



How Much Economic Integration Is There In The Extended EU Family?¹

This note assesses the degree of economic integration within the extended EU family. As would be expected, it finds that the new EU member states have integrated more than candidate and EU neighborhood countries. But it also finds that within each of these three groups the progress is quite varied. For example, the least integrated countries in the EU10 seem to be also the ones that experienced high growth in their non-tradable sector and a reversal in integration in the pre-crisis period. Also, among the EU neighborhood, countries such as Ukraine are still far away from integrating to the EU and are even less integrated than countries such as Morocco.

As is discussed in the literature on optimum currency areas, the degree of economic integration is a key factor in deciding if a country should join or not a monetary union. The premise is that countries that are more integrated will need similar policy responses when an exogenous shock occurs. For instance, if business cycles are closely linked, then an economic slowdown in one country is mirrored in another and thus necessitates a similar policy response. But if integration is still limited, then countries are better-off by maintaining policy independence. It is only under a coincidence of needs that it would seem beneficial for a country to voluntarily limit the policy toolkit at its disposal by ceding monetary and exchange rate policy to supranational entities.

Against this background, it is useful to look at the progress in economic integration. The goal of this note is thus simple: to measure integration to the EU15 by countries in the Europe and Central Asia (ECA) region of the Bank—and even between the EU15 and some countries outside the ECA region with which the EU has signed cooperation agreements. Countries are grouped not according to the actual depth of integration, but following well-accepted classification of countries within the EU family. Specifically, the groups are (i) the EU15, (ii) the new EU member states (or EU10), (iii) the EU candidate countries, and (iv) the countries that form what is known as the EU neighborhood.² This last group covers countries inside and outside the Bank's ECA region, such as countries in northern Africa and in the Middle East.³

But what does economic integration comprise? The literature on economic integration typically distinguishes between nominal integration and real integration. The former covers the co-movement of prices across countries (i.e., the convergence in inflation rates and real interest rates) and the volatility of real exchange rates. The latter emphasizes the degree to which the real economies of different countries are connected with each other. For instance, real integration includes the correlation of business cycles (e.g., developments in industrial production), the degree of bilateral trade among integrating countries, and the convergence in incomes per capita.

¹ Prepared by Naotaka Sugawara and Juan Zalduendo, Office of the Chief Economist, ECA Region, World Bank. We wish to thank M. Willem van Eeghen, Mark Griffiths, Elena Kantarovich, Bryce Quillin, and Martin Raiser for useful comments and suggestions during the preparation of this note; of course all remaining errors are our exclusive responsibility.

² The EU candidate countries include most of the countries in South East Europe (Albania, Bosnia and Herzegovina, Croatia, Kosovo, Montenegro, Serbia and Turkey) and another 'officially sanctioned' EU candidate country (Iceland).

³ The countries in the EU neighborhood are Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine, as well as countries outside the ECA region—Algeria, Egypt, Israel, Jordan, Morocco, Syria and Tunisia.

Parallel to any successful process of integration there are, of course, efforts to approximate institutions. Such integration involves, for example, the adoption of a common external tariff, the harmonization of factor markets regulations, and close coordination of other economic policies. In the case of countries in the EU family, institutional development begins with the creation of a customs union and then extends to a common market and, eventually, a monetary union (e.g., Slovak Republic and Slovenia). This note, however, focuses only on economic integration.

Methodology

The measures of economic integration used are described in Box 1 and build on the theory of optimum currency areas; namely, the work by Mundell (1961) and Frankel and Rose (1998). The assessment of integration is carried out across six indicators: three related to nominal integration and three related to real integration over the period 1997-2008. The focus is on indicators that provide for the largest country coverage in what ultimately is an unbalanced panel. However, limiting the calculations to countries with data for all years provides similar results.

Comparing countries across multiple economic dimensions is always tricky. One illustrative example is shown in Figure 1 for the specific case of Poland vis-à-vis the EU15. Inflation and exchange rate volatility experienced a sharp convergence to the EU15, but in the years prior to the crisis there was a partial reversal in such progress.⁴ The evidence from interest rates is clearer; for example, differences in interest rates between these countries and the EU15 have been in a steady decline for much of the past decade. Trade with the EU15 (as a percent of total trade) is stable, but shows a rapid increase as a share of GDP, implying that Poland has become not only a more open economy, but also that its integration was trade creating. Linkages of business cycles also show a steady progress towards integration. Incomes have also converged.

But deriving conclusions regarding the extent of integration with any certainty is complicated given the many dimensions involved. Thus, instead of focusing on individual indicators as is done in Figure 1, this note assesses the degree of dissimilarity simultaneously across numerous indicators. The dissimilarity is both across individual countries and across groups of countries and is known as hierarchical cluster analysis (HCA). It builds on Dorrucchi et al. (2002) who carried out a similar exercise for the EU15 and contrasted their results to the case of Mercosur countries. HCA is not used here to classify countries into groups. Instead, the intent is to measure the degree of dissimilarity for the *groups of countries* that have been identified within the extended EU family across the metrics of interest—i.e., nominal integration and real integration.

Another advantage of the HCA methodology is that it does not impose ad-hoc thresholds to identify differences across countries. Instead, it lets the data speak for itself. Specifically, for each country i in the sample, the variables described in Box 1 are first compared with the average for the EU15 and then are normalized.⁵ It is on these normalized deviations from the EU15 that the HCA method is applied within each of the country groups specified.⁶ The methodology

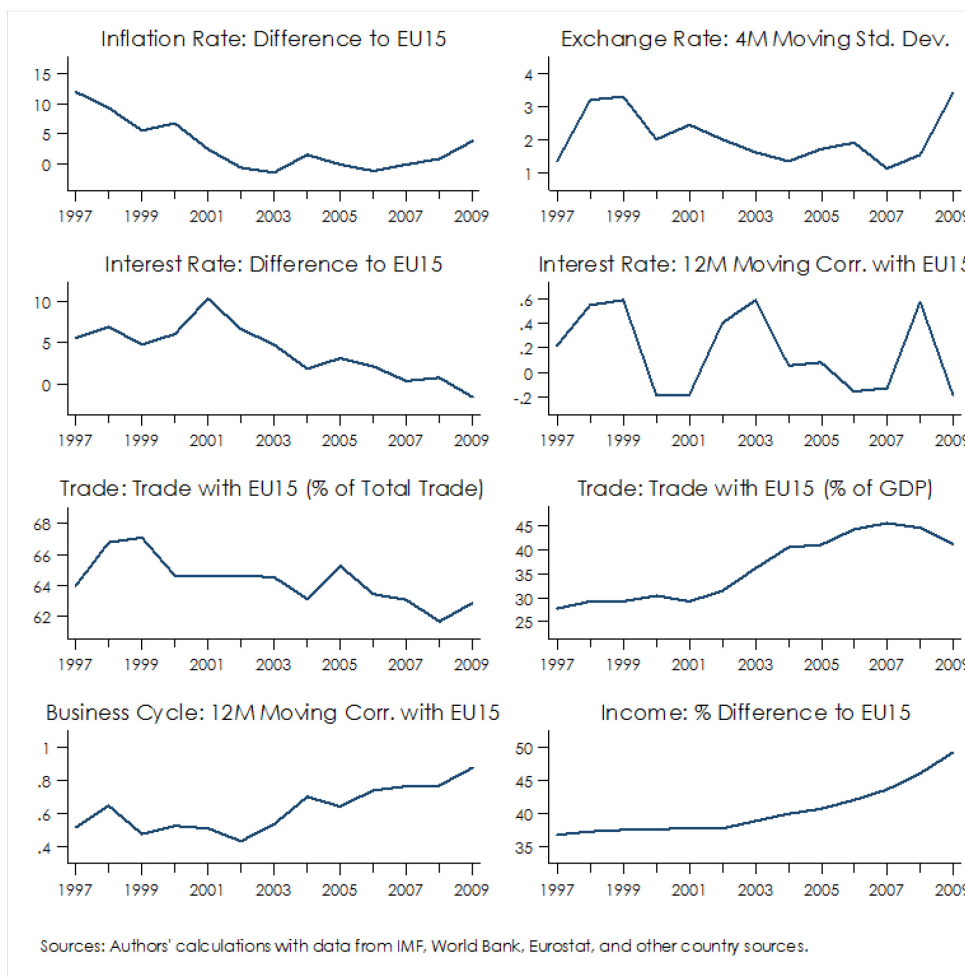
⁴ The calculations were also carried out with respect to the EU6 with results that are different only with respect to Estonia; this country appears to be as less integrated as the other Baltic countries and Bulgaria when the EU6 is used as the comparator.

⁵ The data is normalized (mean zero and standard deviation one) to account for the fact that the original variables are in different units.

⁶ For the EU10, the candidates, and the neighborhood, this is done by comparing each of these groups with the EU15.

averages the dissimilarity of all combinations of country pairs in a group and allows an assessment of the progress in integration by individual countries.⁷

Figure 1. Indicators of Nominal and Real Integration—An Illustration for Poland (1997-2009)



Main Findings

The next few paragraphs describe the findings of this note. These are represented by charts that depict the average dissimilarities across both *groups of countries* and *individual countries*—in all cases relative to the EU15. To facilitate their interpretation, distinct 3-year averages for the period 1997-2008 are used. In other words, four 3-year periods beginning with 1997-99 and ending with 2006-08. The black dots in these charts represents where the integration trajectory ends (2006-08) and each kink in the lines for individual countries is a different 3-year period.

How should the charts that follow be read? The charts represent real integration (horizontal axis) and nominal integration (vertical axis). The charts' origin represents no dissimilarity; integration occurs as we go down and towards the left in each of these charts. For convenience, the scale in Figure 3 and 4 is adjusted to better depict the case of each individual country but, overall, going

⁷ The average of each group is measured by the Euclidean distance between observations.

downwards and towards the left implies more integration (or less dissimilarity). In addition, three factors should be kept in mind for interpreting these charts.

Box 1. Nominal Integration and Real Integration—Definitions

All calculations are based on the deviations for individual countries in any of the four groups to the average EU15 values. Three indicators are used in each of the two components of economic integration (nominal and real).

Nominal Integration

Exchange Rate Variability. Exchange rate stability is key for economic integration as it ensures that competitiveness remains stable over time. In such case, abandoning the exchange rate as a policy toolkit would have limited costs. The measure used in this note relates to the 4-month moving standard deviation of the log difference in real exchange rates vis-à-vis the euro (or the European currency unit prior to 1999).

Convergence of Inflation Rates. Deepening integration implies that prices across countries move in unison. The measure used is the difference of the year-on-year change in consumer prices.

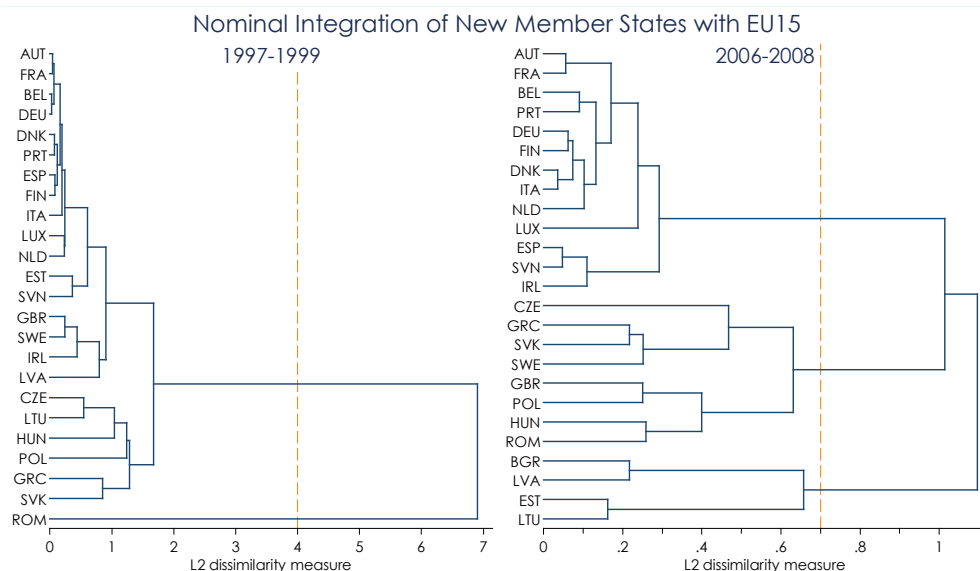
Convergence of Interest Rates. As financial market integration takes hold and the determinants of macroeconomic outcomes converge, it is sensible to expect that interest rates will also be similar across countries. In part this reflects also a common monetary policy stance. Difference in real interest rates are used.

Real Integration

Synchronization of Business Cycles. A high degree of synchronization suggests that business cycles are driven by common shocks and, thus, this lowers the ‘cost’ of pursuing common policies. Synchronization is measured by the moving correlation of the HP filtered series of monthly industrial production indices over a 12 month period. Due to data availability quarterly (instead of monthly) series are used for Albania and Georgia.

Trade Integration and Openness. Trade integration is measured by the share of trade (exports plus imports) to the EU15 countries on total trade. This share is declining for many countries in the sample, reflecting that trade integration with the EU15 has occurred more slowly than integration with the rest of the world.

Convergence in Incomes per Capita. Income convergence is the ultimate measure that a country is integrating to a regional group. It is measured as the percentage difference of a country to the EU15 average income.



The two charts above present, as an example, the dissimilarity between EU10 and EU15 countries for the indicators of nominal integration in two different three year periods; 1997-99 and 2006-08. The degree of dissimilarity across different groups is reflected by the horizontal distances of these so-called dendrograms. Underlying these charts are dissimilarity measures that are used to measure the distance of a country to a group.

How should the hierarchical cluster analysis charts be read? One can arbitrarily set a threshold of dissimilarity; for example, for 1997-99, a threshold of 4 for the chart on the left. This would result in the identification of two most distinct groups of countries: Romania in a group of its own and all other EU25 countries in a separate group. The

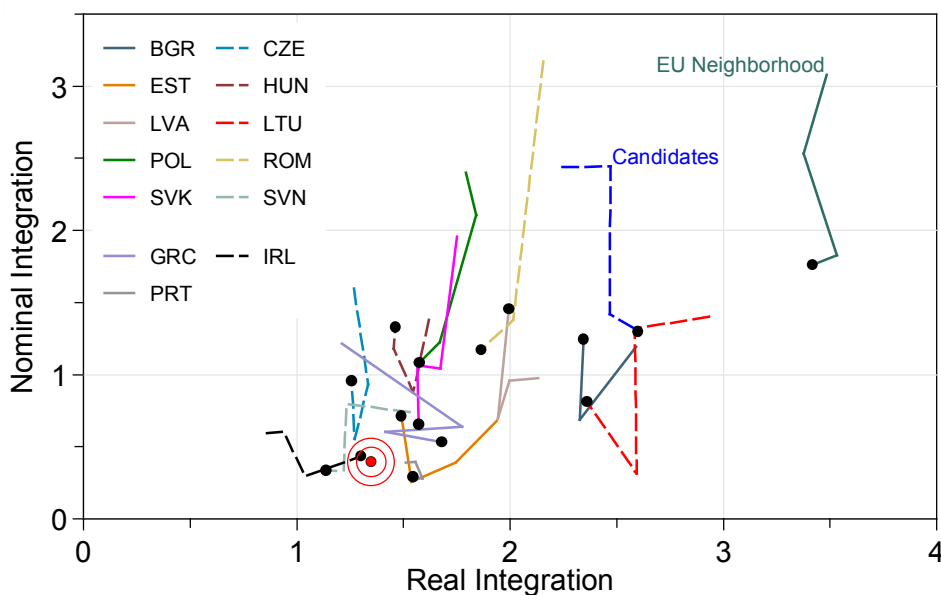
chart also shows that many ECA countries are quite differentiated from the EU15 countries—to the exception of Estonia, Latvia, Slovak Republic, and Slovenia. Interestingly, Greece has greater similarity with these four ECA countries than with the EU15 itself. In contrast, nominal integration appears to have progressed rapidly in the years just before the crisis. Setting a much lower dissimilarity threshold of 0.7 in the chart on the right defines three groups of countries. Group 1 has most of the EU15 countries (plus Slovenia). Group 2 has the Czech Republic, Great Britain, Greece, Hungary, Poland, Romania, Slovak Republic, and Sweden. And the last group has the Baltic states and Bulgaria; perhaps not coincidentally these are the countries with fixed exchange rate regimes. It should be noted that these dendrogram charts produce individual country dissimilarity indicators with each country in the sample; in turn, these can then be used to estimate an aggregate indicator of dissimilarity for each country.

First, dissimilarity equal to zero—or total equality—should not be expected. Indeed, even among the EU15 countries there are differences; of course the difference among the latter are greater than among the former. The goal is to be close to the EU15 average, which is depicted in this note by a red dot that is surrounded by circles denoting proximity to the EU15.

Second, dissimilarity is expected to be larger at the level of real integration as such integration involves structural changes in the economy that, by definition, take longer to materialize.

Finally, countries that are integrating rapidly into the EU family should record over time a move towards the EU15 average in each of the charts presented in this note.

Figure 2. Integration to the EU15 among the New EU Member States (1997-2008; 3-year average periods)



Notes: Each line begins in the average for the period 1997-99 (except for Bulgaria (BGR) whose line starts in 2000-02) and ends at a black dot that represents the average for the period 2006-08 in each country. For Romania (ROM), the first 3-year period shown in the chart is 2000-02. The red dot represents the average for EU15 countries during the period 2006-08.
Sources: Authors' calculations with data from IMF, World Bank, Eurostat, and other country sources.

What are the findings? For the most part the measures of dissimilarity among the EU15 countries is the lowest (pair coordinate (~1.3, ~0.4), the first coordinate representing real and the latter representing nominal integration; Figure 2). The case of Greece, Ireland and Portugal is also shown. It is interesting to note that Ireland converges to the EU15 average over the 1997-2008

period while Greece seems to be experiencing a diverging and volatile integration trajectory. The other ‘political’ groups are, for the most part, more dissimilar—they are farther away from the red dot. For example, progress in nominal integration was achieved among the EU10. In some cases nominal integration was quite sharp—Czech Republic, Poland, Romania, and Slovakia. But real integration, with few exceptions (Estonia, Poland, Slovakia, and Slovenia), is limited.

Can something more specific be said about the progress in economic integration at the level of individual countries? Yes. Some new EU member states appear to have experienced a sharp integration move until 2003-05 in both nominal and real integration, but the years that followed EU accession (in particular those just before the global financial crisis) suggest stagnation (and even a reversal) in nominal or real integration (and sometimes both) for a subset of these countries. For example, Figure 2 shows that the Baltic states recorded a reversal in nominal integration. The same is true for Hungary and the Czech Republic, though these countries still recorded progress in real integration. But here too there are exceptions; for example, Bulgaria has experienced a decline in real integration. It is also worth noting that only a few countries maintained progress throughout the 12-year period in this note. Such is the case for the Slovak Republic, Slovenia, Poland, and Romania. The latter, however, is still quite far from the red dot in Figure 2, which represents the average nominal and real integration in the EU15 countries.

It is also plausible that the stagnation in real integration in some countries reflects the nature of their growth model. Perhaps growth was excessively driven by a catch-up in consumption that was not linked to the drivers of growth among the EU15 countries. While level-wise there is a catch-up in incomes, what is being measured in this note is mostly co-movements and against this metric integration seems to be stalling. The predominance of non-tradables as a growth engine might explain such developments. This would also imply that future integration would need to be more balanced and linked to economic developments in Western Europe.

Although not surprising, the contrast with EU candidate countries is quite marked. These countries seem to have less nominal integration to the EU15 than is the case for new EU members (Figure 3); namely, they are farther to the northeast than is the case for most EU10 countries. Real integration is also lagging and has recorded limited progress. The only exception is Croatia (HRV); this country is closer to the EU15 average than other EU candidate countries, but has also experienced no progress in integration over the past decade.

The EU neighborhood countries have a similar pattern but are even farther away from the EU15 average (Figure 4). These countries have recorded progress in nominal integration and they are even less integrated than candidate countries with regard to real indicators. It is, however, particularly interesting that the degree of integration is high for a subset of these countries. Such is the case for Israel, Morocco, Tunisia, and, though less so, also for Algeria; by all accounts the countries in northern Africa and the Middle East have closer ties to the European Union.

In conclusion, the new EU member states have integrated more than candidate and EU neighborhood countries. But this note also finds that within each of these groups the progress in integration is varied. The least integrating countries in the EU10 that have experienced high growth in non-tradable sectors are also the countries that experienced a reversal in integration prior to the crisis. Also worth noting is that some EU neighborhood countries in Europe (such as Ukraine) are less integrated than some countries in north Africa such as Morocco.

Figure 3. Integration to the EU15 among EU Candidate Countries (1997-2008; 3-year average periods)

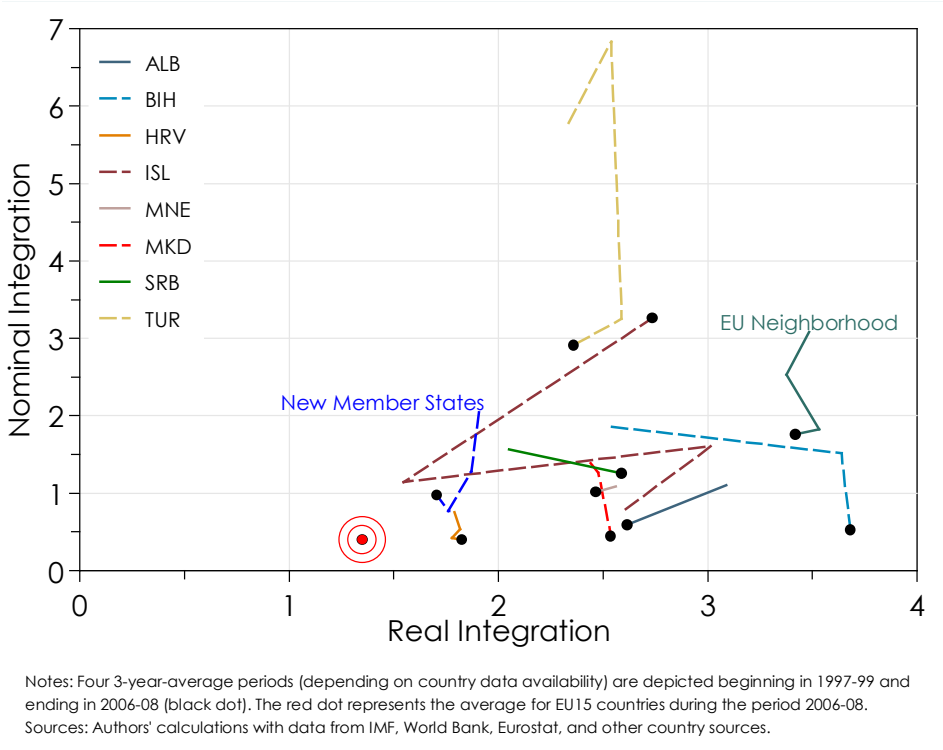
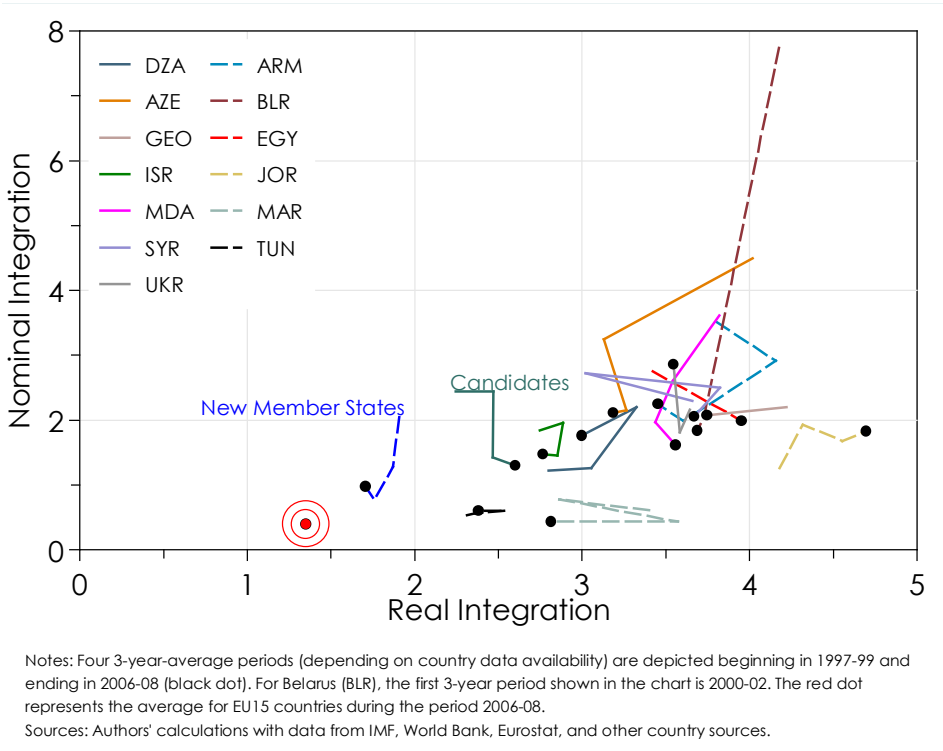


Figure 4. Integration to the EU15 among EU Neighborhood Countries (1997-2008; 3-year average periods)



References

Angeloni, I., M. Flad, and F. Mongelli, 2005, "Economic and Monetary Integration of the New Member States: Helping to Chart the Route," *European Central Bank, Occasional Paper Series*, Number 36.

Dorrucci, E., S. Firpo, M. Fratzscher and F. Mongelli, 2002, "European Integration What Lessons for Other Regions? The Case of Latin America," *European Central Bank, Working Paper Series*, Number 185.

Frankel, J. and A. Rose, 1998, "The Endogeneity of the Optimum Currency Area Criteria," *Economic Journal*, Vol. 108, pp. 1009-25.

Mundell, R., 1961, "A Theory of Optimal Currency Areas," *American Economic Review*, Vol. 51, pp. 105-46.

October 2010