



# “Countercyclical monetary policy in major economies of the Commonwealth of Independent States”

<b>AUTHORS</b>	Serhiy Kozmenko  <a href="https://orcid.org/0000-0001-7710-4842">https://orcid.org/0000-0001-7710-4842</a>  <a href="https://www.webofscience.com/wos/author/record/Z-3430-2019">https://www.webofscience.com/wos/author/record/Z-3430-2019</a> Taras Savchenko
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Serhiy Kozmenko (Ukraine), Taras Savchenko (Ukraine)

## Countercyclical monetary policy in major economies of the Commonwealth of Independent States

### Abstract

The previous financial crisis caused the ending of an unusually long phase of recovery in the former USSR republics, thus increasing the relevance of developing effective measures, specifically, the countercyclical economic policy. Throughout 1991 to 2010, fourteen completed cycles were identified in countries of Commonwealth of Independent States (CIS). At the beginning of June 2011, one economy was in recovery phase, five economies were in the growth phase and one economy was in the decline phase. The authors also analyzed the level of countercyclical monetary policy of central banks in major economies of the CIS. The necessity of a more active countercyclical monetary policy in these countries was identified.

**Keywords:** business cycle, monetary policy, central banks, Commonwealth of Independent States.

**JEL Classification:** E52, E58.

### Introduction

Macroeconomic policies, especially monetary policies aimed at smoothing cyclical fluctuations are critical for maintaining stable and sustained economic growth. Economists in developed countries constantly explore the impact of monetary policy on the phases of business cycles. Increased interest in these studies occurs in periods of economic crisis (Mendoza and Terrones, 2008; Raghuram and Zingales, 1998; Wynne and Balke, 1995). Development of the global financial crisis of 2008-2009 confirms the urgency of cycle regulation in both theoretical and in practical aspects.

The main objectives of this study are: (1) recording business cycles in the former Soviet Union and studying business cycle parameters (amplitude, duration and causes of recessions, the level of synchronization); (2) analyzing central banks' impact on the parameters of business cycles in the major economies of the Commonwealth of Independent States (Russia, Ukraine, Kazakhstan, Belarus).

With all the variations and refinements, there are three main theories that explain the causes of cyclic fluctuations: the first relates to the dynamics of investment cycles, the second – with the uneven nature of the innovation process, and the third – to fluctuations in money supply. Given the above objectives of this work, taken as the basis of the monetarism theory, which was outlined back in 1963 in the classical work of Friedman and Schwartz and detailed in the context of the impact of money on business cycles (Milton and Schwartz, 1975). Theoretical interpretation of the central banks' impact on the business cycles' phases is based on the monetarism theory as well.

### 1. Characteristics of business cycles

#### 1.1. Study of parameters of business cycles in the largest CIS countries. Economists have mostly used

two standard methods of recording peaks and low points of business cycles in individual countries: statistical procedures and methods for subjective evaluation (Don and Pagan, 1999; Don and Pagan, 2006; IMF, 2008; Wynne and Balke, 1995). The statistical method is based on the use of real GDP data. The subjective method takes into account the dynamics of a large number of macroeconomic indicators (GDP, industrial production, trade, capital flows, consumption, unemployment). The latter method, for example, has been used by the National Bureau of Economic Research USA. Both methods are based on annual data from 1960 to 2009, showing four points of lower global economic activity: 1975, 1982, 1991 and 2009 years (IMF, 2009).

In the International Monetary Fund report (IMF, 2009), quarterly real GDP data is used to determine the cyclical peaks and low points. This monetary policy is called the Bry-Boschan for quarterly data (Don and Pagan, 1999; Don and Pagan, 2006). Using Bry-Boschan, representatives of the IMF have studied business cycles in 21 countries with developed economies for the period from 1960 to 2009 (IMF, 2009).

Using the data presented in Table 1, we can determine the largest economies of the CIS: Russia (75.6% of total real GDP of the CIS), Ukraine (7.6%), Kazakhstan (6.3%), and Belarus (3.5%). The combined data of these countries produce about 93% of the total GDP of the CIS. These countries are also the leaders in terms of the CIS foreign trade, industrial production and other indicators of economic development. Thus, we investigate only the parameters of business cycles and measures of monetary policy of these countries. In addition, Table 2 defines the year in which the individual CIS countries finally resumed the economic downturn caused by the collapse of the Soviet Union and reached the value of real GDP, exceeding the 1990 level.

To investigate the recurrence of economic processes in the CIS countries, we use similar approaches to IMF methods analyzed above. As the basic indicator of a business cycle the annual growth rate of real GDP between 1991 and 2010 was chosen. To clarify the turning points of cycles, information about real quarterly GDP were also used. Parameters of business cycles of the CIS countries are shown in Appendix A.

It is assumed that each country's recovery phase lasted until the excess of real GDP pre-crisis level of

1990 (Table 1). After reaching this level, it can be considered that the national economy has passed the phase of recovery. To determine the amplitude phase of recovery, we calculated the percentage of real GDP growth compared with 1990 levels. For downturns caused by the financial crisis of 2008-2009, the amplitude of the recovery phase, according to the IMF approach, is defined as the percentage of real GDP growth a year after the recession (real GDP growth for 2010).

Table 1. CIS GDP in constant prices of 2005, billions U.S. dollars

Country	1990		2009		Growth rate 2009/1990	Excess over 1990 level	
	GDP data	%	GDP data	%		GDP data	year
Armenia	4,076	0.36%	5,793	0.51%	142%	4,304	2004
Azerbaijan	11,961	1.07%	26,949	2.35%	225%	13,245	2005
Belarus	23,782	2.13%	39,876	3.48%	168%	24,773	2003
Georgia*	11,939	1.07%	7,743	0.68%	65%	-	
Kazakhstan	50,230	4.50%	71,770	6.27%	143%	52,073	2004
Kyrgyzstan	3,069	0.27%	3,055	0.27%	100%	-	
Moldova	6,101	0.55%	3,252	0.28%	53%	-	
Russian Federation	845,224	75.68%	865,354	75.61%	102%	889,616	2007
Tajikistan	3,824	0.34%	2,962	0.26%	77%	-	
Turkmenistan	8,609	0.77%	12,414	1.08%	144%	8,676	2005
Ukraine	137,383	12.30%	86,480	7.56%	63%	-	
Uzbekistan	10,664	0.95%	18,873	1.65%	177%	10,962	2001
CIS Total	1,116,862	100.00%	1,144,521	100.00%	102%		

Notes: \*Withdrawn from the CIS in August 2009.

Source: Own calculations and [15].

As shown in Appendix A, for the past 20 years the CIS countries experienced 14 completed cycles. As of 2010, six economies are in the recovery phase, five economies are in the growth phase and one economy is in the decline phase. The decline phase of the CIS countries on average lasted 12.2 quarters, while in the developed countries 3.4 times less time. The average duration of recovery phase of the CIS countries amounted to 19.7 quarters or 6 times the duration of this phase in economically developed countries. The recovery phase in the CIS countries on average lasted 15.9 quarters, whereas in developed countries 21.8 quarters.

The amplitude of recession in the CIS averaged 26.3% of decline of real GDP, where as in developed economies, it was 2.7% decline. The amplitude recovery in CIS countries averaged 47.4%, which exceeded the corresponding rates in the developed countries by more than 10 times. Longer phases of recovery in CIS countries is caused by unprecedented duration and amplitude decline, which was caused by the collapse of the USSR.

The financial and economic crisis of 2008-2009 resulted in the complete recovery of three phases of

the business cycle and phase recovery of four cycles. Three episodes of recession, after a short recovery, were driven by the financial crisis of 1998. The recession phase, which followed the collapse of the USSR and half of the 6 CIS countries ended after 1995, while three other countries had their recession phase end the following year. Thus, the decline in the CIS countries was characterized by high synchronicity of business cycles. Conclusions on the high-level synchronization of business cycles in the CIS countries are confirmed by the correlation coefficients of annual growth rates of GDP of the CIS countries for the period of 1991-2009. Coefficients of correlation between business cycles of Russia, Ukraine, Kazakhstan and Belarus are among the largest.

Appendix A also provides the indicators of business cycles in the major economies of the CIS: Russia, Ukraine, Kazakhstan and Belarus. Findings of the cycles in the major economies of the CIS are confirmed by using the software adapted to the present data to the quarterly GDP in the CIS (Engel, 2011). Despite the high synchronization of the dynamics of business cycles in these countries, rates of variation confirm the presence of significant differences in duration and amplitude of phase cycles. The largest CIS

economies experienced a shorter phase of recovery than the average for the CIS, as well as, smaller amplitude and fall of real GDP. These numbers are explained by larger inertia of major economies.

Appendix B presents dynamics of real GDP in the major economies of the CIS. In Russia, the decline phase lasted from 1991 through the second quarter of 1997 and the recovery phase lasted for the third and fourth quarters of 1997 (Figure 1). The year of 1998 and the first quarter of 1999 showed a 7 decline phase caused by the financial crisis of 1998, which ended with the announcement of government default. Starting with the second quarter of 1999, the recovery and growth phases were observed and lasted 36 and 3 quarters, respectively. The fourth quarter of 2008 showed a decline phase, which lasted 5 quarters, with the first quarter of 2010 to be the recovery phase.

In Ukraine, the decline phase lasted from 1991 through 1999, and then began the recovery phase, which lasted 37 quarters (Figure 2). It should be noted that Ukraine is the only country we identified among the major economies of the CIS that was not seen in the recovery phase because of the absolute data of GDP data compared with 1990. The recession phase lasted five quarters through the fourth quarter of 2009. Since the first quarter of 2010, Ukraine's economy has passed the phase of recovery.

In Kazakhstan, the decline phase lasted from 1991 through 1995; the recovery phase lasted six quarters (Figure 3). It should be noted that certain periods in the years of 1996-1997 can be identified as "times of uncertainty", when the quarterly dynamics of real GDP did not meet the criterion of minimum duration of phase cycles for the Bry-Boschan routine for quarterly data (Don and Pagan, 1999; Don and Pagan, 2006). During the first half of 1998 and the second half of 1999 a decline phase was caused by the financial crisis of 1998. The third quarter of 1999 showed a recovery phase and then growth that lasted 20 and 18 quarters, respectively. The first quarter of 2009 showed a decline phase, which lasted until the third quarter of 2009. From the fourth quarter of 2009, Kazakhstan's economy has passed the phase of recovery.

In Belarus, the decline phase lasted from 1991 through 1995; the recovery phase lasted for the next eight years (Figure 4). Since 2004, the recovery phase began, which went down during the second and third quarters of 2009. After the third quarter of 2009, the recovery and growth phases began.

**1.2. The relationship among phase cycles of countercyclical monetary policy.** In order to analyze the impact of monetary policy on business cycles, no-

minimal interest rates and real interest rate fluctuation according to the Taylor rule are used (IMF, 2009). For each recession phase the basic measure of the policy was presented by the change of the designated indicator between the peak and the low point cycle, which is a cumulative measure of the weakening or strengthening of the policy for the entire time of decline. In order to achieve the indicators of monetary policy, its stimuli were calculated as the sum of deviations in each quarter phase of decline.

Most empirical studies do make distinctions between different phases of business cycles (Bernanke, 1995; Enrique and Terrones, 2008; Christina and Romer, 1989; Wynne and Balke, 1995). An exception is the work of Peersman and Smets where it is shown that monetary policy usually carries a significant impact during recessions rather than during booms. Therefore, given the above study and the monetarism theory, we assume that monetary policy should have countercyclical orientation as during the recession phase (expansionist) and on the peaks of the growth phase (restriction).

It should be noted that during the recovery phase the monetary policy should have a procyclical nature that promotes economic growth. However, at the peak of the growth phase (when there is an "overheated economy" and the imbalances emerge) and in decline phase monetary policy should be mainly driven by countercyclical motives.

Table 2 presents an assessment of appropriate use of monetary policy types by central banks in the largest CIS countries. For the assessment of the appropriate use of restrictive or expansionary monetary policy, we were guided by three basic rules. First, a comprehensive restrictive monetary policy should be performed only after the economic transition from the recovery phase to the growth is completed. Otherwise, the premature restrictive measures may inhibit the increased business activity and slow down the economic recovery to pre-crisis level.

Second, an active restrictive policy should be held for a limited period of time that coincides with the peak of business activity. We determined the peaks of business activity on the basis of calculating the variance of quarterly real GDP growth indicators of average real GDP growth for the entire period of the recovery and growth phase. Applying the above rules, the central banks should be taking measures of restrictive monetary policy during the defined periods (Table 2).

Third, during the decline phase, methods of expansionary monetary policy should be employed. This argument applies primarily to the early phase of recession, when comprehensive and decisive measures of expansionary monetary policy can reduce the amplitude and duration of the decline phase.

Table 2. Evaluation of appropriate use monetary policy types

Period		Restrictive policy (peaks of the growth phase)				Expansionary policy (decline phase)			
		Russia	Ukraine	Kazakhstan	Belarus	Russia	Ukraine	Kazakhstan	Belarus
2004	1 qtr				+/-				
	2 qtr				+/-				
	3 qtr				+/-				
	4 qtr				+/-				
2005	1 qtr				+/-				
	2 qtr								
	3 qtr			+/-					
	4 qtr			+/-	+				
2006	1 qtr				+				
	2 qtr			+	+				
	3 qtr			+					
	4 qtr		+/-	+	+/-				
2007	1 qtr		+/-	+	+/-				
	2 qtr		+/-		+/-				
	3 qtr	+			+/-				
	4 qtr	+							
2008	1 qtr	+			+				
	2 qtr				+				
	3 qtr				+				
	4 qtr					+	+		
2009	1 qtr					+	+	+	
	2 qtr					+	+	+	+
	3 qtr					+	+	+	+
	4 qtr					+	+		
2010	1 qtr								
	2 qtr								
	3 qtr								
	4 qtr								

Notes: Sign «+» means that the appropriate policy should be applied, signs «+/-» mean that the appropriate policy should be applied partially.  
Source: Own estimation.

## 2. Impact of central banks on phases of business cycles

**2.1. Instruments of monetary policy.** We will explore the impact of monetary policy on the phase of

business cycles in the major economies of the CIS on the basis of retrospective analysis of the use of basic tools of monetary policy. Table 3 lists the main tools of monetary policy, along with the regulations.

Table 3. The main instruments of monetary policy

Group of instruments	Country			
	Ukraine	Russia	Kazakhstan	Belarus
	Main instruments of monetary policy			
Interest rate policy	Interest rate policy	Interest rates based on bank of Russia operations	Interest rate refinancing and monetary policy rates	Regulation of refinancing and other rates
Required reserves	Regulating the rates of required reserves	Regulating the rates of required reserves	Regulating the rates of minimum required reserves	Regulating the rates of required reserves
Currency exchange policy	Gold and foreign currency reserves management	Currency interventions	Currency interventions	-
Liquidity regulation	Commercial banks refinancing	Credit organizations refinancing	Loan grants, accounting of debt securities	Liquidity grants instruments
	Open market operations with securitites	Operations with securitites	Selling and buying of government securitites	Liquidity absorption instruments
	Bond issuance	Bond issuance	Bond issuance	-
	-	Establishing money supply targets	Attraction of bank deposits	-
Limits	Regulation of export/import of capital	Direct limits	Direct limits of specific operation	-

Source: [4, 13, 25, 29].

Analyzing the contents of Table 3 we can conclude that the central banks of CIS major economies in their activity mostly use four groups of instruments of monetary policy: required reserves, interest rate policy, monetary policy operations and liquidity regulation. Next, we analyze the features of the application of the above groups of instruments in correlation with the phases of business cycles. It should be noted that in exceptional cases quantitative restrictions are applied, however, we will not investigate them because they are not systematic nor utilize market based data tools.

Some differences in the definition and application of instruments of monetary policy are observed in Belarus. First, the tools of monetary policy are not determined by law. This reduces the effectiveness of monetary policy, because society does not possess reliable information on the precise list of instruments for its implementation. Second, the National Bank does not allocate separate currency intervention as a monetary policy tool and does not provide information regarding their implementation on its official website. Third, there is no clear structuring of instruments that regulate liquidity and no publicly available data on the balance of the adjustments of liquidity. Consequently, when studying the impact of the National Bank of Belarus at the phase of economic cycle we are forced to limit the analysis of two groups of instruments: interest rate policy and required reserves.

**2.2. Interest rate policy.** According to the regulations of the largest central banks of CIS countries, the interest rate is one of the main channels of transmission mechanism, though the banks are aware of the limited capacity of its current application in a transitional regime of monetary policy (National Bank of Ukraine, 2004; Bank of Belarus, 2007; National Bank of Ukraine, 2009; National Bank of Kazakhstan, 2010; Stelmakh, 2009). In practice, the interest rate policies of central banks of major CIS countries are not effective enough. In most cases, there is no significant correlation between central bank rates and interbank rates, which in turn, eliminates the impact of interest rate policy on the dynamics of retail rates money market segment. This thesis is confirmed by analysis of the interest rates in the banking systems of Russia, Ukraine, Kazakhstan and Belarus for the period of 2006-2010 (Appendix C).

Inefficiency of interest rate policy of central banks of the largest CIS countries, as part of the business cycle monetary policy, is confirmed by the significant spreads and dynamics between the rates of central banks on the one hand, and the interbank rate and the retail deposit market, on the other. Given the data presented in Table 2, we will determine whether a formally executed interest rate policy of central banks in major countries of the CIS had a countercyclical function.

Thus, only National Bank of Kazakhstan consistently applied countercyclical interest rate policy. Other central banks did not use this tool to influence the phase of the cycle, given the poor performance of the interest rate channel of transmission mechanism, or its effect was procyclical: the central banks tried to achieve the target performance goals (the dynamics of money supply, inflation, etc.) that are not directly related to phases of economic cycle.

Nevertheless, most CIS countries are in transition to the new monetary policy regime, which is based on ensuring price stability. Accordingly, it is expected to form the foundation that ensures effectiveness of the interest rate channel of transmission mechanism of monetary policy in general (Somik, 2010).

**2.3. Required reserves.** Another instrument of monetary policy that is applied by the central banks of major countries of the CIS is needed reserve requirements. The influence of this tool is determined by the dynamics of its main parameters: reservation period, the assets that may be counted as the reserves cover, the reserves object, required amount of reserves, which is kept daily in accounts of the central bank, required reserves ratios. After analyzing the above parameters, we can conclude that the first three parameters (period, coverage provisions and facility reservation) should be considered as elements of the mechanism of automatic reactions to the level of liquidity in the banking system. They can only indirectly influence the use of required reserves as a tool for adjusting the phases of economic cycle. In this context, it is suggested to analyze the reserves ratio and proportion to the requirements of required reserves that must constantly be kept in the accounts of the central bank.

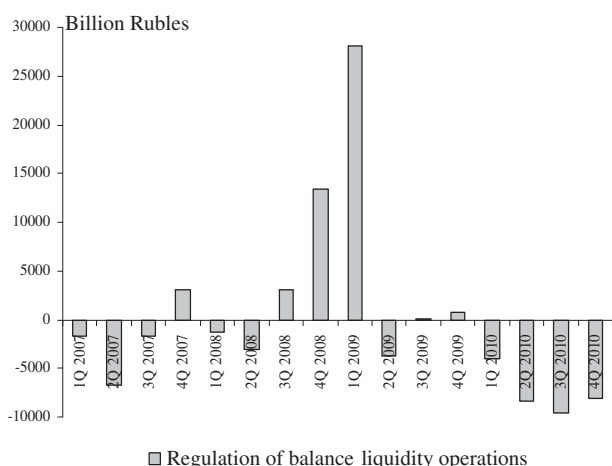
The dynamics of reserves established by the central banks of the Russian Federation, Ukraine, Kazakhstan and Belarus, as well as, a share of required reserves that have to be kept in daily accounts of the regulator, are investigated. Therefore, during the peaks of the growth phase the central banks of major CIS economies did not use reserves for countercyclical influence on economic dynamics. On the other hand, all central banks (excluding National bank of Ukraine) are using this tool in the early phase of decline for countercyclical influence.

**2.4. Foreign exchange policy.** The central banks of the major CIS economies implement foreign exchange policy and manage the international reserves, carrying out foreign exchange interventions (Table 3). The last action is affected by the sale of foreign currency to influence the domestic currency. A purchase or sale of foreign currency results in the increase or decrease in money supply on the domestic money markets.

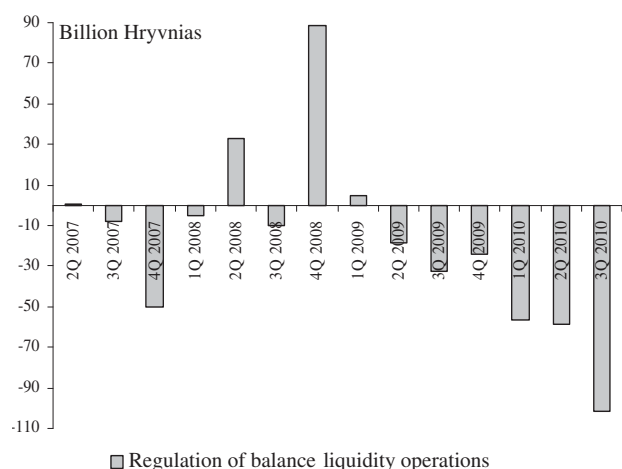
Appendix D presents the dynamics of foreign exchange interventions (with ‘+’ as a purchase, and with ‘-’ as the sale of foreign currency by central banks) and international reserves of the Russian Federation, Ukraine and Kazakhstan. As noted above, the laws of the Republic of Belarus and regulations of its National Bank monetary policy (including foreign exchange interventions) are not regarded as instruments of monetary policy.

Thus, foreign exchange interventions of the central banks of Russia, Ukraine and Kazakhstan were not used to implement countercyclical monetary policy, and were used for other tasks: support for exchange rate stability and the formation of sufficient international reserves.

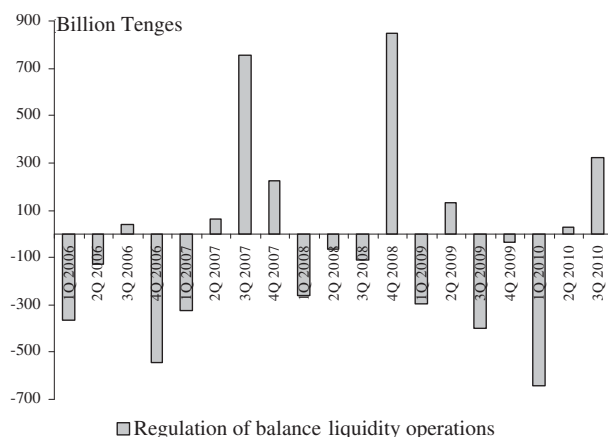
**2.5. Regulation of liquidity.** Figures 1-3 present the amount of funds granted to maintain the liquidity of banks with the sign “+” and with the sign “-” present specified amounts of funds mobilized from the commercial banks by the central banks.



**Fig. 1. Liquidity operations of the Central Bank of Russian Federation**



**Fig. 2. Liquidity operations of the National Bank of Ukraine**



**Fig. 3. Liquidity operations of the National Bank of Kazakhstan**

Source: Own calculations and [17-19].

Central banks use several tools to increase liquidity: overnight loans, short-term loans, stabilization loans, tenders of liquidity support, etc. Also, the tools of liquidity absorption of commercial banks are used: issuance and placement of securities by central banks, raising money in deposits, reverse repurchase transactions, etc. Thus, the main indicators that illustrate the cumulative impact on liquidity of all instruments of central bank are operations with the balance of control liquidity. Belarus is excluded from the analysis due to the lack of data.

Thus, the regulation of liquidity operations by central banks in the major CIS economies had mainly countercyclical orientation. However, their real motives were far from a theory of the cycle regulation of the economy. Dynamics of liquidity regulation primarily was held because of the need to smooth the current imbalance between supply and demand on the national money markets through the volume of currency bought or sold by central banks in national currency markets and the possibility of an excessive money supply pressure on price levels in the national economy.

**Conclusion**

The global financial crisis of 2008-2009 caused the recovery (growth) phase in most CIS countries to end. As a result, on the one hand the problem of the cycle regulation of economic processes became relevant; on the other hand there was an opportunity to fully study the parameters of business cycles of the CIS countries. The main results of the business cycles analysis in the CIS countries over the period from 1991 to 2010 are presented in the first part of this paper. Over the past 20 years the CIS countries experienced 14 completed cycles. As a result, as of 2010, six economies were in the recovery phase, five economies were in the growth phase and one economy was in the decline phase.

More detailed analysis of business cycles in the major economies of the CIS: Russia, Ukraine, Kazakhstan and Belarus, which collectively produce about 93% of the total GDP of the CIS was presented. Based on the evaluation of the peaks of the growth phase and boundaries of the decline phase the periods during which it made sense to apply the restrictive or expansionary monetary policy were defined.

In the second part, the paper analyzes the actual level of compliance regimes of monetary policies implemented by central banks in the major economies of the CIS at the peak phase and recovery phase. Given the differences in models of monetary policies, money market structure and channels of transmission mechanism of CIS in comparison with the developed countries, the assessing of the level of countercyclical monetary policy based on nominal interest rates and declining of the real interest rate from Taylor rule are not acceptable. To solve this problem we used an integrated approach, which provided retrospective analysis of the main instruments of monetary policy: interest rates, required reserves, foreign exchange interventions to support liquidity.

The analysis of dynamics of interest rates of the central banks of major countries of the CIS states that only the National Bank of Kazakhstan have consistently applied the interest rate as a part of countercyclical policy. Other central banks did not use this tool as an active element of monetary policy or applied as procyclical factor while focusing on goals that were not directly related to the regulation of the phase of economic cycle.

Other tools of the monetary policy (required reserves, foreign exchange interventions to support liquidity) had largely a neutral effect on the parameters of the economic cycle. The application was determined by the factors that lie in the plane of ensuring a stable exchange rate dynamics, control of inflation, adequate liquidity in the banking system, creation of reserves, etc. Certain exceptions are required reserves, which the majority of central banks (exclude National Bank of Ukraine) were using for cycle regulation.

Given the above, it seems appropriate to use more active and effective countercyclical monetary policy by central banks in major economies of the CIS, which does not contradict the performance of their basic function, which is to ensure the stability of national currency. It should be emphasized that exter-

nal (exchange rate) and internal (inflation) stability of national currency is in direct correlation with real GDP trend, and, therefore, with phases and parameters of business cycles. Recently, the emphasis in the interpretation of the main function of the central banks of major countries of the CIS is shifting from maintaining stability of exchange rate to ensure an acceptable level of inflation (introduction of inflation targeting).

A complete task of forming a more active and effective countercyclical monetary policy is only possible when solving a number of objective problems in the regulation of economic processes. These problems lay within the competence of central banks and, as well as, the responsibility of other government authorities. It is possible to highlight the following main problems that limit the elements of countercyclical monetary policy in most CIS countries.

First, deals with generation of inaccurate forecasts of macroeconomic dynamics. To effectively use the countercyclical monetary policy tools, central banks should have timely and reliable estimates of changes in the key macroeconomic parameters (especially GDP data), which define the phases of economic cycle. Development of quality macroeconomic models to predict the impact on the dynamics of monetary policy instruments of the macroeconomic key indicators (GDP, inflation, exchange rate) should also be ensured.

Second, the monetary policy model should be reformed to improve efficiency of application of interest rates by central banks that influence the phase of economic cycle. It should be noted that during 2009-2010 some CIS countries took several measures to improve the efficiency of the interest rate channel of transmission mechanism. These measures and further formation of the necessary conditions for effective work in the long-term interest rate channel will use interest rate policy as a basic element of countercyclical monetary policy. This approach is entirely consistent with international experience.

Third, there should be coordination of use of the other instruments of monetary policy (required reserves, foreign exchange intervention, liquidity support operations), which are mainly used for automatic control of the money market with the objectives of countercyclical monetary policy. Solving these problems will help to build an effective countercyclical monetary policy, promote equilibrium of money market and support sustainable economic growth in CIS countries.



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## Appendix A

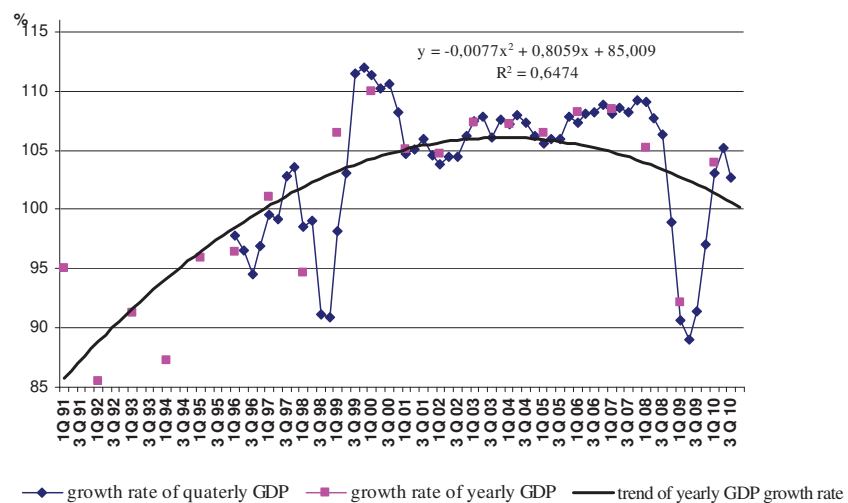
Table 1. Business cycles characteristics of the CIS countries in 1991-2010

Countries	Length <sup>1</sup>			Amplitude <sup>2</sup>		
	Decline	Recovery <sup>3</sup>	Growth	Decline	Recovery <sup>4</sup>	Growth
Main business cycles parameters						
Azerbaijan	22	36	22	-58,12	164,45	113,63
Armenia	12	44	15	-53,09	125,08	56,8
	5	4		-16,1	2,60	
Belarus	20	31	22	-34,86	59,91	60,57
	2	2	3	-0,4	7,60	
Georgia	16	55		-72,33	144,01	
	5	4		-5,37	6,30	
Kazakhstan	20	6		-38,61	2,21	
	4	20	18	-1,9	68,41	36,18
	3	1	4	-2,4	7,00	
Kyrgyzstan	20	34		-49,32	58,47	
	3	18		-0,2	24,16	
	3			-1,4		
Moldova	26	2		-62,89	1,60	
	7	37		-9,69	67,35	
	4	4		-6,5	6,90	
Russia	26	2		-40,15	1,40	
	4	36	3	-5,3	83,27	5,6
	5	4		-7,9	4,00	
Tajikistan	26	54		-68,32	160,35	
Turkmenistan	10	2		-18,88	1,50	
	8	4		-23,25	6,70	
	4	30	20	-11,4	68,72	56,24
Uzbekistan	22	22	36	-18,89	26,73	86,8
Ukraine	34	37		-59,21	81,76	
	5	4		-17,2	4,20	
Characteristics of business cycles across all the countries of the CIS						
Average (1)	12,2	19,7	15,9	-26,3	47,4	59,4
Standard deviation (2)	9,44	18,16	10,41	23,64	53,44	31,94
Coefficient of variation (2)/(1)	0,78	0,92	0,66	0,90	1,13	0,54
Number of observations	26	25	9	26	25	7
Characteristics of business cycles: Russia, Ukraine, Kazakhstan, Belarus						
Average (1)	12,3	14,3	10,0	-20,8	32,0	34,1
Standard deviation (2)	11,02	14,35	8,27	19,74	34,37	33,84
Coefficient of variation (2)/(1)	0,90	1,00	0,83	0,95	1,07	0,99
Number of observations	10	10	5	10	10	3
Characteristics of highly synchronized declines caused by the financial crisis of 2008-2009						
Average (1)	4,1	3,3	3,5	-8,0	5,5	-
Standard deviation (2)	1,12	1,16	0,50	5,96	1,76	-
Coefficient of variation (2)/(1)	0,27	0,35	0,14	0,75	0,32	-
Number of observations	7	7	2	7	7	-

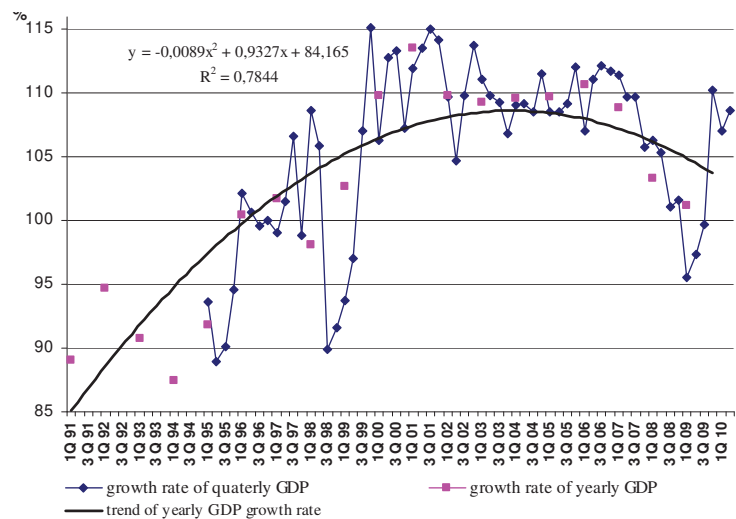
Notes: <sup>1</sup>Number of quarters; <sup>2</sup>Rate change of real GDP; <sup>3</sup>Number of quarters until reaching GDP level of 1990; <sup>4</sup>Growth of real GDP until 1990.

Source: Own calculations.

## Appendix B

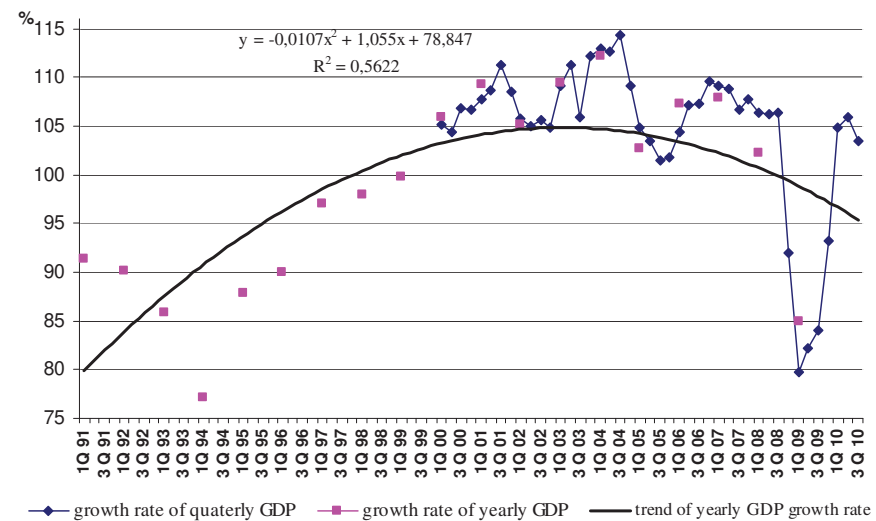


**Fig. 1. Real GDP dynamics in Russia (1991-2010)**

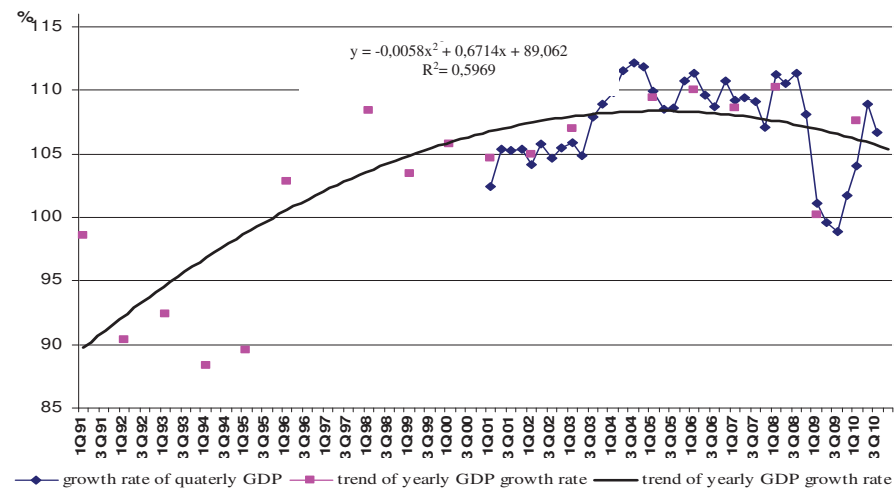


**Fig. 3. Dynamics of real GDP in Kazakhstan (1991-2010)**

Source: Own calculations and [15, 20].



**Fig. 2. Real GDP dynamics in Ukraine (1991-2010)**



**Fig. 4. Dynamics of real GDP in Belarus in (1991-2010)**

Appendix C

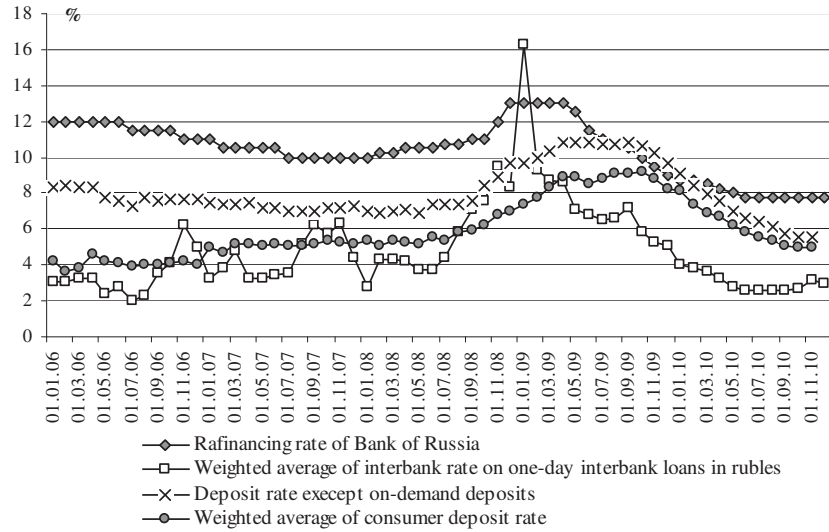


Fig. 5. Dynamics of rates of the banking system of Russia

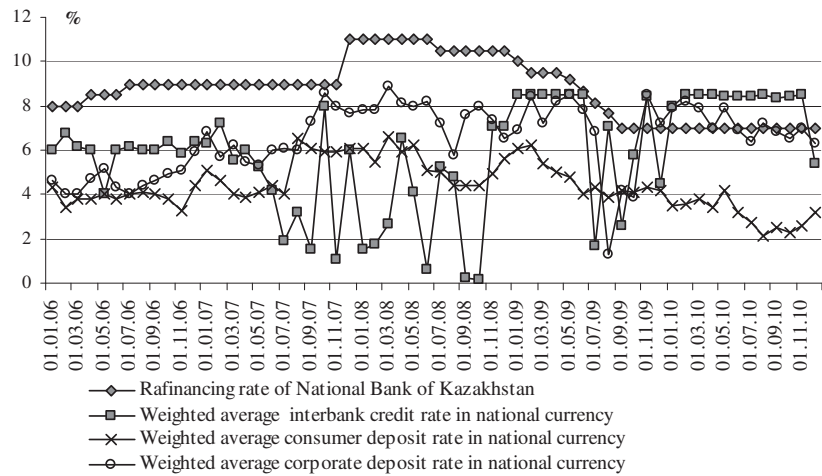


Fig. 7. Dynamics of rates of the banking system of Kazakhstan

Source: Own calculations and [16-19].

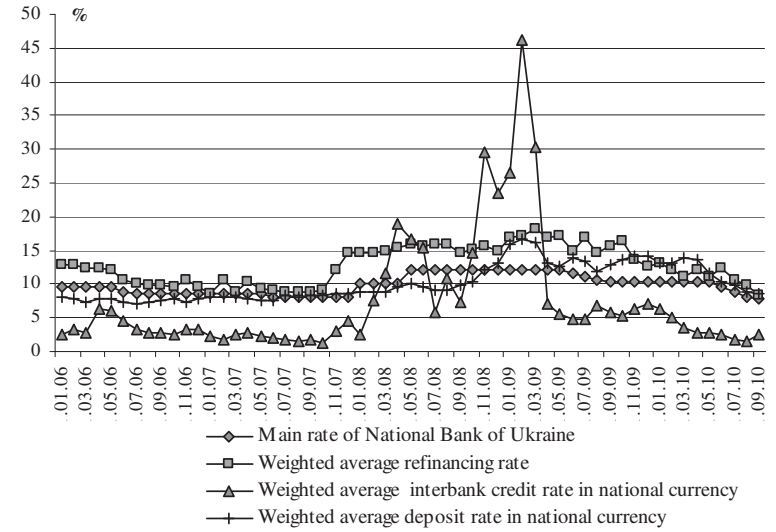


Fig. 6. Dynamics of rates of the banking system of Ukraine

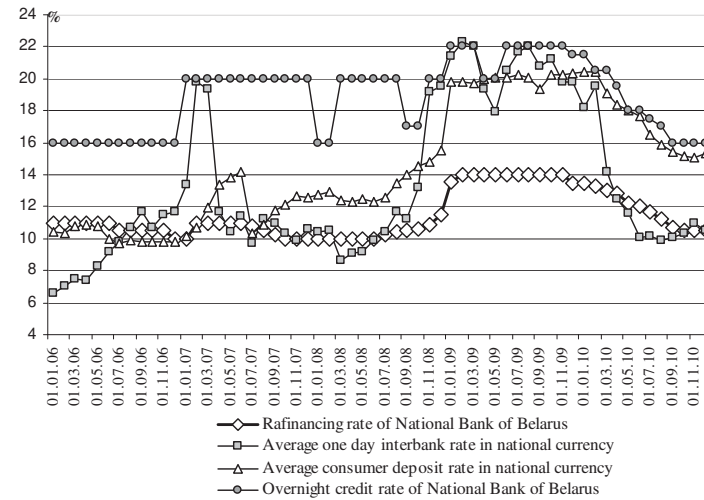


Fig. 8. Dynamics of rates of the banking system of Belarus

Appendix D

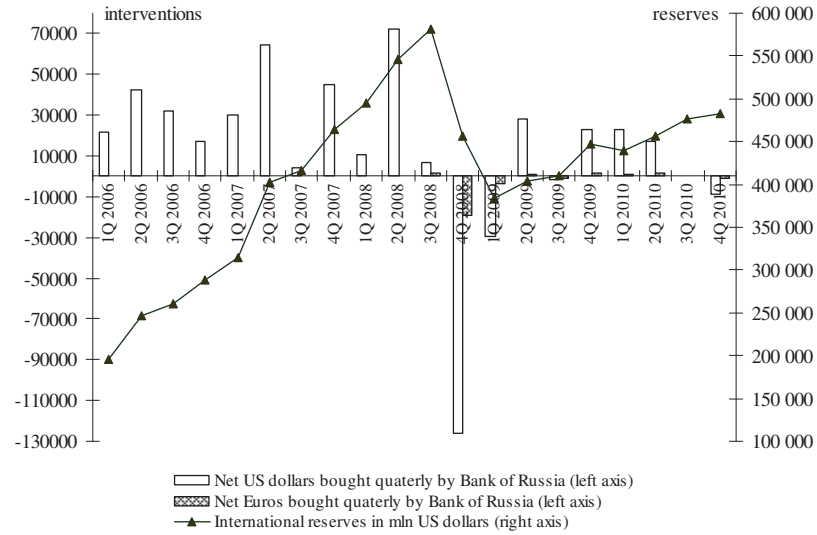


Fig. 9. Dynamics of currency intervention, and international reserves of the Central Bank of Russian Federation

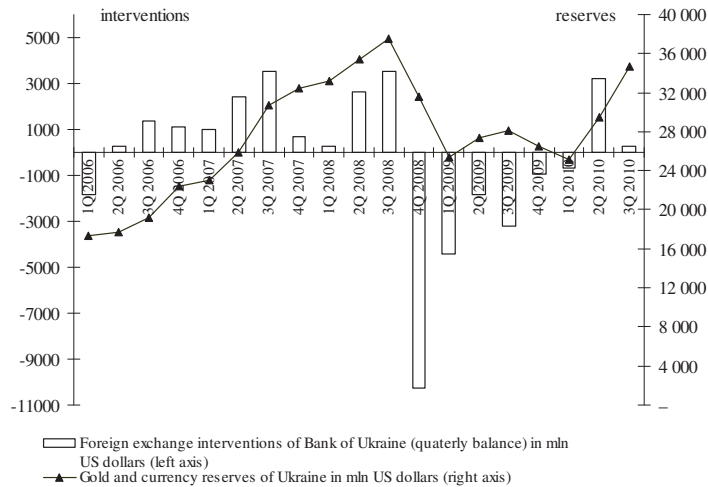


Fig. 10. Dynamics of interventions and international reserves of the NBU

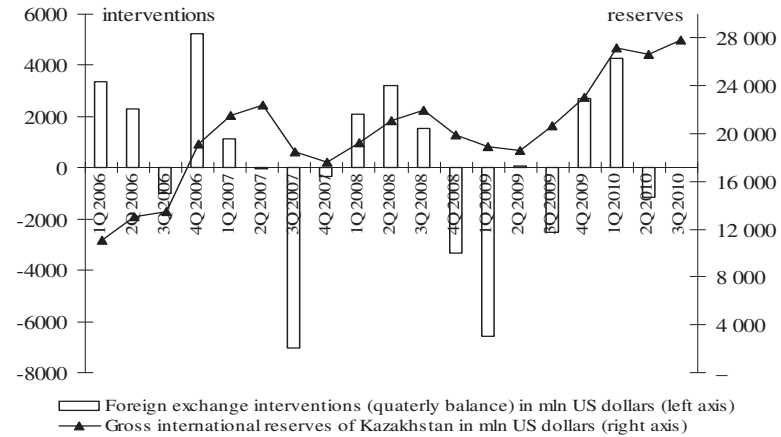


Fig. 11. Dynamics of interventions and international reserves of the NBK

Source: Own calculations and [17-20].