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Vinokurov, Evgeny and Libman, Alexander and Pereboyev,
Vladimir

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The EDB System of Indicators of Eurasian Integration: Eurasian Integration's Trends from 1999 to 2012

Evgeny Vinokurov¹

Alexander Libman²

Vladimir Pereboyev³

5.1 Objectives of the EDB System of Indicators of Eurasian Integration

For almost two decades, regional cooperation and integration has remained one of the most pertinent issues of economic policy in the post-Soviet countries.⁴ There have been hundreds of initiatives and projects that aimed at deeper bilateral and regional cooperation and integration. In many cases, these initiatives had overlapping membership and objectives, or they ceased to exist, or were re-established by the same actors. Agreements with similar content, such as free trade areas or customs unions, were signed over and over again by the same countries. This variety of outcomes needed a comprehensive system to monitor and assess the current processes of economic, political and social interaction between countries. The CIS region did not possess any of these comprehensive studies and measurements. Therefore the assessments normally had to be done on ad-hoc basis. They were limited in terms of the scope of the type of cross-border interaction covered, and the time span of the analysis. For example, much more attention is typically given to cross-border trade of post-Soviet countries than to other aspects of their interaction, such as migration flows or mutual investments. However, it is questionable whether it is indeed the case that trade should constitute the area where possible progress of integration across post-Soviet countries should be observed first (Libman and Vinokurov 2012b).

The deficit became particularly pronounced in recent years, due to the major leap forward in the development of post-Soviet regionalism associated with the establishment of the Eurasian Economic Union (EEU) (2015)⁵ by Belarus, Kazakhstan and Russia. The EEU is based on

¹ Director, Centre for Integration Studies, Eurasian Development Bank

² Assistant Professor, Frankfurt School of Management & Finance; Senior Research Fellow, Institute of Economics of the Russian Academy of Sciences

³ Head of Projects, Centre for Integration Studies, Eurasian Development Bank

⁴ Throughout the paper, "post-Soviet space" refers to twelve former Soviet Union republics (Armenia, Azerbaijan, Belarus, Georgia, Russia, Kazakhstan, Kyrgyz Republic, Tajikistan, Uzbekistan, Ukraine, Turkmenistan and Moldova). Until recently all these countries belonged to the Commonwealth of Independent States, the largest regional integration organization of post-Soviet countries in terms of its membership. Georgia left the CIS in 2009, but is considered as part of the region in the SIEL. Latvia, Lithuania and Estonia are not included in the post-Soviet space in the sense the word is used in this article.

⁵ The Eurasian Economic Union (EEU) is an international organization, formed by the signing of an agreement between Russia, Kazakhstan and Belarus in Astana on May, 29, 2014, to enter in force on January 1, 2015. This is the next level of Eurasian economic integration after the Customs Union (2010) and Single Economic Space (2012). The full text of the Agreement on the Eurasian Economic Union is available on the official site of the Ministry for Economic Development of the Russian Federation, and the website of the Eurasian Economic Commission.

the Customs Union (CU) of the Eurasian Economic Community (EurAsEC)⁶ (2010) and the Single Economic Space (2012) of these three countries. The Customs Union, unlike preceding regional organizations in the post-Soviet space, has a major impact on the regulation of cross-border trade, both across its members and with third parties (see EDB 2013b, Astrov et al. 2012; Isakova and Plekhanov 2012; Ushkalova 2012). The EEU is being endowed with even more ambitious goals. Outside the EEU, there are areas where post-Soviet countries could potentially exhibit a high level of integration, at least due to the institutional and infrastructural legacy from the Soviet Union. For example, the visa-free regime of cross-border movement could be conducive for integration of labor markets. Available evidence suggests that cross-border migration flows intensified in the post-Soviet space over the last decade (Golovnin et al. 2013). Common infrastructure and numerous technological complementarities, as well as cultural similarities such as the role of Russian as lingua franca, could strengthen interaction across businesses outside the scope of formal integration organizations created by governments. Increasing cross-border flows of investments or informal trade communities is an example, and there is some evidence showing this (Libman and Kheyfets 2011).

The blank space was filled by the large-scale research project initiated and implemented by the Eurasian Development Bank (EDB)⁷. The outcome of the project was the System of Indicators of Eurasian Integration (SIEI). It was completed at the end of 2009; and was intended to become an instrument to monitor and assess regional integration projects in the post-Soviet space (Vinokurov, 2010). In 2014, the second edition of the system of indicators (SIEI II) was published by the EDB's Centre for Integration Studies (Vinokurov, 2014). Generally, SIEI represents analysis of long-term integration trends in countries and groups of countries of the post-Soviet space for the entire period 1999-2012. In parallel, SIEI II pays particular attention to mid-term integration trends within the period of 2009-2012. This period is of particular interest because a number of key integration initiatives have been implemented during it.

The SIEI consists of two blocks of indices corresponding to the main aspects of regional cooperation. It is built around several sets of indicators. These include: the integration of trade and labour markets; mutual investments⁸ and cooperation in the key functional areas of agriculture, education, and energy; and convergence of the main characteristics of the post-Soviet economies. The SIEI includes a broad range of indices that reflect both country-to-country interaction and integration in the post-Soviet space as a whole and in its sub-regions. It also calculates the generalized indices that enable the evaluation of regional integration processes in the post-Soviet space.

As mentioned below, the data given in this second version of the SIEI show the dynamics of integration processes in the period 1999-2012. They help determine the “reference points” for the development of post-Soviet countries after the collapse of the Soviet Union in the 1990s, and for the key vectors of Eurasian integration and cooperation in the CIS region in 2000s. In the 1990s post-Soviet countries still had to cope with the initial disintegration push associated

⁶ EurAsEC as such also includes Kyrgyzstan and Tajikistan, which, as of now, do not participate in the Customs Union or Single Economic Space. Armenia and Kyrgyzstan are officially in the process of joining the Eurasian Economic Union, with Armenia likely to join by January 1, 2015 (information as of July 2014).

⁷ Eurasian Development Bank (EDB) is an intergovernmental development bank committed to the advancement of integration in the post-Soviet space. The bank was initially established in 2006 by Russia and Kazakhstan and currently also includes Armenia, Belarus, Kyrgyz Republic and Tajikistan as its member states.

⁸ SIEI *mutual investment* index is based on the data from the permanent EDB “*Monitoring of Mutual Investments of the CIS countries*” (EDB Centre for Integration Studies (2012, 2013a)).

with the creation of independent states. At the same time they had to deal with economic recession, which was partly caused by the fragmentation of the Soviet Union. In the 2000s the region entered a period of rapid economic growth, and most countries managed to complete the initial tasks of state-building that provided the necessary foundation for regional integration. Our long-term analysis shows that integration in the post-Soviet space progresses at an uneven pace in its various domains. The level of integration in the framework of main subregional groups in the CIS space generally remained virtually unchanged in 2009-2012. This means that the permanent disintegration trend observed over two decades might have been reversed, but the qualitative breakthrough point has not been reached. Hence, the integration dynamics of the post-Soviet countries since 2000 are highly relevant in terms of understanding the regional integration perspectives of the post-Soviet space. Have they simply followed a downward spiral of disintegration, or managed to reverse this trend by achieving a new level of interaction? Most important in the analysis of post-Soviet integration was to determine the potential effect of the existing institutional environment on the dynamics of interaction.

The results of the SIEI, as discussed later, have been used in a number of papers, extending and modifying the original datasets. Libman and Vinokurov (2012a) look at the bilateral integration across post-Soviet countries applying hierarchical cluster analysis. Libman and Vinokurov (2011) augment the dataset to cover the informal trade: particularly in Central Asia. They compute similar indicators for integration between China and some of the Central Asian countries. However, SIEI should be viewed not only as a theoretical study, but also as an applied policy-making tool. It should be of interest to: public agencies in CIS countries; regional integration organizations; academia; and scholars of regional integration around the world.

The comprehensive update of the SIEI is scheduled for 2017; the dataset will be updated on regular basis. This paper presents the main elements of the SIEI dataset as published in 2014, in terms of methodology, data sources, and results.

5.2 Conceptual aspects

Our colleagues provide a comprehensive review of the general literature on regional integration indicators elsewhere in this volume. There is therefore no need for us to review it here. We shall merely state that while building the SIEI there has been extensive use of the best world practices. In particular, we utilized findings and logic of ARIC (2009) and COMESA (2002), as well as academic work on measuring regional integration (De Lombaerde and Van Langenhove 2006; De Lombaerde et al. 2008, 2011; and Osterkamp 2008).

Attempts to monitor the *de facto* and/or *de jure* integration process with the help of a series of indicators were made in various regions and integration grouping.⁹ As with monitoring regional integration in general, experiences have been quite diverse and, so far, their results have been mixed.¹⁰ Substantial resources have been invested in these attempts by both intra- and extra-regional organisations, but few have been sustained. The EU Internal Market Scoreboard, the ASEAN Economic Community Scorecard, and the EDB System of Indicators of Eurasian Integration have succeeded.

⁹ On the *de facto* and *de jure* categories in regionalism studies, see e.g. Higgott (1997).

¹⁰ For an overview of general (i.e. qualitative and quantitative) monitoring experiences in various world regions, see De Lombaerde, Esteveordal and Suominen (2008).

It is necessary to clarify the general logic and conceptual framework of the SIEI. First, the goal of the SIEI is to measure the integration of markets rather than intergovernmental cooperation. Some indicators focus on quantifying formal cooperation across countries (Genna and Feng 2003), or on enforcement of existing agreements (EU Internal Market Scoreboard). The SIEI looks at the extent of market integration of individual countries. This is the extent of interdependence and interplay of their economies, regardless of whether it was caused by intergovernmental cooperation as such, or by the interplay of businesses and migrant networks. This approach is justified for the post-Soviet space as in 1999-2012, in the first wave of the SIEI, implementation of the agreements signed by post-Soviet countries was almost non-existent, with most of post-Soviet integration structures being purely rhetorical. This changed after the establishment of the CU, which needed new objectives for integration monitoring in the post-Soviet space (see Blockmans et al. 2012). The coexistence of numerous partly contradictory agreements makes the task of quantifying their content extremely hard. We should acknowledge that some papers attempt to study this aspect by using the number of agreements within the framework of post-Soviet regional organizations signed by individual countries as a proxy for intergovernmental cooperation (e.g. Malfliet et al. 2007; Hale 2008; Darden 2009; and Libman and Obydenkova 2013). This approach also suffers from a number of problems.

Within the general focus on market integration, the SIEI uses two particular approaches to capture the extent of integration: the magnitude of cross-border trade and factor flows; and the convergence of key indicators. The preferable approach to measure market integration is to look at price convergence. Unfortunately, this data is not available in a systematic fashion for the post-Soviet countries, as it probably is elsewhere in the world. The first approach to measure market integration is to look at the magnitude of cross-border transactions relative to the size of the economy. This is standard in most attempts to quantify economic integration: here the SIEI uses the simplest possible indicators. The SIEI covers two main areas of cross-border transactions (trade, mutual investments and labor migration), as well as several specific markets particularly relevant for post-Soviet integration.

The second approach to measure market integration focuses on the convergence of key economic indicators of post-Soviet countries. The SIEI investigates how far individual countries are from each other in terms of a number of variables that characterise their economies. It also investigates how heterogeneous groups of post-Soviet countries are; the idea of sigma-convergence by Barro and Sala-i-Martin (1992) is used here. The reason why the convergence of major indicators matters is straightforward: heterogeneity of countries in terms of their key economic characteristics could constitute an important obstacle for integration. This is because it makes the alignment of position of each participant very difficult and consensus-finding costs very high. It should also be acknowledged that the convergence of economic indicators may also be an outcome of common internal trends in the development of post-Soviet countries. Although it may be an outcome of market integration leading to synchronization of business cycles (Shin and Wang 2003). Other indicators, such as the absolute value of GDP per capita and market integration, can also lead to divergence if one takes the predictions of the new economic geography into account. This does not diminish its importance as a prerequisite for regional integration, but makes it less reliable as an indicator of market integration. Specifically, the interpretation of some of the outcomes of the SIEI for 1999-2008 seems to be more in line with common dynamics of economic transition in post-Soviet countries than with the consequences of market integration.

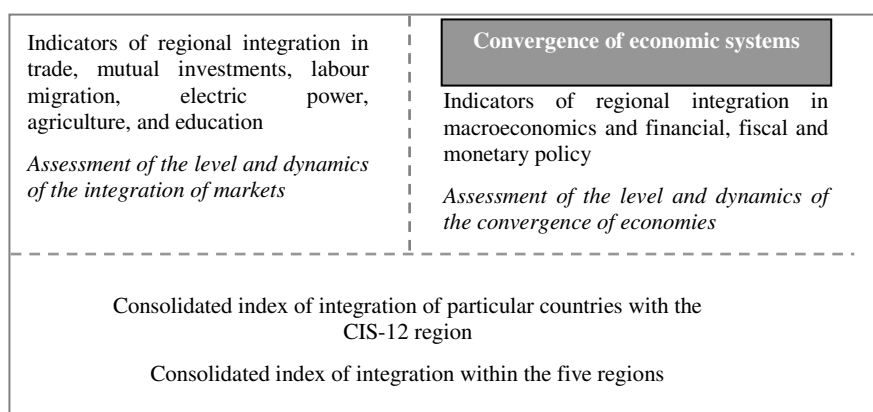
Most data for the SIEI is extracted from either official statistics of the post-Soviet countries, or from the Inter-State Statistical Committee of the CIS for all measures of cross-border flows. Key macroeconomic indicators are also partly extracted from data of the IMF, World Bank, Asian Development Bank, UN Comtrade, Eurasian Economic Commission and the

Customs Union. The exception is the SIEI mutual investment index. It is based on the EDB Centre for Integration Studies' ongoing long-term project "Monitoring of Mutual Investments in the CIS" (EDB 2012, 2013). This is the largest database in the CIS region of mutual investments including offshore transactions.

A substantial advantage of the post-Soviet countries is that most of them still maintain a relatively high quality of public statistics. They are at least superior to that of most developing countries, though certainly less accurate in many instances. While statistical systems of post-Soviet countries diverged substantially after the collapse of the USSR, they are still similar to each other in many aspects. This facilitates the comparative analysis. The Inter-State Statistical Committee was set up in February 1992, two months after the establishment of the CIS. Since then it has accumulated a substantial amount of information that is utilized in the SIEI. Some data used for the computation of the SIEI should not be considered as entirely accurate: this applies particularly to cross-border migration, which very often is informal. The SIEI is characterized by a downward bias in estimating the cross-border migration. This makes the main findings of the first wave of the SIEI discussed below even more striking.

5.3 Technical aspects

In what follows we summarize briefly the key elements for computation of the SIEI - the System of Indicators of Eurasian Integration. As mentioned, it consists of two sets of indices which correspond to the main aspects of regional integration (see Fig. 5.1). The first set measures the integration of markets by looking at two general indices (trade integration; and mutual investments and labor integration) and three areas of functional integration (electrical power, education and agriculture). Electrical power is chosen as one of the crucial elements of cross-border infrastructure. It is where post-Soviet countries often strongly depend on each other, and where substantial potential for cooperation exists. Education (the cross-border movement of students) is essential in maintaining social integration of the post-Soviet space. This includes intensive inter-personal contacts, common language and social networks, all of which provide background for economic integration. Agriculture, and specifically the grain trade, represents a very recent phenomenon in the post-Soviet space; this is unlike power utilities. Some countries have turned into major grain exporters in the last decade. The second set of indices includes indicators measuring the convergence of economic systems. In this case, the subject of evaluation is the convergence of the countries' main quantitative development characteristics in four key areas: macroeconomics (growth dynamics), financial policy, fiscal policy, and monetary policy. In addition, the first version of the SIEI has been accompanied by an expert survey evaluating institutional cooperation. This is the performance of countries in formal integration projects within the post-Soviet space, taking into account the broad range of goals of the respective structures. The expert survey, however, is not part of the system of indicators and is not considered when calculating the aggregate measures of integration. Thus, the core of the SIEI includes ten indicators: four for economic convergence and six for cross-border transactions.

Fig. 5.1 Composition of SIEI

Source: based on SIEI II data (Vinokurov 2014).

Each of these sets is computed in the following way. First, the SIEI includes a set of measures of integration of country pairs (dyadic indicator). It characterizes the extent to which two particular post-Soviet countries are interconnected by means of cross-border trade or migration, or as a result of convergence of their economic indices. For the indicators of cross border transactions the values are computed as the size of cross-border flows (e.g. trade, investments, migration, grain trade etc.) relative to the size of both economies. For power utilities and agriculture the measure of size of the economies used is GDP. For migration and movement of students it is the size of the population of both countries. For trade we use a somewhat more complex procedure. The final index included in the SIEI is the average of two sub-indices: the first measures the size of trade flows within the country pair relative to the GDP of these countries; the second measures the size of trade flows within the country pair relative to the overall foreign trade of both countries. The second indicator is more compatible with the standard analysis of trade integration (although we acknowledge that it represents a rather simple approach to its analysis, as discussed in other papers of this volume). The first indicator is more compatible to other indicators used in the SIEI. However, both components are strongly correlated, and using them separately from each other does not change the results. It should also be noted that the use of GDP or of population as a basis for comparison may affect the outcomes of analysis; this problem has been discussed in Libman and Vinokurov (2012a). For economic convergence the indicators are computed as the Euclidian distance between individual countries in a space defined by the metrics used for a particular convergence indicator (e.g. different measures of macroeconomic development or monetary policy). The dyadic indicators are obtained for all pairs of post-Soviet countries, if the data is available. In the final report of the SIEI the analysis includes both pairwise integration indicators for each year and relative change of pairwise indicators over the period of observation.

The integration of a country and a group of countries (asymmetric indicator) characterizes the convergence within the post-Soviet region of any of the twelve post-Soviet states and any of the five large regions. These regions may be of particular interest from the point of view of practical integration activity, and each region includes several countries. The reason for using this indicator is straightforward. Consider, for instance, a case of integration between a very small and a very large country. Then very often the large country as economic partner is of crucial importance for the small country, but the small country is by far less important for the large country. The indicators we have used so far cannot capture this asymmetric nature of dependence, because the size of trade flows is computed relatively to the size of both economies. This is a problem of extreme importance for the post-Soviet space, where countries are characterized by a very strong economic asymmetry. Thus, another set of

indicators is needed. The asymmetric indicators are computed as follows: for cross-border transactions we compute the overall size of trade or factor flow between a country and a group of countries, but compare it only with the country's economy size or population. For example, while the dyadic integration index between Russia and Tajikistan would compare the cross-border trade between these countries (trade flows in both directions) to the overall GDP of Russia and Tajikistan, the asymmetric indicator compares the trade between these two countries only to the GDP of Tajikistan. For convergence indicators the Euclidian distance is computed between a country and the average for a group of countries.

At this stage it is necessary to notice that the SIEI uses several "groups of countries" mentioned above for its analysis. This variation is determined by both a pragmatic need to account for various possible structures of regional integration in the post-Soviet space and the necessity to analyze the heterogeneity of post-Soviet countries. Specifically, there are four regional groups considered by the SIEI:

- (1) CIS-12 (post-Soviet countries excluding the Baltics but including Georgia);
- (2) EurAsEC-5 (the five members of EurAsEC: Russia, Kazakhstan, Kyrgyzstan, Belarus and Tajikistan);
- (3) SES-3 (the three largest EurAsEC countries – Belarus, Kazakhstan, and Russia – which were moving rapidly towards closer integration at the time when SIEI was being set up; they had established a full-scale Customs Union by 2011, Single Economic Space by 2012 and Eurasian Economic Union by 2015); and
- (4) CA-4 (the four Central Asian states participating in integration projects in the region: Kazakhstan, Kyrgyzstan, Uzbekistan and Tajikistan. Turkmenistan was excluded as it virtually did not take part in the CIS and Central Asian integration projects and did not provide any reasonable statistical information on its cross-border transactions). Thus, for each country the SIEI computes asymmetric integration indicators with five groups of countries.

Some aspects of integration cannot be mapped onto each other, and connections between them are not straightforward; therefore, for the purposes of the SIEI, the focus is clearly on separate indices rather than their aggregates. However, we have developed two types of consolidated indices that give a wider picture of regional integration in the post-Soviet space and include all the nine indices: the consolidated index of a country's integration with CIS-12, and the consolidated index of a country's integration within any of the four regions. The overall structure of the SIEI is shown in Table 5.1.

Table 5.1 The structure of the SIEI

	Integration of markets		Economic convergence	Consolidated indices
	General indices: trade, investments and labour migration	Functional integration: education, agriculture and energy	Macroeconomic conversion, financial policy, fiscal policy, and monetary policy	
Country to country	X	X	X	
Country to region	X	X	X (weighted and non-weighted indices)	Index of a country's integration with CIS-12
Region	X	X	X	Index of integration of five regions
Formal integration projects				

Source: based on SIEI data.

The indices of cross-border transactions and economic convergence were calculated for 1999-2008 (where possible as some early data is missing). The evaluation of regional cooperation is provided as at the time of this report. We should also note that higher values of indicators for cross-border transactions correspond to higher values of integration; and lower values of convergence indicators correspond to higher value of convergence (as one could expect given the description of indicators provided above). For the purpose of aggregated values all indicators have been re-calculated in a way that a higher value corresponds to a higher level of integration.

5.4 Results: unequal pace of integration and integration core

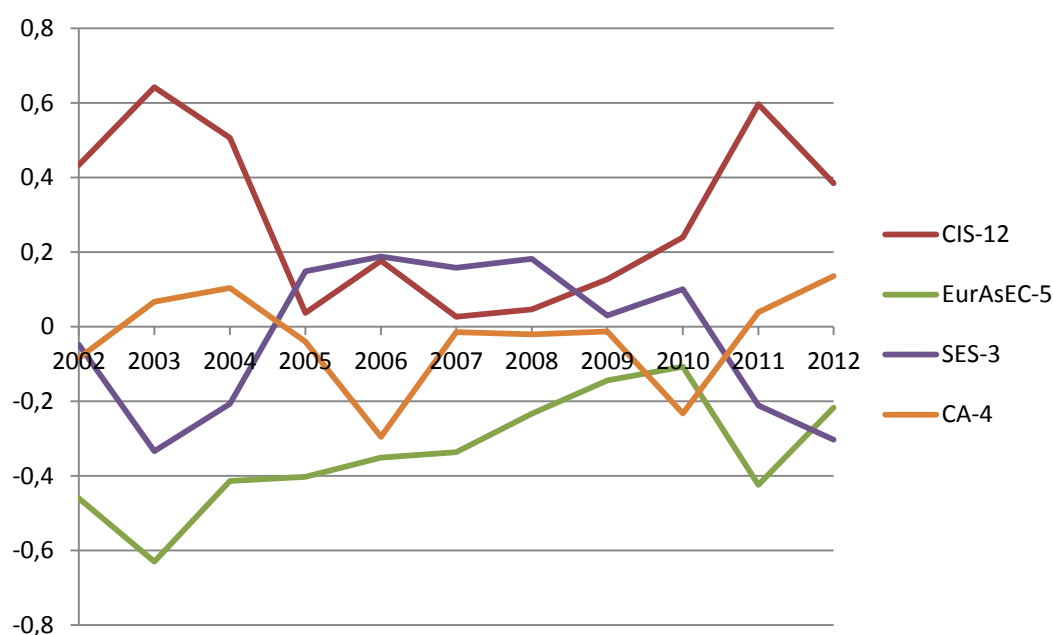
In what follows we summarize briefly the main outcomes of the SIEI. To start with, integration in the post-Soviet space progresses at an uneven pace, both geographically and structurally. Before 2008, there was a sharp upturn in *legal* labor migration and student exchange, whilst integration in the trade, energy and agriculture sectors slowed down and the macroeconomic indices of post-Soviet countries were becoming increasingly divergent. It should be understood, however, that these negative trends were partially attributable to the rapid pace of growth of the post-Soviet economies, i.e. an economy's size grew faster than its ties with other economies. These positive results for labor migration and student exchange were partly due to the selected "basis for comparison": population growth in the region was apparently slower than GDP growth. At the same time, this situation indirectly proves that the extensive social integration of post-Soviet countries has been preserved or has even increased – social integration creates potential catalysts for integration in other areas. Libman and Vinokurov (2012a) provide a more thorough discussion of determinants of integration in different areas.

It should be noted that from 2009 until 2012 there was a more recent trend to the reduction of integration in the area of *legal* labour migration: the degree of interrelation of the CIS-12 region in the area of labour migration was reduced to the 2006 level, which was after a sharp growth that started in 2005 and reached its peak in 2008. Another trend is an increase in inter-country cooperation in education: academic mobility was growing continuously in 2009-2012.

The situation in mutual trade, and trade in electrical power and agricultural products has stabilized after the 2000-2008 recession; and for 2009-2012 has not changed drastically. Probably, the constant disintegration trend, which had been observed for two decades, has ended. Further observations will confirm or disprove this conclusion. 2009-2012 was still characterized by the divergence, and not the convergence of the macroeconomic parameters of countries of the post-Soviet space. There was an increase in the spread of values of indicators of economic policy of countries. A reduction of convergence levels in monetary, financial and fiscal policies was also observed.

The consolidated integration index for CIS-12 suggests that the level of integration has decreased. At the same time, EurAsEC-5 (and especially its core, SES-3) has become more integrated in the 2000s. Figure 5.2 shows the results of the calculations for 2002-2008 (i.e. the period for which data is available for all aspects of integration, except mutual investments). The index varies within a range of -1 to +1. The scale is calibrated so that the mean value corresponds to zero: accordingly, countries with a low level of integration have negative indices and highly integrated countries have positive indices. We can see that there were three main trends by 2008. First, the level of integration within CIS-12 has reduced compared with the other groups. Second, the level of integration of CA-4 remained unchanged. And, third, SES-3 and especially EurAsEC-5 demonstrated generally positive dynamics of regional integration and cooperation. By 2008 SES-3 surpassed all other groups, and this group became the absolute leader in integration all over the post-Soviet space, which is attributable to the growth of the SES-3 index. EurAsEC-5 occupied the lowest position in the rating, although its performance improved considerably. This seems to be in line with the development of 2010-2012, when the major breakthrough in terms of regional integration was associated with the EurAsEC-3 countries (see also Vinokurov and Libman 2011 for discussion on the 'integration core').

Fig. 5.2 Consolidated indices of integration of four groups of countries within the post-Soviet space (2002–2012)



Source: SIEI data.

If we look at the dynamics of integration of four groups of countries within the post-Soviet space in 2009-2012, we can see some changes. In the CIS-12 there was a predominantly positive trend of integration. SES-3 and EurAsEC-5 demonstrated a negative trend of regional economic integration dynamics, which is connected with the slowing down of the world economy. The generalized index of integration in CA-4 during 2009-2012 behaved more volatile than within the other regions. Nevertheless, in recent years there is a trend of integration increase within the CA-4 region. Perhaps it is a temporary effect that should be re-checked in the next version of SIEI research.

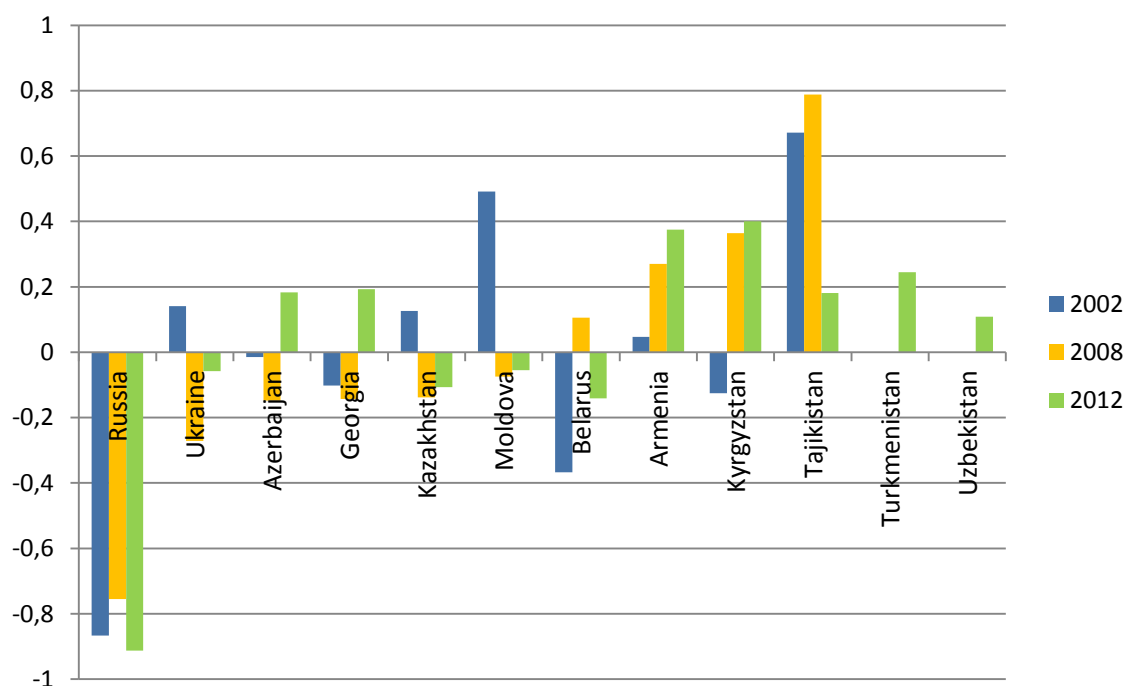
In the same way, if we look at indicators for individual areas of cooperation, integration of markets in the CIS is characterized by the existence of distinct spatial clusters. Particularly, the level of integration in the energy, agriculture and education sectors is higher in Central Asia than in the rest of the post-Soviet space, although this difference shrinks over time. In terms of trade, investments and labor migration, the most intensive interaction normally develops between neighboring countries. Notably, Russia is not the sole “integration centre” in the post-Soviet space: for example, Kazakhstan has become a desirable destination for many migrant workers from other countries (Libman and Vinokurov 2011). There is no indication, however, that spatial clusters have any significance for the convergence of post-Soviet economies whose dynamics is determined principally by the evolution of their domestic economic policies.

5.5 Results: integration patterns for individual countries

If we look at the performance of individual countries in terms of integration, generally, the leadership in integration ratings belongs to small countries: Kyrgyzstan, Armenia and Tajikistan. Integration of these small countries with the post-Soviet space was on the increase during the last six years and in 2012 these two countries became the leaders in corporative integration with the CIS region. Kyrgyzstan is widely involved in trade and labor migration, and benefits considerably from integration in the education and agriculture sectors. Unlike Tajikistan or Armenia, Kyrgyzstan does not view Russia as the only principal partner, and integration with neighboring Kazakhstan is just as beneficial to this country. Like Tajikistan, Kyrgyzstan is an active member of all key integration groups within the CIS. Armenia is primarily interested in trade integration, which has progressed remarkably in recent years. Armenia's part in formal integration projects is somewhat limited, partly due to the obligations imposed by the WTO. However, its interest in integration with other post-Soviet countries remains strong. This is shown by Armenia's decision in 2013 to join the CU and the Eurasian Economic Union.

When considering the overall level of integration of each country with all countries of the post-Soviet space, Kyrgyzstan and Armenia were leaders in 2008 and 2012. Tajikistan had the leading position in 2002 and 2008, and it reduced significantly its scope of integration with the CIS in 2012. Considering other countries of the CIS region, Moldova and Ukraine reduced substantially their integration level in 2008 and 2012 (compared with 2002). Georgia, Azerbaijan and Ukraine substantially increased the degree of their integration with the CIS in 2009-2012. The consolidated index of integration for larger countries, especially Russia, is much lower. Again, the reason is the larger economy size which renders the relative role of economic ties with other post-Soviet countries less important. Figure 5.3 shows the consolidated indices of integration of individual countries with CIS-12. The indices are calculated for ten post-Soviet countries for 2008 and 2002 (i.e. the present time, and the first year of observation when data on all of the ten integration aspects is available). Uzbekistan and Turkmenistan are presented with data for 2012 to compare the dynamics. The values vary within a range of -1 to +1, with mean value corresponding to zero.

Table 5.3 Consolidated indices of integration of post-Soviet countries with CIS-12 (2002, 2008 and 2012)



Source: SIEI data.

Tajikistan remains the country that was most integrated with the rest of the post-Soviet space before 2009. This can be explained by the exceptional importance of trade (primarily with Russia) for Tajikistan, and its active part in labor migration. Cooperation with other post-Soviet countries in the key sectors of functional integration, especially electrical power, is still critical to Tajikistan. However in 2012 the level of Tajikistan's economic ties with the CIS region reduced predominantly due to political reasons. Tajikistan continues to play an active role in most integration groups in the post-Soviet space. It looks forward to the prospect of joining the CU, which can happen after Armenia and Kyrgyzstan have joined.

Ukraine and Moldova continue being rated, and in 2012 they became more integrated with the CIS region. The key spheres are labor migration (for both), and trade and investments (for Ukraine). Russia is Ukraine's main trading partner. The 2014 conflict will result in the dynamics of Ukraine's economic ties with the CIS region being negative. Ukraine, Azerbaijan, Moldova, Georgia and Uzbekistan are participants of the GUUAM organization, which has become informal. They have always taken a restrained stance towards integration projects within the CIS, and have consented to very limited or nominal participation. For Ukraine, the limit of its participation has been the free trade zone.

Kazakhstan, Belarus and Russia, which are the "integration core" of the CU and the Eurasian Economic Union, complete the 2012 rating. These are large economies with a comparatively diverse structure of foreign trade, in which economic ties with the post-Soviet space tend to become less important. These are fairly rich countries - Kazakhstan and Russia are exporters of fossil fuel. It should not be a surprise that Russia occupies the last place in this rating. It is the largest post-Soviet economy, it stands on a par with the rest of the post-Soviet space in terms of population size, and it accounts for about 75% of GDP.

If we look at individual areas of integration and the integration performance of various countries, it is not possible to identify any unquestionable leaders in all aspects of integration among country pairs or groups. Moreover, the structure of mutual links varies greatly across different CIS markets. To some extent, this is illustrative of the diversity of interests and resources involved in integration in the CIS. Belarus, Kyrgyzstan, Tajikistan and

Turkmenistan became leaders in various aspects of integration with CIS-12 region. This shows the large interest that Central Asian countries have in integration processes on the territory of the CIS. However, it is partly explained by the relatively small GDP volume and population size of these countries. Georgia, Kyrgyzstan, Tajikistan and Ukraine are leaders in terms of the absolute increment of integration indices with CIS-12 in 2012 rating. The countries showing the biggest increase in integration levels in 2012 are Armenia, Kyrgyzstan and Ukraine (see Table 5.2).

Table 5.2 The dynamics of integration of markets in the post-Soviet space

Indicator	Pairs-leaders (index level)	Pairs-leaders (index increment)	Leaders of integration with CIS-12 (index level)	Leaders of integration with CIS-12 (index increment)
Trade (1999-2012)	Belarus-Ukraine	Belarus-Ukraine	Belarus	Kyrgyzstan
Labour migration (2000-2011)	Russia-Uzbekistan	Russia-Uzbekistan	Tajikistan	Tajikistan
Electric power trade (2002-2012)	Belarus-Ukraine	Belarus-Ukraine	Kyrgyzstan	Ukraine
Agriculture (2002-2012)	Azerbaijan-Kazakhstan	Georgia-Kazakhstan	Tajikistan	Georgia
Education (2000-2011)	Belarus-Turkmenistan	Belarus-Turkmenistan	Turkmenistan	Turkmenistan

Source: SIEI data.

The main volumes of trade flows in the post-Soviet space are focused between the major countries: Russia, Belarus and Ukraine. The maximum trade integration level in 2012 was observed in pairs Ukraine-Belarus, Russia-Belarus and Ukraine-Russia. Belarus is the leader of trade integration with CIS-12, EurAsEC-5 and SES-3 regions. Kyrgyzstan is ranked second in terms of these indicators. Kyrgyzstan also sees the maximum level of integration in mutual trade with CA-4 region. The highest increment of trade integration indices for 2009-2012 is observed in the pair Ukraine-Belarus, and the biggest reduction is in the pair Ukraine-Turkmenistan. Belarus had the largest increase of integration with CIS-12, EurAsEC-5 and SES-3, and Moldova had the largest reduction. For the remaining countries values of integration indicators with these regions have not changed significantly. The leader in terms of increment of integration with CA-4 is Kyrgyzstan, and the leader in terms of integration reduction is Moldova.

Tajikistan is leading in labor migration indicator concerning CIS-12 and also with EurAsEC-5 and SES-3. This can be attributed to the large outflow of labor resources to Russia in relation to the country's own population. Tajikistan is followed by Uzbekistan and Moldova. Kyrgyzstan has the largest level of integration with CA-4. The pair Russia-Uzbekistan account for the maximum level of integration in labor migration in 2011, the second place is taken by the pair Russia-Tajikistan, the third by Russia-Ukraine. Notably, the lowest labor migration index belongs to Belarus, which otherwise demonstrates excellent integration performance in the area of cross-border trade. It is important to notice that for 2009-2011 the

formal index of labor migration with CIS-12, EurAsEC-5 and SES-3 regions was reduced for all countries by over 50% on average. This was mainly by the reduction of the number of legal workers arriving in Russia registered by the Federal Migration Service. However, it does not mean a reduction of the overall labor migration to the country as at the same time, according to expert appraisals, the volume of illegal migration into Russia increased.

The dynamics of trade in electrical power in the post-Soviet space lags far behind the growth of CIS economies. In most country pairs, this index shrank during 2002-2008. The only exception was Ukraine whose integration with EurAsEC-5 and EurAsEC-3 progressed slightly, whereas its integration with CIS-12 slowed. This process is also driven by trade in electrical power with Russia. Our analysis shows that Russia is the main electrical power supplier in absolute terms, and Belarus is the main recipient. The pair Belarus-Ukraine has the biggest integration index in this area due to Ukraine selling a large power volume to Belarus. They are followed by the pairs Armenia-Georgia and Kazakhstan-Kyrgyzstan. Trade between Kazakhstan and Russia is ranked third in absolute terms, but it is small compared with the GDP of these countries. 2002-2012 is characterized by a significant reduction of integration indices of electrical power trade for all pairs of countries and regions with subsequent stabilization in 2009-2012. The reason for this is both a reduction of trade between Central Asian countries and the outrunning growth of economies of the countries. The reform of the electricity sector in Russia did not result in a qualitative growth of cross-border power flows.

The leader in agriculture integration in the post-Soviet space is Kazakhstan. This is based on data on cross-border trade in cereals. Kazakhstan is present in all three leading country pairs: Kazakhstan-Azerbaijan, Kazakhstan-Tajikistan and Kazakhstan-Kyrgyzstan. In this case, integration of neighboring Central Asian and Caspian states is presumably based on the export of cereals from Kazakhstan. Kyrgyzstan and Tajikistan are the leaders in trade integration with CIS-12, EurAsEC-5 and SES-3, which appears to be caused by the large volume of cereals export in relation to its economic size. The same is the case with Georgia. Russia has the lowest levels of integration with CIS-12 and other groups; this is due to its enormous economy and powerful agriculture sector.

With respect to investments, we can conclude that in 2012 the main “donor” of investments was Russia, and the main recipient was Ukraine. The pair Azerbaijan-Georgia is characterized by the largest degree of integration due to the low GDP of both countries. A high level of investment integration may be highlighted in the pairs Ukraine-Russia, Russia-Kazakhstan and Russia-Belarus with Russia investing substantial funds in the economy of partner-countries. Leaders of integration with CIS-12 region are Armenia, Kyrgyzstan and Georgia. The lowest degree of integration with CIS, EurAsEC-5 and SES-3 is observed in Turkmenistan, which is almost not involved in the processes of inter-country capital movement. Russia, due to its large GDP, has low values of integration indicators with these three regions. The largest integration degree with CA-4 region is seen in Kyrgyzstan and Georgia. Azerbaijan and Moldova have no investment cooperation with groups of CA-4 countries.

In the area of academic mobility the main recipient of foreign students in CIS-12 countries is Russia, with most students coming from the main “donors” of the region: Kazakhstan and Belarus. The third most important “donor” of students is Turkmenistan, with over 20,000 students going to study in Russia, Belarus and Ukraine according to 2011 data. The academic mobility index is the maximum for the pair Turkmenistan-Belarus due to the small population of both countries, and 5,000 Turkmen students which is a large number in relative terms. Turkmenistan also has the maximum integration index in education with CIS-12, EurAsEC-5 and SES-3 followed by Belarus and Kazakhstan. Russia has the lowest integration index with the regions because it has a larger population. In general, during 2000-2011 all pair and intra-regional (except for CA-4) integration indices rose progressively. As a result, the growth of

interregional indices was 100 to 140%. There has been an integration increase in the area of academic mobility in the post-Soviet space. Unlike the integration of markets, the convergence of post-Soviet economies varies greatly depending on particular country pairs or country-region pairs. As mentioned, convergence is generally not driven by any geographic factors. The key role belongs to reform strategies selected by particular countries, and macroeconomic regulation practices that make them become closer. On the whole, we can conclude that the macroeconomic indices of post-Soviet states were diverging over the last decade, whereas their monetary policies converged. The main results of our analysis are summarized in Table 5.3.

Table 5.3 The dynamics of convergence of post-Soviet economies (data for non-weighted indices)

Indicator	Pair-leader (minimum index, 2012)	Pair-leader (index reduction)	Leader of convergence with the CIS (minimum index, 2012)	Leader of integration with the CIS (index reduction)	Total dynamics of the convergence index of the CIS region
Macroeconomics	Kyrgyzstan – Moldova	Armenia - Turkmenistan	Georgia	Turkmenistan	↑
Monetary policy	Azerbaijan - Ukraine	Azerbaijan - Moldova	Uzbekistan	Moldova	↓
Financial policy	Azerbaijan - Armenia	Armenia - Kazakhstan	Armenia	Armenia	↑
Fiscal policy	Armenia - Kazakhstan	Armenia - Russia	Belarus	Russia	↓

Note: increasing the distance (↑) means lowering the convergence level

Source: SIEI data.

To assess economic convergence of individual countries with groups of countries, we also computed a set of weighted indicators. In this case the SIEI compares the economic indicators of a particular country with the weighted average of a country group, and not with the average of a country group, where the weight is determined by the size of the countries. The logic of this approach is straightforward. Assume, for example, that a group consists of a set of countries, with some being relatively large and some relatively small. Then convergence with the largest countries of this group should matter much more than convergence with smaller countries in terms of potential for economic integration. In fact, the results without weighting could be distorted by some very small outliers.

By 2012 the leadership in convergence in CIS-12 belonged to Belarus (fiscal policy), Armenia (financial policy), Georgia (macroeconomics), and Uzbekistan (monetary policy). The most integrated pair of countries in 2012 was the pair Kyrgyzstan-Moldova, and Georgia was the leader of convergence with the CIS group. Recently the pair Armenia-Uzbekistan has converged, and the leader of convergence with three groups of countries was Azerbaijan. In terms of macroeconomic convergence, major changes in the level of integration of regions were not observed for 2009-2012, despite the global economic crisis. The greatest distances

from CIS-12 (in 2009-2012) are demonstrated by Turkmenistan (macroeconomics), Belarus (finance and monetary policies – due to inflation and the drop in the rate of Belarusian ruble in 2011-2012), and Russia and Moldova (fiscal policy). Both approaches (weighted and non-weighted indices) have their merits and demerits. Therefore, economic convergence should be assessed by both methods, and the results should be treated as complementary.

5.6 Further development of the System of Indicators of Eurasian Integration

In accordance with EDB's Charter (EDB 2006), its mission is to contribute to economic growth in member states and to promote trade and economic integration among them. The Bank serves as a catalyst to facilitate integration processes in its member states, both in investments and research (EDB Charter, available at www.eabr.org). It is the Bank's aim that the SIEI becomes the Bank's flagship research project and an integral part of its analytical products dedicated to regional Eurasian integration.

The Centre for Integration Studies of the EDB intends updating SIEI approximately every 3 to 4 years with the next update preliminarily scheduled for 2017 to capture the impact of the Eurasian Economic Union. It will add data series for 2012-2016, an exciting period for integration watchers. The main issue is whether the effects of crisis impede or advance integration. As the Belarus-Kazakhstan-Russia Customs Union, and the Single Economic Space were established in 2010 and 2012 respectively, and the EurAsEC Anti-Crisis Fund (six member states) was established in 2009, we shall start with the hypothesis that economic crisis advanced regional integration of countries formerly belonging to a single economy (a 'holding-together regionalism' hypothesis, offered in Libman and Vinokurov 2012b).

The comprehensive SIEI has been prepared based on an elaborate methodology of regional integration measurement and assessment. We hope that it will be of interest not only as a scientific product, but also as an applied instrument of foreign policy fostering positive integration processes in Eurasia.

Appendix: Details of calculation of the SIEI indicators

Table A.5.1 Calculation of indicators of market integration

Indicator	Pair of countries	Country-region	Region
Market integration in general			
Mutual trade	(Share of trade of countries of the pair in aggregate foreign trade turnover + share of trade of countries of diad in aggregate GDP of these countries) *100 / 2	(Share of trade of the country with countries of the region in aggregate foreign trade turnover of the country + share of trade of the country with countries of the region in GDP of the country) *100 / 2	(Share of inter-trade of countries of the region in aggregate foreign trade turnover of countries of the region + share of inter-trade of countries of the region in aggregate GDP of countries of the region) *100 / 2
Migration	Share of labour migrants of each	Share of labour migrants of the country working	Share of labour migrants of all countries of the

Indicator	Pair of countries	Country-region	Region
	country of the pair working in the other country in aggregate population of these countries	in countries of the region, in aggregate population of the country	region working in other countries of the region, in aggregate population of the region
Mutual investments	(Share of direct investments of countries of the pair in aggregate GDP of these countries) * 100	(Share of mutual direct investments of the country and countries of the region in GDP of the country) * 100	(Share of mutual direct investments of countries of the region between themselves in aggregate GDP of countries of the region) * 100
Functional cooperation in key markets			
Electric power trade	Volume of trade in electrical power between countries of the pair (kW h) divided into aggregate GDP of these countries	Volume of trade in electrical power of the country and the region (kW h) divided into GDP of the country	Volume of inter-trade in electrical power of countries of the region (kW h) divided into GDP of the region
Agriculture	Volume of trade in cereals between countries of the pair (tons) divided into aggregate GDP of these countries	Volume of trade in cereals of the country and region (tons) divided into GDP of the country	Volume of trade in cereals of countries of the region between themselves (tons) divided into GDP of the region
Education	Number of students from countries of the pair who studied in another country of the pair divided into total number of population of the pair	Number of students from a country who studied in the region divided into population of the country	Number of students from countries of the region who studied in other countries of the region divided into total population of the region
Economic convergence			
Macroeconomics	Distance between coordinates of countries including GDP value per capita and GDP growth rate	Distance between coordinates of the country and region including GDP value per capita and GDP growth rate. Coordinate of the region correspond to the mean value of relevant coordinates of all countries comprising the	Mean value of modules of variation coefficients of values of GDP per capita and GDP growth rate in the region

Indicator	Pair of countries	Country-region	Region
		region	
Monetary policy	Distance between coordinates of countries including the growth rate of the rate of national currency to USD and average annual inflation level	Distance between coordinates of the country and region, including the growth rate of the rate of national currency to USD and average annual inflation level. Coordinates of the region correspond to the mean value of relevant coordinates of all countries comprising the region	Mean value of modules of variation coefficients of the growth rate of the exchange rate of national currency to USD and average annual inflation level in the region
Financial policy	Distance between coordinates of countries, including the average deposit rate and average loan rate	Distance between coordinates of the country and region, including the average deposit rate and average loan rate. Coordinates of the region correspond to the mean value of relevant coordinates of countries comprising the region	Mean value of modules of variation coefficients of the average deposit rate and average loan rate in the region
Fiscal policy	Distance between coordinates of countries, including the share of expenses of consolidated budget in GDP, share of foreign debt in GDP, share of consolidated budget balance in GDP and Frank's index	Distance between coordinates of the country and region, including the share of expenses of consolidated budget in GDP, share of consolidated budget balance in GDP and Frank's index. Coordinates of the region correspond to the mean value of relevant coordinates of all countries comprising the region	Mean value of modules of variation coefficients of the share of expenses of consolidated budget in GDP, share of foreign debt in GDP, share of consolidated budget balance in GDP and Frank's index in the region
Generalized indices			
Generalized integration index		Mean value of economic convergence index *(-1) index of market integration of the	Mean value of economic convergence indices *(-1) and indices of market integration inside a region

Indicator	Pair of countries	Country-region	Region
		country and region (except for the index of mutual investments)	(except for the index of mutual investments)

Note: The trade integration index is divided by 100 in order to make the presentation of data more convenient, and to ensure compatibility with the standard “share in foreign trade” indices which are expressed in percent. All variables are standardized using the standard normal distribution for comparability.

Source: Supplementary Material to Libman and Vinokurov (2012a), Vinokurov (2014).

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