

The Perspectives on a Currency Union in the CIS

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The paper presents an attempt to provide a theoretical justification of the problem of currency integration for the CIS countries. As well, the paper deals with empirical analysis of fundamental theory applied to the problem of establishment of a single currency zone in the CIS. The paper, first, identifies theoretical criteria of OCA that outline the most significant benefits and costs of the currency integration in the CIS, as we see them and, second, presents an analysis of statistical data that allows to receive a quantitative ranking of selected criteria using regression analysis methods. Finally, the research allowed to conduct an evaluation of readiness of the CIS countries to establishing an optimal currency area with participation of Russia. The conclusion contains main inferences and policy recommendations with respect of attractiveness of currency integration for Russia and other CIS countries.

JEL Classification: F31, F36, F42.

Introduction

The past decades witnessed a considerable rise in interest in economic and currency integration processes. Albeit not exhaustive, the list of integration processes of later 20th to early 21st century comprises various trade unions and multilateral trade agreements, liberalization of currency and financial markets, among others. The establishment of the European Exchange Rate Mechanism and its subsequent transformation into the European Monetary Union forms one of the greatest achievements of the European economies on their way towards the economic and, particularly, currency integration.

Against such a background there intensifies the debate on the challenges facing the integration in the CIS. The collapse of the USSR and the subsequent birth of a number of new independent states generated a period of transformation of their national economic system. That was inspired by the transition from the planned economy to market coupled with the break of economic ties between enterprises that suddenly found themselves separated by national borders. From its outset, the process paired up with a considerable fall in economic activity in the noted countries and in their population's living standards, high inflation rates,

and poorly efficient budget and tax policies. And if it is not enough, the 1997-1998 global crisis hit heavily both Russia and the other CIS economies.

Consequently, the crisis in the CIS countries contributed to improvement of their economic situation which manifested itself in the rise of real GDP, a notable decline in inflation rates, rise in efficiency of tax and budget policies coupled with a progress in the social sphere and with the balance of payments. The stabilization of the noted countries' currencies can be regarded as one of the most serious merits in their economic policy.

Other factors apart, all the noted improvements that prove the stabilization of the CIS nations' economies enabled them to start designing a medium- and long-term development strategies. Consolidation of the CIS countries' efforts in the economic area, which is based upon developing market relationship between them should undoubtedly play an important part in this process. More specifically, the agreement on creation of the United Economic Area (UEA) concluded by Russia, Belarus, Kazakhstan and Ukraine and their efforts to promote it exemplifies the above. In compliance with the Agreement, the partnering economies should center on promoting trade relations between them and creation of conditions for an unhampered moving of capital and workforce and securing a balanced tax, monetary and exchange rate and financial policies.

That is why the debate on conditions under which integration processes should turn mutually beneficial for all the participating countries has become increasingly vigorous. To address this particular challenge one needs to gain a clear vision and understanding of all benefits and costs associated with the economic integration processes. Those who propone the integration processes in the post-Soviet area often resort exclusively to the European Currency Union experiences, meaning that they suggest to follow the EU path in this regard. However, it cannot be argued *a priori* that copying others' experiences will ensure the expected results, as the current economic and political conditions in the CIS differ greatly from those the European countries enjoyed from the very start of their integration processes.

It is worthwhile noting that despite different opinions on the subject, at present there are practically no papers, at least, in Russia, which would attempt to analyze the problem in question from theoretical perspective. Such an analysis should be based upon the theory of optimal currency area whose fundamental provisions were developed by R. Mundell, P. Kenen, R. McKinnon etc. Understanding of fundamental assumptions of the theory and their difference from actual economic conditions allows a better comprehension and, perhaps, assessment of all potential benefits and costs which the Commonwealth States may run

against while promoting implementation of the Agreement on creation of the United Economic Area and its further prospects.

So, the goal of our research is to assess the readiness of single CIS member states' to enter a currency union from the perspective of fundamental assumptions of the optimal currency area theory. As well, the paper focuses on an evaluation of possible costs and benefits of such a decision for single CIS member states and primarily Russia.

Main objectives of the present research are: (1) an empirical research into comparative dynamics of macroeconomic indicators of the CIS member states and trade between them from the perspective of matching criteria for creation of a single currency area in the CIS territory; (2) assessment of the readiness of single CIS members for establishing a united currency area in the CIS.

The research methodology is built upon the analysis of existing provisions of the optimal currency area theory and conclusions drawn from formal models that identify benefits and costs associated with currency integration. The empirical analysis methods applied in the paper comprise a statistical and econometric analysis of data on dynamics of fundamental macroeconomic indicators of the CIS countries and trade between them.

So the paper presents an attempt to provide a theoretical justification of the problem of currency integration with respect to the CIS countries. The first section of the paper highlights theoretical aspects of currency integration. The evaluation is based upon the optimal currency zones theory which suggests different approaches to the problem of currency integration.

The second part of the paper deals with the empirical analysis of fundamental provisions of the theory that are applied to the problem of establishing of a single currency area in the territory of the CIS countries. The conclusion presents main outputs and recommendations concerning attractiveness of currency integration to Russia and different CIS countries.

1. The Theory of Optimal Currency Area

The fundamental concept underlying the term “optimal currency area” (OCA) is that existing nations and states may originally find it non-optimal to use their own currencies to effect transactions both domestically and internationally. In the literature, the term “optimal currency area” is used to define an “optimal”, in geographical sense, area in the territory of which the generally accepted means of payments is either a single currency or a group of currencies whose bilateral exchange rates are strictly fixed, while the floating exchange rates

are used vs. other foreign currencies. There also may be used other terminology directly associated with the concept of optimal currency area: that is, currency integration and currency union. Both terms imply a group of countries within the territory of which there circulates a single currency (a new one or a currency of one of them)¹.

Conditionally, one can single out two approaches to the analysis of the problem of identification of optimal currency area: namely, traditional (criteria-based) and alternative ones. The former approach demands to identify various economic characteristics and indices that allow identification of the size and limits of optimal currency area throughout the world. In other words, it suggests some criterion² to identify an optimal currency area. The fundamentals of the approach were laid back in the 1960s by Mundell, McKinnon, and Kenen⁵. Their arguments were mostly based upon comparative evaluation of advantages and drawbacks of the floating and fixed exchange rates under the impact of various shocks on a economy or groups of countries.

The literature in question suggests to use a whole series of criteria to assess the level of optimality. Those are:

- Mobility of production factors;
- Openness of the economy and its size;
- Diversification of the domestic production;
- Similarity in inflation rates;
- Economic and financial integration;
- Political integration;
- Other, so-called “proxy-criteria”.

The alternative approach recognizes the limited nature of the traditional one and views the problem of identification of OCZ somewhat differently: that is, by singling out and comparing various costs and benefits a given country may face on its way towards currency integration. Ideally, to ensure a complete evaluation of the possibility to divide all the economies in the world into independent currency areas, one needs to design an analytical vehicle that would allow to consider their all possible economic characteristics. Today, it is

¹ In the cases when it does not affect the conceptual essence of the assertion and it is not asserted otherwise, the terms “currency integration” and “currency union” can be mutually replaceable.

² Here and below the terms “criterion of optimality of currency area” or “criterion of the theory of optimal currency area” will be used to label economic characteristics that can be used to mark borders of an optimal currency zone

⁵ *Mundell (1961), McKinnon (1963), Kenen (1969).*

impossible to solve the problem, that is why the alternative approach suggests to make a final decision on joining in the already existing currency area or creating new one after considering all the benefits and all the costs. Interestingly, by contrast with the traditional approach, such an evaluation is carried out for every single country or region and with due account of their sovereignty and national borders.

Despite the importance and popularity of the challenges associated with optimal currency area, today there exist just a relatively small number of papers that attempted to build a formal model of an OCA that would integrate many of earlier suggested criteria and enable one to describe and assess costs and benefits of a currency integration. Of such papers, the most known are those by Bayoumi, Ricci, Alesina and Barro⁶, which form an attempt to ensure rather a complete formal analysis of criteria of optimality of currency zones.

The noted models imply main conclusions as follows: first, they demonstrate that in the case a currency union is created or a country joins in the existing one economic agents' well-being rises boosted by the growth in output and consumption, which in turn are fueled by the expansion of affordable goods and elimination of transaction costs. Second, it is necessary to consider the size of the economy, as the benefit from the accession to the currency union appears greater for smaller countries whose foreign trade sector accounts for a considerable proportion of their economies, for transaction costs disappear upon their entering the union. Third, the benefits from currency integration grow along with the rise in the correlation between real shocks affecting the economies in question and fall of their volatility. This is explained by the fact that the shocks will exert a similar influence on economic systems of the member countries. That is why there will be no need to use the exchange rate as a stabilization vehicle. Fourthly, the greater is volatility of monetary shocks outside or within the currency union, the less incentives will be for a country entering such a currency union or joining the anchor country, while the greater is volatility of monetary shocks inside the country, the greater its benefits from the currency integration will be. This is explained by the fact that in this particular case the economy "imports" lower inflation rate from the partner countries.

Ricci's paper also suggests that with the rise in correlation between monetary shocks for two countries currency integration sees weaker incentives for. In addition, the noted paper appears the only one to consider such a criterion an openness of an economy. More specifically, Ricci suggests that the size of the benefit from a greater openness of the economy

⁶ *Bayoumi (1994), Ricci (1997), Alesina, Barro (2002)*

depends on other economic characteristics. On the one hand, the paper has proved earlier research outputs that had argued that a more open economy benefits greater from currency integration, which is determined by a greater efficiency and lower public losses. Interestingly, the magnitude of the benefit, at least, in the framework of the model presented in the paper, declines, once the economy undergoes trade shocks. This effect appears lesser, the higher the correlation between real trade shocks, mobility of labor and efficiency of fiscal instruments are. Finally, with the rise in openness of an economy, there grows the role played by monetary shocks whose effects appear hardly predictable.

Besides, Ricci has introduced to the model such elements of the OCA theory as country-specific labor mobility and fiscal policy. He demonstrated that affected by a shock from the demand side, the change in the nominal revenue of the joining countries can be partly or fully compensated by means of labor mobility and fiscal instruments. So in his paper Ricci has formalized core provisions of the OCA theory that concern such gearing mechanisms as labor mobility and fiscal policy.

There exist a great number of papers that deal with single criteria of the OCA theory and attempt to empirically test them. We believe the most significant papers of this kind are those by: *von Hagen, Neuman (1994)*; *Bayoumi, Eichengreen (1996)*; *Dibooglu, Horvath (1997)*; *Jonung, Sjöholm (1999)*; *Stanoeva (2001)*, *King (2001)*; *Alesina, Barro, Tenreyro (2002)*.

In conclusion, it is worth focusing on such an aspect as endogeneity of the OCA theory criteria. Frankel and Rose were the first to provide the genuine presentation of it⁷. They asserted that while considering the problem of countries' accession to a currency union, the evaluation of historical data appears inadequate, as the criteria underlying such an evaluation are endogenous. Such assertions appeared fully conflicting vis-à-vis the OCA theory and somewhat proved its inconsistency, as it earlier recognized the endogeneity of all the criteria. Arguments in favor of mutual endogeneity of the OCA criteria was based upon the premise that once in the currency union, the structure of a economy should change substantially. That is why it is impossible to judge the country's readiness for a currency integration by its historical economic statistics. More specifically, they criticized two particular OCA criteria: that is, the intensity of trade between countries and similarity of shocks or economic cycles.

The validity of the hypothesis on endogeneity is indirectly proved by rather a great number of empirical papers and particularly by *Rose (1999)*; *Rose, Engel (2000)*; *Glick, Rose*

⁷ *Frankel, Rose (1998)*.

(2001), among others. Their conclusions testify that currency integration is likely to result in a notable change in a whole series of economic characteristics of countries. So endogeneity of criteria of the OCA theory (at least, some of them) means that computations based on historical data may inadequately describe (diminish or, on the contrary, exaggerate) potential benefits from currency integration.

2. Empirical Analysis of Currency Integration with Respect to the CIS Countries

The analysis of the literature on empirical studies enabled us to single out methods that can be used to evaluate possibilities for currency integration in the territory of the CIS countries from the perspective of potential benefits and costs.

First, that is an analysis of indicators computed basing on the existing macroeconomic statistics. Such indicators characterize main criteria of optimality of currency areas. Whereas the purpose of the present research is to assess prospects for creation of a single currency area in the CIS, to conduct the comparison one needs to find the basis for that or, in other words, to consider currency integration options. In the present paper, we suggested that the CIS countries have three options:

1. To create a single currency area or a currency union with Russia;
2. To enter the EMU;
3. To establish a currency union in the territory of the CIS countries, but without Russia's participation⁸.

Such an approach allows to evaluate comparative characteristics of the CIS countries and assess, at least, to a first approximation, the relative amount of costs and benefits from currency integration in the frame of country-specific criteria. In parallel with this, we will conduct a comparative evaluation of the computed country-specific indicators vis-à-vis Russia and the Euro area.

Second, we will apply regression analysis. The main assumption underlying its conduct is the existence of a correlation between volatility of the bilateral exchange rates of the CIS countries' currencies and indicators that characterize key criteria of the OCA theory. This can be explained by the fact that each of the noted currency area optimality criteria is based upon the countries' single economic characteristics which imply no need to use floating

⁸ In the study we did not evaluate this option quantitatively.

exchange rate as a vehicle for economic stabilization. That is why at this juncture fluctuations of a given exchange rate can turn fairly insignificant.

While conducting the analysis, we used the data over the period between 1990 through 2003 across 12 states: Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tadjikistan, Turkmenistan, Uzbekistan, Ukraine, and on the Euro area (Germany before 2002). The information pool comprised the databases of the IMF (*International Financial Statistics, IFS*), the World Bank (*World Development Indicators, WDI*), and the EBRD (*Transition Report 2003*).

2.1. Comparative Analysis of Macroeconomic Indicators in the Framework of the OCA Theory

The choice of indicators was chiefly determined by availability of the necessary cross-country macroeconomic statistics. We also considered such criteria of the OCA theory as bilateral nominal exchange rate volatility, correlation and volatility of real and monetary shocks, correlation and volatility of inflation rates, indicators of the size of the noted economies, intensity of their bilateral foreign trade, and the level of development of their financial sectors. Each of the selected OCA criteria, their respective indicators and the value of the threshold used to single out the countries that match the selected criteria are given below⁹. It should be noted that the research implied only pair comparisons vis-à-vis Russia and the EU. That is why all the conclusions concerning the countries' readiness or failure to get ready to currency union with Russia were drawn on the basis of pair comparisons and concern each single country rather than the whole group of countries that match a given criterion.

While computing indicators that present an average value over the given period or volatility indicators, we used the respective macroeconomic statistical data over a maximal possible time period between 1990 through 2003.

Volatility of bilateral nominal exchange rate. We used a standard deviation of values of the logarithm of exchange rate growth rate of the national currency of country *i* vs. country *j* over the period in question – $SD(E_{ij})$:

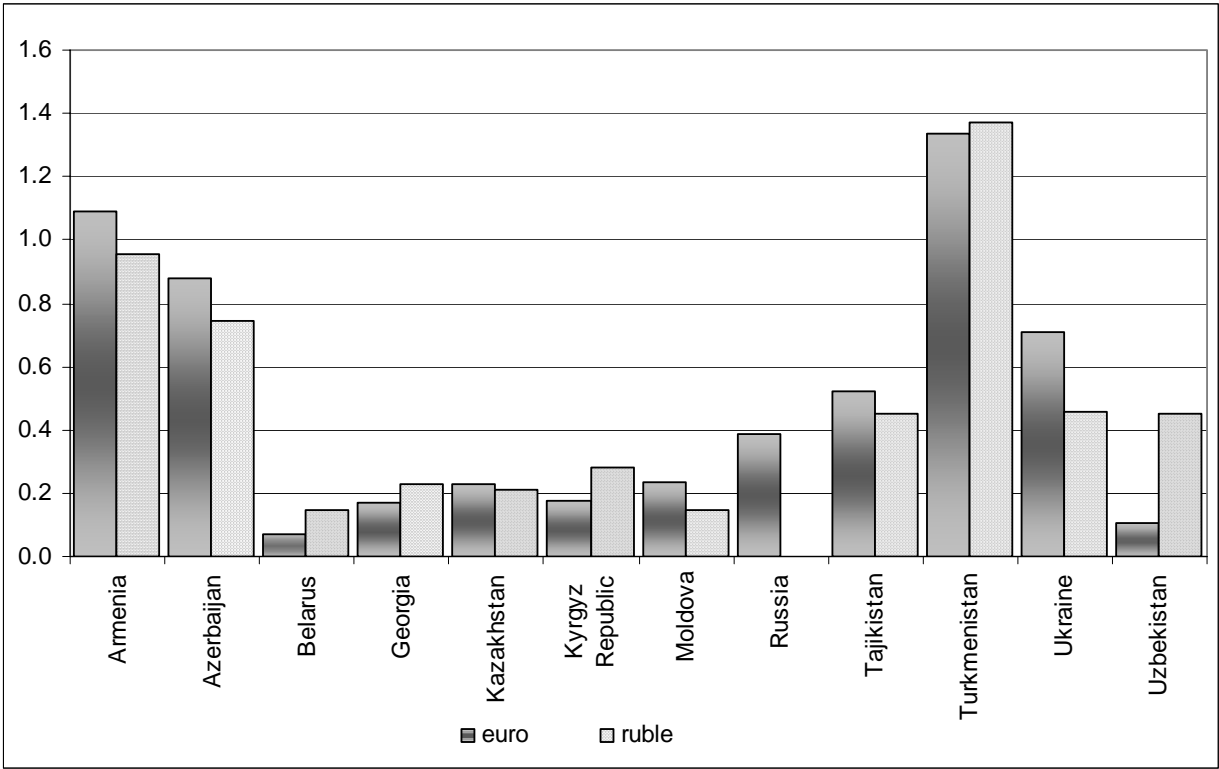
$$SD(E_{ij}) = SD \left(\ln \frac{E_{ij}^t}{E_{ij}^{t-1}} \right).$$

⁹ It must be noted that the selection of the marginal level (threshold) for each criteria presented in this paper appears to a considerable extent arbitrary. In this paper, we selected it basing on the assumption that each criteria should be met by not more than half of the countries in question.

A greater value of the indicator would testify to a greater volatility of the bilateral nominal exchange rate. As the theory reads, all other conditions being equal, a great volatility of the bilateral exchange rate of two countries' national currencies can witness greater costs the given country will have to incur while entering a currency union. There exist a number of assumptions that prove the trustworthiness of the noted effect. This hypothesis is correct in the frame of an assumption on nominal price and wages rigidity. Indeed, in this particular case nominal exchange rate fluctuations will have an actual effect on the country's economy, as they form an instrument of adjustment of effects from various asymmetric shocks. Otherwise, i.e. in the case prices and wages are flexible, effects real shocks can have on the economy (fall in demand for export, for instance) would be adjusted at the expense of cuts in wages and value of exports rather than by means of changes in nominal exchange rate that would restore the balance of payments. Necessary shifts in relative prices and real wages ensure the economy's adaptation. So the flexibility of bilateral exchange rates within the currency union area discontinues to form a necessary condition of maintenance of the balance of payments equilibrium and an optimal correlation between inflation and unemployment inside the union. Besides, the reservation should be made that picking this or that exchange rate regime would automatically tell on its volatility. Notwithstanding this, it is assumed that despite selecting this or that exchange rate policy, the observed fluctuations mirror country-specific structural peculiarities.

It should also be noted that while some papers used information on the value of exchange rate as of the end of the period, other ones used the rate averaged over the whole period. We believe though that for the purpose of analysis of exchange volatility with respect to the CIS countries using the former is incorrect. This is explained by the fact that throughout the period concerned there existed considerable annual fluctuations of exchange rates. Under such circumstances the values of exchange rate as of the start of the year could appear considerably different from those as of the end of it. The use of such data may result in an overvaluation of volatility. That is why for the purpose of further analysis we used statistics based upon average year exchange rates. The respective value of the indicator in question across 12 CIS countries is presented in *Fig. 2-1*.

Figure 2-1. Standard Deviation of Exchange Rate of National Currency vs. Ruble and Euro.



Let us first of all note that while some countries witness a lower volatility of the exchange rate vis-à-vis Ruble, the other ones see it being lower vs. Euro. The CIS countries can be conditionally broken down by three groups, of which the first one comprises economies

where exchange rate of their national currency is rather highly volatile vs. Ruble (those are Azerbaijan, Armenia and Turkmenistan), while Belarus, Georgia, Kazakhstan, Kyrgyzstan and Moldova see a relatively low volatility of exchange rate (the 2nd group). The rest composes the third group. As far as Euro is concerned, the breakdown practically remains unchanged, except for Uzbekistan (low volatility) and Ukraine (relatively high volatility).

So far as the level of volatility of a national currency exchange rate vs. Ruble is concerned, one can formally single out a group of countries with the least respective index. The criterion for ranking became the value of an indicator that accounts for a half of the average one across all the economies, which made up 0.247 for the exchange rate volatility vs. Ruble. The computations have proved that Belarus, Georgia, Kazakhstan and Moldova fell into this particular group. So it is likely that for these countries the currency integration process with Russia would be associated with relatively lesser costs than for the other CIS economies.

The figure above allows another two conclusions. First, according to the exchange rate policy classification in different countries suggested by Reinhart and Rogoff¹⁰, since the early 1990s the CIS countries have been pursuing different currency policies, but overall the differences were not drastic. More specifically, roughly until mid- or late 1990s the countries used the floating rate policy which during the subsequent 4-6 years was replaced by the managed floating rate or adjusted fixed rate policies. That is why the revealed differences in the volatility of the nominal bilateral exchange rate do not form just a sequence of decisions in their exchange rate policies. Rather it mirrors the fundamental macroeconomic differences between these countries under which newly arising shocks exert an asymmetric influence on the given countries. For them the costs of a currency integration with Russia can become greater in terms of losing the flexibility in their exchange rate policies. Second, their exchange rate policies have centered and still center on the USD as a benchmark. Hence apparently the greater volatility of the exchange rate of their national currencies to the Euro.

Real shocks. To analyze asymmetry of real shocks one needs to consider both correlation between them and differences by their absolute value. To assess the former we used the correlations for the logarithm of real GDP growth rate and the index of industrial output (IIO). A high value of the correlation coefficient for a pair of countries may testify to the fact that their economies are under the impact of symmetric shocks that generate positively correlated change in indices of real economic activity. That is why in the case of

¹⁰ Reinhart, Rogoff (2002).

currency integration the economy stabilization would require similar economic policy measures, while the refusal of such a stabilization vehicle as floating exchange rate would not be associated with high costs.

An absolute difference between standard deviations of logarithm real GDP growth rates or industrial output indices for countries i and j ($SD(Y_{ij})$ and $SD(IP_{ij})$) was used as an indicator depicting the difference between volatility of real shocks:

$$SD(Y_{ij}) = \left| SD \left(\ln \frac{RGDP_i^t}{RGDP_i^{t-1}} \right) - SD \left(\ln \frac{RGDP_j^t}{RGDP_j^{t-1}} \right) \right|.$$

A similar formula is used for the case of industrial output index. A high value of this indicator would testify of a considerable asymmetry of real shocks that impact the pair of countries.

So asymmetry of real shocks will be characterized by a low value of the correlation and a high value of the volatility. In the case of entering a currency union or introduction of a single currency the countries meeting these conditions would incur greater costs from the perspective of impossibility to use exchange rate as a tool to resist asymmetric real shocks.

The correlation coefficients computed for the CIS countries vis-à-vis the Euro area's and Russia's indices are given in *Figure 2-2*. The computations were based on the series of annual values of real GDP growth rates in the CIS countries over the period between 1991 through 2003.

Figure 2-2. Correlation between Real GDP Growth Rates for the CIS Countries (vs. the Euro area and Russia).

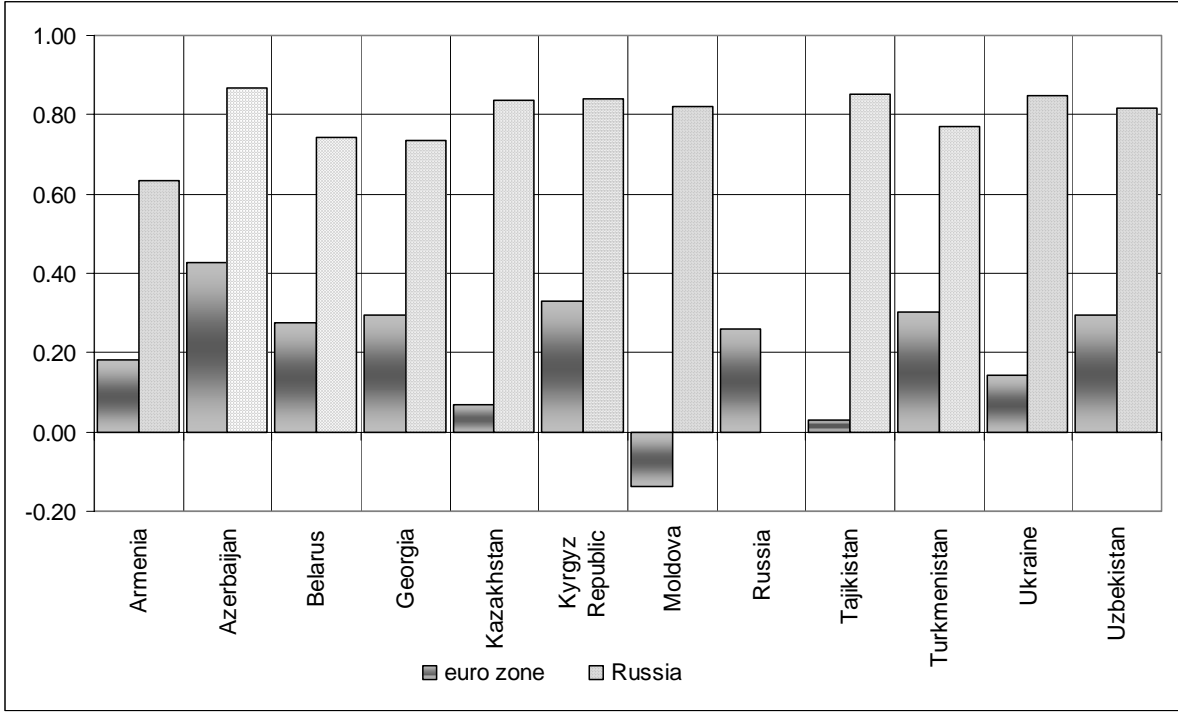


Figure 2-3. Correlation between Index of Industrial Output for the CIS Countries (vs. the Euro area and Russia)

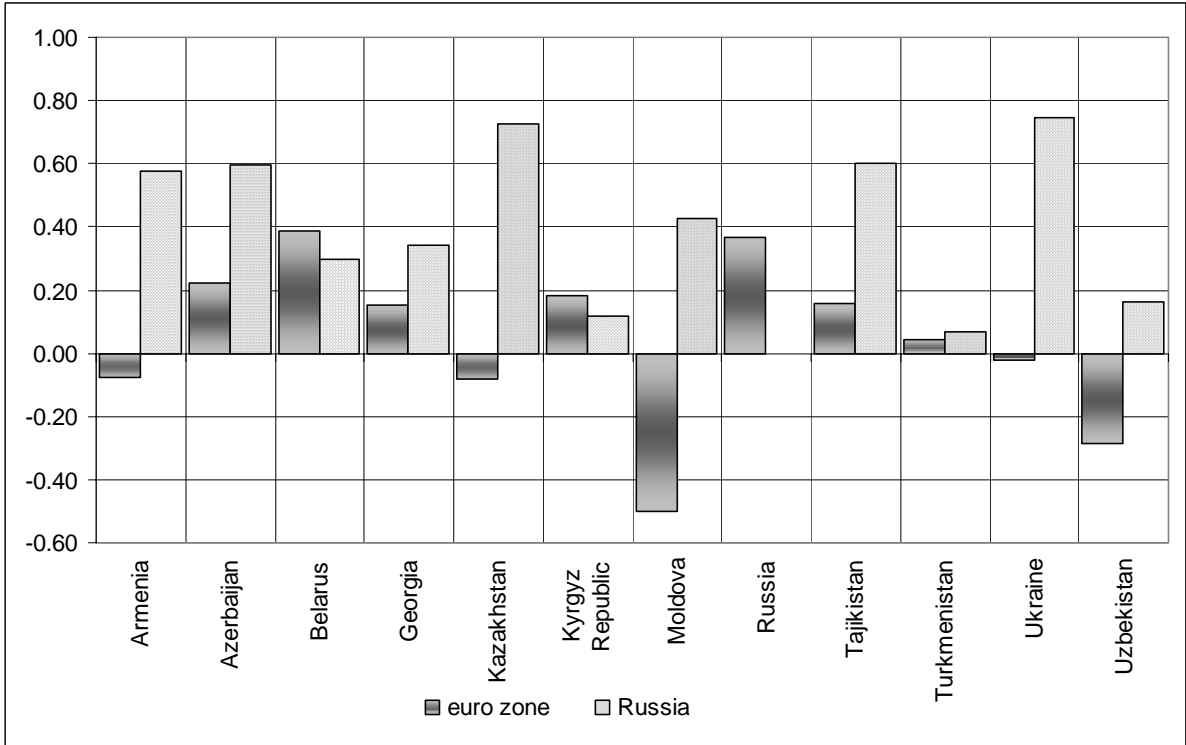


Fig. 2-2 serves as an evidence to the fact that the correlation between real GDP growth rates in the CIS countries and Russia appears substantially greater vs. the respective index of the Euro area. Fig. 2-3 allows practically equal conclusions: from most of countries, the index of industrial output growth rates to a greater extent correlate with IIO in Russia than in the EU countries. At this point Belarus and Kyrgyzstan are the exception – in these countries, the dynamics of IIO to a greater extent correlates with the one of IIO in the Euro area. Apparently such differences can be determined by both a considerable impact on the part of other components that are accounted in the structure of GDP and by a mere coincidence. The results of the computations allow to single out countries whose growth rates of GDP and IIO appear to the greatest extent correlated with Russia's (which exceed the average correlation rate throughout the CIS: namely, 0.796). In terms of GDP growth rates, the group comprises Azerbaijan, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Ukraine, and Uzbekistan, while from the perspective of IIO, the respective group includes Armenia, Azerbaijan, Kazakhstan, Moldova, Tajikistan and Ukraine.

Let us consider another indicator that characterizes real shocks: that is, difference in shock volatility for a pair of countries. Computed values of this particular indicator for real GDP and IIO are given in Fig. 2-4 and Fig. 2-5. The computations were based upon the data over 1991 through 2003.

Figure 2-4. The Indicator of Volatility of Growth Rates of Real GDP for the CIS Countries (vs. the Euro area and Russia).

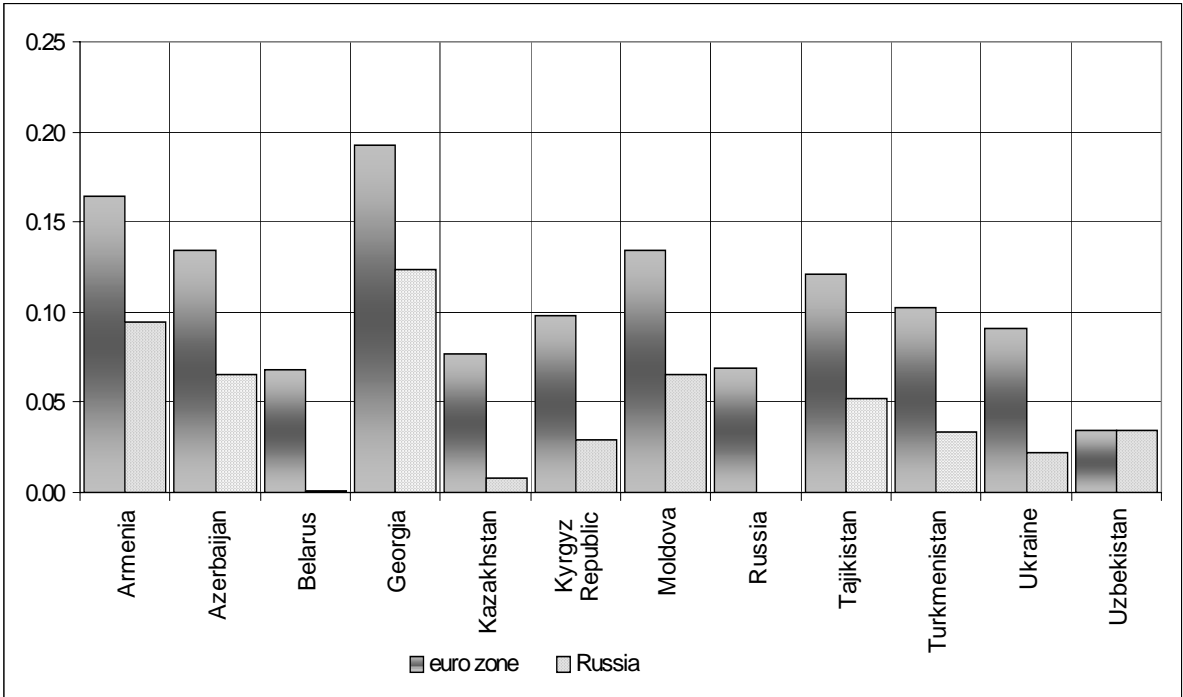


Figure 2-5. The Indicator of Volatility of Growth Rates of Index of Industrial Output for the CIS Countries (vs. the Euro area and Russia).

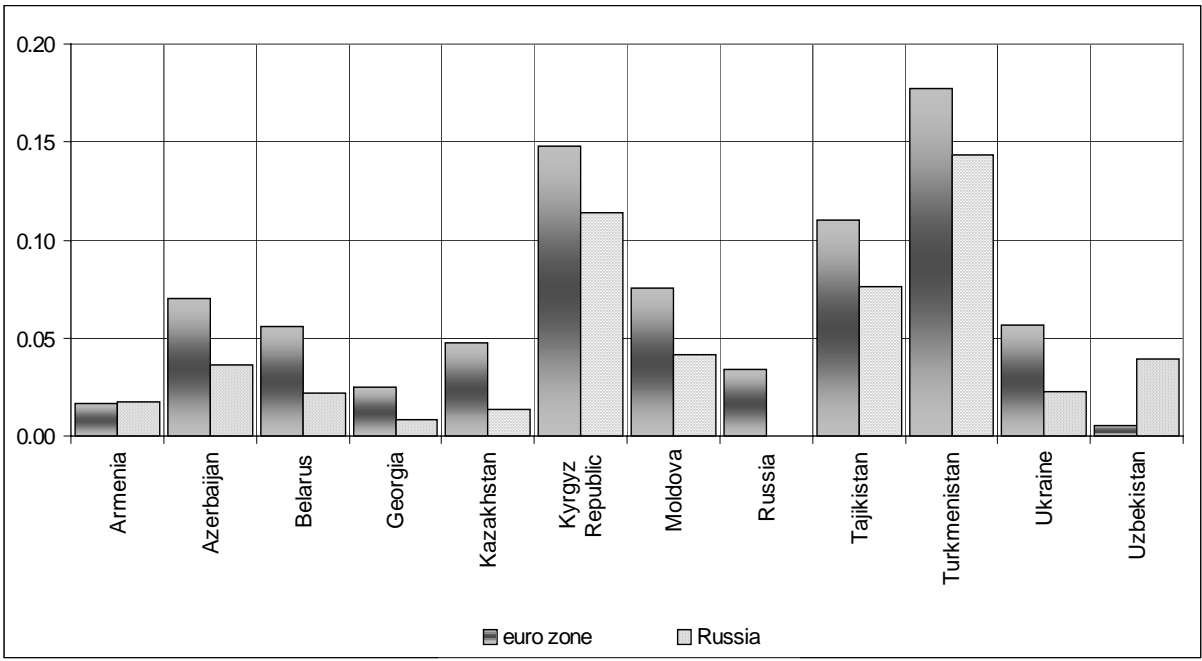


Fig. 2-4 shows that the value of the computed indicator of real GDP is notably greater in the case when the basis of comparison is formed by GDP of the Euro area rather than Russia's GDP. The computation results show that it is only Uzbekistan whose level of asymmetry of real shocks vis-à-vis the Euro area practically coincides with that vs. Russia's, while for the other CIS countries the respective level relative to Russia's appeared notably lower than vs. the Euro area. The least value of the indicator by the criterion of half of the

average value (in this particular case not more than 0.024) was noted for Belarus, Kazakhstan and Ukraine.

As far as the noted index computed basing on the IIO dynamics in the CIS countries vs. the Euro area and Russia is concerned, the picture appears practically identical (see *Fig. 2-5*). While in the former the value of the computed index proves to be greater which reflects the existing differences between the structure of the Euro area and that of the CIS countries, in the latter case the index value proves to be notably lower (and for some economies considerably lower). Using the noted criterion (half of the average value of the index also accounting for 0.024), one can note that the group of countries whose IIO growth rate volatility index appears minimal comprises Armenia, Belarus, Georgia, Kazakhstan, and Ukraine.

The computed indices that characterize fluctuations of real economic activity and, indirectly, volatility of real shocks allow to conclude that the countries whose value of the real shocks index is lower economic cycles are likely to appear more coordinated (as per our computations, those are Belarus, Kazakhstan and Ukraine), or they meet similar shocks. That is why to resist these shocks would require similar economic policy instruments. More specifically, this would not require changes in a bilateral exchange rate, which might be useful in the event of asymmetric shocks.

Monetary shocks. Together with real shocks, one needs to consider effects from monetary shocks. The latter are caused by a country's economic policy. In this paper, for this purpose we will use change in money supply growth rate, because substantial differences in a current monetary policy would imply different inflation rates, thus entailing differences in the purchasing power parity. Its adjustment may require the use of bilateral exchange rate. It is also should be taken into account that parameters of Phillips curve appear different for different countries, i.e. the correlation between inflation and unemployment can vary as of the moment of unification. That is why, at least, in the short run the countries would incur costs determined by the need to ensure a correlation which should be optimal for the currency union as a whole. Furthermore, differences in interest rates caused by the absence of coordination in the course of pursuance of monetary policy would also propel costs associated with currency integration, as interest rates should be unified upon establishment of the union.

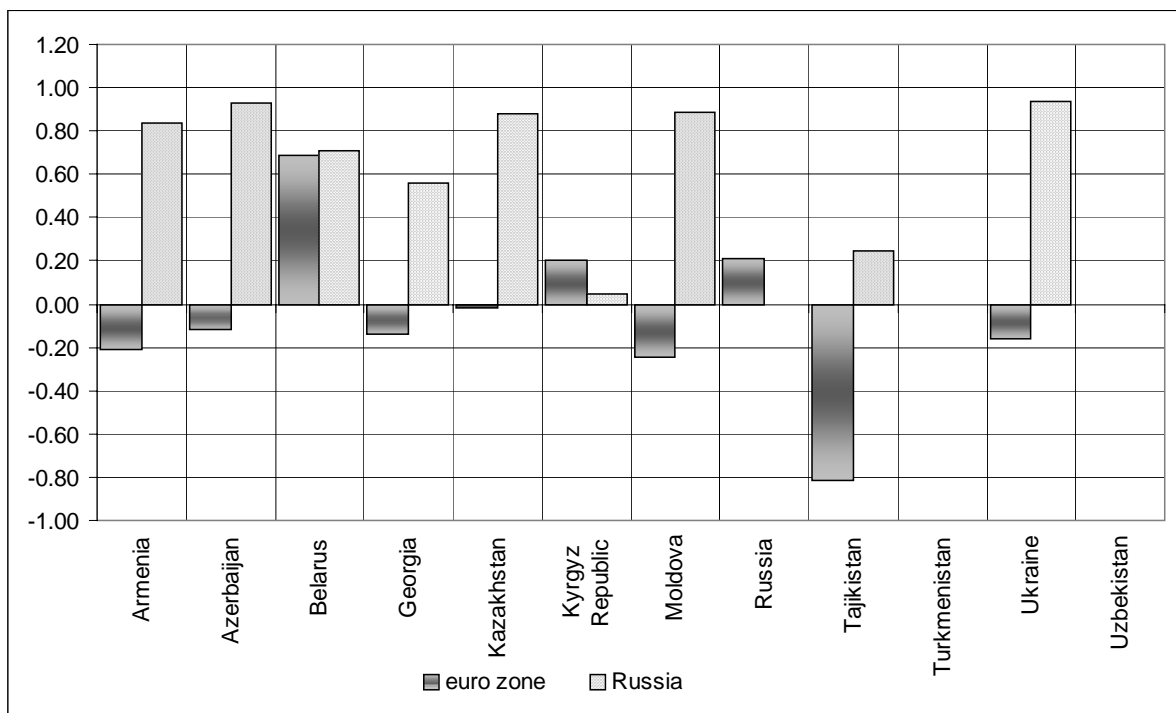
By analogy with real shocks, to depict asymmetry of monetary shocks we will use adjustment coefficient for logarithms of money supply growth rates and an absolute value of the difference between standard deviations of the logarithms of money supply growth rates for country i and country j ($SD(M_{ij})$) that describe the difference between their volatility levels:

$$SD(M_{ij}) = \left| SD \left(\ln \frac{M_i^t}{M_i^{t-1}} \right) - SD \left(\ln \frac{M_j^t}{M_j^{t-1}} \right) \right|.$$

It should be noted that the length of the series vary from country to country, which is explained by different number of years on which the necessary statistics exists. That is why for the purpose of analysis, the indices could be computed by two different means: one – by computing correlations and standard deviations across all the available observations; and the other – by computing adjustment rates and standard deviation on series of equal length (samples). While maximal length of data series on the value of money supply corresponds to the period between 1992 through 2003 (Moldova), minimal one – 1999-2003 (Tajikistan).

Let us first consider the structure of correlations between the noted characteristics of monetary shocks for the CIS countries, Euri area and Russia which was computed only by the second method and is presented in *Figure 2-6*.

Fig. 2-6. Correlation between Money Supply Growth Rates across the CIS Countries (vs. the Euro area and Russia).

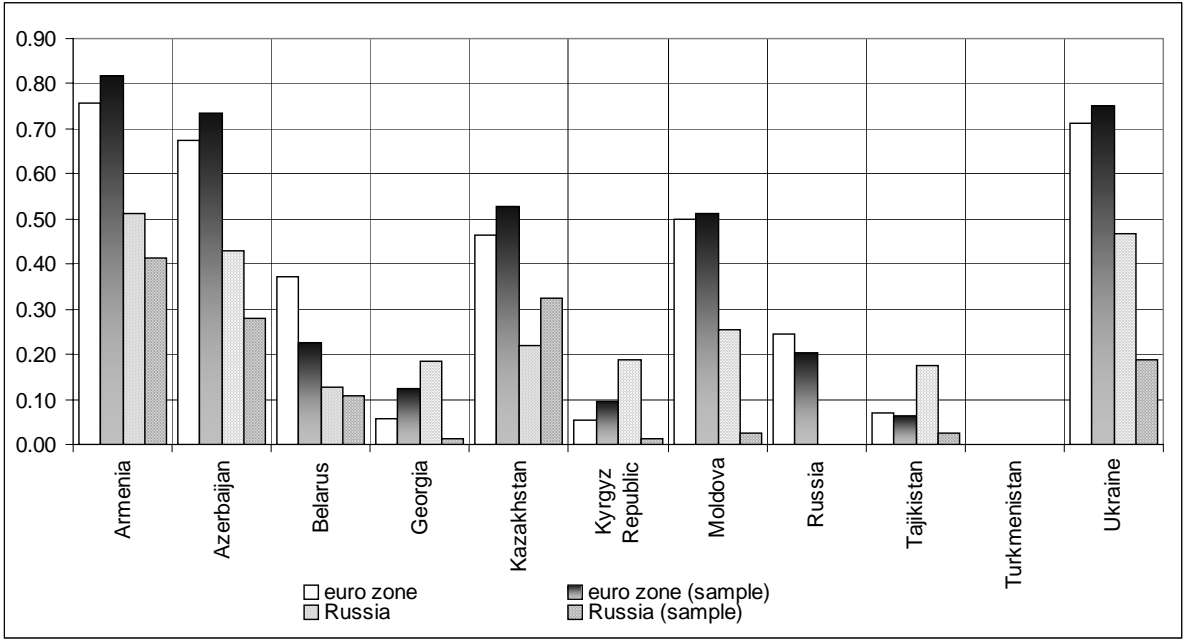


The figure shows that money supply fluctuations in the CIS countries to a greater extent appear correlated to those in Russia than in the Euro area. As it was noted for the case of real economic activity indices, Belarus likewise constitutes an exceptional case, with its correlation coefficients vs. Russia and the Euro area practically coinciding. Armenia,

Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova and Ukraine’s value of correlation coefficient vs. Russia exceeds the average value across the country sample (0.55).

Calculated by two the possible ways, values of the volatility index for the CIS countries are presented in *Figure 2-7*.

Fig. 2-7. Value of Volatility of Money Supply Growth Rates across the CIS Countries (vs. the Euro area and Russia).



It can be noted that this index for monetary shocks appears notably greater than that for real shocks by its absolute values. Apparently this can be attributed to a high inflation rate in the CIS countries coupled with considerable fluctuations of money supply. At the same time, rates of fluctuations of GDP and industrial output were substantially lesser. That is why the value of the index that characterize volatility of monetary shocks turns to be greater.

As concerns comparing the values of the index for the CIS countries vis-à-vis the Euro area and Russia, in the latter case the value proves to be lesser nevertheless. This can be interpreted as a greater (informal) coordination between Russia and the CIS countries in the monetary policy area vis-à-vis the CIS countries and the Euro area. However, for some countries (Georgia, Kyrgyzstan, Tajikistan) the index computed relative to the Euro area turned to be lesser. In all likelihood this was determined by the fact that statistical data on these particular countries cover just a relatively short period of time when fluctuations of money supply were generally less intense, while the other countries enjoy longer time periods.

While singling out countries with the least volatility of monetary shocks, we used an indicator computed by the second method, i.e. by comparable periods. The threshold value for

monetary shocks accounted for 0.07. The group of countries that meet this criterion comprises Georgia, Kyrgyzstan, Moldova and Tajikistan. Should they enter a currency union with Russia, they would see lower respective costs in terms of growth in inflation or unemployment associated with the necessity to coordinate monetary policies.

Generalization of the outcomes allows to note that our expectations were accurate: that is, by both indices (correlation between, and volatility of monetary shocks) the CIS countries have proved to be to a greater extent close to Russia than the Euro area. From the perspective of the OCA theory, the countries with a high value of correlation between monetary shocks and a low value of volatility would bear the least costs associated with currency integration.

Similarity of inflationary processes. By analogue with real and monetary shocks, an important indicator that determines lower costs associated with currency integration is similarity of inflationary processes in economies. To describe coordination between dynamics of price indices, we used coefficient of correlation between logarithms of CPI growth rates in the given country, and in the Euro area, and in Russia. The instability of inflation rates was measured by means of an absolute difference between standard deviations of inflation logarithm for countries i and j — $SD(CPI_{ij})$:

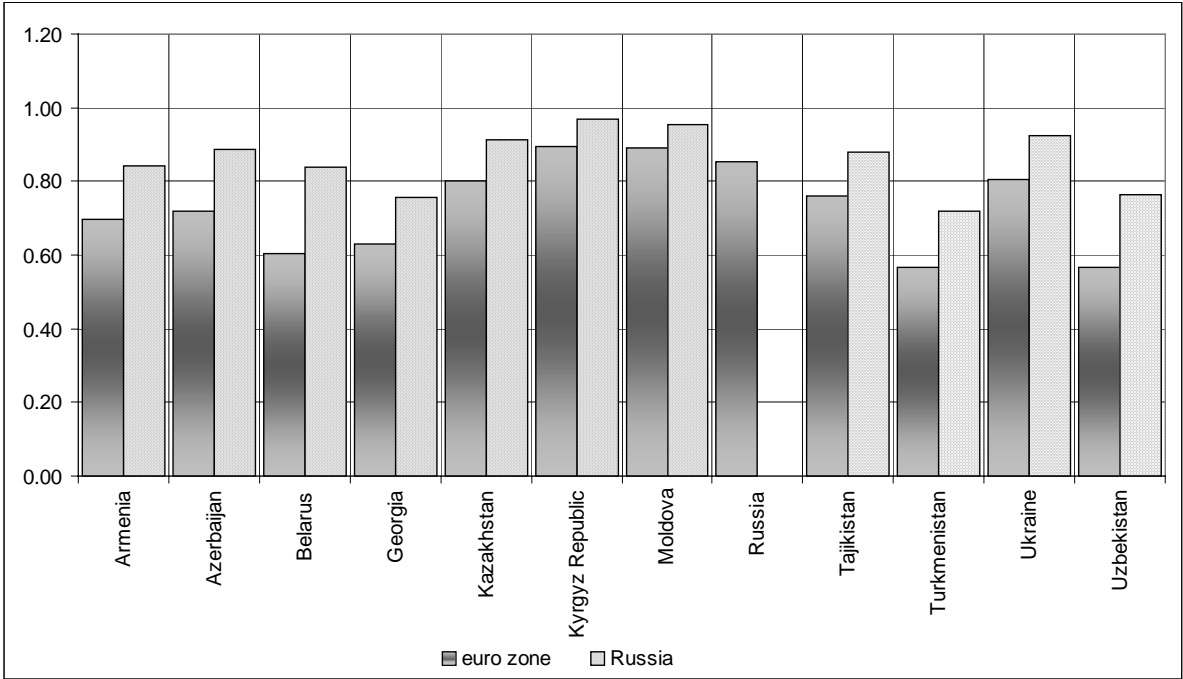
$$SD(CPI_{ij}) = \left| SD \left(\ln \frac{CPI_i^t}{CPI_i^{t-1}} \right) - SD \left(\ln \frac{CPI_j^t}{CPI_j^{t-1}} \right) \right|.$$

As it was noted in the case of real and monetary shocks, an optimal condition of currency integration for a country from the perspective of the OCA theory likewise appears a great coefficient of correlation its inflationary indices with those of an anchor country and a low value of their volatility. The theoretical justification is that providing the respective inflation rates and their relative dynamics differ greatly, a given pair of countries would see fluctuations of relative prices. Floating exchange rate would enable them to smooth away such fluctuations, that is why a loosening of flexibility of their exchange rate policies would fuel costs associated with currency integration. Besides, one should take into account costs in terms of Phillips curve that may be present during a short period: the countries would have to accomplish transition towards a new equilibrium state that may differ from the equilibrium ratio between inflation and unemployment in existence in each country prior to their entering the union.

The values of correlation coefficients and inflation volatility computed for the CIS countries over the period between 1991–2003 are presented in *Fig. 2-8* and *2-9*. It can be

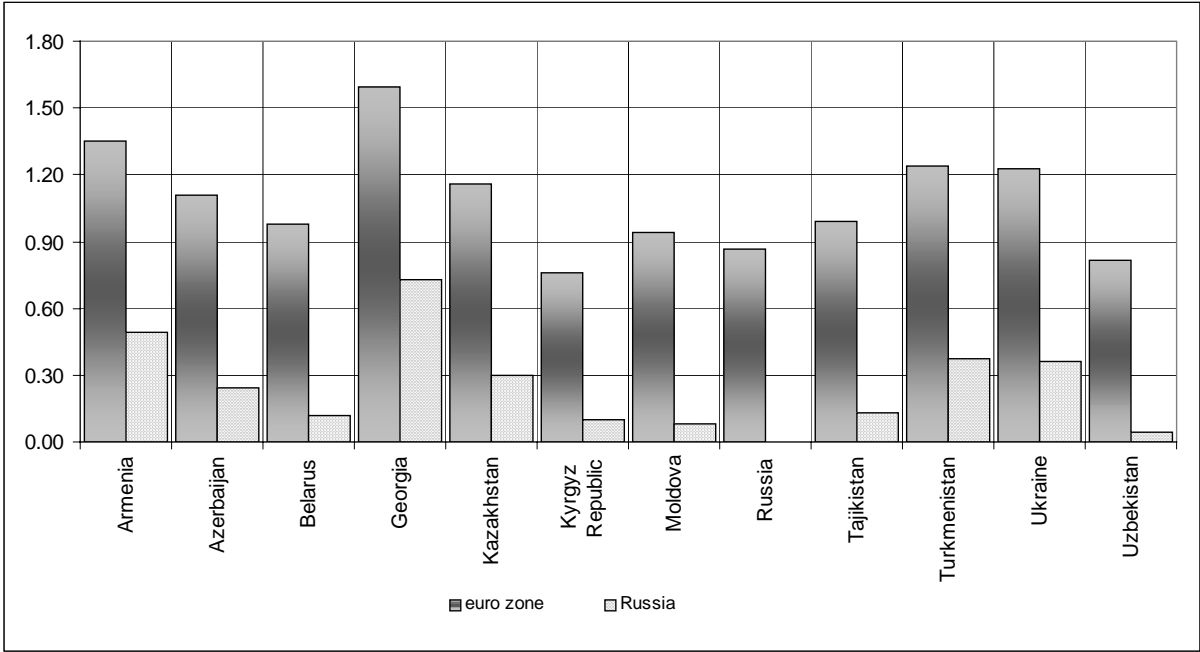
noted that correlation coefficients for the CIS countries vs. the Euro area and Russia appear fairly great. But with the average value of the coefficient across all the CIS countries roughly accounting for 0.86, their inflationary processes to a greater extent appear correlated with Russia's inflation. Interestingly, the correlation value over the average one was noted for Azerbaijan, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, and Ukraine.

Fig. 2-8. Correlation between Inflation Logarithm for the CIS Countries and that of the Euro area and Russia.



As concerns differences between inflation volatility rates, they prove to be substantially greater, should the CIS countries be compared with the Euro area than with Russia (see Fig. 2-9). Armenia and Georgia demonstrated the greatest values of the computed index, which mirrors the greatest difference between volatility of their inflation levels vis-à-vis Russia's. To single out the group of countries whose value of the index is minimum, we used the criterion of a half of the average value, and in this particular case the marginal value accounted for 0.135. Hence the group comprises such countries as Belarus, Kyrgyzstan, Moldova, Tajikistan and Uzbekistan.

Fig. 2-9. The Index of Inflation Volatility for the CIS Countries (vs. the Euro area and Russia).



The respective results allow conclusion that, despite the inflation dynamics in the CIS countries, the Euro area and Russia being fairly similar, relative fluctuations in consumer prices growth rates in the CIS and Russia appear less than in the EMU, which testifies to greater benefits from a currency integration with Russia rather than with the European Union states.

The economy's size. Yet another criterion of OCZ is the size of a given economy relative to the anchor economy. According with the theoretical results, it is suggested that the smaller the given economy is, the more it benefits from entering a currency zone or currency union. It is assumed that a small country is compelled to purchase a greater volume of goods and services overseas which is associated with transaction costs. Once the currency union is established, these costs would be partly or fully eliminated, that is why a small country would benefit from the integration greater than a bigger one.

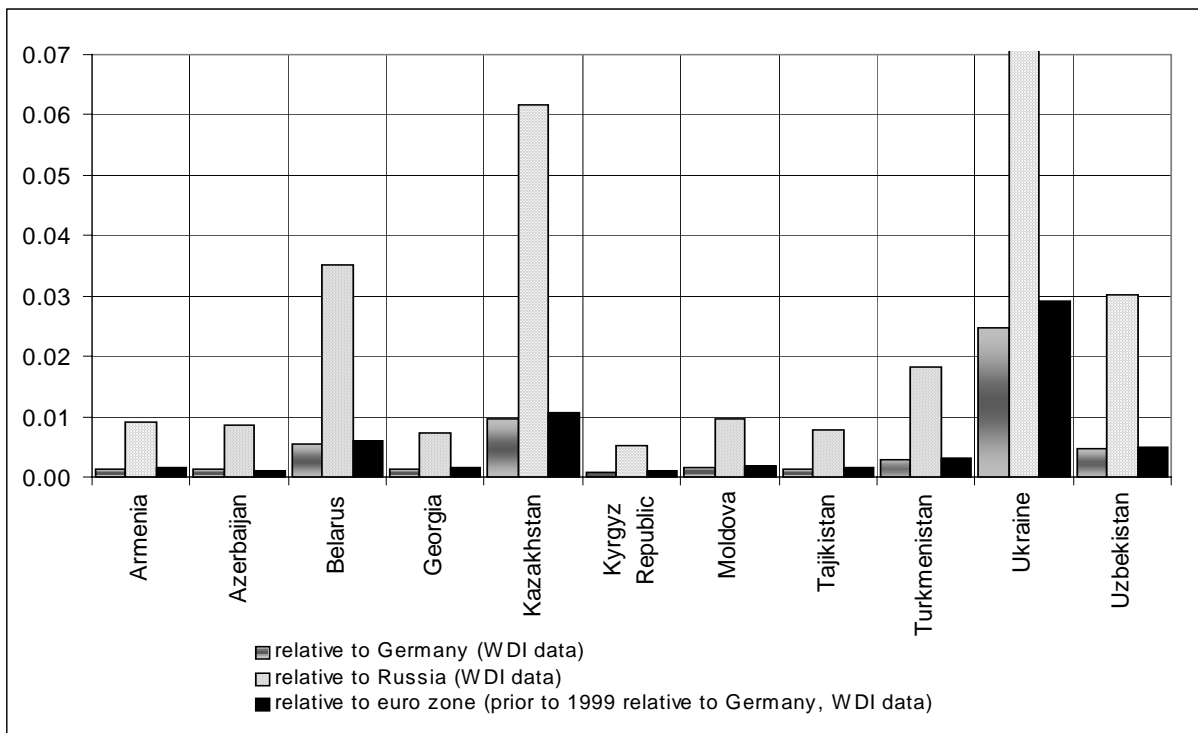
The indicator that characterizes the relative size of two national economies was formed by the value of correlation between their GDP averaged over the period 1990 to 2001 (in constant prices, the World Bank data) for countries i and j – $SIZE_{ij}$:

$$SIZE_{ij} = Average_t \left(\frac{RGDP_i^t}{RGDP_j^t} \right).$$

Fig. 2-10 shows that what all the CIS countries have in common is a substantially lesser size of the economy relative to the Euro area, while a number of the CIS countries enjoy relatively greater size vis-à-vis Russia's economy, especially such countries as Belarus, Kazakhstan, Ukraine and Uzbekistan.

By contrast, Armenia, Azerbaijan, Georgia, Kyrgyzstan, Moldova and Tajikistan by their value indicators do not exceed the half the average value across the sample in question. According to theoretical conclusions, these countries may to the greatest extent benefit from the currency integration with Russia.

Fig. 2-10. The Size of the CIS Economies vs. the Euro Area and Russia's Economy.



The volume of bilateral trade. In the OCA theory, the volume of bilateral trade forms an important argument in favor of currency integration. As a result of currency integration, a given country benefits primarily in the foreign trade area, as the discontinuation of exchange rate fluctuations eliminates the currency risk and the need in monitoring the currency market on the part of companies involved in foreign trade operations. Another side of the benefit in

question is the elimination of transactions costs associated with the need to convert national currencies.

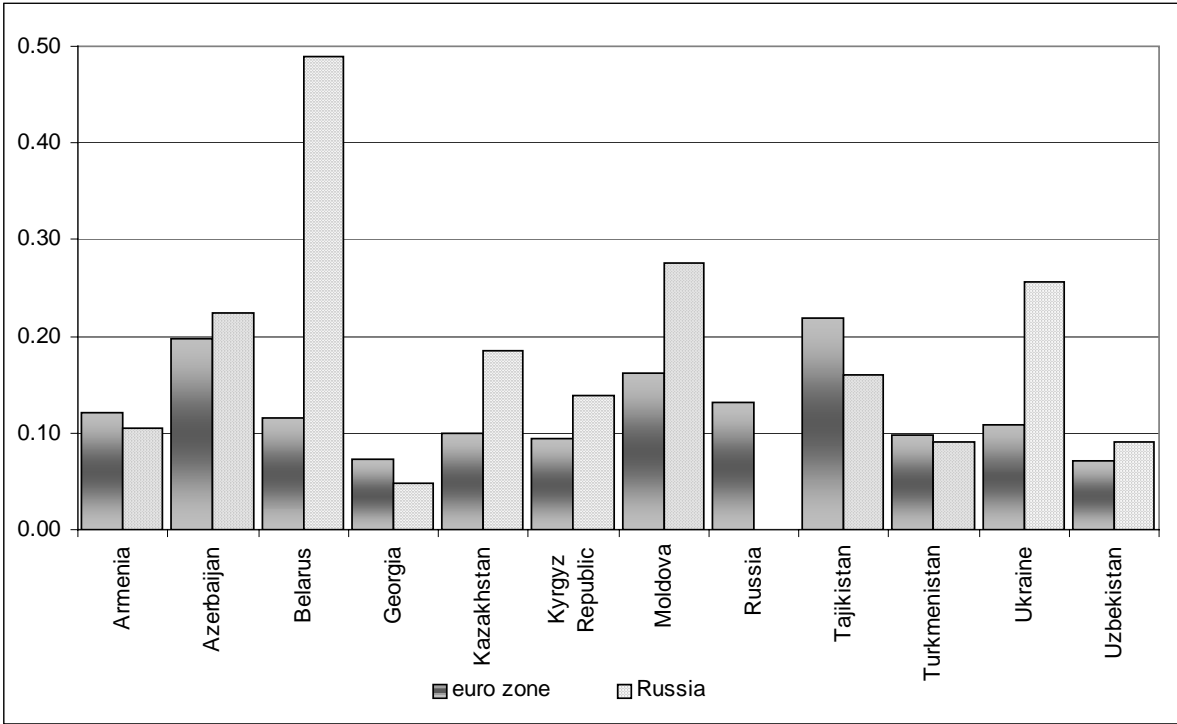
In a general case, this particular index characterizes the level of openness of the given economy from the perspective of exchange with goods or services. In our particular case, the countries that take a more pro-active stand with respect to trading with Russia or the Euro area would enjoy a greater value of the index in question.

To depict the scope of mutual trade between the CIS countries and the EUROzone economies and Russia, we used the average value of the indicator of the ratio of foreign trade to nominal GDP - TR_{ij} :

$$TR_{ij} = Average_t \left(\frac{Ex_{ij}^t + I_{ji}^t}{NGDP_i^t} \right)$$

For each CIS country the index was computed using its foreign trade turnover with the Euro area countries and Russia, and results of the computation are given in Fig. 2-11.

Fig. 2-11. The Index of Foreign Trade Volume between the CIS Countries and Russia and Euro Area.



It can be noted that the index values for different countries vis-à-vis the Euro area and Russia varied. While Armenia, Georgia, Tajikistan and Turkmenistan are more inclined to trade with the Euro area, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Ukraine and

Uzbekistan's foreign trade turnover with Russia is greater than the one with the Euro area. Notably, the group of countries whose index values are over the average value across the sample (0.187) comprises Azerbaijan, Belarus, Kazakhstan, Moldova and Ukraine. Should these countries introduce a single currency, they would enjoy greater benefits. Nonetheless, it should be taken into account that once the currency union is established, the foreign trade turnover between the countries should grow. That is why potential benefits might be even greater.

Financial sector development. In theory, the level of the financial sector development is also viewed as a factor that contributes to an efficient smoothening away of effects from asymmetric shocks. More specifically, the existence of an efficient currency market lowers the probability of speculative attacks against a national currency under fixed exchange rate.

The papers on empirical testing of the OCA theory cite various indicators that allow to characterize the financial sector development and most frequently – the proportion of credits given to the private sector (which characterizes the level of development of the banking sector) and a relative level of monetization of GDP. The latter can be regarded as proxy that characterizes possibilities for money supply regulation to adjust the impact of various shocks. For the purpose of the present research the noted indicators were computed as follows:

- The proportion of loans to the private sector in the total volume of given loans averaged over the period between 1992 to 2003¹² – FC_i :

$$FC_i = Average_t \left(\frac{PC_i^t}{TDC_i^t} \right);$$

- The ratio between i country's GDP monetization ratio¹³ averaged over the period between 1992 to 2002 to the sum of GDP monetization ratios for countries i and j :

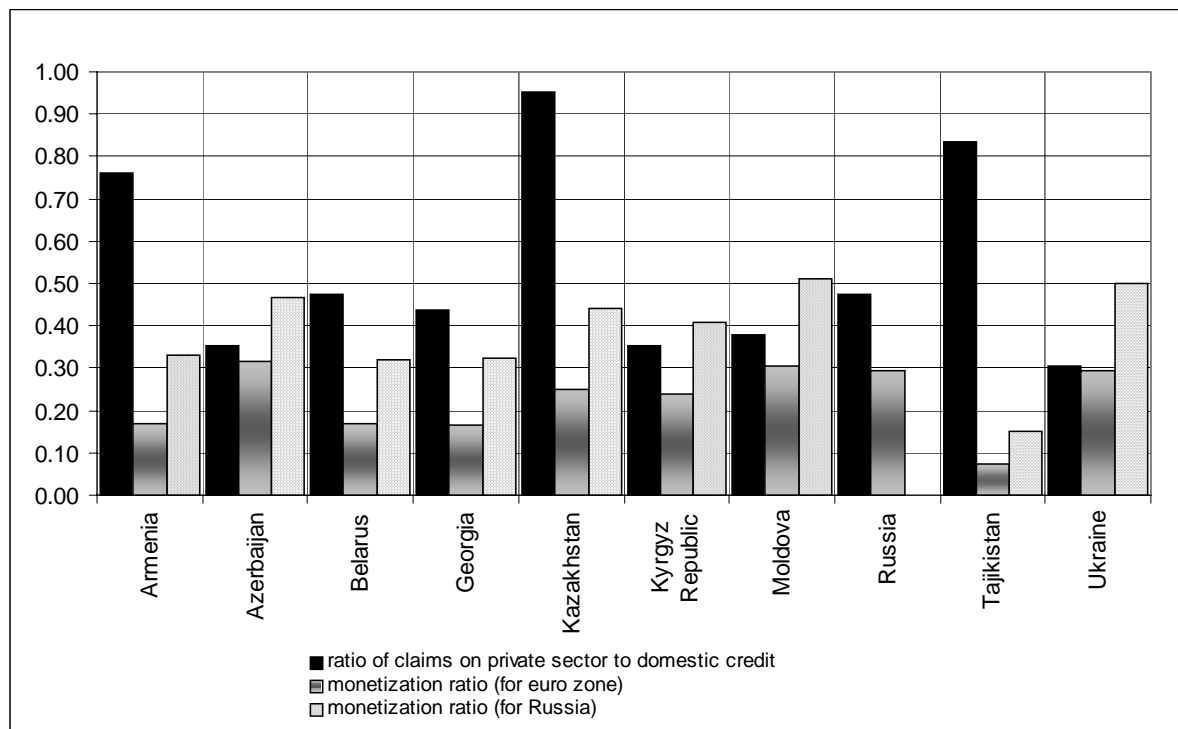
¹² The data on this particular period were not available on all the countries: more specifically, to compute the index for Kazakhstan and Russia, we used the data on 1993–2003, Belarus – 1994–2003, and Georgia and Kyrgyzstan – 1995–2003.

¹³ The length of the series varied from country to country, which is explained by availability of the data over different periods of time

$$FD_{ij} = \text{Average}_t \left(\frac{\frac{M_i^t}{NGDP_i^t}}{\frac{M_i^t}{NGDP_i^t} + \frac{M_j^t}{NGDP_j^t}} \right)$$

Fig. 2-12 presents the financial sector development indices across the CIS countries.

Fig. 2-12. Indices of Development of the Financial Sector in the CIS countries.



Let us first of all consider the index of volume of credits given to the private sector. It can be noted that the index values vary from country to country. Given that it accounts for over 0.9 for Kazakhstan, it makes up only 0.3 for Ukraine. The group of countries where the proportion of loans to the private sector is greater than the average value across the sample (0.53) comprises Armenia, Kazakhstan and Tajikistan. But the reservation should be made that these results should be treated with caution, as they cannot adequately mirror an actual state of affairs in these countries' banking sector, for a high value of the index may be determined by specific computation procedures in these countries or any other unaccounted factors. In particular, for Russia this index is also lower than the average value across the sample in question.

As concerns the GDP monetization ratio, the results show that it appears greater in the event the CIS countries are compared with Russia rather than with the Euro area. If one considers the index values vs. Russia's, for most CIS countries the values do not considerably vary. The minimum value of this particular index is observed in Tajikistan (0.15), while maximum – for Moldova (0.51). In case of the ranking of all the countries by the value of the index, the group of countries with a high value (over 0.38 which constitutes the average value across the sample) comprises Azerbaijan, Kazakhstan, Kyrgyzstan, Moldova and Ukraine.

So, so far as this particular criterion is concerned, in the last countries the financial sector appears rather developed. According to the OCA theory, a developed financial sector should help smooth away payment imbalances and facilitate the process of real adaptation in the economy. It should also inhibit the impact of shock on an exchange rate stability in countries that employ the fixed exchange rate regime, i.e. ultimately the costs associated with the loss of such an instrument of economic stabilization as floating exchange rate may prove to be lower for the countries we singled out basing on our computations.

* * *

The results of the comparative evaluation of indices that characterize a certain criterion of the OCA theory are provided above. The summary indices by each of the countries that match the selected criteria are given in *Table 2-1*. They are ranked by the number of characteristics that match the targeted group¹⁴. The complete list of the countries selected by every indicator is given in *Table 2-2*.

Table 2-1. Aggregate Indices Across the CIS Countries.

Country	The number of indices by which its values are over/smaller than the threshold level
Moldova	10
Kazakhstan	10
Ukraine	8
Azerbaijan	7
Tajikistan	7
Belarus	6
Kyrgystan	6
Armenia	5
Georgia	5
Uzbekistan	2
Turkmenistan	0

¹⁴ It is assumed that providing an index computed for each country meets the conditions stipulated in the present paper, the given country meets the respective criterion.

Table 2-2. The Countries that Meet the OCA Criteria.

Criterion	Index name	Countries
Instability of exchange rate	Volatility of bilateral exchange rate	Belarus, Georgia, Kazakhstan, Moldova
Real shock asymmetry	Correlation of real GDP growth rates	Azerbaijan, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Ukraine, Uzbekistan
	Volatility of real GDP growth rates	Belarus, Kazakhstan, Ukraine
	Correlation of growth rates of index of industrial output	Armenia, Azerbaijan, Kazakhstan, Moldova, Tajikistan, Ukraine
	Volatility of growth rates of index of industrial output	Armenia, Belarus, Georgia, Kazakhstan, Ukraine
Nominal shock asymmetry	Correlation of money supply growth rates	Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova, Ukraine
	Volatility of money supply growth rates	Georgia, Kyrgyzstan, Moldova, Tajikistan
Inflation	Correlation of growth rates of consumer price index	Azerbaijan, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Ukraine
	Volatility of growth rates of consumer price index	Belarus, Kyrgyzstan, Moldova, Tajikistan, Uzbekistan
The economy size	The average real GDP over the period in question	Armenia, Azerbaijan, Georgia, Kyrgyzstan, Moldova, Tajikistan
Foreign trade	The ratio of the foreign trade to GDP	Azerbaijan, Belarus, Казахстан, Moldova, Ukraine
The financial sector development	The proportion of loans to the private sector in the total volume of credits in the economy	Armenia, Kazakhstan, Tajikistan
	The GDP monetization ratio	Azerbaijan, Kazakhstan, Kyrgyzstan, Moldova, Ukraine

Basing on the results presented in Tables 2-1 and 2-2, it becomes possible to draw conclusions for the CIS countries regarding the economic attractiveness of establishment of a currency union with Russia from the perspective of the criteria of the OCA theory. Of the countries in question it is Moldova and Kazakhstan that enjoy the greatest OCA index and match the targeted group by 10 of 13 indices. Consequently from the perspective of the criteria in question, these countries to a greater extent are ready to establish a single currency area with Russia's participation. Ukraine, Azerbaijan and Tajikistan's OCA index values are somewhat lower (8 and 7, respectively), meaning this group of countries to a relatively lesser degree is ready to unite their currencies with the Russian Ruble, for there exist substantial differences by many indicators, which may entail certain costs in the process of currency unification. Finally, Belarus and Kyrgyzstan's OCA index value made up 6, both Armenia and Georgia's ones – 5, while Uzbekistan's – 2 and Turkmenistan – 0. In other words, by most their indices these particular countries drastically differ from Russia, that is why they would incur far greater costs associated with currency integration than the countries with high OCA values.

2.3. Regression Analysis

The papers on empirical testing of the OCA theory used regression analysis to solve two tasks: to test the dependence of the nominal exchange rate volatility on various indicators that formed proxy for the OCA criteria and to estimate structural vector autoregression models that allowed to evaluate mutual impact of shocks of the indices in question. Whereas the estimation of structural VAR-models requires the presence of rather long time series of the indices, it appeared impossible to use this particular approach in our study. By contrast, the existing macroeconomic statistics across the countries allows cross-sectional analysis of the nominal exchange rate volatility equation for the selected countries.

In the OCA theory frame, there exists a fundamental assumption of the existence of a correlation between the OCA criteria and nominal exchange rate volatility. The logic is that each criterion determines conditions under which there happens a decrease in costs determined by the impossibility of further using the exchange rate for the macroeconomic stabilization purposes (counteracting effects generated by asymmetric shocks), or, on the contrary a greater gain from the currency union.

To empirically test the OCAZ theory conclusions with respect to the CIS countries, we estimated the following regression model:

$$SD(E_{ij}) = \alpha_0 + \alpha_1 SD(IP_{ij}) + \alpha_2 SD(M_{ij}) + \alpha_3 SD(CPI_{ij}) + \alpha_4 TRADE_{ij} + \alpha_5 SIZE_{ij} + \alpha_6 FC_i + \alpha_7 OIL + \alpha_8 UNION + \varepsilon_{ij}$$

where $SD(E_{ij})$ – standard deviation of the nominal exchange rate growth rate logarithm for national currencies of countries i and j ;

$SD(IP_{ij})$ – absolute value of the difference between standard deviations of industrial output growth rate logarithms;

$SD(M_{ij})$ – absolute value of the difference between standard deviations of money supply growth rate logarithms;

$SD(CPI_{ij})$ – absolute value of the difference between standard deviations of inflation logarithms;

$TRADE_{ij}$ – average value for the ratios of foreign trade to nominal GDP for countries i and j ;

$SIZE_{ij}$ – average value of real GDP logarithms (in constant prices) for countries i and j ;

FC_i – the share of loans to the private sector in the total volume of given loans;

OIL – dummy that accounts for the countries with a high proportion of mineral (oil and gas) sector in their exports (Azerbaijan, Kazakhstan, Russia, Turkmenistan);

UNION – dummy that accounts for the United Economic Area member countries (Belarus, Kazakhstan, Russia, Ukraine).

Estimating the given regression equation, we test the following hypotheses:

1. Coefficient $\alpha_1 > 0$ and statistically significant. A high value of indicator $SD(IP_{ij})$ means that countries i and j appear susceptible to the impact of asymmetric shocks, which is why an adjustment of their impact may require a change in the national currency current exchange rate. At this juncture, given other conditions being equal, the exchange rate volatility should be greater for the given couple of countries.

2. Coefficient $\alpha_2 > 0$ and statistically significant. By analogue with the first hypothesis, a high value of indicator $SD(M_{ij})$ may testify to an asymmetry of monetary shocks under which there can exist differences in interest rates. According to the interest rate parity, the arising deviations from the original state would be adjusted by means of changes in the given currency rate. So a high asymmetry of monetary shocks can associate with a high volatility of nominal exchange rate.

3. Coefficient $\alpha_3 > 0$ and statistically significant. Substantial differences between inflation levels would testify to frequent changes in relative prices for the two countries. To adjust them, a bilateral exchange rate may be used. So, a high value of variable $SD(CPI_{ij})$ should correspond to a greater volatility of the bilateral nominal exchange rate.

4. Coefficient $\alpha_4 < 0$ and statistically significant. An intense trade between two countries would decrease the probability of speculations on the forex market, as the demand for, and supply of currency to a greater extent would be determined by the need to carry out trade operations. At this point, it does not matter in which currency transactions are effected, be that one of the countries' or any third country's currency. This forms the basis for the assumption of a lower volatility of the national currencies exchange rate.

5. Coefficient $\alpha_5 > 0$ and statistically significant. According to the hypothesis formulated in McKinnon's paper, in a bigger economy, the share of tradables would be relatively small, as most of them would be produced domestically. Under such circumstances, the given country would find it more beneficial to employ floating exchange rate, because

otherwise (under fixed rate) fluctuations in the balance of payments would require deployment of a fiscal and monetary policy. That is why according to the noted hypothesis, a relatively greater indicator of the given economy's size would correspond to a greater exchange rate volatility.

6. Coefficient $\alpha_6 < 0$ and statistically significant. It is suggested that a more developed financial sector forms one of the mechanisms that allow to diminish the negative effect from asymmetric shocks. So, changes in the exchange rate would be required to a lesser degree and, consequently, its volatility can be lower.

7. Coefficient $\alpha_7 > 0$ and statistically significant. As the prices for main minerals are set on the global markets, export-oriented countries would find themselves to a greater degree susceptible to the impact of external price shocks that generate fluctuations of the demand for, and supply of the national currency. Consequently, this causes a greater volatility of exchange rate fluctuations. Besides, this particular index can be viewed from the perspective of the criterion of economy diversification. The exchange rate of the national currency of a country whose economy appears poorly diversified would be more volatile, as external shocks would seriously affect the economy and it necessitates the use of exchange rate to absorb these shocks.

8. Coefficient $\alpha_8 < 0$ and statistically significant. This dummy we used to account for the nominal exchange rate volatility level of the countries that have entered into the Agreement on Establishment of the United Economic Area. The hypothesis is that from the perspective of economic criteria they had reasons to sign the Agreement, which is why the volatility rate of nominal exchange rates of the respective currencies seems to be lower.

Estimation results of the regression model are given in *Table 2-3*. As the insufficient data has not allowed to compute the monetary shocks asymmetry indicator for each given pair of countries, we ignore it while assessing the model. The table shows that the model satisfactorily depicts the data on the exchange rate volatility (the adjusted R-squared accounts roughly for 0.3). We used standard White consistent covariance estimator.

Table 2-3. Results of the Model Cross-Section Assessment.

Explained variable	Standard deviation of the nominal exchange rate logarithmic rate for a pair of countries	
The number of observations	64	
	Coefficient	P-value t-stat..
Absolute term	-3.035	0.027
SD(Y _{ij})	6.614	0.000
SD(CPI _{ij})	-0.207	0.357
TRADE	-2.161	0.027
SIZE	0.144	0.016
FC	-0.026	0.888
Oil	0.168	0.045
Union	-0.259	0.005
Adj. R ²	0.304	
P-value F-statistics	0.000	

The data in the Table above show that practically all the hypotheses relative to coefficients signs before the respective variables are not rejected. The coefficients have the necessary sign and appear statistically significant at the 5% significance level. The results compel one to reject hypothesis 3 (the coefficient has the opposite sign, but appears statistically insignificant at the 5% significance level), i.e. the inflation volatility does not exert a statistically significant influence on the exchange rate volatility. By contrast, the coefficient under the financial sector development variable (the share of loans to the private sector) has the necessary sign, but appears statistically insignificant. We would like to specifically focus on an empirical proof of the hypothesis on the existence of a correlation between specialization of a given economy and exchange rate volatility. Yet another result was the member countries of the UEA Agreement saw their exchange rates volatility be at a lower level.

The above results testify in favor of adequacy of the OCA theory criteria with respect to the CIS countries. The criteria – to be more precise – the indicators that mirror these theoretical criteria can be used to carry out a qualitative and, to some degree, quantitative, analysis of potential benefits and costs the CIS countries may gain/loss from their currency integration with Russia.

Conclusions

The present paper contains the analysis of the possibility for creation of a currency union in the CIS countries' territory from the perspective of the OCA theory criteria. We

analyzed such criteria as asymmetry of real and monetary shocks, inflation asymmetry, relative size of an economy, intensity of bilateral foreign trade operations, the financial sector development level and, partially, the economy diversification level. The research outcomes allow conclusions as follows:

- First, they prove that experiences of the European integration appear applicable to an evaluation of options of creation of a single currency zone in the CIS. Both the comparative evaluation of indices that characterize main criteria of the OCA theory and the regression estimates prove this.

- Second, the empirical results considered hereinabove show that as of the moment of establishment of the European Currency Union, not all of its member countries fully matched both the OCA theoretical criteria and the Maastricht criteria. They nonetheless have become members of the EMU due to a high role played by political factors. This serves as a convincing proof to the need in considering political aspects associated with currency integration. It should be also noted that it appears empirically impossible to evaluate the significance of these factors, but a special attention should be paid to them. Especially as far as the CIS countries are concerned. Countries that ruled to establish a currency union should have a clear apprehension of the role played by the political component of this particular process, as the transition to a single currency would require the search for mutually beneficial decisions that would imply primarily the prosperity of the union as a whole rather than its single members. In this case decision makers should be ready to take responsibility for the decisions to be made, even if such decisions would entail short-term negative consequences for the economy.

- Third, it is necessary to single out a range of countries for which the currency integration according to the noted criteria will be more attractive from the perspective of lower costs, or, in other words, a greater benefit. If half the total number of indicators (13) selected in our paper is taken as a threshold level, the number of countries that are more ready for the currency integration with Russia would comprise particularly Azerbaijan, Kazakhstan, Moldova, Tajikistan and Ukraine. The indices computed hereinabove testify to the fact that these countries' economies appears similar to Russia's one by many of the criteria in question. Furthermore, practically all the hypotheses put forward in the present paper on correlation between various indicators that form proxy for the OCA theory criteria and volatility of the nominal bilateral exchange rate have been proved empirically basing on regression analysis (except for inflation volatility and the level of the financial sector development). If one considers only the indicators that were proved basing on the results of the regression analysis

(9 in total¹⁵), then it is Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova and Ukraine that show the greatest readiness for the currency integration with Russia by macroeconomic characteristics. All these countries fall under the sub-sample of countries by more than 4 indices out of 9.

- Fourth, the paper outcomes allow a number of assumptions concerning affordability to Russia a currency integration with the CIS countries. If one considers solely the countries that were noted above as most ready for the currency union, the integration with them would imply relatively smaller costs. This is explained by their similarity with Russia by many of the noted macroeconomic indicators. In the event targeted macroeconomic parameters of the would-be union would be defined basing on member countries' individual characteristics, Russia's costs associated with hitting these particular landmarks will be less than in the case of its union with the other countries. At this point, it should be noted that Russian economy is far greater than any other in the CIS, so its relative amount of benefits from the currency union may become lower than for the other participating countries.

- Finally, the results of the present research into the UEA Agreement concluded between Russia, Kazakhstan, Belarus and Ukraine deserve separate comments. While by the total and adjusted number of their indicators two of the three countries in question (Kazakhstan and Ukraine) fall into the group of the countries that are potentially ready for the currency union with RF, Belarus falls under this group only upon adjustment of the set of its indicators. Accordingly, our results do not show that both Belarus and Russia would see net benefits from their currency union.

The research outcomes allow a primary breakdown of the CIS countries into economies that potentially are ready for the currency union with Russia's participation and those that would have to put forth certain efforts to boost the level of unification of macroeconomic indices, should they pretend to participation in the currency union in the CIS territory. Their existing country-specific peculiarities require further synchronization of economic cycles and, accordingly, ensuring a greater correspondence between the respective economic characteristics. Coupled with the political integration, meeting these conditions would allow to lower potential costs and increase potential benefits associated with currency integration. That would contribute to the sustainability of the currency union in the future.

¹⁵ Because of the lack of the some macroeconomic statistics, some indices that match the criteria selected in the present paper and tested by means of static analysis were not taken into account while running the regression analysis. But the overall number of "working" criteria was not adjusted nonetheless.

References

1. Alesina, A., R. Barro (2000) Currency Unions // *Quarterly Journal of Economics*, 117, pp. 409–436.
2. Alesina A., R. Barro, S. Tenreyro (2002) Optimal Currency Areas // *NBER Working Paper*, 9072.
3. Bayoumi T. (1994) A Formal Model of Optimum Currency Areas // *IMF Staff Papers*, 41(4), pp. 537–554.
4. Bayoumi T., B. Eichengreen (1997) Ever Closer to Heaven? An Optimum Currency Area Index for European Countries // *European Economic Review*, 41, pp. 761–770.
5. Dibooglu S., J. Horvath (1997) Optimum Currency Areas and European Monetary Unification // *Contemporary Economic Policy*, 15, pp. 37–49.
6. Frankel J., A. Rose (1998) The Endogeneity of the Optimum Currency Area Criteria // *The Economic Journal*, 108, pp. 1009–1025.
7. Glick R., A. Rose (2001) Does A Currency Union Affect Trade? The Time Series Evidence // *NBER Working Paper*, 8396.
8. Ichiyama Y. (1975) The Theory of Optimum Currency Areas: A Survey // *IMF Staff Papers*, 42(2), pp. 344–383.
9. Jonung L., F. Sjöholm (1999) Should Finland and Sweden Form a Monetary Union? Blackwell Publishers Ltd.
10. Kenen P. (1969) The Theory of Optimum Currency Areas: An Eclectic View // *Monetary Problems in the International Economy*. Chicago: University of Chicago Press, pp. 41–60.
11. King H. (2001) Optimum Currency Areas in East Asia. A Structural VAR Approach // *ASEAS Economic Bulletin*, 18, pp. 206–217.
12. McKinnon R. (1963) Optimum Currency Areas // *American Economic Review*, 53, pp. 717–725.
13. Mundell R. (1961) A Theory of Optimum Currency Areas // *American Economic Review*, 51, pp. 657–665.
14. Reinhart C., K. Rogoff (2002) The Modern History of Exchange Rate Arrangements: A Reinterpretation // *NBER Working Paper*, 8963.
15. Ricci L. (1997) A Model of Optimum Currency Area // *IMF Working Paper*, 97/76.
16. Rose A., C. Engel (2000) Currency Unions and International Integration // *NBER Working Paper*, 7872.
17. Rose A. (1999) One Money, One Market: Estimating The Effect of Common Currencies on Trade // *NBER Working Paper*, 7432.
18. Stanoeva G. (2001) The Theory of Optimal Currency Areas: an Application to Ten Central and East European Countries // *LAREefi, University Mintesquieu–Bordeaux IV*.
19. Tavlas G. (1993) The “New” Theory of Optimum Currency Areas. Blackwell Publishers Ltd.
20. Von Hagen J., M. Neuman (1994) Real Exchange Rates Between Currency Areas: How Far Away is EMU? // *Review of Economics and Statistics*, 76, pp. 236–244.