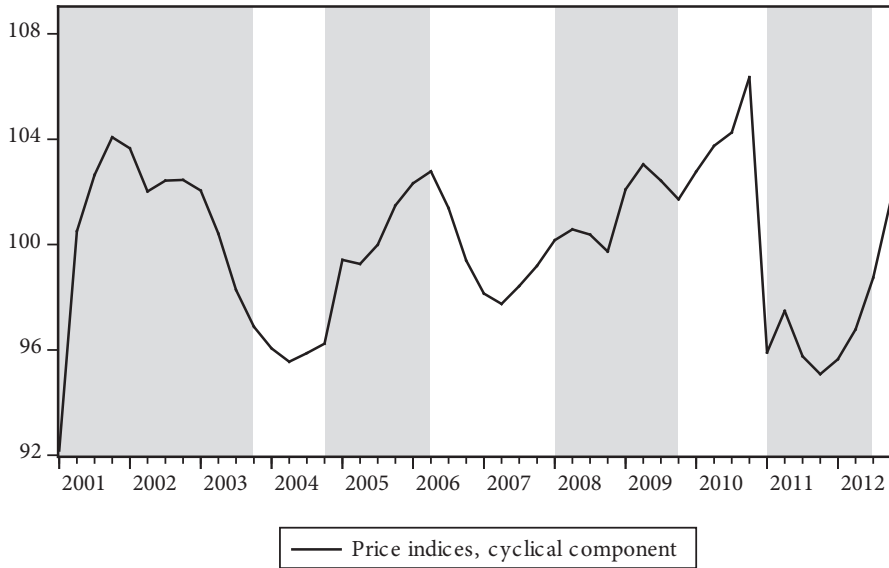
Real budget revenues, cyclical component

M2 money supply, cyclical component

Real M2 money supply, cyclical component

Real effective exchange rate, cyclical component

Price indices, cyclical component