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Non-technical summary and short version

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The Suitability of Structural Indicators for the Assessment of EU Countries' Economic Performance with a Particular Focus on Economic Reforms – An Evaluation of EU Structural Indicators and Options for Improvement

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Non-technical summary

Indicator based co-ordination processes are becoming increasingly popular within the EU. An indicator list constructed in a sensible way is a precondition for the success of any such approach. This holds true in particular with regard to the EU structural indicators which are to assist in evaluating member countries' progress towards reaching the Lisbon objectives. This list's variety of issues but also its mere size leaves the derivation of general conclusions a challenging undertaking. With this background this study aims at a double objective: Firstly, recommendations for the list's development are to be derived. Secondly, hints for the application of the existing list are to be given.

In the first part of the study a consistent grid of criteria is developed which lays the basis for the assessment of currently used and potential future key variables on the list of structural indicators. These criteria correspond to the indicators' function within the institutional framework of the so called open method of co-ordination.

Within the study's extensive second part the complete current long-list of EU structural indicators is analysed in detail. The analysis highlights both technical shortcomings of a number of indicators and conceptual problems which limit the informational value of indicator based country comparisons.

The study's final part is devoted to the question if and how a condensation of the existing indicator list could be achievable in the course of the imminent Lisbon mid-term review. In particular the potential role of scoreboards, rankings, multivariate statistics and efficiency considerations is discussed on the basis of exemplifying applications.

Key findings are the following:

1. *Detail critique:* In their present definitions, numerous indicators do not allow meaningful cross-country comparisons. An overall problem of many indicators is a significant distortion by the business cycle.
2. *Non-covered policy field:* The public sector is currently not covered in a systematic way. In the course of developing the indicator list, this deficit should be overcome by the inclusion of an indicator group focused at the public sector.
3. *Missing type of indicator:* Concerning relative weights of important types of indicators particular attention should be paid to the development of efficiency indicators.
4. *Impact of qualitative reforms:* Economic reforms such as the ongoing German labour market reforms have only a punctual and lagged impact on the current indicators.

5. *Indicators of regulation:* Approaches to quantify changes of a qualitative nature and to depict them through indicators should be taken into account in the further improvement of the indicator list.

6. *Forward-looking analyses:* Even with a much improved indicator list a sensible evaluation cannot do without the prospective consideration of ongoing reforms' expected effects.

7. *Rankings:* Within the imminent Lisbon mid-term review, indicators whose conceptual design or data quality do not allow cross-section analyses must not be used for country comparisons or even rankings.

8. *Methods:* The Lisbon mid-term review can fruitfully be supported by the application of efficiency considerations making use of the existing indicators. The application of standard tools of multivariate statistics has a potential for indispensable background analyses.

9. *Lisbon overall indicator:* The idea of summarizing the manifold information of the indicator list by a single aggregate indicator or even an overall Lisbon ranking has to be rejected.

10. *General conclusion:* It is an illusion to believe that a multifaceted and complex process like the Lisbon process could be depicted and managed comprehensively by a set of quantitative indicators. Hence, any mechanical and schematic evaluation of structural indicators without substantial background analyses must be avoided.

Introduction

Indicator based co-ordination processes are becoming increasingly popular within the EU. The motivation is obvious: In contrast to vague and non-binding governmental declarations the quantification of agreed objectives and their constant monitoring is to create a higher degree of commitment. An indicator list constructed in a sensible way is a precondition for a successful co-ordination process. This holds true in particular with regard to the EU structural indicators which are to assist in evaluating member countries' progress towards reaching the Lisbon objectives. Corresponding to the multi-dimensionality of the Lisbon agenda this extensive list covers a number of very different policy fields.

This variety of issues but also the mere size of the indicator list leaves the derivation of general conclusions a challenging undertaking. Further problems result from the fact that many ongoing reform projects will not necessarily have a prompt impact on quantitative indicators. With this background this study is to scrutinize the EU list of structural indicators in a comprehensive way. There is a double objective: Firstly, recommendations for the list's development are to be derived. Secondly, hints for the application of the existing list are to be given. The latter objective is more urgent in the short run due to the imminent Lisbon mid-term review.

Part A: Requirements for EU structural indicators

In the first part of the study a consistent grid of criteria is developed which lays the basis for the assessment of currently used and potential future key variables on the list of structural indicators. These criteria have to reflect the indicators' function within the institutional framework of the so called open method of co-ordination (OMC). OMC is increasingly being applied as an alternative to the classical community method with its definition of legally binding minimum standards. With OMC, quantitative indicators serve to make political objectives precise and are being used for these objectives' constant monitoring. OMC's "soft" way of sanctioning is based on the public attention for the indicators' signals and mechanisms of "peer pressure". There are both chances and risks attached to the application of OMC. Chances relate to the improvement of learning processes, the safeguarding of national leeway in line with the principle of subsidiarity and the overcoming of internal reform resistance. Risks exist with regard to possible innovation adverseness or the lacking sensitivity to national particularities. The quality of the employed indicators largely decides whether chances or risks prevail.

The following requirements are to be fulfilled by the list of indicators:

- *Limited size*: The larger the dimensionality and the extent of an indicator list the more difficult is the derivation of a general message.
- *Full coverage of objectives*: All dimensions of objectives as defined in the political process have to be covered.
- *Clear link with objectives*: Only variables with a clear link to the given objectives should be part of a benchmarking exercise.
- *Causal impact of political instruments*: Economic variables completely out of reach for available policy instruments are not suitable for the monitoring of economic policy.
- *Proneness for manipulation:* Indicator variables should not offer scope for manipulation.
- *Comparability:* Countries can be compared in a meaningful way only on the basis of indicators which are not largely influenced by given national peculiarities for the foreseeable future.
- *Unbiasedness:* An indicator usable for structural cross section comparisons should not be significantly influenced by the business cycle or the size of a country.
- *Gender differentiation:* Within some of the covered policy fields, due to gender policies, it can be desirable to indicate numbers separately by genders.

Part B: Detail analysis of structural indicators

Within the study's extensive second part the complete current long-list of EU structural indicators is analysed in detail. The analysis highlights both technical shortcomings of a number of indicators and conceptual problems which limit the informational value of indicator based country comparisons. The most important results and conclusions are summarised within tables 1-6. Partly, there are also deficits with regard to the full coverage of objectives as defined by the Lisbon strategy.

General economic background (table 1)

This group of indicators takes an exceptional position in the list of structural indicators, since it does not cover a policy field which can be influenced by policy indicators directly. Rather these indicators report about the general economic conditions under which structural reforms take place.

Most of the indicators in this group are key indicators that are, in principle, suitable to report about reaching the Lisbon goal on a macroeconomic level. So far, however, the illustration of highly cyclical biased snapshots of the respective overall economic situation of a country is predominating. The presentation of the situation of public finances on the list of structural indicators is too simplistic. Indicators for the sustainability and quality of public finances would allow a more profound analysis of financial policy. Further shortcomings of the group of indicators could be overcome by the inclusion of an indicator of industrial competitiveness.

Employment (table 2)

The main objective of the Lisbon agenda in the area of employment, namely a high employment rate, is represented by several indicators. However, the relevant indicators only refer to the number of employees but not their volume of work.

Furthermore, the listed indicators primarily point to the quantity of employment but hardly reflect the quality of work. Merely the indicator on accidents at work depicts a certain aspect of the quality of work, however, in an insufficient way.

A further shortcoming is that the indicators do not describe structural reforms like a deregulation or a change in the flexibility of the labour market. Therefore, economic policy reforms are hardly be reflected real-time by the current list of indicators.

The objective of giving a higher priority to lifelong learning is reflected by one indicator. The indicator is very unspecific and does not depict the intensity of learning, though. The progress in gender non-discrimination is only taken up by the indicator on the gender pay gap. Reconciling family and work is an important determinant of the employment decision for the large group of families and should be reflected by the indicators, as well.

Innovation and research (table 3)

The field innovation and research strongly correlates with the objective of the Lisbon Strategy, making Europe the world's most competitive and dynamic knowledge-based society and economy by 2010. Covering expenditures for R&D and human resources, this field comprises the investments essential to the generation of knowledge and new technologies.

One deficiency of the list of indicators – aside from an array of smaller problems specific to individual indicators – is its emphasis on the input side and its subsequent neglect of results and the institutional framework. A balanced consideration of input and output values is, however, indispensable to take into account efficiency issues.

Efficiency considerations are desirable in regard to human capital as well. The current indicator only allows a limited assessment of the education system's effectiveness and of its realization of educational potential. A more comprehensive examination of education policy would require a more detailed consideration of the education system, e.g., through differentiations by various levels (pre-, elementary and secondary education).

Economic reform (table 4)

Important fields of economic reforms are not covered by this indicator group since they are dealt with in a more logical way in other policy fields. Examples relate to labour market reforms which should be attributed to the employment indicators. Indicators referring to the objectives of integration and liberalisation are sufficiently present. Deficits exist with regard to the public sector. Public sector indicators included like state aid and public procurement offer insights into the extent of market distortion through government activities. In contrast to that, efficiency of the public sector is not quantified at all. Shortcomings also remain with regard to direct measures of regulation which could mirror progress in national reform policy in a more direct way. However, it can be argued that business investment is a suitable forward looking indicator reflecting the success of national reform policies in a timely way: If national reform policies really implement measures able to increase the economy's growth potential rational and well-informed investors should take account of this in their investment decision. In this case business investment should be instantaneously affected positively. The investment indicator's function as an early bird for the success of reforms is, however, impaired by its strong reaction to the business cycle.

Social cohesion (table 5)

The objectives behind this indicator group are not completely free of contradictions. A possible conflict within the group "social cohesion" relates to the incentive effects especially of means tested social transfers. Increasing such transfers results in an improvement of the indicators related to poverty and inequality, but at the same time this could lead to a rise of unemployment due to the disincentives on labour supply caused by the presence of means tests ("poverty trap"). Adverse effects on employment and growth can also result from the need to fund these transfers, since taxes, social security contributions or public deficits are likely to reduce the growth dynamics of the economy. With regard to income distribution the question arises if it is sensible to assume equal preferences for all EU member states, or if income inequalities are evaluated differently among countries.

The indicators currently included in the indicator list are very much focused on the issues of monetary income and employment situation, except for the indicator “early school leavers“. They are thus based on a resource approach rather than the “living situations approach” envisioned by the German federal government as a model in its “poverty and wealth report“. Additional weaknesses of the present indicator list concern the lack of a measure of poverty intensity and the limited relevance of the inequality measure chosen.

Environment (table 6)

The environmental indicators correspond closely to the guidelines of the Gothenburg process. The priorities of European environmental policy are quite comprehensively represented, though non-uniformly weighted. Climate change and its social driving forces energy use and transport are particularly emphasized. Compared to other sets of environmental or sustainability indicators this accentuation of resource efficiency creates the explicit link to the mainly economically motivated objectives of the Lisbon strategy. On the other hand, the use of natural resources and environmental impacts on public health are presently represented only by a few indicators, which, in addition, are methodologically less developed and for the most part suffer from a poor database.

We support the focusing of the short list indicators on climate change, energy and transport. The appropriate representation of the decoupling objective, the possible synergies with the competitiveness goal of the Lisbon strategy and the consistency with international commitments in the context of the Kyoto protocol are all in favour of this approach. Concerning the further development of the long list, however, one should avoid selecting particularly those environmental impacts that are easier to measure and to quantify than others. Environmental problems due to the loss of biodiversity or the release of harmful substances from industry and agriculture to soils and water bodies are of increasing importance though often disregarded for methodological difficulties.

Table 1: Overview indicators "general economic background"

	Objective	Classification[1]	Overall assessment and recommendations	Should remain on long-list	Should remain/appear on short-list
Indicator 0.1:					
– GDP per capita in Purchasing Power Standards (PPS)*	Standard of living	Performance	Provides only a snap-shot of standard of living, limited comparison over time, calculation of growth rates is not feasible.	Yes	No
– Real GDP growth rate	Dynamic macroeconomic performance	Performance	Practical indicator for the assessment of overall economic performance, population growth should be accounted for → growth rate of GDP per capita.	Yes	Yes
Indicator 0.2:					
– Labour productivity per person employed*	Overall economic efficiency, competitiveness	Performance	Measurement bias through labour displacement effect, limited application of this indicator due to the use of GDP in PPS in the nominator.	Yes, after elimination of measurement bias trough labour displacement	Yes, but calculation should be based on national currencies rather than PPS
– Labour productivity per hour worked	Overall economic efficiency, competitiveness	Performance	More precisely measure of labour productivity since the indicator refers to the actual labour volume, but limited quality of data.	Yes	No

[1] policy indicator: under direct policy control; performance indicator: policy has an impact, but other determinants are important as well

	Objective	Classification[1]	Overall assessment and recommendations	Should remain on long-list	Should remain/appear on short-list
Indicator 0.3: Total employment growth, also female and male employment growth	Employment growth	Performance	Indicator should be listed in the subject area "employment", there the set of structural indicators should be augmented with a measure of structural unemployment.	Yes, but in the subject area "employment""	No
Indicator 0.4: Inflation rate	Sound macroeconomic environment	Performance	Reasonable indicator, focus should be on middle to long-term performance of this indicator.	Yes	No
Indicator 0.5: Unit labour cost growth	Competitiveness, employment growth	Performance	Measurement bias through labour displacement effect, important indicator of labour demand.	Yes, after elimination of measurement bias trough labour displacement	No
Indicator 0.6: Public balance	Sound macroeconomic environment, sustainability of public finances	Policy	Should be adjusted for business cycle movements → structural deficit, vulnerable to technical manipulations.	No, should be replaced by a more meaningful indicator like sustainability gap	No
Indicator 0.7: General government debt	Sound macroeconomic environment, sustainability of public finances	Performance	Level of government debt is not adequate for the judgement of consolidation efforts, vulnerable to technical manipulations.	No, should be replaced by a more meaningful indicator like sustainability gap	No

* currently indicator on short-list

Table 2: Overview indicators "employment"

	Objective	Classification	Overall assessment and recommendations	Should remain on long-list	Should remain/ appear on short-list
Indicator I.1: Employment rate: - 15 to 64 years of age */** - 55 to 64 years of age */**	High employment rate	Performance	Reasonable indicator; relates directly to main objective, should be complemented by indicator on average working hours in order to depict the volume of work and to prevent a bias.	 Yes Yes	 Yes No
Indicator I.2: Average exit age from the labour force **	Higher exit age and employment rate	Performance	Indicator provides little additional information compared to the employment rate of the elderly and should hence be removed from the long-list.	No	No
Indicator I.3: Gender pay gap	Reduction of gender pay differences on the labour market	Performance	Reasonable indicator; minimal working time from which on persons are considered should be reduced from 15 to about 10 hours a week in order to prevent a bias.	Yes	No
Indicator I.4: Tax rate on low wage earners:		Policy	Indicators depict incentives only for the group of low wage earners. Income of the low wage earners should be defined differently.		
- Tax wedge on labour cost	Higher incentive to employ low wage earners		Reasonable indicator.	Yes	No
- Unemployment trap	Higher incentive for low wage earners to take up employment		Reasonable indicator. Consumption taxes have to be considered in order to ensure comparability across countries.	Yes	No
Indicator I.5: Life-long learning **	Increase human capital.	Performance	Indicator is unspecific, should be complemented by sub-indicators on professional and other training. The age limit should be increased to 30 years.	Yes	No

	Objective	Classification	Overall assessment and recommendations	Should remain on long-list	Should remain/ appear on short-list
Indicator I.6: Accidents at work **	Increase the quality of work	Performance	Indicator concerns only a small part of all employees. Comparability across countries is not ensured. Should be removed from long-list and substituted by another indicator on the quality of work.	No	No
Indicator I.7: Unemployment rate **	Full employment, avoidance of social exclusions	Performance	Reasonable indicator, should be complemented by sub-indicator youth unemployment rate.	Yes	No

* currently indicator on short-list, ** by gender

Table 3: Overview indicators "innovation and research"

	Objective	Classification	Overall assessment and recommendations	Should remain on long-list	Should re-main/ap-pear on short-list
Indicator II.1: Spending on Human Resources	Human capital	Policy	Dependent on the educational system and hence only limited international comparison possible, split up by educational levels would make sense; private spending on human re-sources should be included.	Yes	Yes
Indicator II.2: Total R&D expenditure *	R&D	Performance	To a large extent determined by the level of development, partly cyclical, however good international comparability, core indicator for the assessment of the Lisbon-objective.	Yes	Yes
R&D expenditure by source of funds - industry	R&D	Performance	In its current form difficult to interpret, because this indicator depends on the development of the two other indicators (R&D expenditure by source of funds: state and aboard); if measured in % of GDP high correlation with GERD in % of GDP.	No	No
R&D expenditure by source of funds - government	R&D	Policy	In its current form difficult to interpret (see above); should be measured in % of GDP and not in % R&D expenditure.	Yes	Yes
R&D expenditure by source of funds - abroad	R&D	Performance	In its current form difficult to interpret (see above); highly dependent on the level of Foreign Direct Investment.	No	No
Indicator II.3 Level of Internet access					
- households	ICT	Performance	Relatively low data quality, thereby limited comparability; rate of change depends on the position on the curve of diffu-sion.	Yes	No
- enterprises	ICT	Performance	Relatively low data quality, thereby limited comparability; due to convergence to the maximum value (100%) in many countries, not very helpful in the future.	No	No

	Objective	Classification	Overall assessment and recommendations	Should remain on long-list	Should remain/appear on short-list
Indicator II.4: Science and technology graduates	Human capital	Performance	Dependent on the educational system, duration of study, and beginning of study; hence only limited international comparison possible; should not be limited to science and technology fields, but include all tertiary education graduates in % of the 25 to 35 year old population.	Yes (in the proposed modified version)	No
Indicator II.5 Patents			The most important disadvantage ("home bias") of the so far used patent indicators can be overcome by looking at triade patents (Inventions, which are granted in USA, Europe and Japan). This also leads to a higher homogeneity of the patents with respect to their economic value. A disadvantage is the high computational requirements.	Yes (should replace the current patent indicator)	Yes
- EPO	R&D	Performance	Not a very helpful indicator; the indicator allows only comparisons within the EU ("home bias"); in the future the year a patent is assigned to should be the priority year and not the year of application, because the current practise increases the "home bias".	Yes (only in the proposed modified version)	No
- USPTO	R&D	Performance	Not a very helpful indicator, since the year a patent is assigned to is based on the year of the publication of the patent, the patented invention dates back several years. Should be changed from the year of publication to the priority year, if the indicator is supposed to be used in the future.	Yes (only the proposed modified version)	No
Indicator II.6 Venture capital investments			Both sub-indicators represent a very specific area of start-up financing and are dispensable. Collected are the investments of VC-Founds without accounting for the country in which the investment is made. The indicator loses its explanatory power because of the growing internationalisation. Different shares of trans-national VC-Investments can be observed comparing countries.		
- early stage	R&D	Performance		No	No

	Objective	Classification	Overall assessment and recommendations	Should remain on long-list	Should re-main/ap-pear on short-list
- expansion and replacement	R&D	Performance		No	No
Indicator II.7 ICT expenditure - IT expenditure	ICT	Performance	Level depends on the level economic development; only the input but not the efficiency and productivity are measured.	Yes	No
- Telecommunications expen-diture	ICT	Performance	Level depends on the competition (price of the telecommuni-cation goods); Thus fluctuations can barely be interpreted (Increase means either lower competition and therefore an increase in prices or increasing investments in telecommuni-cation goods.)	No	No
Indicator II.8 E-commerce	ICT	Performance	E-commerce is a very specific form of selling; maximizing the turnover from E-commerce can not be justified form an economic point of view; data quality and international com-parability are questionable.	No	No
Indicator II.9 Youth education attainment level *	Human capital	Performance	It is a useful indicator, dependent on the educational system, however; it would be better, if different levels of education could be distinguished.	Yes	Yes

* currently indicator on short-list

Table 4: Overview indicators "economic reform"

	Objective	Classification	Overall assessment and recommendations	Should remain on long-list	Should remain/ appear on short-list
Indicator III.1: Price level: – Comparative price levels*, – Price convergence.	Integration of product markets, market efficiency	Performance	Unsuitable measure of integration due to dominant impact of the level of economic development.	No	No
Indicator III.2: Prices in network industries: – in telecommunications, – in electricity, – in gas industry.	Market efficiency, liberalization	Performance	Technical shortcomings of telecommunication indicator in particular: inclusion of VAT and limitation to variable costs reduce usefulness. Indicator is rather a measure of integration than efficiency.	Improved yes	No
Indicator III.3: Market structure in network industries: – in electricity, – in telecommunications.	Market efficiency, liberalization	Performance	Indicator's focus limited to possible monopolies. Development should target at taking account of oligopolistic structures by calculation of Herfindahl index.	Improved yes	No
Indicator III.4: Public procurement	Product market integration, transparency of public procurement	Policy	Meaningful indicator. GDP as denominator should again be replaced by a measure for the size of the public sector.	Rather yes, after modification	No
Indicator III.5: Sectoral and ad hoc	Reducing distor-	Policy	Meaningful indicator, but substantial distortion	Yes, but use of a	No

	Objective	Classification	Overall assessment and recommendations	Should remain on long-list	Should remain/ appear on short-list
state aid	tions of Internal Market, market efficiency		due to exclusion of EU subsidies in the context of the Common Agricultural Policy. The latter should be included.	wider definition	
Indicator III.6: Market integration: – interest rate convergence, – trade integration, – FDI integration.	Market integration	Performance	Interest rate indicator interpretable as measure of integration only within the Euro area. Trade indicator: comparison of levels meaningless. FDI indicator: without any usable message.	Yes (only trade indicator)	Nein
Indicator III.7: Business investment*	Growth	Performance	Suitable as early indicator for success of reform policies. Ranking on the basis of levels not sensible. Changes fully interpretable only after cyclical adjustment.	Yes	Yes
Indicator III.8: Business demography: – birth rate of enterprises, – survival rate of enterprises, – death rate of enterprises.	Economic dynamics, fostering entrepreneurship	Performance	Cross section comparisons only possible to a limited extent. Condensation of sub-indicators in aggregation like “turbulence” advisable.	Yes	No

* currently indicator on short-list

Tabelle 5: Overview indicators "social cohesion"

	Objective	Classification	Overall assessment and recommendations	Should remain on long-list	Should remain/ appear on short-list
Indicator IV.1: Inequality of income distribution (income quintile share ratio S80/S20)	Poverty reduction	Performance	S80/S20 only registers changes in the income distribution that affect the total share of the first and fifth income quintile. All other changes in the income distribution are not recorded. S80/S20 should be replaced by a summary measure of income inequality (Atkinson(1)).	Replace by summary inequality measure:	No
Indicator II.2: At risk of poverty rate - At risk of poverty rate before social transfers (total/males/females)	Poverty reduction	Performance	At risk of poverty rate takes only account of the number of the poor but not of the extent to which their income falls below the poverty line. It should be replaced by a measure of poverty intensity (recommendation: Foster-Greer-Thorbecke (1)).	Replace by poverty intensity measure	No
- At risk of poverty rate after social transfers (total/males/females)*	Poverty reduction	Closer to performance	Further possibility of adaptation: percentage reduction of the poverty measure through social transfers instead of using the absolute poverty measure in order to.	Replace by poverty intensity measure	Replace by poverty intensity measure
Indicator IV.3: At persistent risk of poverty rate (total/male/female)	Poverty reduction	Performance	Again: replacement by poverty intensity measure is recommended.	Yes	No
Indicator IV.4 Dispersion of regional employment rates (total/male/female) *	Regional cohesion	Performance	Sensible indicator of regional cohesion	Yes	Yes

	Objective	**Classification**	**Overall assessment and recommendations**	**Should remain on long-list**	**Should remain/ appear on short-list**
Indicator IV.5: Early school leavers (total/male/female)	Good level of basic education	Performance	Sensible indicator with respect to the goal of a good level of basic education.	Yes	No
Indicator IV.6 Long term unemployment rate (total/male/female)*	Reduction of long term unemployment	Performance	In measuring long term unemployment on the basis of the duration of unemployment *to date*, as it is presently done, the extent of long term unemployment is systematically underestimated. One should go over to the measurement on the basis of the *completed* duration of unemployment. The indicator is comparatively sensible for measures of indicator cosmetics through measures of active labour market politics.	Yes, adapted	Yes, adapted
Indicator IV.7 - Population in jobless households – Children aged up to 17 years - Population in jobless households – Persons aged 18 to 59 years (total/male/female)	Not clear	Performance	The goal this indicator is meant to reflect is not clear. The fact of unemployment is recorded repeatedly, since it is already taken account of in the indicator group “employment“.	No	No

* currently indicator on short-list

Table 6: Overview indicators "environment"

Indicator	Objective	Classification	Overall assessment and recommendations	Should remain on long-list	Should remain/appear on short-list
V.1: Greenhouse gases emissions *	Limit the climate change, implement the Kyoto Protocol	Performance	Meaningful. Scientifically sound, direct representation of the objectives of European climate policy in the context of the Kyoto Protocol. Methodologically sound.	Yes	Yes
V.2: Energy intensity of the economy *	Decouple energy consumption from economic growth, more efficient energy use	Performance	Meaningful. Linked to several priorities of European policy: Climate policy, the competitiveness goal of the Lisbon Strategy, due to the potential for technological innovation, and the aim of ensuring security of supply in the energy sector. Methodologically sound.	Yes	Yes
V.3 Transport	Decouple transport growth from economic growth		Meaningful. Linked to climate policy and the competitiveness goal of the Lisbon Strategy, due to the potential for technological innovation. In the future air traffic should also be taken into account. Collected data for all modes should consistently refer to inland transports.		
- Transport intensity – freight *		Performance		Yes	Yes
- Transport intensity – passenger		Performance		Yes	No
- Percentage share of road in total freight transport		Performance		Yes	No
- Percentage share of car in total passenger transport		Performance		Yes	No
V.4: Urban air quality	Improve urban air quality, reduce environmentally caused problems with public health		In principle meaningful. Data availability is presently too fragmentary. Alternatively, indicators with respect to environmental pressures in this domain, as the ozone-generating precursors SO_x or NO_x, could be used.		

Indicator	Objective	Classification	Overall assessment and recommendations	Should remain on long-list	Should remain/appear on short-list
- Air pollution by ozone		Performance		Presently No	No
- Air pollution by particulate matter		Performance		Presently No	No
V.5 Municipal waste	Decrease waste generation and decouple it from economic growth		In principle meaningful. In the future the recycling of waste should also be considered, since it is the favored waste policy option of the EU. In order to take the decoupling aspect into account it would be more appropriate to refer the indicator to private final consumption instead of having a per-capita representation.		
- collected		Performance		Adapted, Yes	No
- landfilled		Policy		Adapted, Yes	No
- incinerated		Policy		Adapted, Yes	No
V.6 Share of renewable energy	Sustainable energy production, increase share of renewable electricity	Performance	Meaningful. Strong link to the EU Directive on the promotion of electricity from renewable energy sources. In the future an incorporation of renewable energy sources in other sectors (e.g. biodiesel) could be considered. Present indicator is methodologically sound.	Yes	No
V.7 Protection of natural resources	Conservation of biodiversity		Dispensable. Link to Lisbon Strategy not clear. Biodiversity state indicators (e.g. the share of threatened species) are more meaningful than the present response indicators for this domain.		
- Fish stock in European marine waters		Policy		Rather No	No
- Areas protected under the Habitats Directive		Policy		No	No

Indicator	Objective	Classification	Overall assessment and recommendations	Should re-main on long-list	Should re-main/appear on short-list
- Areas protected under the Birds Directive		Policy		No	No

* currently indicator on short-list

Part C: Suggestions for a future list of indicators

A new indicator field covering the public sector

A striking feature of the current list of EU structural indicators is the low attention to public sector developments and their highly incomplete coverage. This situation is dissatisfying since quantitative and qualitative characteristics of the government sector are important growth determinants. Because of this the inclusion of the new indicator group "public sector" is strongly recommended. Table 7 describes the new indicator group's possible structure.

Table 7: Structure of a new indicator group "public sector"

Issue	Possible indicator	General comment
Extent of government activity	Government expenditure/GDP	Only changes will be meaningful since no homogeneous EU preferences concerning size of government.
Growth impact of tax system	Marginal tax rates for companies, employees and capital income	Methods for meaningful comparisons do exist.
Expenditure structure	Share of investment in total public expenditure	Extension of national accounting investment definition necessary to include expenditure on R&D and human capital.
Efficiency of public sector	Free-disposable-hull-indicator	Can be based on existing literature on comprehensive efficiency measures for the public sector.
Sustainability of budgetary policy	Sustainability gap	Indicator's openness for different ways of closing gap is advantageous.

Suggestion for a new long- and short-list

In addition to the discussed lack of public sector indicators the detail analysis of part B has clarified a number of shortcomings which can be addressed either by modifications of existing indicators or by the definition of new ones. These insights result in a revised long-list of indicators summarized in table 8. The revised long-list should not be seen as an incontestable optimum but rather as a rough guide for the desirable direction of change.

Table 8: Synopsis long-list under status quo and revised

Long-list status quo	Long-list revised	Modification, comment
	General economic background	
GDP per capita in Purchasing Power Standards (PPS)	GDP per capita in PPS	
Real GDP growth rate	Real GDP per capita growth rate	The consideration of per capita variables becomes more important especially in the light of demographic developments
Labour productivity	Measure of labour productivity that takes into account a bias trough labour displacement	Currently, the measurement of labour productivity is biased through labour displacement effects
	Total factor productivity	Comprehensive consideration of technological competitiveness
Total employment growth, also female and male employment growth		Should be listed in the subject area "employment"
Inflation rate	Inflation rate	
Unit labour cost growth	In addition sub-indicator unit labour cost growth of manufacturing	Sub-indicator is a more adequate indicator of industrial competitiveness
Public balance		Sustainability of public finances is comprehensively covered in "public sector"
General government debt		See above
	New indicator group: Public sector	
	Government expenditure/GDP	Extent of government activity
	Marginal tax rates for companies, employees and capital income	Proxy for distortions from tax systems
	Share of investment in total public expenditure.	Qualitative analysis of government expenditure
	Free-disposable-hull-indicator	Efficiency of publicly used resources
	Sustainability gap	Comprehensive indicator for sustainability of current budgetary path
	Employment	
	Changes in the labour force	Shifted from "general economic

		background“
Employment rate	Employment rate	
	Working hours per employee	Important information on the volume of work
Average exit age from the labour force		Little additional information, indicator is dispensable
Gender pay gap	Gender pay gap	Reduce minimal working time
Tax rate on low wage earners	Tax rate on low wage earners	Consumption taxes have to be taken into account
Lifelong learning	Lifelong learning	More sub-indicators would be helpful
Accidents at work		Accidents at work can hardly be compared across countries and concern only a specific group of employees
	Indicator on quality of work	Hardly any information on quality aspects in current indicators
	Indicator on labour market flexibility: OECD-regulation indicators, NAIRU	Important policy indicator
Unemployment rate	Unemployment rate	Add sub-indicator on youth unemployment and information on transition rates
Innovation and Research		
Spending on human resources	Spending on human resources	Inclusion of private educational expenses
Total R&D expenditures in per cent of GDP; also by source of funds (firm/government/ international)	Total R&D expenditures in per cent of GDP; public R&D expenditures in % of GDP	Public R&D expenditures in per cent of GDP more clearly interpretable as policy indicators
	Share of firms with innovations or indicator of innovation success	Measure of output corresponding to the existing measure of input (R&D)
Level of internet access (households/firms)	Comprehensive combined indicator of ICT diffusion	Restriction of diffusion consideration to internet unsatisfactory
Science and technology graduates	All higher education graduates	Restriction to science and technology fields not justified
	Educational benchmarks (“PISA“)	General education, increasing availability of data
Patents (EPA/USPTO)	Triad patents, acquired according to priority year	Modification eliminates home bias

Venture capital		Non-essential; excessively specific aspect of foundation financing
ICT expenditures	Information technology expenditures	Communication technology expenditures excessively influenced by competitive circumstances in communication market
E-commerce		Non-essential, poorly founded conceptually, low data quality
Youth education attainment level	Youth education attainment level	Further differentiation by level of education
Economic reform		
Comparative price level/ price convergence		No suitable measure of integration
Prices in network industries	Prices in network industries	VAT-correction and inclusion of fixed costs in telecommunications
Market share of leading player in network industries	Herfindahl-Index: sum of squared market shares of all suppliers	Comprehensive measure of concentration, sole focus on monopolies increasingly less justified
Public procurement: openly advertised public procurement in per cent of GDP	Public procurement: openly advertised public procurement in per cent of public expenditure	Measure of extent of public activity in denominator improves interpretability
Sectoral and ad hoc state aid without EU subsidies	Sectoral and ad hoc state aid including EU subsidies	No economic justification not to include EU subsidies of Common Agricultural Policy
Market integration (interest rate convergence, trade integration, FDI)	Market integration (only trade integration)	Interest rate and FDI based concepts hardly interpretable as measure of integration
Business investment	Business investment	
	Regulation indicator: either based on administrative procedures required for setting up an enterprise or summarising measure on the basis of earlier OECD work	Sheds a light on hampering role of bureaucracy and regulation for investment and establishment of enterprises
Business demography (birth rate, survival rate, death rate)	Business demography (condensation, e.g., in “turbulence“)	More meaningful to measure extent of re-allocation
Social inclusion		
Inequality of income distribution (income quintile share S80/S20)	Inequality of income distribution (Atkinson(1) Measure)	Current measure is focused on top and bottom quintile

At risk of poverty rate (before and after social transfers)	Poverty intensity measure (Foster-Greer-Thorbecke-measure)	Current measure does not record the extent to which income falls below the poverty line
At persistent risk of poverty rate	At persistent risk of poverty rate	
	Indicator for housing situation and household equipment	Important additional information on availability of resources
	Indicator for subjective satisfaction and/or social relationships	Covers extended view of poverty according to living situations approach
Dispersion of regional employment rates	Dispersion of regional employment rates	
Early school leavers	Early school leavers	
Long term unemployment rate (based on duration of unemployment to date)	Long term unemployment rate (based on completed duration of unemployment), disaggregatioin according to qualification and age	Current concept leads to systematically underestimating long term unemployment.
Population in jobless households		May be dropped, since little additional information compared to the other employment related indicators
Environment		
Greenhouse gases emissions	Greenhouse gases emissions	
Energy intensity of the economy	Energy intensity of the economy	
Transport: Transport intensity and share of road transport for freight and passenger transport	Transport: Transport intensity and share of road transport for freight and passenger transport. Add air traffic and refer consistently to inland transport for all modes	
Urban air quality		Data availability presently too fragmentary
	Water resources: indictor on quality and availability of freshwater	High priority regarding public health
Municipal waste (collected, landfilled, incinerated)	Municipal waste (collected, landfilled, incinerated and recycled)	Recycling is favored option of EU waste policy
Share of renewable energies	Share of renewable energies, possibly taking other sectors than the electricity sector into account.	
Protection of natural resources		Dispensable, no evident link to

(fish stock, habitats and birds)		Lisbon strategy
	Biodiversity	State indicator referring to a measure of the actual existing diversity of species is more appropriate than presently used response indicators concerning the amount of protected areas.
	Consumption of toxic chemicals	Relevant for ecosystems and public health
	Healthy life years	Meaningful supplement to economic welfare measures

indicator to be eliminated new indicator

Due to the short-list's prominent role for monitoring the Lisbon process the choice of indicators for this list is of particular importance. Indicators included on the short-list receive a lot more attention compared to "simple" long-list variables – e.g. in the context of the annual assessment on the occasion of the spring European Council meeting. Table 9 summarises the suggestions for an improved short-list originating from this study's analysis.

Table 9: Suggestions for a revised short-list

Short-list status quo	**Short-list revised**
GDP per capita in PPS	
	Change in GDP per capita
Labour productivity	Change in labour productivity taking into account effects from labour displacement
	Sustainability gap budgetary policy
	Efficiency indicator public sector
Employment rate (total)*	Keep unchanged
Employment rate (55 to 64 years of age)*	
	Indicator on quality of work or average working hours
Youth educational attainment level*	Modified by inclusion of different levels of education
	Spending on human resources (public and private)
R&D expenditures	Keep unchanged
	Triad patents
Comparative price level	
Business investment	Keep unchanged
	Regulation indicator
At risk of poverty rate after social transfers*	Modified using poverty intensity measure
Rate of long term unemployment*	Measurement on basis of completed duration of unemployment instead of unemployment duration to date
Dispersion of regional employment rates*	Keep unchanged
Greenhouse gases emissions	Keep unchanged
Energy intensity of the economy	Keep unchanged
Transport intensity of freight transport	Improved by taking air traffic into account and by referring consistently to inland transport for all modes

*differentiated by gender

indicator to be eliminated new indicator

Part D: Approaches for the Lisbon mid-term review

The study's final part is devoted to the question if and how a condensation of the existing indicator list could be achievable in the course of the imminent Lisbon mid-term review.

Scoreboard-based rankings

Due to its substantial public attention the publication of indicator scoreboards is a popular means of information condensation. The same holds for rankings which in practice are often calculated on the basis of rather arbitrary indicator weights.

Given the EU experience with different scoreboards the following conclusions can be drawn with regard to the structural indicators: The EU structural indicators are of the "multi-policy/multi-issue-type" and as such belong to the most complex class of potential scoreboards. Indicators referring to very different policy fields are united in one single framework. This finding leads to the question whether it is conceivable to distil a general quantified message and a comprehensive country ranking. Unambiguously, this question has to be answered in the negative. The main argument is that the economic reality depicted by the structural indicators is much too complex to be transformable into one single indicator. The rejection of a summarising aggregate indicator accompanied by an overall Lisbon-ranking does not mean that the Lisbon monitoring should completely refrain from rankings. This way of data exposition might be applicable on the lower level of single indicators if the particular indicator allows meaningful cross-section comparisons. A further advantage of limiting rankings to focused analyses of single indicators or policy fields is that derivation of practical policy conclusions is much easier in a specific context.

Multivariate statistics

The use of methods of statistical analysis cannot solve problems that result from the conceptual design of the indicator list, inadequate construction of indicators or conflicts of objectives that can only be judged within the realm of politics. Nevertheless, methods of multivariate descriptive statistics may be useful in the process of reducing the multidimensionality of the indicator information by means of objective methods. By presenting some examples of application we illustrate the potentials of cluster analysis and multidimensional scaling (MDS) in this respect.

The usefulness of cluster analysis results from the fact that it can be employed to identify groups of countries with structurally similar strengths and weaknesses. Identifying such structural similarities can help pointing out common characteristics of set-ups and political instru-

ments in a field of policy that lead to the grouping into the same cluster. In this way, indications to the possible causes of striking indicator values can be identified in an indirect way.

The instrument of MDS may be particularly useful in the process of condensing information within a policy field. In interpreting the summary indicator constructed by means of this instrument one has to bear in mind that this indicator cannot be interpreted in the sense of a socio-economic trait. The meaning of a summary indicator calculated by MDS can rather be seen as a signal that points to the necessity of examining a country more closely in cases where exceptionally high or low indicator values appear.

Efficiency analysis

A further possibility of relating different indicators in a meaningful way is based of efficiency considerations. If it is possible to identify pairs of indicators having the characteristic of corresponding input and output indicators this analytical approach is feasible. A particular method for the case of only a limited number of observations (as it is true for EU structural indicators) is the so called “free disposable hull” (FDH) analysis. This method aims at the identification of a production possibility frontier exploiting the information of observed input-output-combinations.

This method’s exemplifying application for the indicator couple R&D expenditure/patents demonstrates the potential of this kind of efficiency analyses for a comparative evaluation of certain structural indicators. The lack of efficiency indicators on the current list can thus partly be compensated for. Furthermore, the analysis allows differentiated statements for countries which do not show a difference judging solely on a given minimum input objective (e.g. the 3-per-cent of GDP objective for R&D expenditure).

Overall, efficiency analyses have the merit to redirect the focus towards a much neglected aspect: Political measures should not solely target at the mobilisation of additional resources for policy priorities. Instead, a priority should be to increase efficiency in resource allocation. Simple comparisons of input levels represent the questionable concept of resource maximisation. In contrast to that, approaches like the FDH analysis stand for the concept of improving the efficient use of given resources.

For these reasons, the use of efficiency analyses at the occasion of the Lisbon mid-term review is strongly recommended.

Ten conclusions

The study's insights can be summarised by the following ten conclusions:

1. *Detail critique:* Both the long- and the short-list of EU structural indicators can and should be improved. In their present definitions, numerous indicators do not allow meaningful cross-country comparisons. An overall problem of many indicators is a significant distortion by the business cycle.

2. *Non-covered policy field:* The public sector is currently not covered in a systematic way. In the course of developing the indicator list, this deficit should be overcome by the inclusion of an indicator group focused at the public sector.

3. *Missing type of indicator:* Concerning relative weights of important types of indicators particular attention should be paid to the development of efficiency indicators. The current list is characterised by a preference for input-, fewer output- and the almost complete absence of efficiency indicators. The implied concept behind this is that of input maximisation which is mistaken.

4. *Impact of qualitative reforms:* Economic reforms such as the ongoing German labour market reforms have only a punctual and lagged impact on the current indicators.

5. *Indicators of regulation:* Approaches exist in order to quantify changes of a qualitative nature and to depict them through indicators. These approaches should be taken account of in the further improvement of the indicator list.

6. *Forward-looking analyses:* In spite of all chances for the improved quantification of structural changes there are natural limits to any such undertaking. The consequence is that – even with a much improved indicator list - a sensible evaluation cannot do without the prospective consideration of ongoing reforms' expected effects.

7. *Rankings:* Within the imminent Lisbon mid-term review based on the existing list of indicators the shortcomings of this existing list have to be taken into account in all assessments. In particular, indicators whose conceptual design or data quality do not allow cross-section analyses must not be used for country comparisons or even rankings.

8. *Methods:* The Lisbon mid-term review can fruitfully be supported by the application of efficiency considerations making use of the existing indicators. The application of standard tools of multivariate statistics has a potential for indispensable background analyses.

9. *Lisbon overall indicator:* The idea of summarizing the manifold information of the indicator list by a single aggregate indicator or even an overall Lisbon ranking has to be rejected. The calculation of any such aggregate to measure success is conceptually impossible given the fact that, due to different national weights for the objectives of the Lisbon agenda, "success" is being defined differently among EU countries.

10. *General conclusion:* Indicator based co-ordination comes to its limits in the context of the Lisbon process. It is an illusion to believe that a multifaceted and complex process like this could be depicted and managed comprehensively by a set of quantitative indicators. Hence, any mechanical and schematic evaluation of structural indicators without substantial background analyses must be avoided.