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QUANTITATIVE MONITORING AND COMPARISON OF REGIONAL INTEGRATION
PROCESSES: STEPS TOWARDS GOOD PRACTISE*

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1. Introduction

It is often taken for granted that regional integration processes are progressing and that the regional governance level is indiscriminately gaining importance worldwide, at least from a longer time perspective. However, both from an academic and policy perspective, a need is felt to monitor these processes more closely in order to be more precise with respect to their direction, speed and depth, and with respect to making cross-regional comparisons.

This paper deals with how to quantitatively monitor and compare regional integration processes using composite indices.[1] In depth-studies of qualitative monitoring and the interaction between (regional) monitoring and (regional) policy-making in different regions in the world have been presented elsewhere.[2]

Regional integration is hereby understood as a complex and multi-dimensional process of societal change, including: (i) actors associated with the (sub-)national level(s) of governance, who increasingly interact at the (supra-national) regional level; (ii) their behaviours and policies, which are increasingly coordinated or unified at the regional level; and/or (iii) regional institutions being built up.[3]

In section two we start with a review of some proposals to quantitatively assess the course of regional integration processes. This will lead us in section three to problematize measurement and comparison and to suggest some guidelines and steps to be taken into account when building a (good) monitoring system, based on indicators. Section four concludes.

2. Reviewing some recent proposals

To our knowledge, only few attempts have been undertaken to design and construct composite indices of regional integration, and no proposal has been systematically and continuously used as a policy tool. In the following paragraphs we will review

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[1] This paper is based on work in progress. A final report will appear in the GARNET Handbook on Monitoring and Analysing Regional Integration Processes.
[2] See, De Lombaerde, Estevadeordal and Suominen (2008).
[3] For a further conceptual discussion on regions, regional integration, regionalisation, regionalism and related concepts, see, for example, Hettne and Söderbaum (2000), Van Langenhove (2003), Farrell (2005), and Söderbaum (2005).

five relevant (recent) proposals: Hufbauer and Schott (1994) and related work; Dorrucci et al. (2002) and related work; UNECA (2002); Dennis and Yusof (2003), UN-ESCWA (2007).

Hufbauer and Schott (1994)

Hufbauer and Schott (1994) present a proposal to assess the pre-conditions for (further) regional (hemispheric) integration in the Americas, taking into account the complexity of the process related to the vast differences between the countries of North and South America. The authors distinguish between two sets of indicators. A first set assesses the level of economic integration achieved by each sub-regional group. A second set examines the level of 'readiness' of these groups to increase the degree of hemispheric integration. With the first set of indicators composite 'achievement scores on economic integration' are calculated for five sub-regional arrangements and one benchmark case (EU). The authors' point of departure is a conceptual framework inspired by Balassa (1961) and the European experience (Box 1).

Box 1.   Five main stages of regional institutional integration (Balassa framework)

- *Stage 1.* Free Trade Area (FTA) - An area where tariffs and quotas are abolished for imports from area members, which, however, retain national tariffs and quotas against third countries. Examples are ASEAN and NAFTA;

- *Stage 2.* Customs Union (CU) - A FTA setting up common tariffs and quotas (if any) for trade with non-members. An example is the European Economic Community since 1968;

- *Stage 3.* Common Market (CM) - A CU abolishing non-tariff barriers to trade (i.e., promoting the integration of product and service markets) as well as restrictions on factor movement (i.e., promoting the integration of capital and labour markets). Examples are the Andean Community and the European Community since 1993 (with the establishment of the European Single Market).

The CM was already set up as an objective under the Treaty of Rome (so-called "four freedoms");

- *Stage 4.* Economic Union (EUN) - A CM with a significant degree of co-ordination of national economic policies and/or harmonisation of relevant domestic laws. An example is the European Union nowadays; and

- *Stage 5.* Total Economic Integration (TEI) - An EUN with all relevant economic policies conducted at the supranational level, possibly in compliance with the principle of subsidiarity. To this aim, both supranational authorities and supranational laws need to be in place. An example is the euro area (comprising, from 2008 onwards, 15 out of 27 EU members), which can be currently classified somewhere between an EUN and a TEI. However, some supranational authorities and joint rule making were established already with the Treaty of Rome in 1957, and subsequently enhanced.

Source: Balassa (1961)

'Achievement' in terms of economic integration is captured by six indicators (table 1). The scores reflect both quantitative and qualitative aspects of the integration process. The weighting and aggregation procedure is based on equally weighted arithmetic averages. The results of their exercise (situation in 1994) are presented in table 2. In parallel, 'readiness' indicators are calculated, based on scores for each country within a sub-regional arrangement for seven indicators (on a 0-5 scale) (table 1). Again, a combination of quantitative and qualitative aspects explains the scores, and simple arithmetic averages are computed to obtain the composite indicators for the regional groupings (table 2). The readiness indicators thus only reflect macro-economic and (to a lesser extent) political conditions in member states.

Table 1: Indicators in the Hufbauer and Schott proposal

Achievement indicators	Readiness indicators
- free trade in goods and services - free movement of capital	- price stability - budget discipline

- free movement of labour - supra-regional institutions - monetary coordination - fiscal coordination.	- external debt - currency stability - market-oriented policies - reliance on trade taxes - functioning democracy

Source: Hufbauer and Schott (1994).

Table 2: Achievement and readiness scores for economic integration in the Americas (1994).

	(EU)	NAFTA	Mercosur	Andean Group	CACM	CARICOM
Achievement scores						
Free trade in goods and services	(4)	4	2	3	2	4
Free movement of capital	(4)	4	1	3	0	3
Free movement of labour	(3)	2	1	1	1	2
Supra-regional institutions	(5)	3	2	3	2	2
Monetary coordination	(3)	1	0	0	0	2
Fiscal coordination	(1)	0	0	0	0	0
Average achievement score	(3,3)	2,3	1	1,7	0,8	2,2
Readiness scores						
Average readiness scores	(-)	4,4	3,1	3,4	2,7	3,7

Note: scale is (0-5), zero showing the lowest levels of achievement or readiness, five showing the highest levels.
Source: Hufbauer and Schott (1994:6,102).

Feng and Genna (2003, 2004, 2005) present a modified version of Hufbauer and Schott's Achievement score and apply it to regional integration processes in the Americas (NAFTA, Andean Community, CACM, Mercosur), Europe (EU), and Asia-Pacific (APEC, ASEAN, EAEC, ANZCERTA), using data for an expanded time frame (from the year of creation of the regional scheme until 1998). They measure the level of regional integration according to the same six categories but use a five-level Gutman scale within each category. The integration achievement score is used mainly to test the hypothesis that "a critical condition for the emergence of a successful economic union is that the homogenization of domestic economic institutions and the process of regional integration reinforce each other". The weighting and aggregation procedures are also based on simple arithmetic averages. The general conclusions of these papers are that successful integration develops when domestic homogenization

and deepening integration follow each other in a synchronous time frame. For example homogenization and deepening occurs in three year cycles for the EU. However the cycle from deepening to homogenization takes two years and from homogenization to deepening takes three years for ASEAN.

**Dorrucci et al. (2002,2004)**

The contributions of Dorrucci et al. (2002, 2004) and Mongelli et al. (2007) also take the Balassa framework (Balassa, 1961) as a reference point. Initially, the authors develop an index of institutional economic integration (IEI) based on the measurement of Balassa's "five stages" (Box 1). The overall degree of institutional integration achieved within a regional arrangement at a given point in time is quantified by assigning numbers ("scores") to the level of integration recorded, for each of these five stages, throughout the relevant period (e.g. 1957 onwards for the EU, 2001 onwards for Mercosur, etc.). This allows *measuring*, and therefore comparing, those regional arrangements in the world that broadly evolve along the Balassa lines in a relatively homogeneous way, although with some unavoidable degree of discretion and judgement. The authors assign scores from 0 to 25 to the degree of regional integration achieved over time in the development of, respectively:

- a Free Trade Area/Customs Union (FTA/CU, considered jointly) (measured by the changes over time of tariffs and quotas on trade, and in the case of the EU the implementation of the Common Agricultural Policy - CAP),

- a Common Market (CM) (measured by the progress in abolishing non-tariff barriers, and the liberalization of the movement of capital and workers),

- an Economic Union (EUN) (measured by the degree of co-ordination of national macroeconomic and micro-economic policies), and

- an area with Total Economic Integration (TEI) (measured by the set-up of supranational institutions and decision-making processes, as well as the structuring of the process of regional integration through laws issued and enforced at the supranational level, and the conduction of macro-economic policies at the regional level).
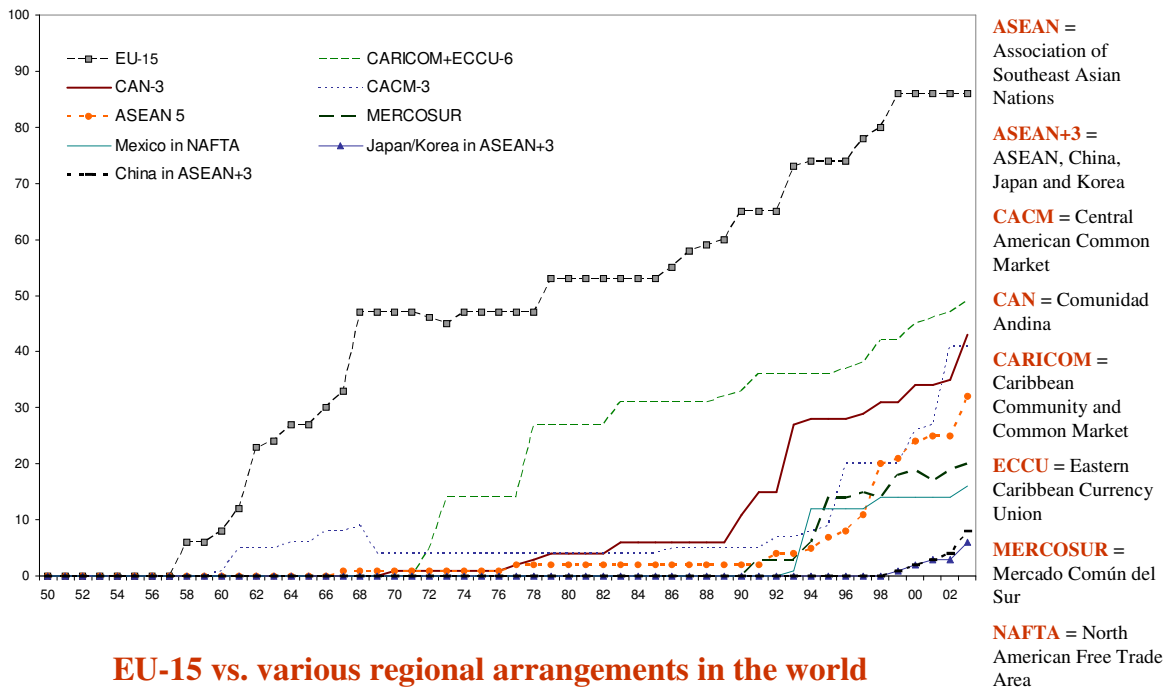
By summing up the scores achieved in each moment in time (monthly data are used), an index of institutional regional integration is obtained which can range between 0

(no economic integration at all) and 100 (full economic integration, including monetary and financial integration). Scores are assigned on the basis of the indicators mentioned above. To the extent possible, the authors do not assign scores on the basis of the year when a certain decision was taken (e.g. Treaty of Rome in 1957), but rather on the basis of the year and month when such a decision started being actually *implemented* (e.g. lowering of EU-6 internal tariffs between 1959 and 1968). This implies that those projects which were never implemented (e.g. Werner Plan) are not taken into account. Moreover, the authors take into account that, e.g. in the European experience, some Balassa stages tend to develop *in parallel*, which implies that in this case the term "stage" could be misleading. This entails that numbers can be assigned *in parallel* to each of the five stages. Figures 1 and 2 report the index of institutional integration for, respectively, the six founding members of the EU, and EU-15 compared with all regional arrangements in East Asia and Latin America.

Figure 1: Index of institutional integration for the EU, 1950-2004
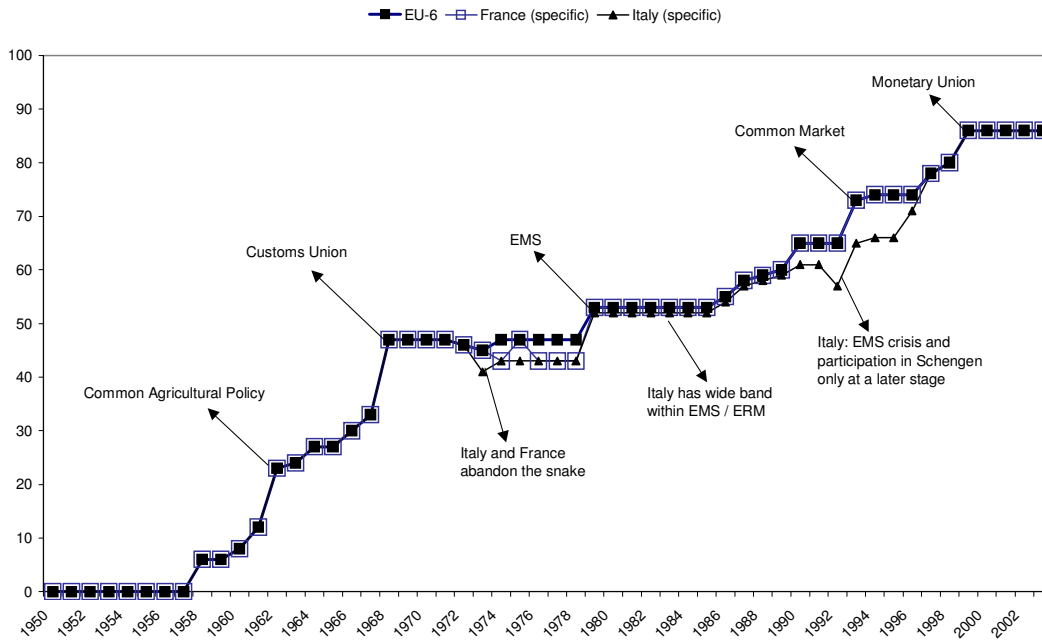
Figure 2: Index of institutional integration for the EU-15 and various regional arrangements in the world

EU-15 vs. various regional arrangements in the world

ASEAN = Association of Southeast Asian Nations

ASEAN+3 = ASEAN, China, Japan and Korea

CACM = Central American Common Market

CAN = Comunidad Andina

CARICOM = Caribbean Community and Common Market

ECCU = Eastern Caribbean Currency Union

MERCOSUR = Mercado Común del Sur

NAFTA = North American Free Trade Area

Independently from the IEI index, the authors measure 'actual economic integration' (AEI) with a set of indicators (table 3). The underlying theoretical framework is inspired by optimum currency area (OCA) theory.[4]

Table 3: Actual Economic Integration Indicators in the Dorrucci et al. proposal

Actual Economic Integration Indicators
- synchronisation of the business cycle
- convergence of inflation rates
- exchange rate variability
- trade openness and integration
- financial market integration
- convergence of interest rates
- income convergence

Source: Dorrucci et al. (2002, 2004)

After having developed the AEI measures and having constructed a composite index, the authors measure the interaction between the IEI index and the AEI index via a cluster analysis (Dorrucci et al., 2002) and a VAR analysis (Dorrucci et al., 2004). The analysis leads to the general conclusion that IEI and AEI have been strongly interacting over time in the EU case, with the direction of causality going in both directions.

UNECA
UNECA (2001, 2002, 2004) develops a new indicator system to assess progress in African regional integration since the signing of the Abuja Treaty in 1994 in its ARIA1 Report (*Assessing Regional Integration in Africa*). The main objectives of the indices are listed as follows:

(i)   " [t]o assess each country's performance and relate it to the goals and objectives of each regional economic community and that of Africa as a whole, as well as to assess the performance of each economic community to that of Africa;

(ii)   to compare the contributions of each member country in a regional economic community towards the realization of such goals and objectives, in addition to the contributions that each regional economic community

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[4] For a detailed justification of the inclusion of these variables, see Dorrucci et al. (2002:12-13).

has made towards the realization of goals and objectives of the continent at large;

(iii) to monitor the performance of each country, regional economic community, and the continent as a whole for regional integration efforts over time;

(iv) to enhance the quality of the analysis by providing indices for scores and rankings at country, regional economic community and continent levels" (UNECA, 2004:244).

The structure of the composite indicator is based on eight sectors (or clusters of activities) that are common to the treaties of the regional economic communities: trade, money and finance, transport, communications, energy, agriculture, manufacturing and human development and labour markets. Progress in these clusters is measured by a variable number of indicators, totalling 19 indicators in the whole system (table 4). The data come from published official sources but also from questionnaires that were specifically designed for the purpose. Basic data are normalised transforming them in annual indices taking 1994 as the base year (1994=100).

Table 4: Integration indicators in the UNECA proposal

Integration indicators
- intra-regional exports
- intra-regional imports
- share of budget spent on education
- inflation
- external debt
- investment
- budget deficit
- cross-border industrial inputs
- intra-regional food exports
- intra-regional food imports
- air transport freight
- air passengers carried
- number of aircraft departures
- length of the paved roads network
- length of the total roads network
- intra-regional electricity exports

> - intra-regional electricity imports
> - intra-country telephone calls
> - intra-regional telephone calls

Source: UNECA (2004)

The Composite Integration Index which assesses the 'relative performance of a regional economic community' is based on these eight sectoral indices for all member countries. Country weights are GDP figures; sector weights are based on expert judgement. UNECA also calculates weighted averages of the regional economic community indices, using the corresponding GDP weights of each regional economic community. Indicator values for a selection of African RECs for the 1994-1999 period are shown in Table 5.

Interestingly, in the UNECA proposal two benchmarks are used for the purpose of evaluating and comparing the integration efforts: (i) the self-defined pre-determined targets for target-driven indicators (if they exist for particular integration groupings), and (ii) an average of the *n* best performers (UNECA, 2002:246-248). Although further improvements and refinements of the indicator system were announced (UNECA, 2002:228,249), namely incorporating institutional and other qualitative aspects of regional integration, the effort has unfortunately not be sustained in ARIA2 (UNECA, 2004).

Table 5: Integration indicators for African regional economic communities (1995-1999, 1994 = 100)

	1995	1996	1997	1998	1999
CEMAC	129,7	135,7	136,0	134,8	128,4
CEN-SAD	122,9	130,8	133,7	121,2	121,0
CEPGL	90,6	89,5	93,7	91,2	86,6
COMESA	110,1	123,0	125,2	127,2	119,4
EAC	114,7	120,3	118,5	120,5	119,2
ECCAS	124,6	128,1	132,0	126,8	121,7
ECOWAS	117,2	130,8	130,3	136,6	133,9
IGAD	113,0	114,1	120,8	119,8	119,7
IOC	116,2	126,2	118,3	123,8	109,6
MRU	90,2	96,4	119,3	109,3	117,1
SADC	115,6	131,5	131,0	137,2	136,9
UEMOA	117,4	132,3	133,4	138,6	137,1
UMA	101,4	100,4	101,3	99,5	100,4
Simple average	*112,6*	*119,9*	*122,6*	*122,0*	*119,3*
Weighted average	*114,9*	*124,7*	*126,1*	*125,5*	*123,6*

Source: UNECA (2002).

Dennis and Yusof

The report on Developing Indicators of ASEAN Integration (Dennis and Yusof, 2003) is a technical document prepared for the ASEAN Secretariat and funded by the Australian Regional Economic Policy Support Facility (REPSF). The objective of the proposal is to measure "the progress towards economic integration of the 10 ASEAN nations in the context of the aim to move towards an ASEAN Economic Community" (Dennis and Yusof, 2003:1). The authors use a Balassa-type conceptual framework, and discuss, on the one hand, the conceptual differences between integration, openness and interdependence, and on the other, the differences between process, input, outcome and output indicators (Dennis and Yusof, 2003:19-28). The set of indicators that is proposed covers the following areas (dimensions): trade in goods, investment, trade in financial and other services, infrastructure, customs, standards, mutual recognition agreements and conformity assessment, small and medium enterprises, e-ASEAN, and intellectual property. The complete set of indicators to monitor the progress of economic integration consists of 145 indicators (Annex 1). However, a limited set of 11 key integration indicators has also been selected to be used in the initial stages of monitoring (table 6). A composite ASEAN Economic Integration Index is calculated as a simple arithmetic average of only two of the key indicators: intra-ASEAN trade (as % of ASEAN GDP) and intra-ASEAN FDI (as % of ASEAN GDP). In spite of the size and the seriousness of this effort, to our knowledge, this proposal has not been implemented as a monitoring tool for ASEAN.

Table 6: Key integration indicators in the Dennis and Yusof proposal

Key integration indicators
- intra-ASEAN export index
- intra-ASEAN import index
- intra-ASEAN trade index
- intra-industry-trade index
- CEPT usage index
- ASEAN FDI index
- intra-ASEAN FDI index
- ASEAN transnationality index
- foreign assets and liabilities indicator
- portfolio equity and FDI indicator
- ASEAN economic integration index

Source: Dennis and Yusof (2003:107).

UN-ESCWA

In its 2006 Annual Review of Developments in Globalization and Regional Integration in the Arab Countries, UN-ESCWA (2007) presented for the first time a regional Integration Index for the Arab World. The index seeks to measure the degree of openness and interdependence (or: 'actual' integration) of individual Arab countries with respect to the region. In its current version, only four variables are used, mainly because of severe data constraints in the region (table 7). These variables (or sub-indicators) are: Country rankings are aggregated using a statistical weighting procedure (principal component analysis). Data for 16 countries (2003-2005 period) are currently covered by the Regional Integration Index. First results show that countries like Lebanon, Yemen, Jordan and Bahrain are among the most regionally integrated countries in the region, whereas the Maghreb countries like Algeria, Libyan Arab Jamahiriya, Tunisia and Morocco appear as the laggards in the list.

Table 7: Integration indicators in the UN-ESCWA proposal

Integration indicators
-   openness to Arab intra-regional trade -   openness to Arab intra-regional investment -   openness to Arab intra-regional workers' remittances -   openness to Arab intra-regional tourism

Source: UN-ESCWA (2007)

UN-ESCWA has the intention to further develop this index, basically through the incorporation of additional variables, such as: ODA, financial sector flows, trade barriers, capital controls, personal contacts, and cultural proximity (UN-ESCWA, 2007:42).

3. Steps towards good practise

3.1. Step One: Selection of individual indicators

The boxes in section two already indicated that a great variety of indicators exist from which the analyst can pick the indicators for the purpose of monitoring. Due to the economic bias of the available cases, in reality the list of potential indicators is even much larger. Regional integration or regionalisation are indeed multi-dimensional phenomena.

The selection of such indicators of regional integration, as any other type of indicators, should be based on a number of general principles which, however, are often neglected. A summary is provided below:[5]

Relevance

Indicators should inform the user about the phenomenon in which he/she is interested. Conceptual clarity is therefore a *conditio sine qua non* for a good selection of indicators. It is up to the analyst to define whether a broad view is taken or whether he/she wants to focus on a narrower aspect of regional integration. Relevance is therefore a relative concept.

One can, for example, distinguish between the formalisation of the process and the actual degree of regional integration or interdependence. An indicator informing us about the former does not necessarily inform us about the latter, and vice versa.

If coding is used, does the score match more the expectations of the treaty or the reality of the situation? Researchers that construct integration measures from coding treaties must consider if the treaty is in fact being implemented. False starts stemming from coordination problems, unforeseen domestic crises, or wishful thinking are very frequent. Therefore it is important that the coder verifies whether the treaty has been implemented. Another consideration in this context is that variables referring to the national governance level do not necessarily inform us about the regional integration process.[6]

Overlapping memberships are problematic because the level of integration may not be uniform across the regional case. If the unit of analysis is the region, we assume that all countries have at least the legal and political ability to integrate at the same rate. But if two or more countries are members of other regional groupings and if these groupings vary in the level of integration, then it becomes unclear as to what the researcher is actually explaining. If overlapping membership is perfect across two or more regional groupings, then this is not a problem. The problem may not be grave if

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[5] See also, OECD (2003a); Dennis and Yusof (2003); and Nardo et al. (2005).
[6] It should be borne in mind, however, that regional integration indicator systems often include a large proportion of such variables (De Lombaerde, Pietrangeli and Weeratunge, 2006).

the number of overlapping memberships is small. The same problem carries over when the unit of analysis is dyadic because it is uncertain if the level of integration observed is due to being associated with regional grouping A or B. This problem may be remedied if we can accept the following assumption: the level of integration will more likely be higher in a treaty environment that allows more integration. This also assumes treaty implementation, but verification of this is relatively simple. By making this assumption, then the score for the deeper integration treaty should be used.

Accuracy and credibility

The principle of accuracy refers more generally to the need for indicators to describe or estimate the variables that they are expected to describe or estimate. This is a function of the quality of the technical procedures followed to produce the basic data. The credibility of the data source can be used as a proxy for the accuracy of the data. In various regions, regional bodies are increasingly promoting the harmonization of statistical methods and quality standards among their members. Examples include the EU/EUROSTAT, GCC, Andean Community and ECOWAS.

Data availability

The ease with which original data can be accessed is also crucial. With respect to regional integration, the availability of comparable data for different regions and policy areas is really problematic. Especially, but not exclusively, for less-developed countries (LDCs), the range of available data is limited. This is why many in this area work with score-based metrics that rely on treaties and expert assessments. Indicator systems on regional integration crucially require data on intra-regional interaction and interdependence, but these are usually not systematically available. Consolidated trade data are available from UN Comtrade, but for several regions, data on bilateral intra-regional flows are missing. The IMF provides reliable time series data on dyadic direction of trade, which has been improved by Gleditsch (2002). However, the IMF trade data suffers from not discerning the types of products, economic sectors, or intra-industry trade. Detailed data is attainable, but on a region-by-region basis with many missing cases among the LDCs. Even for OECD member countries systematic data on intra-regional services trade, trade in intermediate and final goods or trade by multinationals is not systematically available (OECD, 2004). Currently dyadic FDI

data is not readily available for all countries. However, there is regional data available in many cases, but senders of FDI are often unknown. Labour mobility, and migration in general, is also a measure that lacks accuracy and global completeness. Moving from the economic sphere to other spheres of regional interaction (political interaction, diplomatic tensions, conflict, knowledge flows, etc.) generally involves further constraints with respect to data availability.[7]

Timeliness

This principle refers to the minimisation of the time between the publication of data and the realisation of the events they describe or measure. In the case of systems of indicators and composite indices, the overall quality of the system or index will depend on the least timely components in the system.

Comparability

If monitoring refers to two or more regional integration processes and if comparison is one of the aims of the exercise, particular attention should be paid to comparability. As mentioned above, comparability is related to data availability and quality, and definitional issues. However, comparability is also related to conceptual and methodological issues. This can best be illustrated with an example, based on a very often used indicator: the indicator of intra-regional trade intensity (box 2).

Box 2: Comparing indicators of intra-regional trade

The intra-regional trade share (expressing intra-regional trade as a percentage of total trade of the countries of a particular region) is usually considered as an unproblematic indicator, easy to understand, even for non-trade specialists. It is also well known that the EU scores high on this indicator (69% for the EU-27 in 2005), while other regional organisations have low scores (for example, 8% for SADC and 9% for CARICOM in 2005).[8] The indicator is often a-critically used as an indicator of 'success' of a particular integration project. However, the indicator is not unproblematic. One of the reasons is that the indicator is correlated with the size of

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[7] For dyadic data on conflicts and conflict related variales, the COW website is worth exploring.
[8] Data obtained from the Regional Integration Knowledge System –RIKS-, http://www.riks.garnet-eu.org/, last visited 18 April 2008.

the region; economically large (small) regions logically trade more (less) within their region and less (more) with the rest of the world. There is thus a problem of comparability, especially if we would want the indicator to reflect the 'success' of regional integration policies. Alternative measures, correcting the intra-regional trade share for the scale bias and other technical deficiencies, have been proposed (see, for example, Iapadre, 2006). Without going into a detailed discussion of all these indicators here, we just signal that different indicators (all reflecting the importance of intra-regional trade) can produce different country rankings (see table 8), pointing to the fact that 'comparability' is a complex issue.

Table 8: Ranking of regional integration groupings according to different indicators of the importance of intra-regional trade

Ranking according to:	Intra-regional trade share	Intra-regional trade intensity index	Symmetric trade introversion index
1	EU-27	CARICOM	CARICOM
2	EU-15	CAN	CAN
3	NAFTA	SADC	NAFTA
4	ASEAN	MERCOSUR	SADC
5	MERCOSUR	ASEAN	EU-27
6	CAN	NAFTA	MERCOSUR
7	CARICOM	EU-27	EU-15
8	SADC	EU-15	ASEAN

Source: RIKS, http://www.riks.garnet-eu.org/, last visited 18 April 2008.

3.2. Step Two: Systematic organisation of the indicators

In order to bring clarity to the monitoring exercise it is recommended to classify the variables and indicators describing particular aspects of regional integration processes into categories, each one corresponding to a broad aspect or dimension of the phenomenon "regional integration". This process of classification provides thet structure of an indicator system and reflects the conceptual and theoretical framework of the analyst. Conceptual frameworks can:

• be broad or narrow in terms of actors considered, policy areas covered, etc.;

- reflect different theoretical models of regional integration: functionalist model, optimum currency area theory, fiscal federalism, transactionalism, liberal intergovernmentalism, two-level games analysis, etc.;
- reveal biases of different sorts (disciplinary, ideological, geographical, etc.).

Generally speaking, variables and indicators can be classified by:

- policy areas (economic policy, social policy, migration, agriculture, foreign and defence policy, or peacekeeping)[9],
- disciplinary approaches (political science, IR, economics, or geography),
- their logical or functional place within a system or process of regional integration. The latter type of classification is more sophisticated than the previous ones, and may significantly increase the analytical value added of the system of indicators. In the process of regional integration one could, for example, distinguish between inputs, outputs and process indicators (Dennis and Yusof, 2003:20; De Lombaerde and Van Langenhove, 2005:21). The difficulties that then arise are related to the contents of the input category (exogenous versus endogenous/policy variables), the contents of the output category (intermediate versus final output, direct versus indirect policy effects, etc.), and the causal interpretation of the links between the variables, which might be problematic in a systemic context.

Another important distinction, often used when constructing indicator systems for monitoring regional integration processes, is the one between:

- indicators describing the integration process from an *institutional* angle,
- and indicators examining the *actual* process of regionalisation.

In an inter-governmental context, indicators of institutional integration measure the policy decisions taken and/or implemented by two or more governments of countries belonging to the same geographic area in order to promote co-operation in different possible spheres such as, for instance, economic, security, or foreign policy issues. Such co-operation consists in the deepening and/or widening of the spheres of co-ordination under the terms of an agreed pact, which defines a set of procedures and institutions. Pacts may vary widely in form, ranging from inter-governmental agreements on sectoral co-operation to economic and monetary unions with transfer

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[9] Compare, for example, with UNECA's consideration of 'clusters' of activities (UNECA 2002).

of sovereignty to supranational institutions. In a more general context, institutional integration can also refer to other actors and instances of regional governance.

Conversely, the indicators of actual regional integration measure the degree of interpenetration of activities and interdependence among two or more countries belonging to the same geographic area as measured at a given point in time. Interaction and interdependence can of course take place also between different areas (in this case the adjective "inter-regional" is often used). Economic activity includes here real aspects of an economy (such as trade and labour mobility), financial/monetary aspects (such as financial flows and interest rate differentials), and policy-related aspects (such as budget deficits or tax rate differentials).

Assessing regional integration from both the institutional and the actual perspective presents diverse advantages. First, it helps understanding the *different nature and features* of integration in different regions. Different combinations of institutional and actual regional integration can indeed be found in different regions. According to Dorrucci et al. (2002, 2004), for example, whereas the EU presents high scores for both aspects, East Asia exhibits high actual regional economic integration despite low institutional integration. This helps understand that, differently from Europe, the engine of regional economic integration in East Asia was not given by joint policy decisions taken by governments, but rather by other factors, such as the market-driven need to develop a regional production chain to integrate in the global economy. The various Latin American regional arrangements in turn would illustrate the paradox of a relatively high degree of institutional integration but very low degrees of actual economic integration.

A second advantage of developing measures of institutional versus actual integration is that this is a necessary step towards a better knowledge of the *interaction* between the policy decisions taken to enhance integration and the actual degree of integration. This is an important development in the literature on regional economic integration. For example, in their seminal contributions on the endogeneity of optimum currency areas (OCAs), Frankel and Rose (1997, 2000) measured actual economic integration (AEI) from the moment when a monetary union starts, but they did not focus on two key aspects, namely that: (i) there is a whole dynamic institutional process leading to

the establishment of a monetary union, a process that can last decades and needs to be measured; (ii) during such a process, AEI and institutional economic integration (IEI) may well interact (i.e., AEI is not necessarily endogenous to IEI, but may in turn stimulate IEI further).

A third advantage is that this distinction provides for a framework to evaluate the performance of regional institutions and policies. This would answer important questions related to the efficiency of regional institutions in producing desired goals. Related questions involve the capabilities of states to coordinate efforts and/or implement joint policies when regional institutions are weak.

In the economic literature, institutional integration is further disaggregated into 'negative' and 'positive' functional types of integration (Tinbergen, 1954). These concepts, however, can easily be applied to other policy domains. In its original formulation, negative integration refers to the removal of barriers to the circulation of goods, services, workers and capital. Such barriers range from tariffs and quotas to other, less visible, types of obstacles. Positive integration refers to the coordination, or even implementation at a supranational level, of a number of microeconomic and macroeconomic policies, and to the ensuing the creation of supra-national institutions.

Regarding a process of economic integration, a helpful, and widely accepted, classification of the various functional degrees of institutional integration is the one provided by Balassa (1961), who indicated five main stages of institutional integration (see Box 1). This framework has inspired the indicator systems of Hufbauer and Schott (1994), Dorrucci et al. (2002, 2004) and Dennis and Yusof (2003).

A complication of this framework is that the five "stages" of integration referred to in Box 1 suggest a clear *sequencing* of economic integration, from purely trade, through free movement of the factors of production, to the establishment of supranational organisations, laws and policies. This sequencing can be identified in the European experience – though some aspects of total economic integration, such as supranational institutions, were already present at the beginning of the process of institutional integration – but contrasts with the "menu approach" that currently characterises several experiences outside the EU.

An additional element of complexity is that an optimal sequencing of IEI should not only be depicted by the five stages of integration, but also *within* each of them. For example, with respect to the liberalisation of factor mobility in the creation of a common market, experience has taught that reform of the financial sector, particularly banking, should be a prerequisite for the removal of capital controls, and that the strengthening of regulation and institutional capacity should precede financial sector reform.[10]

Bearing in mind these caveats and over-arching questions about the usefulness of developing an indicator of IEI and its adaptability to regions other than the EU, the five Balassa stages remain a key classification starting from which an index of institutional integration can be developed.

Most conceptual frameworks have an economic focus because of the economy-driven nature of many arrangements. Nonetheless, the focus may also be on other aspects. We focus hereafter on security communities. Deutsch *et. al.* (1957) defined such communities as states committing themselves to resolve disputes in peaceful ways. Security communities, they observed, can be either pluralistic or amalgamated. A pluralistic community fully retains state sovereignty and is, therefore, intergovernmental in nature. It is held together by a set of core values (common identity, loyalty) and some common institutions. An amalgamated community includes merged units and is governed by a "supreme decision-making center." Both pluralistic and amalgamated communities are readily measurable.

Adler and Barnett (2006) start from the Deutsch *et. al.* description and expand it to also explicitly include security relations *external* to the community. They do so when laying out three broad phases of a security community development:

- In the nascent phase, states do not explicitly seek out the development of a security community but recognize the need for mutual security. To foster this need

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[10] Baele et al. (2004) further illustrate this complexity. They postulate that financial integration is achieved when all potential market participants with the same relevant characteristics (i) face a single set of rules; (ii) decide to deal with specified financial instruments and/or services; (iii) have equal access to the selected set of financial instruments and/or services; and (iv) are treated equally when they are active in the market.

in an environment lacking mutual trust, states establish institutions needed to overcome collective action problems. The establishment of such institutions becomes the key indicator of the nascent phase;

- In the ascendant phase, institutions are developed to manage increasing military coordination and cooperation. This phase also includes the decreasing belief that security threats exist among member states, and occurs in an environment of "increasingly dense networks" aiming to a collective identity. Indicators include military procurement from firms across the member states; sharing of intelligence; and the dismantling of institutions needed to monitor cooperation;

- In the final or mature phase, a single identity and a community governance system are shared. Indicators include intergovernmental or supranational decision-making mechanisms for foreign and defence policy, the lack of border checkpoints, military planning, integrated arms, a common belief of what defines an external and internal threat, and common norms regarding foreign policy.

Thus, adopting a different conceptual framework leads to a different selection and classification of indicators.

A final remark concerns the issue of relevance of the indicators. This has been discussed before in section one. However, in the context of a system of indicators or for the purpose of constructing composite indices, relevance should not be evaluated for each indicator individually; rather, the selection of an indicator should take the purpose of the system or the composite index into account. Adding new indicators should not affect the balance of the system.

3.3. Step Three: Constructing composite regional integration indices

Many integration measurements rely on developing one index out of multiple indicators. The logic behind this is simple: regional integration is a complex, multidimensional phenomenon. To capture the complexity and not bias results by focusing on one or a few aspects, it becomes necessary to breakdown the concept, measure its components, and then aggregate them in some fashion. The researcher then has a summary indicator that can be tracked across time and space. Such a summary measure can then also be used as a (dependent or independent) variable in

econometric work to test hypotheses related to the causes and consequences of regional integration.

There are many ways to construct composite indices. Although it is unavoidable that the construction involves important portions of judgement by the researcher and some degree of arbitrariness, it is possible to give some indications of what constitutes 'good' practise in this field. A good benchmark for assuring 'good' practise in the construction of composite indicators is the stepwise approach proposed by Nardo et al. (2005) (Box 3).

Box 3: Steps in the construction of composite indicators

Step 1:   Development of a theoretical framework
Step 2:   Data selection
Step 3:   Exploratory multivariate analysis
Step 4:   Imputation of missing data (if applicable)
Step 5:   Normalisation of indicators
Step 6:   Weighting and aggregation of indicators
Step 7:   Analysis of robustness and sensitivity of composite indicator
Step 8:   Linkage with other variables/indicators
Step 9:   Visualisation of results
Step 10: Linkage (back) to components, sub-indicators and individual variables

Source: Based on Nardo et al. (2005:9-10).

Steps 1 and 2 have already been covered in sections one and two of this paper. In this section we will concentrate on the following important steps in the construction of composite indicators: normalisation; weighting and aggregation; and robustness tests.

Normalisation process

Aggregating varying measurement ranges would bring about the introduction of unintended weights. For example, if an additive index is developed from three components, A, B, and C, and the range of each component is different (A ranges between 1 and 3, B between 0 and 5, and C between 1 and 10), then the multivariate analysis will more likely explain the variation in C rather than the overall index, since C has the largest range and thereby the largest impact on the overall index range. The components would need to be rescaled so that the ranges are identical and results are

not unintentionally biased in favour of one or more components. Different technical options are available for this purpose (OECD, 2003b; Nardo et al. 2005) (Box 4).

Box 4: Available technical options for normalising sub-indicators

- ranking of countries or regions for each individual indicator,

- assignment of (qualitative or quantitative) categorical scales for each indicator,

- re-scaling of indicators in order to obtain identical ranges (e.g. 0-100),

- standardisation of indicators in order to obtain common scales with mean zero and standard deviation one,

- transformation of each indicator into a relative distance from a benchmark value, and

- transformation of each indicator into a (percentage, annual) difference over time.[11]

Weighting and aggregation

Although applying equal weights is probably the easiest and most used weighting procedure, of course in certain cases it would be necessary to include index components at different weights. This would occur when the underlying concept of integration is defined in such a way that particular components have more value than others. Components may still need to be normalized so that the researcher can maximize control over the amount of weight given to any one component. Subjectively, a researcher can give greater importance to certain items based on expert opinions of integration in a geographic or substantive area, or because of theoretical considerations. If the index aims to measure e.g. the level of societal integration, the level of transnational communication would have greater substantive importance than the exchange of goods and services. If security communities are of interest, then mechanisms of foreign policy coordination and military asset sharing would have greater value than labour mobility. Expert opinions on weights can be

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[11] Standardised values are also called z-values. Other normalization techniques are available, see, for example, Nardo et al. (2005:11-13).

gathered in different ways. These include the budget allocation approach, the analytic hierarchy process, and conjoint analysis.[12] Usually, weights are defined at two (or more) levels: weights are defined for the different dimensions of the composite indicator (i.e. for sub-sets of individual indicators), and they are defined for individual indicators within these sub-sets.

In the case of statistical weighting procedures, multivariate statistical methods (like factor analysis or principal components analysis) are used to derive the weights mechanically. Statistical weighting maximises the information content (read: variation) in the individual indicators and/or minimises the number of variables capable of representing the different statistical dimensions of the measured multi-dimensional phenomenon.[13] In any case, it should be clear that both statistical and non-statistical weighting procedures depend on value judgements of the builders (and users) of the composite indicator, based on theoretical and conceptual considerations, the purpose and use of the indicator, and technical and practical considerations. No one-size-fits-all solution exists, and each method has advantages and disadvantages.

Once the indicators and indicator categories are weighted, these can be aggregated in order to obtain the composite indicator of regional integration. Aggregation can be linear or geometric.

Robustness and sensitivity tests

As explained before, the construction of a composite indicator of regional integration is thus a complex process in which many choices have to be made by the analyst and which are, in addition, often imposed by data constraints or lack of information. All these choices involve some degree of uncertainty, not only with respect to the choice itself but more importantly with respect to the implications of these choices for the computation of the composite indicator, related regional rankings, and policy lessons.

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[12] See, for example, Nardo et al. (2005:21-23).
[13] An alternative weighting procedure consists in letting the weights reflect the statistical quality of the underlying data, attaching higher weights to higher quality data (Nardo et al., 2005:21).

The sources of uncertainty include: the choice of sub-indicators, the existence of erratic data, the use of a particular editing scheme for data imputation, and the choice of normalisation, weighting and aggregation procedures (Nardo et al., 2005:23-24). The potential impact of each source of uncertainty on the values of the composite indicator depends on the structure of the latter. The more complex this structure, the more difficult to link uncertainty to potential impact on composite indicator values or regional rankings.

Sensitivity analysis can help in assessing these mechanisms, not only in the construction phase of the composite indicator, but also when communicating results ex post. Sensitivity analysis makes the potential impact of a variation in one (uncertain) component (be it substantial or procedural) on the value of the composite indicator or on the resulting regional rankings explicit. This is usually done by showing uncertainty bounds for values or rankings and can be visualised with scatter-plots. One could, for example, show the incidence of adding (or omitting) a particular sub-indicator, replacing one data source by another, changing weights, etc.

4. Conclusions

This paper has dealt with the quantitative monitoring of regional integration processes. Starting from an exploratory overview of a few examples of indicator systems and composite indices, applied to different regions in the world, we have tried to identify what could constitute 'good practise' with respect to quantitative monitoring of regional integration processes. A number of steps are suggested which the analyst could follow in order to reach this objective. They are related to:

- the selection of individual indicators,
- the systematic classification of individual indicators, and
- the construction of composite indices.

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Annex 1: Indicators in the Dennis and Yusef proposal (2003)

- Intra-regional X (% of total X)
- Intra-regional X (% of GDP)
- Intra-regional X index
- Intermediate X Index
- Intra-regional M (% of total M)
- Intra-regional M (% of GDP)
- Intra-regional M index
- Intermediate M Index
- Intra-regional trade (% of total trade)
- Intra-regional trade (% of GDP)
- Intra-regional trade by country index
- Intra-regional Trade time based Index
- Intra-industry trade index
- Ratification and Implementation Indicator
- CEPT (% of tariff lines)
- CEPT Index
- CEPT Index (in value terms)
- 0 intra regional tariffs (% of tariff lines)
- 0 intra regional tariffs (% of tariff lines) (in value terms)
- NTBs (% of tariff lines)
- FDI Index
- Share of intra-regional FDI
- Index on intra-regional FDI
- Intra –regional investment by sectors
- Intra –regional investment by source country
- Intra –regional investment by value of investment and source country
- Overall regional transnationality index
- Intra –regional transnationality index
- Financial integration indicator, Savings investment indicator
- Foreign assets and liabilities indicators
  - o stocks of aggregate foreign assets and liabilities as a ratio of GDP
  - o Indicator of the level of equity (portfolio and FDI) cross holdings
- Credit and Bond Market indicators
  - o Interest rate differentials between the regional economies (inter bank 3 months rate, 10 years government bond benchmark yield, mortgage rate and corporate loan rate)
  - o Price differentials for banking services (comparisons of charges in the region for credit cards, loan and deposit rates, coroperate loan rates and current accounts. Cross border or cross regional bank transfer chargers compared with costs of within country bank transfers.)
  - o Share of assets of intra -region banks (number of intra regional banks in each country, share of total banking assets held by the intra regional banks, share of loans extended by banks from other intra-regional countries in each regional country and share of foreign assets and liabilities held by national banks in each country)
- Stock market indicators
  - o Returns on stock market equity

- o Correlation in stock market returns in the region
- o Equity funds in the region (share of equities invested in each country in regional equities compared to total international funds)
- Cross border corporate financing indicators
- Index of competitiveness of the intra-regional construction sector within the region.
- Financial Openness
  - o Total capital flows (inflows and outflows)
- ASEAN Investment Area indicators
- Temporary Exclusion List
- Sensitive List
- Most Favoured Nation
- Intra-regional air freight value index
- Intra-regional air freight market share index
- Index of competitiveness of the non intra-regional construction sector within the region. (to be used for comparison in order to measure intra-regional competitiveness compared to foreign construction firms)
- Intra-regional cargo index
- Intra-regional cargo index (volume terms)
- Intra-regional telco index
- The growth rate of intra-regional visitor arrivals compared with that of all visitor arrivals
- The number of intra-regional visitors as a percentage of all visitor arrivals
- Intra-regional visitors index
- Number of intra-regional travellers who tick 'tourist' or 'visiting friends and relations' on their arrival cards
- Length of stay of regional tourists in the destination country
- Share of intra-regional tourists from all tourists to the countries in the region
- Proportion of total tourism receipts that come from intra-regional tourism
- Intra-regional tourism indices
- Intra-regional business arrivals index
- Intra-regional visit intensity index
- Average cost for each intra-regional country of using the various infrastructure services compared to those for the whole region in the same year.
- Intra-regional approved products index
- Number of intra-regional professionals working in regional countries that are not their own (By profession and by country)
- Value of SME intra-regional investment as a percentage of total intra-regional investment
- Value and number of joint ventures that SMEs establish with partners residing in other regional countries
- Value of SME intra-regional manufacturing exports by country and sub sector. Comparison with total intra- regional manufacturing exports from the same country and sub sector
- Proportion of SME production that is exported to other intra-regional countries
- Proportion of manufacturing imports that are sourced from SMEs in other intra-regional countries. In comparison with all manufactured imports into the regional country concerned and/or by selected sub sectors
- Number of patents (nature and sector of patent) that are registered by regional nationals in the region

- The value of R&D expenditure and as a percentage of GDP
- Estimates of the amount of intra-regional commerce transacted through ecommerce, business-to-business (B2B) and business-to-consumer (B2C)
- Estimates the number of intra-regional residents (individuals, households and corporations) that subscribe to intra-regional ISPs
- Openness
  o total % share of trade to GDP
- Mode of supply index
- Mode of supply (implementation) index
- Implementation of the existing MoU. By ASEAN country of destination, annually
- Implementation of the amended MoU regarding 5th freedom rights, BY ASEAN country of destination, annually from 2005
- Ratification, enactment of appropriate legislation and implementation of air services agreements agreed to.
- Agreement on the indicative timeframe for implementation of the three steps towards an open sky regime
- Number of signed Mutual Recognition Agreements in business services (By number of specific service, per round of service negotiation)
- Percentage of the Customs Valuation Guidelines that have been agreed at a given time
- Number of sectors identified for development of Mutual Recognition Agreements
- Number of ASEAN harmonized standards
- Number of Mutual Recognition Agreements for professional services that have been negotiated
- Implementation of the Mutual Recognition Agreements in business services. (By country, annually)
- Enactment of appropriate legislation and/or regulations to change the maximum possible limit of equity levels for regional construction firms from other regional countries
- Countries that have provided information regarding intra-regional country requirements and criteria for licensing and registration by the proposed deadline
- Regional project – Singapore-Kunming Railway
  o Progress towards the completion of the full feasibility studies.
  o Progress towards development of the implementation programs and the securing of finance.
  o Progress on the construction of the 48km Poipet-Sisophon missing section. (Overall construction cost, ASEAN contribution towards the construction cost, Money spent per year, Kilometres of track laid, Passenger kilometres travelled and revenue earned, Volume and value of freight carried)
  o Overall construction cost
  o ASEAN contribution towards the construction cost
  o Money spent per year
  o Kilometres of track laid
  o Passenger kilometres travelled and revenue earned
  o Volume and value of freight carried
- Regional project – ASEAN Highway Network
  o Progress towards the completion of the project preparation studies.
  o Overall construction cost
  o ASEAN contribution towards the construction cost

- o Money spent per year
  - o Kilometres of highway completed
  - o Kilometres of highway open and in use
  - o Estimations of passenger movements and freight carried on the highway network
- Regional project – ASEAN Power Grid
  - o Progress towards the completion of the ASEAN Interconnection Masterplan study
  - o Progress towards developing ASEAN common policy for power interconnection and electricity trade.
  - o Progress towards concluding an ASEAN cooperation agreement on interconnection policy and implementation
  - o Overall construction cost
  - o ASEAN contribution towards construction cost
  - o Money spent per year
  - o Estimate of the percentage of the power grid that is completed.
  - o Number of connections to households and industry made possible by the grid
  - o Additional power available to areas covered by the grid
- Regional project - Trans ASEAN Gas Pipeline Project
  - o Overall construction cost
  - o ASEAN contribution towards construction cost
  - o Money spent per year
  - o Estimate of the percentage of the pipeline that is completed
  - o The value of production of new/expanded industries that have been made possible by the pipeline
  - o Amount of gas available to areas covered by the pipeline and its interconnections
  - o Regional project- proposed Trans ASEAN Land and Submarine Water Pipeline
  - o Overall construction cost
  - o ASEAN contribution towards construction cost
  - o Money spent per year
  - o Estimate of the percentage of the pipeline that is completed
  - o The amount of water made available to households and industry by the pipeline
  - o Additional water that could be made available
- Number and value of new projects handled by the ASEAN infrastructure section
- Number and value of all current projects handled by the ASEAN infrastructure section
- Progress towards the goal of harmonization of Custom's automation in terms of achievements of defined goals by Member Countries.
- Number of harmonized standards that have been introduced by country
- Number of institutions and testing facilities that are authorised to test and certify products according to ASEAN Mutual Recognition Agreements
- Number of sectors/sub sectors for which technical regulations or requirements are harmonized
- Implementation of the Mutual Recognition Agreements, by country
- Number and value of projects that have been implemented under the ASEAN Industrial Cooperation scheme Openness

> - comparison of the avg intra regional tariff with the average tariff for regional imports from the rest of the world also with the avg intra-regional import tariff % for the whole region for the same year
> - Index of intra-regional passengers carried under the liberalized system by regional airlines
> - CEPT Usage Index (compared with the value of actual intraregional imports of eligible products)
> - CEPT Usage Index (compared with the value of all intra regional imports)
> - Intra-regional economic integration index
> - Intra-regional balance of payments
> - Wage rates of intra-regional labour in individual member countries
> - Number of intra-regional workers employed in individual member countries and also as a percentage of total labour employed (the data should also be disaggregated by skill level, occupation and key sectors)
> - Wage rate, for a specific category of labour that is paid to the worker in the intra-regional host country can be compared to the wage rate for the same category of worker in the other member countries
> - Intra-regional price comparisons
> - Macro economic policy harmonization
>   - Growth forecast or expectation of each member economy
>   - Contribution of each country's economic growth in GDP to the overall intra-regional GDP growth
>   - Degree of looseness of monetary policy
>   - Size and nature of the fiscal stimulus (size of the public investment for the budget or fiscal year and the size of the fiscal deficit or surplus of each member country)
>   - Current account of the balance of payments of each member country.

Note: A few other indicators were suggested by the authors but not included in the above table as these were not clearly defined in the documentation. See De Lombaerde, Pietrangeli and Weeratunge (2008) and Dennis and Yusof (2003).