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The LIME assessment framework (LAF):

a methodological tool to compare, in the context of the Lisbon Strategy, the performance of EU Member States in terms of GDP and in terms of twenty policy areas affecting growth

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The views expressed in this paper are those of the authors and should not be attributed to the European Commission or Member States.

FOREWORD

The need for enhanced and transparent methodology to assess the economic impact of structural reforms

The assessment and close monitoring of structural reforms plays an increasingly important role under the Lisbon Strategy as only economically sound and transparent assessments of progress with structural reforms can ensure consistency across policy areas and Member States. Thus in February 2007, the Ecofin Council stressed that "*monitoring and assessing reforms is an important factor for the success of the Lisbon strategy. This calls for a clear and transparent approach based on suitable methods.*" Moreover, on the basis of a report from the Economic Policy Committee (EPC), the ECOFIN Council in November 2007 called upon the EPC to " … *continue its work on developing a clear and transparent methodology at EU level to assess Lisbon reforms, and together with the Commission improve the economic underpinnings of approaches used to track and evaluate the impact of structural reforms*". During the EPC's country review exercise in January 2008, many country representatives again underlined the need for an improved assessment framework, and the importance of this was recalled by many Ministers at the ECOFIN Council of 22 January 2008. In the draft Council Recommendations for the 2008 update of the BEPGs, agreement was reached in the EPC and EFC (see recital 8) stating that "... *the Commission should provide more analytical underpinning to the proposed recommendations*." In addition, in the Key Issue Paper agreed at the EPC and EFC meetings of 30 and 31 January 2008 it is underlined that "... *the monitoring and evaluation of reforms is an important factor* …" for the success of the Lisbon strategy.

The role of the Lisbon Methodology Working Group (LIME)

To respond to this need for an enhanced and transparent methodology, the Lisbon Methodology Working Group (LIME) was formed as a sub-committee to the EPC. Its main objective was to drive forward the development of methodological approaches to track, analyse and model structural reforms carried out in the context of the Lisbon strategy and the Integrated Guidelines in order to increase transparency, visibility and ownership of the Lisbon process. A firm focus has been maintained on the practical application of tools for policy making. In line with the mandate, significant advance has been made in the methodological framework for assessing progress against the Lisbon agenda. Member States have participated actively by, amongst other things, responding to questionnaires, submitting papers and carrying out pilot studies. This has ensured a full partnership approach to methodology building. The work has benefited from close collaboration with the Commission and the involvement of the ECB, the OECD, stakeholders from other Council formations (e.g. the Employment Committee and the High Level Group on Competitiveness) and EUROSTAT.

The main issues discussed and the main outcomes

The LIME group has undertaken analytical work covering several broad strands: improved information to track and monitor progress with structural reforms; the development of an analytical framework to identify policy challenges; and, finally, economic modelling of structural reforms. This paper focuses on the second strand of work and presents the LIME assessment framework (LAF). LAF is an analytical tool that systematically compares the performance of Member States in terms of GDP and across 20 policy areas affecting growth (looking at both levels and change) relative to a benchmark. It is rooted in an extensive survey of the economic literature and involves a consistent and transparent statistical examination of key indicators (mostly structural indicators developed by Eurostat and EMCO) which is then qualified with additional evidence on country specific conditions and circumstances. It was developed by Commission services working together with national authorities in the LIME. LAF has two main outputs:

- a methodology (LAF methodology) which is an analytical framework that can help underpin the assessment of policy challenges facing Member States in raising growth potential. It could also be used for a variety of analytical purposes of interest to the EPC. *Inter alia*, it could be used for more in-depth studies on individual economies. It could also be used for cross-country comparative analyses on structural reforms and the real side of the economy and could be developed to assess the impact/adequacy of the reforms;

- a database (LAF database) with all the data and the underlying computations used. This should be seen as a separate output in its own right, as the Commission services have invested considerably in this analytical tool and made it available to national authorities in LIME and EMCO to use for their own purposes;

There are, however some limitations to LAF. The usual caveats associated with growth accounting (used to assess GDP components) apply, e.g. no information is provided on causality, there is a much higher degree of disaggregation of labour utilisation compared with labour productivity components. Also, there are important data and theoretical limitations in several policy areas which underline the need for caution in interpreting the results. Moreover, while LAF has a broad coverage and captures the most important drivers of growth, it does not cover all areas and objectives falling under the Lisbon strategy and the Integrated Guidelines such as job quality, social inclusion and the environment. It should also be recalled that due to inevitable time lags, many indicators used in LAF may not reflect the impact of reforms recently adopted by Member States. Finally, it is worth recalling that if LAF provides analytical insights to support national authorities' own reflections on their reform priorities, nonetheless it is only one of the tools which could contribute to this aim. LAF nevertheless offers several advantages as it is an economically-based framework for examining performance that is comparable across many policy areas and Member States in a consistent and transparent manner.

We thus hope that the work carried out so far will be a useful contribution to the analytical framework underpinning surveillance of Member States economies.

Brussels, 9 September 2008

Gert-Jan Koopman
Director, Directorate Economic Service and Structural reforms – Directorate-General Economic and Financial Affairs

Lorenzo Codogno
President of the LIME Working Group

Executive summary

The LIME Assessment Framework (LAF) is an analytical tool (not a rule) that can help underpin the assessment of policy challenges facing Member States in raising growth potential. Building upon the results of an extensive literature survey, it systematically compares the performance of Member States in terms of GDP and twenty policy areas affecting growth (looking at both levels and changes) relative to a benchmark (in this exercise EU15). This involves the utilisation of scores calculated from quantitative indicators (mostly structural indicators of Eurostat and EMCO), whose choice was based on the literature survey and involved considerable dialogue and exchange of views with LIME and EMCO to lead to an assessment of relative performance. Additional information on country specific conditions and circumstances is an integral part of the LAF as a complement to the indicator-based assessment. This tool was developed by the Commission services working together with national authorities in the EPC's Lisbon Methodology Working Group (LIME), and in close collaboration with EMCO. There are two main outputs on LAF:

- *a methodology (LAF methodology) or analytical framework, agreed by LIME and presented in this paper, and which could be used to assess policy challenges facing Member States in raising growth potential but could also serve for a variety of analytical purposes;*

- *a database (LAF database) with all the data and the underlying computations. This should be seen as a separate output in its own right, as the Commission has developed this analytical tool, and made it available to national authorities in LIME and EMCO who can use it themselves for their own purposes;*

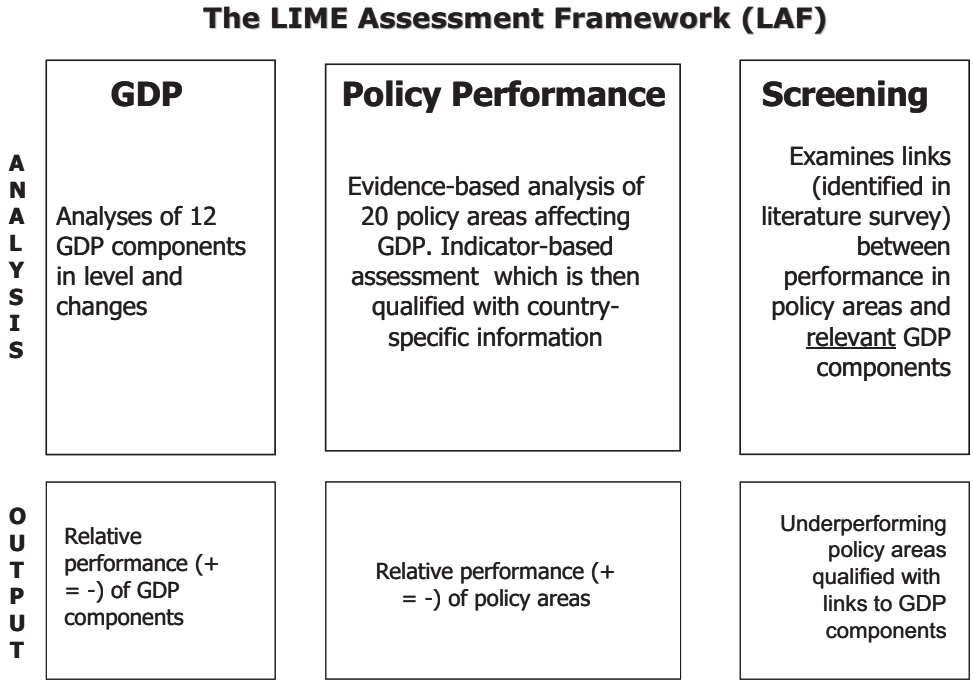
A description of LAF

The LAF is structured around three main elements.

- first, there is an examination of the sources of GDP per capita differentials and the main drivers of growth. In particular, a statistical analysis is carried out of twelve GDP components (3 demographic, 6 labour utilisation, 3 labour productivity), in both levels (2006) and changes (2000-06) relative to a benchmark (EU15).

- second, an evidence-based analysis of performance is carried out in 20 policy areas which the economic literature has identified as being relevant for GDP. This consists of an indicator-based assessment, the results of which are then qualified through a transparent mechanism/system by country-specific information. The outcome is an assessment of the relative performance (+ = -) of all policy areas.

- finally, for the policy areas identified as being underperforming (-), a screening exercise examines whether there is a coincidence of underperformance in the relevant GDP components that have been identified in the literature survey. The outcome of LAF is a list of underperforming policy areas which are qualified with evidence on relevant links to GDP.



The value-added of LAF as well as caveats and limitations

The main value added of LAF is that it provides an analytical framework for identifying policy priorities for each Member State. In particular, channels through which policies affect growth and jobs are assessed for the selection of quantitative indicators and basis for interpreting indicators. In addition to examining performance in individual policy areas, it also explores the link to growth and jobs. Third, LAF provides a systematic and consistent framework for examining performance across many (20) policy areas in the Lisbon process, taking account of both levels and changes. Fourth, LAF is transparent with respect to the quantitative indicators used, their overall quality and their weighting for the calculation of aggregate scores, which are therefore traceable. Additional country specific evidence is used to qualify findings of the indicator-based analysis.

However some limitations linked to the methodology need to be recalled. First, the usual caveats associated with growth accounting (used to assess GDP components) apply, e.g. the GDP accounting approach is descriptive and says nothing about causality *per se*. Moreover, components can be affected by the business cycle, especially if the period of time being considered is short: when comparing countries or time periods, differences in output gap should be recalled systematically. Also, developments in each component might be difficult to interpret in practice, given the multiplicity of factors affecting them, the existence of trade-offs in the short-term between variables, and statistical and measurement problems. Finally, the growth accounting is more developed with respect to labour inputs compared with the decomposition of labour productivity. Secondly, there are important data and theoretical limitations in several policy areas, which underline the need for caution when interpreting the results. The working group has discussed the need to balance the important country-specific qualitative information with the need to ensure sufficient transparency and consistency. Thirdly, due to inevitable time lags, many of the indicators used in LAF may not reflect the latest economic developments and impact of reforms recently adopted by Member States. Fourthly, the screening exercise which identifies the coincidence between underperforming policy areas and relevant GDP components provides no indication of causality, i.e. that underperformance in a policy area has affected outcomes in a relevant GDP component: it merely provides an additional consideration when assessing growth priorities. Furthermore, the identification of underperforming policy areas is based on both performance and policy indicators; although correlation analysis was used in the selection of

indicators to avoid overweighting, the correlation between GDP components and policy areas may not fully reflect a true relation between policy and performance. Finally, the trade-offs that might be inherent in the choice of focussing in one policy area or another need to be systematically explored as spillovers and complementarities between policy areas could occur.

Moreover, even if the LAF has a broad coverage and captures most drivers of growth in a systematic framework, which is conductive to a coherent policy analysis, it does not address some areas that could be relevant for growth. This holds for instance for areas related to environment and climate change and for a number of dimensions and objectives falling under the Lisbon strategy and the Integrated Guidelines, such as quality at work and fostering of better jobs, comprehensive strategy for youth, work organisation, anticipating change, social cohesion and social adequacy, quality of and access to education, and the efficiency of vocational training. In several policy areas, including R&D and ALMPs, indicators to assess the efficiency and quality of public spending are lacking. Quantitative indicators are also lacking in the links regarding R&D and innovation strategies between universities and enterprises, entrepreneurship education and competition. Although LAF already covers several specific aspects of flexicurity, it is not designed to provide for a comprehensive and integrated assessment of flexicurity per se, which is a political strategy to enhance at the same time, flexibility of labour markets, work organisation and labour relations, and security – income security and social security. It involves the combination of flexible and reliable contractual arrangements, comprehensive life long-learning strategies, effective active labour market policies, and modern, adequate and sustainable social protection systems.

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1. INTRODUCTION

In October 2006, the Economic Policy Committee (EPC) established a specific Lisbon Methodology Working Group (LIME) to drive forward the development of methodological approaches to track, analyse and model structural reforms carried out in the context of the Lisbon strategy and the Integrated Guidelines, in order to increase transparency, visibility and ownership of the Lisbon process. In February 2007, the ECOFIN Council stressed the key importance of the work of LIME by concluding that "*Monitoring and assessing reforms is an important factor for the success of the Lisbon strategy. This calls for a clear and transparent approach based on suitable methods.*"

The LIME group has undertaken analytical work in several broad strands – improved information to track and monitor progress with structural reforms – developing analytical framework to identify policy challenges and evaluate the impact of structural reforms – the modelling of structural reforms. This paper focuses on the second strand of work, and presents the LIME assessment framework (LAF) which has been developed by the Commission services working together with national authorities in the EPC's Lisbon Methodology Working Group, and in close cooperation with EMCO in accordance with conclusions of the EPC of November 2007 (ECFIN/EPC(2007)/REP/55063/final)[1].

This paper contains a description of a methodology (LAF methodology), which is an analytical framework that could be used for a variety of analytical purposes of interest to the EPC. *Inter alia*, it could be used by the Commission or national authorities for more in-depth studies on individual economies. It could also be used for cross-country comparative analyses on structural reforms and the real side of the economy and could be developed to assess the impact/adequacy of the reforms. This paper is organised as follows. *Section 2* provides an overview description of LAF. *Section 3* outlines each step of LAF in more detail. In addition, this paper also contains three annexes. Annex I takes a closer look at GDP accounting and cyclical adjustment. Annex II is a survey of the literature on the effects and the channels of transmission of structural reforms and explains the underlying rationale behind the choice of indicators used in the LAF. Annex III provides the results of the various robustness check and sensitivity analysis carried out on the results given by the LAF.

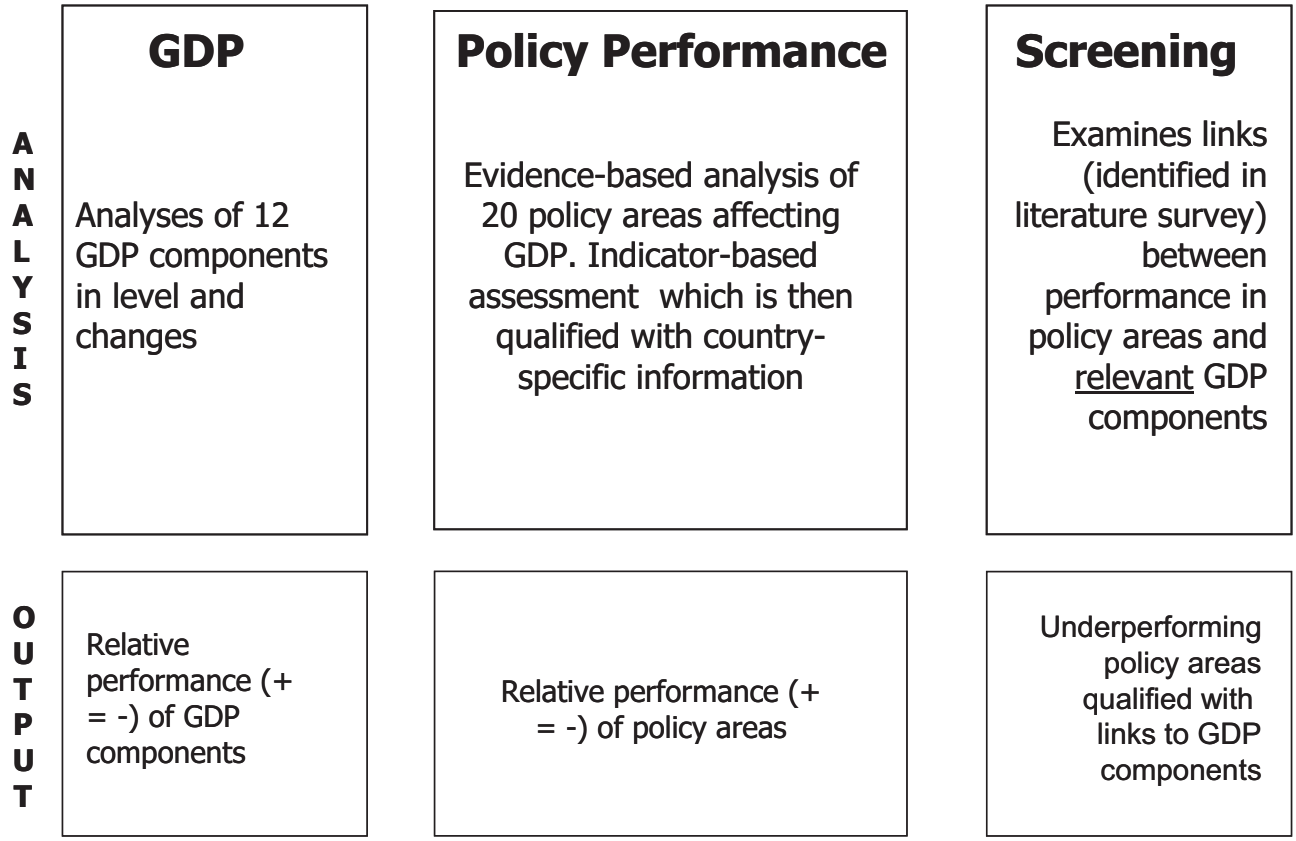
2. OVERVIEW OF THE LIME ASSESSMENT FRAMEWORK (LAF)

2.1. Presentation of the main steps

LAF is an analytical tool (not a rule) that can help underpin the assessment of policy challenges facing Member States in raising growth potential. Building up on the results of an extensive survey of the economic literature, LAF systematically compares the performance of Member States in terms of GDP and twenty growth affecting policy areas (looking at both levels and changes) relative to a benchmark (in this exercise EU15). This involves the utilisation of scores calculated from quantitative indicators (mostly structural indicators of Eurostat and EMCO), whose choice was based on the literature survey and involved considerable dialogue and exchange of views with LIME and EMCO, to lead to an assessment of relative performance. Additional information on country specific conditions and circumstances is an integral part of the LAF as a complement to the indicator-based assessment.

1 In particular, there has been very close cooperation with the Indicators Sub-Group attached to EMCO who have discussed LAF on several occasions.

Figure1. Elements in the LIME assessment framework LAF



The LAF is structured around three main elements.

- there is an examination of the sources of GDP per capita differentials and the main drivers of growth. In particular, a statistical analysis is carried out of twelve GDP components (3 demographic, 6 labour utilisation, 3 labour productivity), in both levels (2006) and changes (2000-06) relative to a benchmark (EU15). The overall assessment of performance of GDP components for a Member State is reached by combining the results of an indicator-based assessment in level terms with the relative performance in change and supplementing it with additional country-specific evidence and qualifications, i.e. it is not purely based on the mechanical results of an indicator based assessment.;

- an evidence-based analysis of performance is carried out in twenty policy areas which the economic literature has identified as being relevant for GDP. This consists of an indicator-based assessment, the results of which are then qualified through a transparent mechanism/system by country-specific information. The outcome is an assessment of the relative performance (+ = -) of all policy areas. The overall assessment of performance of policy area for a Member State is reached by combining the results of an indicator-based assessment in level terms with the relative performance in change and supplementing it with additional country-specific evidence and qualifications, i.e. it is not purely based on the mechanical results of an indicator based assessment;

- for the policy areas identified as underperforming (-), a screening exercise examines whether there is a coincidence of performance in the relevant GDP components that have been identified in the

literature survey. The outcome of LAF is a list of underperforming policy areas which are qualified with evidence on relevant links to GDP.

2.2. Underlying assumptions and approaches

The following underlying assumptions have been agreed by LIME in developing LAF.

As regards ***data sources***, LAF relies on data and indicators that are already commonly used in coordination processes at the EU level. The macroeconomic data underpinning the assessment of GDP components mostly comes from the Commission (AMECO).

As regards the ***time horizon***, the indicator-based assessment of performance of GDP components and policy areas is made with respect to both levels and changes. The analysis is based on data for the period 2000 to 2006, i.e. from the beginning of the Lisbon process, although the Commission has agreed to update the database in time for autumn country review exercise

The LIME group discussed the ***choice of benchmark*** on several occasions[2]. Although some Member States felt that it was not ambitious enough, it was agreed to use the EU15 (weighted average) as a working assumption. In addition, at the request of LIME members, the Commission services have introduced a feature in the LAF database which would allow national authorities to easily use alternative benchmarks, e.g. euro area, EU27, EU15, best 5 EU countries and the US.

Box 1 A comparison of LAF and the OECD's Going for Growth project

LIME and the Commission have drawn inspiration from the analytical approach developed by the OECD to underpin their *Going for Growth* project, and have benefited from the active participation of the OECD in the working group. There are many similarities between both exercises, not least that both are grounded in findings from the economic literature on how policies influence GDP performance, and moreover rely on an indicator-based assessments the results of which are qualified using additional country specific evidence and expertise. There are a number of differences. As regards coverage, LAF includes macroeconomic policies as they fall within the remit of the Lisbon Strategy whereas *Going for Growth* exclusively deals with structural reforms. LAF covers all EU27 Member States whereas not all EU countries are members of the OECD and *Going for Growth* covers several non EU-countries. There are some technical differences regarding the choice of indicators used, with LAF relying more heavily on EU sources and indicators already used within EU policy coordination processes. The benchmark used in the LAF is the EU15 compared with the US in *Going for Growth*, and moreover LAF explicitly allow for national authorities to use an alternative benchmark. *Going for Growth* has been developed and applied by the OECD Secretariat and the outcome is the identification of five reform priorities for all countries which would have the biggest impact on growth potential. In contrast, LAF seeks to identify all underperforming policy areas without putting an upper/lower limit, and is a tool to be used by national authorities and not just the Commission services.

A ***standardised continuous scoring system*** has been applied to assess performance of both GDP components and policy areas, both for levels and changes. It simply consists in standardising the value of the considered indicator by the mean and the standardised deviation and multiplying it by ten. More formally, it can be expressed as *Score = [(Indicator - EU15 average)/Standard deviation] *10.* To

2 Several LIME members have argued that the US could provide a good benchmark due to its similar size and level of development to the EU. On the other hand, the differences in social preferences on both sides of the Atlantic coupled with the conceptual problems of per capita GDP as a measure of economic well-being reduce somewhat the relevance of US policies to be applied in the European context. Moreover, data limitations do not currently allow to perform the GDP decomposition growth accounting at the most disaggregated level using the US benchmark

avoid giving too much weight to outliers, the score is capped at three standard deviations. Thus scores range from +30 to -30: a score of 0 implies the indicator in question is the same as the EU15 weighted average, whereas a score of -10 implies the indicator is 1 standard deviation below the EU15 average. Standardised thresholds have also been used to determine categories of performance. Any score below – 4 is *a priori* considered to represent underperformance (-)[3]: any score between +3 and -3 is *a priori* considered to represent a neutral performance (=): any score above +4 is *a priori* considered to represent over-performance (+). These thresholds have been chosen because, assuming a normal distribution of results, one third of outcomes should be found in each of the categories.

The ***assessment of performance*** of both GDP components and policy areas is made in a standard manner. It is reached by first considering the results of an indicator-based assessment in **level terms** and qualifying them with the relative performance in change and WITH additional country-specific evidence and qualifications. *A priori,* a GDP component or policy area is considered to be underperforming if the score in level terms in less than -4 (+4 in the case of the TFP component). However, this assessment can be qualified, either because of additional evidence regarding (i) the results of the indicators in terms of changes or growth, or (ii) additional country-specific evidence. As regards:

- the first qualification, there is no rigid rule on how to interpret level scores in light of change scores since account must be taken of the disparity in level performance and the pace of growth. *A priori*, a negative score in the relative "growth" is not a sufficient reason for qualifying a level score: however, in exceptional cases, a positive or neutral score in level terms could be qualified on the basis of a very negative growth score especially if there is evidence of negative growth in absolute terms, i.e. not just relative to the EU15.

- the second set of qualifications, this concerns additional evidence and qualifications of a country-specific nature. However, the assessments should not be qualified on the basis of relatively minor issues, i.e. there must be a *compelling case* that the outcome of the indicator-based assessment is misleading or misrepresentative of the actual situation in a policy area. The qualifications must be made explicit according to the standard qualification types (see table 2 and table 5). These concern potential qualifications of a statistical nature (e.g. gaps/breaks for specific countries, cyclicality, the impact of very significant recent reforms not yet reflected in the indicators but for which reliable data exists from other sources), interlinkages between GDP components, and country specific qualifications related to policy areas.

The analysis of the narrow list may reveal some specific issue(s) which are concealed by the results of aggregate scores, which blend together the performance of several indicators capturing different dimensions. A specific issue emerging from the narrow list would be signalled by a negative score (-4) in one of the qualitative indicators, provided it is considered meaningful by country-specific expertise.

3 The normal rounding rules have been applied. Hence, any score below - 3.5 is rounded and presented as -4 in the summary tables and is a priori considered to represent underperformance.

2.3. The value-added, caveats and limitations of LAF

LAF offers several advantages compared with evaluation methods used to date in the Lisbon strategy which relied heavily on the mechanical ranking of quantitative indicators. In particular:

- it provides input when considering growth priorities, i.e. it presents the likely channels through which policies affect growth and jobs, the criteria for the selection of quantitative indicators and basis for interpreting those indicators;

- LAF provides a systematic framework for examining performance across many (20) policy areas in the Lisbon process, taking account of both levels and changes;

- LAF is transparent, both as regards the quantitative indicators used and where additional country specific evidence has been used to qualify findings: the analysis is therefore tractable;

- LAF is a flexible tool and *inter alia* can cater for the very different starting position of Member States, balance the need for consistency across Member States with the need to take account of wide differences in country-specific institutional settings and circumstances and can be extended and improved both in quality (e.g. when updated or better indicators becomes available) or in scope (e.g. extending the sectoral coverage or to include missing policy areas).

There are, however, several important limitations to LAF as follows:

- the usual caveats associated with growth accounting apply, e.g. no information is provided on causality, there is a much higher degree of disaggregation of labour utilisation compared with labour productivity components etc;

- there are important data and theoretical limitations in several policy areas which underlines the need for caution when interpreting the results. The working group has however discussed the need to balance the important country-specific qualitative information with the need to ensure sufficient transparency and consistency;

- the reliability could differ from one policy area to another. This is the reason why, in agreement with the LIME members, an indication of the degree of reliability has been added for each policy area (see Table 9 below which gives an *a priori* indication of reliability for each policy area, where three stars (***) signifies high reliability and one star (*) signifies low reliability). It should, however, be noted that this indication of reliability could change over time if new reliable data becomes available, or if additional analysis can strengthen the understanding of the channels through which policies affect growth performance. Moreover, a sensitivity analysis has been carried out to assess the impact of different choice of indicator set and weights. The results show that the aggregate score does not vary a lot on average, the effect could be non-negligibly higher for some countries and some policy areas (see box 5 below).

- due to inevitable time lags, many of the indicators used in LAF may not reflect the latest economic developments and impact of reforms recently adopted by Member States;

- the screening exercise which identifies the coincidence between underperforming policy areas and relevant GDP components provides no indication of causality, i.e. that underperformance in a policy area has affected outcomes in a relevant GDP component: it merely provides an additional consideration when assessing growth priorities. Furthermore, the identification of underperforming policy areas is based on both performance and policy indicators; although correlation analysis was used in the selection of indicators to avoid overweighting, the

correlation between GDP components and policy areas may not fully reflect a true relation between policy and performance. Finally, the trade-offs that might be inherent in the choice of focussing in one policy area or another need to be systematically explored as spillovers and complementarities between policy areas could occur;

- even if the LAF has a broad coverage and captures most drivers of growth in a systematic framework, which is conductive to a coherent policy analysis, it does not address some areas that could be relevant for growth. This hold for instance for areas related to environment and climate change and for a number of dimensions and objectives falling under the Integrated Guidelines, such as quality at work and fostering of better jobs, comprehensive strategy for youth, work organisation, anticipating change, social cohesion and social adequacy, quality of and access to education, and the efficiency of vocational training. In several policy areas, including R&D and ALMPs, indicators to assess the efficiency and quality of public spending are lacking. Quantitative indicators are also lacking in the links regarding R&D and innovation strategies between universities and enterprises, entrepreneurship education and competition. Although LAF already covers several specific aspects of flexicurity, it is not designed to provide for a comprehensive and integrated assessment of flexicurity per se, which is a political strategy to enhance at the same time, flexibility of labour markets, work organisation and labour relations, and security –income security and social security. It involves the combination of flexible and reliable contractual arrangements, comprehensive life long-learning strategies, effective active labour market policies, and modern, adequate and sustainable social protection systems.

Finally, while not being necessarily a limitation, it is important to bear in mind that the LAF is not capable of determining the relative contribution of the different policy areas to raising growth potential in each Member State. As already explained, LAF is an analytical tool (not a rule) and as such it cannot be used as a model to quantify the impact of relative performances in a policy area.

3. DESCRIPTION OF THE LIME ASSESSEMENT FRAMEWORK (LAF)

3.1. The assessment of GDP components

3.1.1. The GDP decomposition

The first element in LAF is an examination of the sources of GDP per capita differentials and the main drivers of growth. As illustrated on Table 1, a statistical analysis is carried out of twelve GDP components (3 demographic, 6 labour utilisation, 3 labour productivity), in both levels (2006) and changes (2000-06) relative to a benchmark (EU15). The usual caveats associated with growth accounting approaches apply. In particular, the approach is descriptive and does not inform about causality per se. Several GDP components might be affected by the business cycle. The potentially substantial role of trade-off/interactions between components calls for a "dynamic reading" of the GDP accounting instead of a static examination, where each component is considered one by one in isolation. Although, the approach does not allow for a quantification of trade-offs or interactions, a dynamic interpretation of the results paying attention to interactions (complementarities or trade-offs) which are well known in the economic literature could be undertaken (see section 3.1.3 below).

Table 1. The assessment of GDP components

	I		II	III
	GDP decomposition scores	Absolute contribution to annual growth	Qualification	Overall assessment
	Level 2006 / Growth 2000-2006			
Demographic components				
Fertility / Native Population				
Share of foreign population / Net Migration				
Share of Working age Population				
Labour market components				
Youth Participation				
25-54 Male Participation				
25-54 Female Participation				
55-64 Participation				
Unemployment Rate				
Average Hours Worked				
Labour productivity components				
Capital Deepening				
Total Factor Productivity				
Initial education of labour (Labour quality)				
GDP per capita (level) / GDP (growth)				

Score-based assessment: levels (gap to EU15) and change (gap relative to average contribution for EU15)

Absolute contribution to annual growth is given as a memo item

Additional evidence: used to qualify the results of the score based assessment in level terms

Final assessment of above (+), neutral (=) or under (-) performance for each GDP component

The outcome of the assessment of GDP components is presented on Table 1. As explained in section 2.2, the assessment of performance (shown in column III in both tables as "-" for under, "=" for neutral or "+" for over performance) is based on the outcome of indicator-based assessment (shown in column I) unless it is qualified by additional evidence. This is clearly indicated in column II. The starting point is to consider the outcome of the indicator based assessment in level terms. *A priori,* a GDP component is considered to be underperforming if the (rounded) score in level terms is equal to or less than -4 (+4 in the case of the TFP component[4]). This means that an underperforming GDP component is characterised by a (relative) performance in level significantly lower than the EU15 average. However, this assessment can be qualified, either because of additional evidence regarding (i) the results of the indicator-based assessment in terms of changes/growth, or (ii) additional country-specific evidence. The qualification-types which are eligible in the assessment of GDP components are presented on Table 2.

4 The threshold has been relaxed for TFP. The latter is defined as a residual and is virtually a "catch-all" variable, which is potentially affected by a wealth of factors, which are difficult to disentangle. Therefore, an average performance in TFP might conceal some particular problems in the product market and the area of innovation and knowledge, which are offset by good performances in other policies. As a result, the coexistence of an "average" TFP (i.e. close to the EU15 average and displaying a score between -3 and +3) and underperforming policy areas could indicate potentially serious issues affecting TFP. An additional argument is that the EU15 is likely not to be at the technological frontier (unlike the US and some Northern EU countries). Then, an average TFP (with a score between -3 and 3) should not be considered per se as a satisfactory result.

Table 2. List of qualifications-types relevant for determining performance of GDP components

Qualification type	Reasons	Remarks
Growth	*Qualification of level score based on growth*	*A priori,* a GDP component is considered as underperforming (-) if the score in level terms is equal to or less than -4 irrespective of the score in change. However, this can be based on the "change" score for example if absolute and relative growth was strongly positive.
Statistical	*Statistical inaccuracies or breaks in series*	Some GDP components might suffer from statistical inaccuracies.
	Cyclicality	Cyclicality should only be included provided that it impacts significantly the outcome of the indicator.
Low benchmark	*EU15 benchmark not ambitious enough*	For advanced Member States, the EU15 benchmark may not be ambitious enough target. The Commission services have not used this qualification in the LAF studies.
Interlinkage	*Interlinkages across GDP and policy components*	Account should be taken of interactions between GDP components and policy indicators in assessing GDP performance. For example, good productivity performance caused by poor labour market participation; low youth participation due to a substantial increase of youth enrolment in tertiary education; decline in annual average annual hours worked due to a significant increase in part time work, etc.

3.1.2. A closer look at the decomposition of GDP in level and growth

A very detailed GDP decomposition (growth accounting) exercise has been developed for LAF: all data and computations have been made available to LIME members in the LAF database.[5] As explained on Table 3, it involves a GDP accounting exercise. In terms of level, it decomposes GDP per capita into multiplicative components. In terms of growth, it decomposes GDP into additive contributions. The decomposition in level and in changes is made into 12 components, which fall into three main groups:

- ***demographic components:*** in level terms, the demographic component is computed in an *ad hoc* way as the average score of the three demographic components in level, so that they appear to average out.[6] The fertility rate also complements the share of foreign population, as the former gives information on the future trend of the population. As regards changes/growth, the demographic component corresponds to the growth in the working age population, which can be obtained as the sum of the contributions of native population, migration and share of working-age population.

5 An application of the growth accounting framework can be found in Mourre G (2007)., " Identifying the sources of slow growth and income gaps in Europe: a detailed GDP accounting exercise ", 10th IMAD and 38th C.M.T.E.A. joint international conference, National reforms for the implementation of the Lisbon Strategy: their monitoring, assessment and impacts, Kranjska Gora, Slovenia, 14-16 June 2007. See the link: http://www.umar.gov.si/en/conferences_and_projects/conferences/#c174.

6 Strictly speaking the demographic component of GDP per capita is equal to the share of working age population, since the fertility rate and the share of foreign-born population are only displayed to put the score of native population growth and the growth contribution of migration into context (i.e. relating it to its starting condition).

- ***labour market components***: in level terms, this refers to the relative gap of the average hours worked per working-age person (aged 15-64). As regards changes, this measures the growth in average hours worked per working-age 15-64 person, which is the sum of the contributions of the participation of youth, prime age men and women and older workers, unemployment rate and working time. The contribution of the total participation rate is broken down by relevant age and gender groups: youth, prime-age men (aged 25-54), prime-age women, old-age workers (aged 55 and over);[7]
- ***hourly labour productivity components***: in level terms, this measures the relative gap of hourly productivity vis-à-vis the EU15. Hourly productivity is defined as the ratio of GDP to total hours worked in the economy, and is a multiplicative decomposition where total factor productivity is defined as the Solow residual. As regards change, this refers to the growth in hourly productivity vis-à-vis the EU15, which could also be computed as the sum of the contributions of initial education of workers, capital deepening and total factor productivity.

Box 2: Taking account of cyclicality

The economic cycle may impact the results of the growth accounting. Therefore, DG ECFIN has estimated the cyclical reaction of each growth component by regressing them on output gap from AMECO with a panel of 27 EU countries covering the period 1995-2005.[8] These calculations are done in the LAF database. This method does not claim to be the best way of identifying the cyclical effects, but has the great merit of being applicable consistently to all twelve GDP components (unlike the Output Gap Working group method, which is more reliable and economically-sound), while remaining relatively clear and simple. It could be used by member states if deemed relevant. It would not be necessarily the case if better estimates are available for some GDP components or qualitative analysis is preferred.

The following simple fixed-effect specification is used where k is the identifier of growth components, OG denotes a measure of the cyclical position of the economy, ΔOG the change in cyclical position from the previous year and αi are i country dummies.

$$Contrib_{k\,it} = \alpha_{k\,i} + \beta_k\ OG_{it} + \gamma_k\ \Delta OG_{it} + \varepsilon_{k\,it}$$

Then the effect of the (level of and changes in) the business cycle from the contribution to growth is removed.

$$CycleAdjusted\ Contrib_{k\,it} = \hat{\alpha}_{k\,i} + \hat{\varepsilon}_{k\,it}$$

The estimated coefficients are in compliance with the expected sign, except for hours worked. Annex I on the GDP decomposition exercise presents the approach in detail and the result of the cyclical adjustment.

7 The last two groups are particularly sensitive to policies e.g. childcare facilities, part-time employment regulation, flexible working time arrangements, the removal of fiscal distortions, reforms of old-age pension regimes and early-retirement schemes.

8 See the note to he LIME meeting of November 2007 on "Identifying the most important growth-enhancing policies in EU Member States: Proposals for refinements to the methodology in response to the comments of LIME members" (ECFIN/REP 55034).

Table 3. The components used in the GDP accounting exercise

	LEVELS			CHANGES		
	Component	**Definition**	**Comments**	**Component**	**Definition**	**Comments**
DEMOGRPAHIC	**Fertility rate**	Absolute difference between the fertility rates of the country considered and the EU15	Not strictly speaking a component of GDP per capita, but instead a useful stock variable to assess the starting condition of the increase in native population (flow variable). It is much better than the size of population which makes no sense in a benchmarking perspective, where small countries will always be the worst performers. The fertility rate also complements the share of working-age population, as the former gives information on the future trend of the population as opposed to the former, which is the result of past trend.	**Native population**	Growth in native population (total population less the cumulated flows of net migration from 1999).	This concept corresponds to the natural increase of the population (births minus deaths). Additive decomposition.
	Net migration	Absolute difference between the migration rate (net migration flow over total population) of the country considered and the EU15	Not strictly speaking a component of GDP per capita, but a useful stock variable to assess the starting condition of net migration (flow variable).	**Net migration**	Growth in the ratio of net migration to the native population.	Net migration is defined by Eurostat as the difference between the increase in total population and the balance of births and deaths. Additive decomposition.
	Share of working age population in total population	Relative gap of the share of working age population in total population vis-à-vis the EU15	Only demographic component of GDP per capital. Multiplicative decomposition.	**Share of working age population in total population**	Growth in the share of working age population in total population vis-à-vis the EU15. The working-age population is made of those 15-64.	Additive decomposition.
PRODUCIVITY	**Initial education of labour**	Relative gap of the initial education of labour	This indicator informs about the effect of the composition of employment by educational attainments, of which relative productivity is proxied by EU15 relative wages by level of education. Multiplicative decomposition.	**Labour quality (power the labour share 65%)**	The growth in the indicator of initial education of labour, multiplied by 65% (the labour share in total value added)	Additive decomposition
	Capital accumulation (capital *per hour worked*)	Relative gap of total capital stocks per hour worked vis-à-vis the EU15	Multiplicative decomposition.	**Capital deepening**	The growth in capital accumulation (capital per hour worked)	Additive decomposition
	Total factor productivity (Solow residuals)	Relative gap of TFP vis-à-vis the EU15	Total factor productivity is defined as the Solow's residual. The one emerging once the other components. Multiplicative decomposition.	**Total factor productivity (Solow's residuals)**	The additive residuals of GDP growth: GDP growth minus all of the other components.	Therefore, all contributions add up to total growth.

	LEVELS			CHANGES		
	Component	**Definition**	**Comments**	**Component**	**Definition**	**Comments**
LABOUR MARKET	**Youth Participation**	Relative gap of the participation rate for those aged 15-24 vis-à-vis the EU15, *multiplied* by the share of those aged 15-24 in total working age population	Not additive decomposition of total participation but more easily interpretable in terms of relative performance.	**Youth Participation**	The growth in the participation for those aged 15-24 vis-à-vis the EU15, *multiplied* by the share of those aged 15-24 in total working age population	A necessary statistical correction is used to convert the LFS data on participation for specific age group into National Account concepts, which are consistent with the concept of GDP and are systematically employed in the GDP accounting exercise. This additive correction consists of the gap between the overall contribution of total participation in LFS and Nationals accounts, weighted by the share of the group in the working-age population. Therefore the group-specific contributions add up to the overall participation contribution derived from the National account. The consequence can be a discrepancy in some cases between the direction of changes in the LFS participation rate and the sign of its contribution to growth.
	Male prime-age participation	Relative gap of the participation rate for men aged 25-54 vis-à-vis the EU15, *multiplied* by the share of men aged 25-54 in total working age population		**Male prime-age participation**	The growth in the participation for men aged 25-54 vis-à-vis the EU15, *multiplied* by the share of men aged 25-54 in total working age population.	
	Female prime-age participation	Relative gap of the participation rate for women aged 25-54 vis-à-vis the EU15, *multiplied* by the share of women aged 25-54 in total working age population		**Female prime-age participation**	The growth in the participation for women aged 25-54 vis-à-vis the EU15, *multiplied* by the share of women aged 25-54 in total working age population.	
	Older-worker participation	Relative gap of the participation rate for those aged 55-64 vis-à-vis the EU15, , *multiplied* by those aged 55-64 in total working age population		**Older-worker participation**	The growth in the participation for those aged 55-64 vis-à-vis the EU15, *multiplied* by those aged 55-64 in total working age population.	
	Unemployment rate	Relative gap of the non unemployment rate (one minus the unemployment rate) vis-à-vis the EU15	Multiplicative decomposition.	**Unemployment rate**	The growth in the non unemployment rate (one minus the unemployment rate)	
	Working time (Average Hours worked per person)	Relative gap of the average hours worked per person employed vis-à-vis the EU15	Multiplicative decomposition.	**Working time (Average Hours worked per person)**	The growth in the average hours worked per person employed	Additive decomposition

3.1.3. Specific considerations in the GDP decomposition

Which GDP components can governmental policies impact?

The growth accounting used in LAF has several advantages from the perspective of policy analysis. It is based on an uncontroversial and commonly used description, using a standard Cobb-Douglas production function. This approach is replicable for all EU27 countries, making cross-country comparison easy. Last and not least, it is also a flexible tool as growth components can be broken down to a level that best fits policy needs.

This detailed decomposition into GDP components also facilitates to distinguish broadly exogenous factors from growth factors that can be influenced by policies although caution should be exercised when interpreting the results for some components (see table 3 and text below on migration). Some GDP components are potentially influenced by governmental policies in the short and medium run, while the others are clearly out of the reach of governmental actions in the short and medium run (demographic and deeply-rooted societal factors). More specifically, three groups of components can be identified:

- *mainly exogenous* components, such as the share of the working age population are not under the direct control of government (except perhaps in the very long-run),
- *partly endogenous* components can partly be influenced by governmental policies, and includes female participation, net migration flows, average hours worked per person employed, capital accumulation and TFP;
- *mainly endogenous* components can be influenced by public policies, and would include the initial education of labour, the participation rate (especially youth, prime-age male and older workers) and unemployment.

The indicator on initial education of labour: a proxy for labour quality

One of the innovative extensions in LAF is the indicator of "initial education of labour" included in the GDP decomposition[9]. It measures the average productivity per person employed relative to the productivity of the low skilled, proxied by those with lower secondary education or less. The indicator moves with the change in the employment composition by educational attainment. If this change is neglected, it is implicitly incorporated in TFP movements (i.e. Solow residual) and could be misinterpreted as a change in technical progress. The indicator is computed as follows:

$$Q_t = \frac{1}{E_{L\,t} + E_{M\,t} + E_{H\,t}} \cdot \sum_{S \in \{Low,\, Medium,\, High\}} \left(E_{S\,t} \cdot \frac{W_{S\,2002}}{W_{L\,2002}} \right).$$

9 Note to the February LIME meeting on "What are the main Sources of income Differentials and what are the key drivers of economic growth in Europe? A detailed accounting exercise" (REP 50633).. Note to the May LIME meeting on " Identifying the sources of growth in EU Member States between 2000 and 2005: possible methodological approaches" (REP 52360).

where Es and Ws respectively denote employment and hourly wage (without overtime) for each skill group. Ws/WL then corresponds to the relative hourly wages of those with the educational attainment *s* (low, medium or high) compared with the low skilled (i.e. those with lower secondary education or less). As commonly assumed in the literature, this ratio is a proxy of the relative productivity of those with skill *s* compared with the low skilled. The data come from the Structure of Earning Survey SES2002 and are only available for the year 2002.[10]

In this framework, Q measures the average productivity per person employed in low-skilled equivalent and Q*E*H measures total labour input expressed in low-skill equivalent. In this setting, a low skilled worker is worth one unit, while high skilled labour is worth the relative productivity of the high skilled compared with the low skilled (which is higher than 1). Although this method somehow resembles that used by OECD (Scarpetta, Bassanini, Pilat and Schreyer, 2000)[11], it is slightly different in the sense they compute the average wage per person employed rather than the average wage in low skill equivalent (that is, the average wage per person employed compared with that of the low skilled). They use different data of wages by educational attainment. Indeed, another crucial point is that relative wages used in LAF are those of the EU15 and not those of individual countries.

Caution should be exercised when interpreting the results for migration

A special note of caution applies to data on migration and its mechanical interpretation as a growth component. As there is also no breakdown of migrants by age, gender, or educational attainment, the growth accounting analysis mechanically considers the role of migration in the change in overall population size. When the analysis highlights an increasing role of migration as a source of economic growth, it cannot assess the full economic impact of migration, which broadly depends on the efficient integration of migrants in the labour market and on the skills and productivity of migrants. The impact of migration is also partly captured by the other components of growth.[12]

Dynamic reading of GDP composition to take account of interactions

The potentially substantial role of trade-off/interactions between components calls for a "dynamic reading" of the GDP accounting. Although, the approach does not allow for a quantification of trade-offs or interactions, a careful and dynamic interpretation should pay attention to a couple of interactions (complementarities or trade-offs), which are well known in the economic literature. In particular, five types of standard interactions, set out in Table 4, should be systematically borne in mind.

10 The indicator is based on the 2002 proxy of relative productivity by educational attainment: however, its real value should not change dramatically over a ten-year period.

11 Stefano Scarpetta, Andrea Bassanini, Dirk Pilat and Paul Schreyer (2000): Economic growth in the OECD area: recent trends at the aggregate and sectoral level, Growth Project Background Papers.

12 Staff Working Paper 'Migration into the EU: main determinants and economic impact', Brussels, 06/11/07, (REP 54748).

Table 4. Main examples of interaction amongst GDP components.

Interaction	Sign	Channels
Labour input and labour productivity	Negative (substitute)	Strong/weak employment could be associated with a weak/strong hourly productivity, through relatively low/high capital accumulation per worker, lower (higher) initial education of those employed or weaker (stronger) TFP induced by the lower (higher) average level of skills that are not captured by initial education. Indeed, an inclusive labour market tends to reduce capital-labour intensity mechanically –as the capital stock is divided by more labour) and attracts less productive people (low-skilled) into employment. It might also signal a higher return of labour relative to capital, leading to less capital accumulation. High average hours worked might mean lower productivity, due to lower capital/hours-worked intensity and negative marginal returns of long working-time.
Female participation and average hours worked	Negative (substitute)	A high female participation might, in some countries, mean a high level of part-time employment which bears negatively upon the average hours worked per person employed. There could then be a partial trade-off between higher participation (external margins) and average hours worked (internal margins), although the net effect on total hours worked is often found to be positive.
Youth participation and initial education of labour	Negative (substitute)	A high level of initial education of labour could mean a relatively low participation of youth to the labour market, as young people are enrolled massively in schools and universities.
Migration and the share of working-age population	Negative (substitute)	In countries with relatively high per capita GDP, decreasing population or a relatively low share of working-age population might be associated with higher contribution of migration, in order to limit the population decline. The link is indirect and largely determined by immigration policies.
Total factor productivity and capital accumulation	Positive (complementary)	Capital accumulation is often a condition for thriving Total Factor Productivity (TFP), as innovation or technical progress is, to a large extent, embedded in new equipment good. There is a difficulty to separate the contribution of capital good from Total Factor Productivity. The absence of correction for the quality of capital (e.g. the use of non hedonic prices) means that the "quality of capital" is often captured then by TFP as a residual. Therefore, more capital accumulation, often associated with an increase in the quantity and quality of capital stock, also implies a rise in TFP.

3.2. Assessing the performance policy areas affecting GDP

3.2.1. The assessment of performance of policy areas

The second element in LAF is an evidence-based analysis of performance is carried out in 20 policy areas which the economic literature has identified as being relevant for GDP. Ten areas concern labour market and demographic issues; nine policy areas are especially relevant for labour productivity as they deal with product and capital markets plus innovation and knowledge; one policy area cover macroeconomic policies. An additional area, namely "macroeconomic background information" is included in the LAF database. It is not a "real" growth-enhancing policy area, but rather provides a first indication on the broad orientation of the macroeconomic framework.

As illustrated in Table 5, the assessment consists of an indicator-based assessment, the results of which are then qualified through a transparent mechanism/system by country-specific information. The outcome is an assessment of the relative performance (+ = -) of all policy areas. The overall assessment of performance of policy area for a Member State is reached by first looking at the results of an indicator-based assessment in level terms, qualifying them with the relative performance in change and with additional country-specific evidence and qualifications, i.e. it is not purely based on the mechanical results of an indicator based assessment. As explained in section 2.2, the assessment of performance (shown in column III in both tables as "-" for under, "=" for neutral or "+" for over performance) is based on the outcome of indicator-based assessment (shown in column I) unless it is qualified by additional evidence. This is clearly indicated in column II. The starting point is to consider the outcome of the indicator based assessment in level terms. *A priori,* a GDP component is

considered to be underperforming if the score in level terms is equal to or less than -4. However, this assessment can be qualified, either because of additional evidence regarding (i) the results of the indicators in terms of changes or growth, or (ii) additional country-specific evidence. The qualification-types which are eligible in the assessment of GDP components are presented on

Table 5. The assessment of performance of policy areas

	Indicator-based assessment		Qualification	Overall assessment
	I		III	III
Policy areas -- Aggregate scores for ES	**Level 2006**	**Change 2000-2006**		
Labour market				
Active labour market policies**				
Making work-pay: interplay of tax and benefit system***				
Labour taxation to stimulate labour demand ***				
Job protection and labour market segmentation/dualisation**				
Policies increasing working time***				
Specific labour supply measures for women***				
Specific labour supply measures for older-workers***				
Wage bargaining and wage-setting policies**				
Immigration and integration policies***				
Labour market mismatch and labour mobility**				
Product and capital market regulations				
Competition policy framework*				
Sector specific regulation (telecom, energy)**				
Business environment - Regulatory barriers to entrepreneurship**				
Business Dynamics - Start-up conditions***				
Financial markets and access to finance**				
Market integration - Openness to trade and investment**				
Innovation and knowledge				
R&D and Innovation***				
ICT**				
Education and life long learning***				
Macroeconomy				
Orientation and sustainability of public finances ***				

Indicator-based assessment: aggregate score based on the indicators in the narrow list – Scores both in level terms and changes relative to EU15

Additional evidence: used to qualify the results of the score based assessment in level terms

Final assessment of above (+), neutral (=) or under (-) performance for each policy area

Note: for each policy area the overall quality of the coverage by narrow list indicators is signalled: *** means a broad coverage, ** medium coverage and * narrow coverage.

Table 6. List of qualification-types relevant for determining performance of policy areas

Qualification type	Reasons	Remarks
Growth	*Qualification of level score based on growth*	*A priori,* a policy area should be considered as underperforming (-) if the score in level terms in less than -4 irrespective of the score in change. However, this can be adjusted by the Commission country teams (to = or +) based on the "change" score, for example if absolute and relative growth was strongly positive.
Statistical	*Statistical inaccuracies or breaks in series*	Some indicators may be missing for some countries. Particular care should be paid to breaks in series: for example, some LFS series have been affected by methodological changes, thereby reducing the comparability of the series. However, these arguments should only be used if one considers that the aggregate score has been altered very significantly
	Cyclicality	To be used only if cyclicality impacts significantly the outcome of the indicator.
	Low standard deviation	Low standard deviation can cause some countries with a fairly low absolute deviation from the average to become outliers. For example, low standard deviations are found in some financial market indicators, such as insurance premium volume or bank overhead costs.
	Impact of very significant recent reforms not yet captured by indicators	This should only refer to very significant reforms, which have been enacted and whose effects are covered by reliable data from other sources.
Low benchmark	*EU15 benchmark not ambitious enough*	For advanced Member States, the EU15 benchmark may not be ambitious enough target.
Country specific	*Country specific feature identified in the narrow list:*	This could arise when the aggregate score for a policy area may be above -4 and thus provide an indication of neutral (=) or positive (+) performance of the policy area, but where underperformance in one/several dimensions of a policy area is considered to be critical importance by the Commission country teams. This is reflected in the score of some indicators included on the narrow list used to calculate the aggregate score.
	Other country-specific features	This could arise when the aggregate score for a policy area may be above -4 and thus provide an indication of neutral (=) or positive (+) performance of the policy area, but where underperformance in one/several dimensions of a policy area is considered to be critical importance by the Commission country teams. This is not captured in the narrow list used to calculate the aggregate score. It could for example arise if there is a missing dimension of policy area that is not captured by the indicators (e.g. the efficiency of public spending).

3.2.2. The choice of LAF policy areas and their coverage

The choice of the policy areas and relevant indicators used to assess performance is based on a comprehensive literature survey. A complete version of the literature survey together with information on the indicators used to assess performance can be found in annex II.

The literature survey is an essential building block of LAF, as it helped identify the selection of policy areas that could potentially influence performance in GDP components. The surveyed contributions cover the main academic papers as well as research undertaken by the services of the European Commission and other international institutions like the OECD, IMF and the World Bank. For each policy area, the literature survey identifies the theoretical mechanism and transmission channels through which the policy area could affect GDP components. Where possible, evidence and estimated elasticities on the basis of the most recent empirical studies are presented. Possible spillovers and complementarities with other policy areas are explored.

Table 7 compares the coverage of the twenty policy areas in LAF with the Integrated Guidelines. It is worth recalling that in the development of LAF, and as extensively discussed with LIME Members, a particular attention has been given to the creation of a systematic, analytical framework, since this is a necessary condition for a coherent policy analysis. Although LAF has a broad coverage and captures most drivers of growth, it does not address some areas and dimensions of the Integrated Guidelines, and some of these may be difficult to integrate into this framework given the level of current knowledge in these areas. For instance, LAF does not cover environment and climate change (IG11), nor does it directly address adequately physical infrastructure (IG16). In other policy areas, LAF does not cover a number of dimensions and objectives falling under the Lisbon strategy and the Integrated Guidelines. These missing dimensions are in the field of improving quality at work (IG17), improve matching of labour market needs (IG20), strengthening social and territorial cohesion (IG17) and the promotion and dissemination of innovative and adaptable forms of work organisation, with a view to improving quality and productivity at work, including health and safety (IG21). The quality of and access to education (IG23 and 24), including vocational training, is also a dimension which is not adequately covered in the policy area on education and lifelong learning.

For the same reason, the coverage of LAF may not be fully adequate to capture broader policy aims included in some of the Integrated Guidelines such as the integrated strategies for young people in the labour market (although it is considered in LAF under different policy areas including ALMPs, job protection and labour segmentation, and education and lifelong learning) and anticipating change (although this is partly captured in policy area on education and lifelong learning). Flexicurity is a political strategy to enhance at the same time, flexibility of labour markets, work organisation and labour relations, and security – employment security and social security. It involves the combination of flexible and reliable contractual arrangements, comprehensive life long-learning strategies, effective active labour market policies, and modern, adequate and sustainable social protection systems. Although policy areas within LAF already cover several specific aspects of flexicurity, it is not designed to provide per se a comprehensive and integrated assessment of flexicurity.

Table 7. Coverage of policy areas in LAF compared with the Integrated Guidelines

Policy area	Integrated Guidelines	Missing dimensions
Active labour market policies	IG 20 Improve matching of labour market needs IG 17 Implement employment policies aimed at achieving full employment, improving quality and productivity at work, and strengthening social and territorial cohesion. IG 5 To promote greater coherence between macroeconomic, structural and employment policies.	Efficiency and quality of spending on ALMPs Targeting of ALMPs to disadvantaged groups (e.g. minorities or youth) The integrated and comprehensive approach to flexicurity
Making work-pay: interplay of tax and benefit system	IG 19 Ensure inclusive labour markets, enhance work attractiveness, and make work pay for job seekers, including disadvantaged people and the inactive. IG 22 Ensure employment-friendly labour cost developments and wage setting mechanisms. IG 5 To promote greater coherence between macroeconomic, structural and employment policies.	
Labour taxation to stimulate labour demand	IG 19 Ensure inclusive labour markets, enhance work attractiveness, and make work pay for job seekers, including disadvantaged people and the inactive. IG 22 Ensure employment-friendly labour cost developments and wage setting mechanisms.	
Job protection and labour market segmentation/dualisation	IG 21 Promote flexibility combined with employment security and reduce labour market segmentation, having due regard to the role of the social partners. IG 5 To promote greater coherence between macroeconomic, structural and employment policies. IG 17 Implement employment policies aimed at achieving full employment, improving quality and productivity at work, and strengthening social and territorial cohesion.	The integrated and comprehensive approach to flexicurity
Policy increasing working time	IG 18 Promote a lifecycle approach to work. IG 21 Promote flexibility combined with employment security and reduce labour market segmentation, having due regard to the role of the social partners.	Intrinsic job quality Health and safety Work organisation Social dialogue
Specific labour supply measures for women	IG 17 Implement employment policies aimed at achieving full employment, improving quality and productivity at work, and strengthening social and territorial cohesion. IG 18 Promote a lifecycle approach to work. IG 19 Ensure inclusive labour markets, enhance work attractiveness, and make work pay for job seekers, including disadvantaged people and the inactive. IG 21 Promote flexibility combined with employment security and reduce labour market segmentation, having due regard to the role of the social partners.	Intrinsic job quality Health and safety Work organisation
Specific labour supply measures for older-workers	IG 17 Implement employment policies aimed at achieving full employment, improving quality and productivity at work, and strengthening social and territorial cohesion. IG 18 Promote a lifecycle approach to work. IG 19 Ensure inclusive labour markets, enhance work attractiveness, and make work pay for job seekers, including disadvantaged people and the inactive. IG 21 Promote flexibility combined with employment security and reduce labour market segmentation, having due regard to the role of the social partners.	
Wage bargaining and wage-setting policies	IG 4 To ensure that wage developments contribute to macroeconomic stability and growth. IG 22 Ensure employment-friendly labour cost developments and wage setting mechanisms.	Institutional aspects of collective bargaining
Immigration and integration policies	IG 17 Implement employment policies aimed at achieving full employment, improving quality and productivity at work, and strengthening social and territorial cohesion. IG 20 Improve matching of labour market needs. IG 21 Promote flexibility combined with employment security and reduce labour market segmentation, having due regard to the role of the social partners.	
Labour market mismatch and labour mobility	IG 17 Implement employment policies aimed at achieving full employment, improving quality and productivity at work, and strengthening social and territorial cohesion. IG 20 Improve matching of labour market needs. IG 21 Promote flexibility combined with employment security and reduce labour market segmentation, having due regard to the role of the social partners.	Social and territorial cohesion Occupational matching

Table 8. Coverage of policy areas in LAF compared with the Integrated Guidelines

Competition policy framework	IG 12 To extend and deepen the internal market. IG 13 To ensure open and competitive markets inside and outside Europe and to reap the benefits of globalisation.	Institutional set-up of competition authorities Enforcement of competition policy
Sector specific regulation (telecom, energy)	IG 13 To ensure open and competitive markets inside and outside Europe and to reap the benefits of globalisation.	Professional services (partly)
Business environment - Regulatory barriers to entrepreneurship	IG 14 To create a more competitive business environment and encourage private initiative through better regulation. IG 15 To promote a more entrepreneurial culture and create a supportive environment for SMEs.	Entrepreneurship education
Business Dynamics - Start-up conditions	IG 14 To create a more competitive business environment and encourage private initiative through better regulation.	
Financial markets and access to finance	IG 12 To extend and deepen the internal market.	
Market integration - Openness to trade and investment	IG 12 To extend and deepen the internal market.	
R&D and Innovation	IG 7 To increase and improve investment in R&D, in particular by private business. IG 8 To facilitate all forms of innovation.	Efficiency and quality of R&D spending Links between universities and businesses
ICT	IG 9 To facilitate the spread and effective use of ICT and build a fully inclusive information society.	Efficiency of e-government services
Education and life long learning	IG 23 Expand and improve investment in human capital. IG 24 Adapt education and training systems in response to new competence requirements.	Quality of and access to education Quality of vocational training Adaptability of labour force The integrated and comprehensive approach to flexicurity
Orientation and sustainability of public finances	IG 1 To secure economic stability for sustainable growth. IG 2 To safeguard economic and financial sustainability as a basis for increased employment. IG 3 To promote a growth and employment orientated efficient allocation of resources.	
Macroeconomic background		
	IG 11 To encourage the sustainable use of resources and strengthen the synergies between environmental protection and growth	Environment Energy efficiency Renewables Climate change
	IG 16 To expand, improve and link up European infrastructure and complete priority cross-border projects.	Infrastructure

3.2.3. The choice of indicators

The choice of indicators was based on the literature survey and involved considerable dialogue and exchange of views with LIME and EMCO members. Not surprisingly, the overwhelming majority of indicators used are already employed in policy coordination processes at EU level and are drawn from the structural indicators developed by Eurostat and EMCO.

For each policy area, the LIME group has discussed at length a set of relevant indicators: all indicators are included in the LAF database sent to national authorities. In order to ensure the comparability and a minimum of robustness, the assessment of performance for each policy area is computed on the base of a "narrow" set of indicators. This yields an aggregate score of performance of the policy area as a whole. However, more detailed analysis of the indicators (including those not on the narrow list) allows for exploration of specific issues within the policy areas.

A multi-step procedure was agreed by the LIME group to select the narrow list of indicators to be used to calculate the aggregate score for each policy area, which is based on:

- ***minimum statistical standards:*** criteria included (i) e*conomic rationale* (ii) comparability and statistical reliability, (iii) time coverage so that the indicators cover the year 2005 at least and one other year is provided (to compute the change), (iv) geographical coverage requiring data for at least 14 countries;

- ***redundancy criteria:*** correlation analysis (see box below) was used to remove the redundant indicators, i.e. an indicator displaying both a tight theoretical relationship and a high degree of statistical correlation with another one. A specific weight could, however, be given to some specific indicator when the indicator exists for men and women (where each of them is given a weight of ½), or if the policy area has clearly two (or more) dimensions (as weighting allows for assigning an equal importance to each dimension which is covered by an uneven number of indicators).

- ***inputs from associated stakeholders:*** especially, the LIME and EMCO members.

Box 3: Caveats on the interpretation of correlation

Correlation is a rather coarse statistical method to address possible relationships between indicators. This is due to:

- *the existence of potentially long time lags:* this is especially relevant as LAF only covers seven years at most, and for some (mostly performance) indicators, only cross-sectional correlation is available;

- *reverse causality:* the absence of real correlation (or even slightly negative correlation), especially between policy indicators and performance indicators, should not be misinterpreted. In many cases, policies are affected by long time-lags before they come into effect. In this context, a negative correlation could mean actual progress in a given policy areas, while the recorded performances are still bad or even deteriorating. Indeed, a negative correlation could capture reverse causality, i.e. the fact that policies are taken in areas characterised by poor or even deteriorating performances. The current changes in policy stance or speed-up of reforms may only materialise into better performances a couple of years latter. In a nutshell, the correlation analysis in the very short-time period considered can only capture contemporaneous relationship between variables, cannot apprehend the real nexus between variables, mostly, between policy and performance indicator, and could convey mistaken pictures. It should be recalled that many of the indicators used do not exist as (long) time-series. Therefore, it is better to consider primarily what the literature taught in this respect and to use the work already done within EPC working group on structural indicators and the EMCO Indicator subgroup. Only very strong contemporaneous correlation should be taken as meaningful;

- *omitting other key determinants:* correlation analysis is a bivariate method, which does not control for other potential very relevant factors and the interaction with other variables;

- *statistical robustness:* a correlation could just be a function of random, as shown by the famous Monte-Carlo experiment, consisting in generating random indicators, which could eventually show a high correlation.[13] No meaningful interpretation can then be derived from the data.

13 W. Enders (2004): Applied Econometric Time Series, Wiley Series in Probability and Mathematical Statistics. Hardcover

3.2.4. The reliability of the indicator based assessment in each policy areas

Due to the current state of the economic literature and availability of indicators, the results of the indicator-based assessment are more reliable in some policy areas than others. In annex III a number of robustness checks are conducted, the main results of which are described in the box 4. Based on this analysis, as well as input from members, the LIME group decided that a more systematic approach should be applied when reporting the results of LAF.

Box 4: Testing the robustness of the aggregate score

As regards the reliability of the aggregate score per policy area, various robustness checks and sensitivity analyses have been carried out to assess the impact of different choice of indicator set and weights. Four types of tests were carried out (see annex III):

- comparing the outcome of the aggregate score for a reduced set of indicators compared with the outcome based on the full list of indicators. The exercise was carried out for two illustrative policy areas, and is based on a more parsimonious set of indicators, in which highly correlated indicators were removed. The weight of each indicator remains equal to one;
- comparing the aggregate score for a reduced set of indicators which are available for at least 22 countries with the results for the full list of indicators;
- comparing the aggregate score for some policy areas using different aggregation methods Using the extensive analysis already carried out by the JRC (JRC EUR 21682 report) we apply 5 different calculation techniques (equal weights non normalized, equal weights normalized, average country rankings, benefit-of-the-doubt, random weight) to compute the aggregate scores;
- comparing the randomly-weighted aggregate score with the current aggregate score (equal weights) for all policy areas.

These sensitivity analyses shows that the aggregate score does not vary a lot on average, the effect could be non-negligibly higher for some countries. However, the choice of random weights instead of equal-weights does not lead to strong changes. Dropping indicators, which are not available for at least 22 countries has a more substantial effect. There is a clear trade-off here: dropping these indicators might increase the comparability of the aggregate score. However, it might also lead to dropping useful indication when available. Therefore, it appears more appropriate to keep all available indicators and to systematically display the difference from the score based on a set of indicators available for most or all countries. Taking the most redundant indicators out has also a non-negligible impact on some countries.

Table 9 gives an *a priori* indication of reliability for each policy area as agreed by LIME, where three stars (***) signifies high reliability and one star (*) signifies low reliability. It should, however, be noted that this indication of reliability could change over time if new reliable data becomes available (e.g. updated EPL and PMR indicators of the OECD – although some LIME members are sceptical regarding the reliability of these indicators even if updated), or if additional analysis can strengthen the understanding of the channels through which policies affect growth performance. However, for some policy areas, such as the competition policy framework, there are only few indicators and the indicators that are available have a limited bearing on the assessment of both performance and policy response.

Table 9. The overall reliability of indicators used to assess performance of policy in LAF

Policy area	Overall reliability	Explanation
Labour market		
Active labour market policies	**	Indicators do not capture the efficiency of public spending and the quality of the micro design of institutions.
Making work-pay: interplay of tax and benefit system	***	
Labour taxation to stimulate labour demand	***	
Job protection and labour market segmentation/dualisation	**	Lack of policy indicators: EPL indicators excluded from the narrow list. The segmentation dimension better captured than Job protection.
Policies increasing working time	***	
Specific labour supply measures for women	***	
Specific labour supply measures for older-workers	***	
Wage bargaining and wage-setting policies	**	Lack of reliable and timely indicators on important dimensions of wage-setting institutions (bargaining coverage, unionisation).
Immigration and integration policies	***	
Labour market mismatch and labour mobility	**	No policy instrument indicator available.
Product and capital market		
Competition policy framework	*	Lack of up to date indicators. PMR indicators from OECD are excluded from the narrow list.
Sector specific regulation (telecom, energy)	**	Some important sectors are not covered in the narrow list for timeliness reasons.
Business environment - Regulatory barriers to entrepreneurship	**	The reliability of some of the World Bank Doing Business indicators may need to be further explored. Also, no indicators on administrative burdens exist.
Business Dynamics - Start-up conditions	**	The reliability of some of the World Bank Doing Business indicators may need to be further explored.
Financial markets and access to finance	**	The structure of the financial market and the mean of financing may vary from one country to another.
Market integration - Openness to trade and investment	**	Some of the indicators may be affected by the size of the country
Innovation and knowledge		
R&D, innovation policies	***	
ICT	**	The coverage could be extended although correlations are high in this policy area.
Education and life long learning	***	
Macroeconomy		
Orientation and sustainability of public finances	***	It has been supplemented by many new indicators on sustainability and ageing projections.
Other		
Macroeconomic background information		

3.3. The link between underperformance in policy areas and relevant GDP components

The final step of LAF is a screening exercise which compares whether there is coincidence between underperformance in a policy area (i.e. a negative sign (-) in the final column in Table 5) and underperformance in a relevant GDP component (i.e. a negative sign (-) in the final column on Table 1. This yields a list of underperforming policy areas which are qualified with evidence on relevant links to GDP. As such it may help establish priorities amongst policy areas which have been identified as underperforming, as an aim of the Lisbon process is to focus on reforms which can contribute most to raising growth and jobs potential. Moreover, it can also highlight potential interlinkages or packages of reform measures.

Table presents an overview of the screening exercise. All 20 LAF policy areas are presented on the vertical axis and the GDP components on the horizontal axis. The survey of the economic literature (see annex II) identified a list of GDP components each policy area could impact, which are graphically shown by the shaded cells: for instance, active labour market policies could theoretically impact youth participation, 25-54 male participation, 25-54 female participation, 55-64 participation and unemployment rate.

When there is coincidence between underperformance in a policy area and a relevant GDP component the respective field in Table 10 is marked with an "x". It should be underlined that this exercise provides no evidence of causality, but simply points to a coincidence of underperformance.

The results of this screening exercise are read in three different ways in order draw some insights on:

- *a horizontal reading* of Table 10 examines the possible impact of each underperforming policy area in terms of underperforming GDP components;

- *a vertical reading* of Table 10 examines possible packages of policy responses that could respond to underperformance in GDP components;

- *mismatches might appear from a vertical reading* of Table , i.e. the items that are not captured in the screen exercise in table 8. For example, underperformance in some policy areas may exist without any underperformance in relevant GDP components, and vice versa there may be underperformance in a GDP component without any underperformance in relevant policy areas.

Table 10 Screening of coincidence between underperformance in policy areas and relevant GDP components

	Demographic components			Labour market components						Labour Productivity		
	Fertility (level) / Native Population (growth)	Share of foreign population (level) / Net Migration (growth)	**Share of Working age Population**	**Youth Participation**	25-54 Male Participation	25-54 Female Participation	**55-64 Participation**	**Unemployment Rate**	**Average Hours Worked**	Capital Deepening	Total Factor Productivity	Initial education of labour (Labour quality)
Active labour market policies												
Making work-pay: interplay of tax and benefit system							x	x				
Labour taxation to stimulate labour demand								x				
Job protection and labour market							x	x				
for older-workers							x					
Wage bargaining and wage-setting policies												
Immigration and integration policies								x				
Labour market mismatch and labour mobility												
Competition policy framework												
Sector specific regulation (telecom, energy)												
Business environment - Regulatory barriers to entrepreneurship												
Business Dynamics - Start-up conditions												
Financial markets and access to finance												
Market integration - Openness to trade and investment												
R&D and Innovation												
ICT												
Education and life long learning												
Orientation and sustainability of public finances												

Policy areas identified as underperforming (-) are highlighted in bold

GDP components identified as underperforming (-) are highlighted in bold

A coincidence of underperformance in a policy area and relevant GDP component is indicated by"x"

The links in the economic literature between policy areas and relevant GDP component are represented by the shaded cells

ANNEX I:

A CLOSER LOOK AT GDP ACCOUNTING AND CYCLICAL ADJUSTMENT

1. GDP DECOMPOSITION

This annex provides more details on the first step of LAF, namely the growth accounting and includes an analysis of cyclical adjustment. It draws upon several notes examined by LIME.

1.1. Presentation of the GDP breakdown in levels and changes

The first step of LAF involves identifying those components of growth where Member State are underperforming relative to the EU15 average, and also determining the degree/intensity of that underperformance. It involves a GDP accounting exercise which decomposes GDP per capita, in level and in changes, into 12 components. They are the contribution of natural population increase, migration rate, ratio of working-age population to total population, participation of youth, prime-age men, prime-age women and older workers, unemployment, average hours worked, labour quality, capital deepening and TFP (as the Solow's residual). The advantage of this detailed growth accounting is to dig deeper into three dimensions: The Table 1 below explains the decomposition of GDP in details. The advantage of this detailed growth accounting is to dig deeper into three dimensions:

- *demographics*: the working-age population growth is decomposed into natural population increase, the contribution of the change in the migration rate and the change in the age-structure of total population;

- *labour participation:* the contribution of the total participation rate is broken down by relevant age and gender groups: youth, prime-age men (aged 25-54), prime-age women, old-age workers (aged 55 and over). Given that the last two groups are particularly sensitive to policies[14], and display the most dynamic increase recently, their specific monitoring is fully warranted. The relevance of this further breakdown is confirmed by *ex post* analysis showing that youth participation and male prime-age participation are often behaving very differently from the participation of prime aged women and older-workers;

- *labour quality:* an indicator of initial education of labour is added (i.e. the employment composition by educational attainment). This inclusion helps better specify TFP as "pure" technical progress, which would otherwise have encompassed the initial education of labour.

14 e.g. childcare facilities, part-time employment regulation, flexible working time arrangements, the removal of fiscal distortions, reforms of old-age pension regimes and early-retirement schemes.

Table 1. The components used in the GDP accounting exercise

Decomposition in level (GDP per capita)	Definition	Comments	Decomposition in growth (GDP growth)	Definition	Comments
Fertility rate	Absolute difference between the fertility rates of the country considered and the EU15	Not strictly speaking a component of GDP per capita but useful stock variable to assess the starting condition of the increase in native population (flow variable). It is much better than the size of population which makes no sense in a benchmarking perspective, where small countries will always be the worst performers). The fertility rate also complements the share of working-age population, as the former gives information on the future trend of the population as opposed to the former, which is the result of past trend.	Native population	Growth in native population (total population less the cumulated flows of net migration from 1999).	This concept corresponds to the natural increase of the population (births minus deaths). Additive decomposition.
Net migration	Absolute difference between the migration rate (net migration flow over total population) of the country considered and the EU15	Not strictly speaking a component of GDP per capita but useful stock variable to assess the starting condition of net migration (flow variable).	Net migration	Growth in the ratio of net migration to the native population.	Net migration is defined by Eurostat as the difference between the increase in total population and the balance of births and deaths. Additive decomposition.
Share of working age population in total population	Relative gap of the share of working age population in total population vis-à-vis the EU15	Not additive but multiplicative decomposition. Only demographic component of GDP per capital.	Share of working age population in total population	Growth in the share of working age population in total population vis-à-vis the EU15. The working-age population is made of those 15-64.	Additive decomposition.
Sub-aggregate DEMOGRAPHIC COMPONENT	The demographic component is computed in an ad hoc way as the average score of the three demographic components in level, so that they appear to average out.	Strictly speaking the demographic component of GDP per capita is equal to the share of working age population (reported in the third row), since the fertility rate and the share of working-age population are only displayed to put the score of native population growth and the growth contribution of migration into context (i.e. relating it to its starting condition). The fertility rate also complements the share of working-age population, as the former gives information on the future trend of the population as opposed to the former, which is the result of past trend.	**Sub-aggregate DEMOGRAPHIC COMPONENT**	Growth in the working-age population	Additive decomposition. It can be obtained as the sum of the contributions of native population, migration and share of working-age population.

Youth Participation	Relative gap of the participation rate for those aged 15-24 vis-à-vis the EU15, *multiplied* by the share of those aged 15-24 in total working age population	Not additive decomposition of total participation but more easily interpretable in terms of relative performance.	Youth Participation	The growth in the participation for those aged 15-24 vis-à-vis the EU15, *multiplied* by the share of those aged 15-24 in total working age population	A necessary statistical correction is used to convert the LFS data on participation for specific age group into National Account concepts, which are consistent with the concept of GDP and are systematically employed in the GDP accounting exercise. This additive correction consists of the gap between the overall contribution of total participation in LFS and Nationals accounts, weighted by the share of the group in the working-age population. Therefore the group-specific contributions add up to the overall participation contribution derived from the National account. The consequence can be a discrepancy in some cases between the direction of changes in the LFS participation rate and the sign of its contribution to growth.
Male prime-age participation	Relative gap of the participation rate for men aged 25-54 vis-à-vis the EU15, *multiplied* by the share of men aged 25-54 in total working age population		Male prime-age participation	The growth in the participation for men aged 25-54 vis-à-vis the EU15, *multiplied* by the share of men aged 25-54 in total working age population.	
Female prime-age participation	Relative gap of the participation rate for women aged 25-54 vis-à-vis the EU15, *multiplied* by the share of women aged 25-54 in total working age population		Female prime-age participation	The growth in the participation for women aged 25-54 vis-à-vis the EU15, *multiplied* by the share of women aged 25-54 in total working age population.	
Older-worker participation	Relative gap of the participation rate for those aged 55-64 vis-à-vis the EU15, , *multiplied* by those aged 55-64 in total working age population		Older-worker participation	The growth in the participation for those aged 55-64 vis-à-vis the EU15, *multiplied* by those aged 55-64 in total working age population.	
Unemployment rate	Relative gap of the non unemployment rate (one minus the unemployment rate) vis-à-vis the EU15	Not additive but multiplicative decomposition.	Unemployment rate	The growth in the non unemployment rate (one minus the unemployment rate)	
Working time (Average Hours worked per person)	Relative gap of the average hours worked per person employed vis-à-vis the EU15	Not additive but multiplicative decomposition.	Working time (Average Hours worked per person)	The growth in the average hours worked per person employed	Additive decomposition

Sub-aggregate LABOUR MARKET COMPONENT	Relative gap of the average hours worked per working-age 15-64 persons	Not additive but multiplicative decomposition.	**Sub-aggregate LABOUR MARKET COMPONENT**	The growth in the average hours worked per working-age 15-64 persons	Additive decomposition. It can be obtained as the sum of the contributions of the participation of youth, prime age men and women and older workers, unemployment rate and working-age population.
Initial education of labour (power the labour share 65%)	Relative gap of the initial education of labour *power the labour share* (65%) vis-à-vis the EU15	Not additive but multiplicative decomposition. This indicator informs about the effect of the composition of employment by educational attainments, of which relative productivity is proxied by EU15 relative wages by level of education.	Labour quality (power the labour share 65%)	The growth in the indicator of initial education of labour, multiplied by 65% (the labour share in total value added)	Additive decomposition
Capital accumulation (capital *per hour worked*)	Relative gap of total capital stocks per hour worked vis-à-vis the EU15	Not additive but multiplicative decomposition.	Capital deepening	The growth in capital accumulation (capital per hour worked)	Additive decomposition
Total factor productivity (Solow's residuals)	Relative gap of TFP vis-à-vis the EU15	Not additive but multiplicative decomposition. Total factor productivity is defined as the Solow's residual, once the other components are taken into account. It is virtually a "catch-all" variable, which is potentially affected by a wealth of factors, which are difficult to disentangle. Therefore, an "average performance" in TFP might conceal some particular problems in the product market and the area of innovation and knowledge, which are offset by good performances in other policies.	Total factor productivity (Solow's residuals)	The additive residuals of GDP growth: GDP growth minus all of the other components.	Therefore, all contributions add up to total growth.
Sub-aggregate HOURLY PRODUCTIVITY	Relative gap of hourly productivity vis-à-vis the EU15. Hourly productivity is defined as the ratio of GDP to total hours worked in the economy.	Not additive but multiplicative decomposition. Total factor productivity is defined as the Solow's residual. The one emerging once the other components	**Sub-aggregate HOURLY PRODUCTIVITY**	The growth in hourly productivity vis-à-vis the EU15. Hourly productivity is defined as the ratio of GDP to total hours worked in the economy	Additive decomposition. It can be obtained as the sum of the contributions of initial education of workers, capital deepening and total Factor Productivity. .

1.2. Caveats and limitations

The accounting approach presents a couple of limitations. Four caveats should be mentioned and duly borne in mind.

- The approach is descriptive and does not inform about causality per se. For instance, growth and its components can be affected by common caused such as the business cycle, which plays an important role if the time period being considered is short. More generally, developments in each component might be difficult to interpret in practice, given the multiplicity of factors affecting them, the existence of trade-off/interaction between variables and the residual role of TFP as a catchall variable.

- The potentially substantial role of trade-off/interactions between components calls for a "dynamic reading" of the GDP accounting instead of a static examination, where each component is considered one by one in isolation. Although, the approach does not allow for a quantification of trade-offs or interactions, a careful and dynamic interpretation should pay attention to a couple of interactions (complementarities or trade-offs), which are well known in the economic literature. In particular, five types of interactions deserve being a systematically borne in mind. First, a strong (weak) employment could be associated with a weak (strong) hourly productivity, through relatively low (high) capital accumulation per worker, lower (higher) initial education of those employed or weaker (stronger) TFP induced by the lower (higher) average level of skills that are not captured by initial education. Indeed, an inclusive labour market tends to reduce capital-labour intensity mechanically –as the capital stock is divided by more labour) and attracts less productive people into employment. It might also signal a higher return of labour relative to capital, leading to less capital accumulation. Likewise, high average hours worked might mean lower productivity, due to lower capital/hours-worked intensity and negative marginal returns of long working-time. Second, a high female participation might mean in some countries a high level of part-time employment, which bears negatively upon the average hours worked per person employed. There could then be a partial trade-off between higher participation (external margins) and average hours worked (internal margins), although the net effect on total hours worked is often found to be positive (e.g. Garibaldi and Mauro, 2002 and Mourre, 2006). Third, a high level of initial education of labour could mean a relatively low participation of youth to the labour market, as young people are enrolled massively in schools and universities. Fourth, in countries with relatively high per capita GDP, decreasing population or a relatively low share of working-age population might be associated with higher contribution of migration.

- A special note of caution should be mentioned as regards the data on migration and its mechanical interpretation as a growth component. Since most countries either do not have accurate figures on immigration, and especially emigration, or have no figures at all (gross flows), we use estimates of net migration derived from the difference between the population change and the natural increase of population between two dates (i.e. the difference between the number of births and deaths during the year). Moreover, net migration data are defined as the difference between immigration into and emigration from a given country during a particular year: net migration is therefore negative when the number of emigrants exceeds the number of immigrants. It should be borne in mind that net migration flow data are not disaggregated between intra- and inter-EU flows. As there is also no breakdown of migrants by age, gender, or educational attainment, the growth accounting analysis mechanically considers the role of migration in the change in overall population size. When the analysis highlights an increasing role of migration as a source of economic growth, it cannot assess

the full economic impact of migration, which broadly depends on the efficient integration of migrants in the labour market and on the skills and productivity of migrants. The impact of migration is also partly captured by the other components of growth, such as labour quality, productivity, participation rates or the unemployment rate, which is not taken into account by the mechanical effect of migration on total population, presented in the growth accounting. The growth accounting approach therefore tends to overestimate the impact of migration on growth in the short to medium term, as the migrants compared with the natives tend to participate less in the labour market, to suffer from higher unemployment and to display a lower level of education on average (Diez Guardia and Pichelmann, 2006).

- More technical and ancillary issues include the choice of a Cobb-Douglas specification of the production function, the supposed absence of economy of scale, the choice of labour share calibration, etc. Statistical and measurement problems (identification of the quality of productive factors, measures of hours worked) can also weigh upon the reliability of any detailed growth decomposition.

1.3. Can government policies impact the GDP components?

The accounting approach, and especially the growth accounting, has several advantages from the perspective of policy analysis. It is based on an uncontroversial and commonly used description, based on a Cobb-Douglas representation of the production function. This is feasible for all EU27 countries, making cross-country comparison possible and relatively easy. It is also a flexible tool as growth components can be broken down to a level that best fits policy needs. The graphical representation allows one to intuitively identify the areas of growth weaknesses, the trade-offs between components and the large components such as TFP for which further insights might be required (e.g. from sectoral analysis). It is also a flexible approach, as the different contributions are additive and could be rearranged at will to fit the analytical needs. We use this flexibility to develop the standard growth accounting towards a more detailed description of labour inputs, which also attempts to distinguish broadly exogenous factors from policy-influenced factors. Some GDP components are potentially influenced by governmental policies in the short and medium run, while the others are clearly out of the reach of governmental actions in the short and medium run (demographic and deeply-rooted societal factors). More specifically, three groups of components can be identified:

Some factors are outside the direct control of government (mainly exogenous), such as the growth of native population and the ageing of population captured by the declining share of working age population in total population (i.e. increased dependency ratio). Of course, those factors are strictly speaking exogenous in the short and medium term only but may potentially be changed by policies in the long term, although with great uncertainty. For instance, policies designed to restore positive population growth will not have direct (supply side) effects on population size until the long run but the intermediate result (higher fertility rate) can be immediately measured;

Some growth components can partly be influenced by governmental policies (partly endogenous), such as female participation thanks to reduced tax distortion, family friendly policies and less discrimination. However, the cohort effect, associated with societal change and rising educational levels, contributes to mechanically raising the female participation rate. Likewise, while net migration flows are partly at the government discretion, they also partly depend upon uncontrollable illegal immigration, family reunification rules, binding refugee convention and the normal play of globalisation (e.g. migration of students). In the same vein, while average hours worked per person employed are in part related to the business cycle and people's preference for leisure, it will also be determined by the interplay of tax and benefit systems, which could cause poverty traps, preventing

additional working hours from paying off. Capital deepening (i.e. the rise in capital intensity) is sensitive to the quality of the macroeconomic framework, the rigidity of the labour and product markets, the level of entrepreneurship and the relative price of labour and capital, but also depends upon many determinants such as initial capital stock, world demand and the business cycle. TFP could partly be enhanced by good innovation policies, more efficient ICT dissemination policies, the stimulation of R&D and a flexible functioning of labour and product markets, although numerous factors of structural nature might play a great part such as the distance to the production frontier, the average age of capital stock, etc.

A set of growth factors are crucially influenced by public policies and the institutional setting (mainly endogenous). The initial education of labour (as a rough proxy for labour quality) should greatly depend upon the existence of an efficient system of initial education and upon the design of tax and benefit systems, which could greatly affect the return of human capital investment. However, while the impact of the improvement of vocational training systems and on-the-job training could be seen in the medium run, the reform in the initial education system may take much longer time to materialise as higher growth. This will occur only when the younger generations replace the older ones in the labour market. Moreover, the participation of youth to the labour market will be affected by educational policies, the rigidity in the labour market and, to some extent, the business cycle. Besides the effect of the economic cycle, male prime-age participation primarily hinges upon the existence of inactivity traps generated by tax and benefit systems. The change in old-worker participation is primarily caused by the removal of early-retirement schemes, the reforms of pension system, which reduces the implicit rate of taxation, and other policies to make work pay. The development of flexible work arrangements and combating age discrimination might help . Unemployment is affected by the business cycle and by all types of institutional rigidities influencing the labour demand and the labour supply (unemployment traps and tax wedge, insufficient labour mobility and matching, rigid employment protection legislation, inadequate wage-setting, etc). Malfunctioning product market may play an additional part in hindering business development.

1.4. Computing a comparable indicator of labour quality: the initial education of labour

The indicator of "initial education of labour" measures the average productivity per person employed relative to the productivity of the low skilled, proxied by that of those with lower secondary education or less. The indicator moves with the change in the employment composition by educational attainment. If this change is neglected, it is implicitly incorporated in TFP movements (i.e. Solow's residual) and could be misinterpreted as a change in technical progress. The indicator is computed as follows:

$$Q_t = \frac{1}{E_{L\,t} + E_{M\,t} + E_{H\,t}} \cdot \sum_{S \in \{Low,\, Medium,\, High\}} \left(E_{S\,t} \cdot \frac{W_{S\,2002}}{W_{L\,2002}} \right).$$

where Es and Ws are respectively employment and hourly wage (without overtime) for each skill group. Q is the relative hourly wage of those with the educational attainment *s* (low, medium or high) compared with the low skilled (i.e. those with lower secondary education or less). As it is commonly assumed in the literature, this ratio is a proxy of the relative productivity of those with skill *s* compared with the low skilled. The data are stemming from the Structure of Earning Survey SES2002 and are only available for the year 2002[15]. In this

15 The indicator is based on the 2002 proxy of relative productivity by educational attainment: however, its real value should not change dramatically over a ten-year period.

framework, Q measures average productivity per person employed in low-skilled equivalent and Q*E*H measures total labour input expressed in low-skill equivalent. In this setting, a low skilled worker is worth one unit, while high skilled labour is worth the relative productivity of the high skilled compared with the low skilled (which is higher than 1). Although this method somehow resembles to that used by OECD (Scarpetta, Bassanini, Pilat and Schreyer, 2000), it is slightly different in the sense they compute the average wage per person employed rather than the average wage in low skill equivalent (that is, the average wage per person employed compared with that of the low skilled.). They use different data of wages by educational attainment. Indeed, another crucial point is that the relative wages used here in the indicator calculation are those of the EU15 and not those of individual countries. Although using the latter might partly allow for reflecting the fact that the level of professional skills are not equivalent across countries for the same level of educational attainment, it faces the major shortcoming of also capturing the degree of wage compression and the existence (and level) of minimum wages, which strongly differ amongst EU countries. In countries with relatively high minimum wages compared with the average earnings, such as Belgium and France, the relative productivity of the high skilled as measured by relative wages is distorted and artificially low. Therefore, using a common standard for relative wages across all EU27 countries ensures that the indicator only measures differences in the initial education of those employed.

This indicator, which captures the impact of the compositional change of employment by educational attainment, is not entirely covering the very complex concept of "skill", and calls for a couple of caveats. It only includes initial education, but does not capture "on-the-job" gains in competence, professional experience and "soft-skills" which can be acquired through professional activity. It is a degree-based indicator, and does cater for early-school leavers who may have accumulated useful passive knowledge, which is not recognised by a formal diploma. More broadly, it measures the potential skills obtained in the schooling system and not the skills actually exploited through economic activity. The "over-qualification" of the workforce is indeed frequent in many European countries characterised by high unemployment rates. Moreover, it does not include the skills acquired through vocational training systems and life-long leaning policies.

Having that in mind, the indicator provides useful insights and there is no obvious alternative. Its inclusion in analysis to decompose economic growth has a number of significant advantages. It has clear economic meaning, albeit only capturing one dimension of the complex skill issue. It represents a significant effect, contributing to 0.3 p.p. of total GDP growth in EU15 between 1995 and 2006. It is calculable and requiring neither model-based estimates nor micro-data, which are very complex and time-consuming to handle. One can compute it for all EU27 countries from 2006 back to the early 1990s, with annual update, based on relatively harmonised macro data coming from Labour Force Survey and following the international ISCED1997 classification. Moreover, there is no obvious operational alternative. In an influential paper, De la Fuente and Domenech (2006) propose a very interesting indicator of average number of years of schooling, and they measure its impact on growth by taking into account the positive externalities of human capital accumulation on growth. However, the raw data available at country level are not harmonised and generally of very poor quality. They only cover the adult population, not those employed and contributing to the economic activity. De la Fuente and Domenech (2006) use various econometric techniques to estimate the real contribution of average number of years of schooling to GDP growth. Their series are only computed from 1960 to 1999 and cover main OECD European countries only, leaving out half of the EU10 countries. Their methodology is complex, not easily replicable for missing countries and runs into data availability problems. It also faces the issue of excluding "on-the-job" learning and any kind of training.

The measured contribution of the "labour quality" component to economic growth should be interpreted carefully. The structure of employment by skill is changing fast with the share of low skilled workers declining sharply over time. For instance, the share of those with lower-secondary education or less in total employment in EU27 fell from 37% in 1995 to 35% in 2000 and 30% in 2005, while the weight of those tertiary educated rose from 20% in 1995 to 23% in 2000 and 25% in 2005. Labour quality indicator in absolute terms made a positive contribution to growth over the period 1995 to 2006 in all countries except EE. This might reflect two trends of different nature, both contributing to the positive growth but difficult to disentangle:

- *the rise in the average educational attainment of the working-age population.* The average number of years of schooling has increased across the EU. This has partly been explained by the growing part played by education and knowledge in modern economies, but also by past policies which have (either deliberately or unintentionally) curtailed the labour supply, in particular, by delaying the entry of youth into the labour market;
- *the exclusion of the low-skilled from employment.* Three explanations for that are conventionally put forward, i.e. globalisation and the pressure exercised by low-wage countries, the "skill-bias" of technical progress which demands a more qualified and adaptable workforce at the expense of the low skilled, and increasing competitive pressures pushing firms to race for innovation and to implement or develop ICT, which are intensive in highly skilled employees.

2. TAKING ACCOUNT OF THE BUSINESS CYCLE

The economic cycle may impact the results of the growth accounting. Therefore, DG ECFIN has estimated the cyclical reaction of each growth component by regressing them on output gap from AMECO with a panel of 27 EU countries covering the period 1995-2005.

2.1. Cyclical-adjustment: a hybrid model with output gap and change in output gap

This method does not claim to be the best way of identifying the cyclical effects but has the great merit of being applicable consistently to all twelve GDP components (unlike the Output Gap Working group method, which is more reliable and economically-sound), while remaining relatively clear and simple. We first use the following simple fixed-effect specification where k is the identifier of growth components, OG denotes a measure of the cyclical position of the economy, ΔOG the change in cyclical position from the previous year and αi are i country dummies.

$$Contrib_{k\,it} = \alpha_{k\,i} + \beta_k \; OG_{it} + \gamma_k \; \Delta OG_{it} + \varepsilon_{k\,it}$$

We then remove the effect of the business cycle from the contribution to growth.

$$CycleAdjusted\ Contrib_{k\,it} = \hat{\alpha}_{k\,i} + \hat{\varepsilon}_{k\,it}$$

This model is hybrid in the sense that there is no choice made on the specification of the cyclical pattern. Indeed, except for GDP growth, which theoretically depends upon the change in output gap only, there is no compelling theoretical rationale in favour of apprehending the effect of the business

cycle with only the level of output gap or the change in output gap. As seen in Table 2, the estimation seems to back this approach using both level and change of output gap, as the cyclical pattern (i.e. the role of level or change in output gap) varies across growth components.

Table 2 Estimation of the cyclical impact on each growth component score (in bold the coefficients used in the cyclical adjustment)

	Residual following common AR(1)				Residual following country-specific AR(1)				Instrumental variable: one-year-lagged output gap and change in output gap			
	Output gap		Change in output gap		Output gap		Change in output gap		Output gap		Change in output gap	
GDP			1.006	(83.20)***			1.027	(94.57)***	0.285	(5.40)***	1.135	(21.31)***
Native Pop	-0.01	(-3.37)***	0.013	(3.84)***	-0.015	(4.91)***	0.016	(5.01)***	-0.016	(-1.04)	0.031	(2.01)**
Migration	0.029	(4.59)***	-0.026	(-4.34)***	**0.034**	(6.02)***	**-0.031**	(-5.98)***	-0.005	(-0.21)	-0.09	(-4.17)***
Working-age pop. share	0.002	(0.55)	-0.005	(-1.42)	0.003	(0.87)	-0.007	(-1.93)*	0.008	(0.85)	-0.002	(-0.24)
Youth participation	0.029	(1.42)	0.079	(3.39)***	0.005	(0.29)	**0.084**	(4.28)***	0.086	(1.88)*	0.154	(3.34)***
Prime-age male part.	0.007	(0.69)	**0.032**	(2.62)***	0.006	(0.59)	0.03	(2.60)***	0.057	(2.14)**	0.08	(2.98)***
Prime-age female part.	-0.015	(-1.12)	**0.04**	(2.78)***	-0.015	(-1.24)	0.034	(2.56)**	0.012	(0.39)	0.034	(1.09)
Older-worker part.	0.035	(2.62)***	-0.023	(-1.34)	**0.037**	(3.16)***	-0.012	(-0.81)	0.082	(2.31)**	0.018	(0.51)
Unemployment	0.161	(5.20)***	0.137	(4.16)***	**0.196**	(8.70)***	**0.121**	(4.52)***	0.221	(2.84)***	0.218	(2.78)***
Average hours worked per person	-0.043	(-1.90)*	0.034	(1.6)	**-0.041**	(-2.01)**	0.03	(1.57)	-0.18	(-2.72)***	-0.065	(-0.97)
Initial education of labour	**-0.068**	(-2.98)***	0.034	(1.4)	-0.057	(-2.62)***	0.023	(0.99)	-0.096	(-1.29)	-0.002	(-0.03)
Capital deepening	0.036	(1.73)*	-0.128	(5.23)***	**0.042**	(-2.34)**	**-0.129**	(-6.12)***	0.082	(1.81)*	-0.102	(-2.22)**
TFP	-0.017	(-0.51)	0.802	(20.71)***	-0.016	(-0.54)	**0.841**	(25.41)***	0.033	(0.47)	0.861	(12.21)***
Number of observation	265				265				238			

*Value of t- statistics in parentheses: * significant at 10%; ** significant at 5%; *** significant at 1%. Note: The first two equations are estimated over the period 1995-2005 by feasible generalised least squares allowing for heteroskedastic errors and first order serial correlation. The later is estimated as common across countries in the first equation and as specific to each country in the second equation. The first two equations contain country dummies to account for cross-country heterogeneity. The third equation is estimated with instrumental variable techniques, using one-year-lagged output gap and one-year-lagged change in output gap as instrumental variables.*

We run this equation for each policy area, except for native population and the share of working-age population, for which there is no sound theoretical reasons justifying any cyclical pattern. We select the output gap coefficients with the highest t-statistics in the first two equations, as marked in bold in Table 2. The third equation, which is run over fewer observations due to the inclusion of lagged variables, is only shown as a robustness check. The selected coefficients are used to correct the growth in GDP components from the cyclical components.

The estimated coefficients are in compliance with the expected sign, except for hours worked. The following growth contributions appear to be procyclical: unemployment and TFP, to a lesser extent, youth participation, prime-age male participation and prime-age female participation, older-worker participation, unemployment and migration, which complies with expectations. Conversely, average hours worked per person, the initial education of labour and capital deepening appears countercyclical. The surprising negative correlation of output gap with average hours worked should be investigated further, as it is at odds with the counter–cyclical pattern of part-time employment rate, which is one key driver of average hours worked. On the other hand, a high output gap might coincide with more recruitment as an alternative to overtime to raise productive capacity. The initial education of labour increases in good time (and declines in bad times), as booming labour markets are more inclusive for low-skilled employees. As for TFP, it will incorporate the movements in productive capacity utilisation that are not captured by cyclical movements in labour input: for instance, a high level of labour hoarding in a cyclical downturn will be reflected in lower TFP. Prime-age participation does not seem to be significantly related to output gap. Moreover, except for migration and as already mentioned above, we assume that demographic growth components are not influenced by the business cycle, as there is no theoretical reason to believe so.

2.2. The result of the cyclical adjustment

Table 3 shows the estimated cyclical component of each growth contribution in percentage point, which is generally moderate in terms of annual average. However, for some countries and some GDP components, the cyclical effect is not negligible (e.g. for unemployment or TFP, especially in new member states), all the more if we consider cumulated growth over a multi-annual period, when the annual growth rate cumulate. The strongest impact of the business cycle on the score is seen for the contribution of TFP and, to a lower extent, unemployment, capital deepening and initial education. More marginal impacts show up for, average hours worked, youth participation, older worker participation, although not always negligible for particular countries, especially amongst the New Member States. The cyclical adjustment of GDP growth, obtained as the sum of the adjusted contributions to growth, is close but not identical to the rougher method consisting in applying the method directly to GDP growth. The former method leads to an annual average cyclical adjustment of 0.0, -0.2 and -0.1 for the EU27, the EU15 and the euro area respectively. Table 4 displays the estimation of each cyclically-adjusted growth contribution, that is, the contribution to growth after removing the cyclical components displayed in Table 3.

Table 3. Estimation of the cyclical component of each growth contribution in percentage point

Cyclical effects 2001-2006			Capital Deepening	Total Factor Productivity	Initial education (Labour quality)	Share of Working age Population	55-64 Participation	Unemployment Rate	Average Hours Worked	Native Population	Net Migration	Youth Participation	25-54 Male Participation	25-54 Female Participation
	GDP aggregate	Sum of GDP components	CI	TFP	LQ	SWP	OPR	Unempl	AHW	Npop	MI	YP	MP	FP
AT	-0.4	-0.4	0.0	-0.3	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
BE	-0.3	-0.2	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BG	0.6	0.7	-0.1	0.5	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
CY	-0.3	-0.1	0.1	-0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
CZ	0.4	0.0	-0.1	0.3	0.1	0.0	-0.1	-0.4	0.1	0.0	-0.1	0.0	0.0	0.0
DE	-0.3	-0.3	0.0	-0.2	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
DK	-0.3	-0.3	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EE	0.7	0.4	-0.1	0.6	0.1	0.0	0.0	-0.1	0.0	0.0	-0.1	0.1	0.0	0.0
ES	-0.3	-0.2	0.1	-0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
FI	-0.6	-0.6	0.1	-0.5	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1	0.0	0.0
FR	-0.3	-0.1	0.1	-0.2	-0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
GR	0.5	0.6	-0.1	0.4	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
HU	0.3	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IE	-0.7	-0.2	0.2	-0.6	-0.2	0.0	0.1	0.4	-0.1	0.0	0.1	-0.1	0.0	0.0
IT	-0.3	-0.2	0.1	-0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
LT	0.8	0.7	-0.1	0.7	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0
LU	-0.6	-0.5	0.1	-0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0
LV	0.3	0.2	-0.1	0.3	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
MT	-0.9	-0.8	0.1	-0.7	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1	0.0	0.0
NL	-0.7	-0.6	0.1	-0.6	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1	0.0	0.0
PL	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
PT	-0.7	-0.6	0.1	-0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0
RO	1.2	0.5	-0.3	1.0	0.2	0.0	-0.1	-0.5	0.1	0.0	-0.1	0.1	0.0	0.0
SE	-0.2	-0.3	0.0	-0.2	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0
SI	-0.4	-0.5	0.0	-0.3	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0
SK	-0.3	-0.8	-0.1	-0.2	0.2	0.0	-0.1	-0.5	0.1	0.0	-0.1	0.0	0.0	0.0
UK	-0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EU27	-0.1	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EU15	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Euro area	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
EU5	-0.6	-0.5	0.1	-0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 5 shows the difference in results between the new scoring systems applied to the cyclically-adjusted growth contributions and the new scoring systems applied to the raw growth contributions. As an example, when correcting for the impact of the business cycle, AT seems to see its score deteriorate by one unit for initial education but improve by one unit for TFP, by two units for older-worker and youth participation and by three units for non-unemployment rate. The other scores remain unchanged when the first decimal is not displayed (albeit calculated with all decimals in the LAF database). By and large, the change in scores of GDP accounting when cyclicality is taken into account does not appear dramatic in EU15, given the relatively moderate magnitude of the output gap in the period considered. However, the change in score, especially for unemployment and average hours worked is far stronger in many New Member States.

Table 4. Estimation of each cyclically-adjusted growth contribution in percentage point

Cyclically-adjusted with outputgap& OG first differenc Average growth 2001-2006			Capital Deepening	Total Factor Productivity	Initial education (Labour quality)	Share of Working age Population	55-64 Participation	Unemployment Rate	Average Hours Worked	Native Population	Net Migration	Youth Participation	25-54 Male Participation	25-54 Female Participation
	GDP aggregate	Sum of GDP components	CI	TFP	LQ	SWP	OP	Unempl	AHW	Npop	MI	YP	MP	FP
AT	2.2	2.2	0.5	0.8	0.2	0.0	0.4	-0.1	0.1	0.0	0.5	0.1	-0.3	0.0
BE	2.1	2.0	0.3	0.4	0.4	0.0	0.5	-0.2	0.2	0.1	0.4	-0.1	-0.1	0.2
BG	4.8	4.8	1.5	1.2	0.3	0.3	1.6	1.3	0.3	-0.3	-0.4	-0.4	-0.2	-0.3
CY	3.6	3.5	0.2	-0.5	0.4	0.8	0.1	0.0	0.5	0.3	1.4	0.0	-0.1	0.5
CZ	3.8	4.2	2.2	2.1	0.0	0.3	0.7	0.7	-0.9	-0.1	0.2	-1.0	0.0	0.0
DE	1.2	1.3	0.5	1.0	0.0	-0.4	0.8	-0.3	-0.5	-0.1	0.2	-0.1	-0.1	0.2
DK	2.0	2.0	0.4	0.5	0.4	-0.2	0.2	0.1	0.3	0.1	0.1	-0.1	0.0	0.0
EE	8.1	8.3	2.8	3.2	0.0	0.3	0.5	1.4	0.2	-0.3	0.0	-0.1	0.1	0.2
ES	3.7	3.5	0.6	-0.1	0.5	0.1	0.3	0.4	-0.7	0.0	1.4	0.3	0.0	0.7
FI	3.6	3.5	0.2	2.2	0.2	-0.1	0.7	0.5	-0.3	0.1	0.1	0.0	-0.1	0.0
FR	2.0	1.8	0.6	0.8	0.3	0.0	0.4	-0.2	-0.5	0.4	0.2	0.1	-0.3	-0.1
GR	3.9	3.8	1.0	1.5	0.5	-0.1	0.3	0.3	-0.1	-0.1	0.4	-0.6	0.1	0.7
HU	4.0	4.1	2.3	1.8	0.3	0.1	1.3	-0.2	-0.6	-0.4	0.2	-1.2	0.2	0.2
IE	6.2	5.6	0.8	1.9	0.8	0.4	0.3	-0.4	-0.4	0.7	1.1	0.1	0.0	0.5
IT	1.2	1.1	0.3	-0.5	0.4	-0.4	0.4	0.6	-0.5	-0.1	0.6	-0.4	0.1	0.6
LT	7.0	7.1	2.2	3.6	0.3	0.5	0.4	2.0	0.1	-0.3	-0.2	-1.2	-0.1	-0.3
LU	4.8	4.7	1.4	1.5	0.4	0.0	0.6	-0.4	-0.4	-0.1	1.0	-0.5	0.2	0.8
LV	8.5	8.7	3.1	3.6	0.1	0.4	1.0	1.4	-0.5	-0.5	-0.1	0.2	0.0	-0.1
MT	2.1	2.0	1.0	-0.3	1.0	0.5	-0.1	0.0	-0.8	0.5	0.3	-0.5	-0.3	0.6
NL	2.2	2.2	0.5	1.1	0.4	-0.1	0.5	-0.1	-0.5	0.4	0.0	-0.2	-0.2	0.3
PL	3.7	3.8	1.5	1.5	0.5	0.5	0.0	0.6	0.0	-0.1	0.0	-0.4	-0.1	-0.2
PT	1.6	1.5	0.4	-1.0	0.6	-0.1	0.1	-0.7	1.0	0.1	0.5	-0.1	0.2	0.5
RO	4.8	5.5	1.6	2.3	0.4	0.4	0.0	0.5	0.7	-0.2	0.1	-0.8	0.3	0.2
SE	2.9	2.9	0.5	2.1	0.1	0.3	0.1	-0.2	-0.4	0.0	0.4	0.1	0.0	-0.1
SI	4.4	4.5	2.0	1.4	0.4	0.0	0.8	0.3	-0.2	-0.1	0.2	0.0	-0.3	-0.1
SK	5.8	6.3	1.6	2.9	0.1	0.6	1.0	1.6	-0.7	0.0	0.1	-1.0	0.0	-0.1
UK	2.6	2.6	0.8	1.6	-0.1	0.3	0.3	-0.1	-0.5	0.2	0.3	-0.2	0.0	0.1
EU27	1.9	1.9	0.5	0.8	0.5	0.0	0.4	0.0	-0.5	0.0	0.3	-0.1	0.0	0.0
EU15	1.9	2.1	0.6	0.5	0.2	-0.1	0.5	0.0	-0.4	0.1	0.4	-0.1	-0.1	0.2
Euro area	1.8	1.9	0.4	0.4	0.5	-0.1	0.4	-0.1	-0.5	0.1	0.4	0.0	0.0	0.0
EU5	2.8	2.7	0.6	1.0	0.4	0.0	0.4	-0.1	-0.2	0.3	0.3	-0.1	-0.2	0.2
std dev EU15	1.0	0.9	0.2	0.8	0.2	0.3	0.2	0.3	0.3	0.2	0.4	0.2	0.1	0.3

Table 5. Impact of removing the cyclical component on the score of each growth component

Growth accounting assessment vis-à-vis EU15	GDP growth	Capital Deepening	Total Factor Productivity	Initial education (Labour quality)	Share of Working age Population	55-64 Participation	Unemployment Rate	Average Hours Worked	Native Population (natural increase of pop)	Net Migration	Youth Participation	25-54 Male Participation	25-54 Female Participation
AT	2	0	1	-1	0	2	3	0	0	0	2	0	0
BE	0	0	0	0	0	0	0	0	0	0	0	0	0
BG	0	0	-1	0	0	0	2	0	0	-1	-1	0	0
CY	0	0	-1	1	0	0	-4	1	0	1	-1	0	0
CZ	14	0	5	-5	0	6	24	-9	0	1	0	0	0
DE	3	0	2	-1	0	1	4	-3	0	0	2	0	0
DK	1	0	1	-1	0	1	2	0	0	0	1	0	0
EE	0	0	0	-2	0	3	13	0	1	0	4	0	0
ES	0	0	-1	0	0	-1	1	1	0	1	-1	0	0
FI	3	0	0	0	0	0	5	-1	0	0	1	0	0
FR	-3	0	-1	1	0	-1	-5	1	0	0	-1	0	0
GR	3	0	0	0	0	0	1	1	0	0	-1	0	0
HU	6	0	1	-2	0	0	5	-2	1	0	0	0	0
IE	0	0	-5	4	0	-5	-20	8	0	0	-7	0	0
IT	-2	0	0	0	0	0	-1	0	0	0	-1	0	0
LT	0	0	0	-1	0	0	0	0	0	-1	0	0	0
LU	3	0	0	-1	0	0	0	-1	0	0	-1	0	0
LV	0	0	0	-2	0	0	0	-3	0	0	2	0	0
MT	0	0	1	0	0	1	0	-1	0	0	0	0	0
NL	1	0	0	-1	0	0	-1	-1	0	0	1	0	0
PL	7	0	2	0	0	0	0	-2	0	0	3	0	0
PT	-2	0	0	0	0	0	-7	1	0	0	-1	0	0
RO	0	0	0	0	0	0	33	-4	0	0	10	0	0
SE	4	0	1	-1	0	2	3	-2	0	0	2	0	0
SI	7	0	2	-3	0	1	9	-3	0	0	2	0	0
SK	11	0	6	-6	0	0	24	-10	0	1	0	0	0
UK	0	0	0	1	0	0	0	1	0	0	-1	0	0

Based on this analysis, it could be concluded that the effect of business cycle might be particularly relevant for some countries and some growth components (e.g. unemployment, hours worked and TFP, especially in the New Member States). This analysis may then be found useful when considering the effects of economic cycle on GDP accounting and drawing overall policy conclusions, whenever relevant. Indeed, as indicated in the main document, the business cycle is an argument to qualify the overall assessment of GDP components and make it depart from the score-based assessment. Of course the cyclical dimension should not be over-emphasised in many cases where the estimated effect remains weak.

ANNEX II:

SURVEY OF THE LITERATURE ON THE EFFECTS AND THE CHANNELS OF TRANSMISSION OF STRUCTURAL REFORMS - CHOICE OF INDICATORS.

1. INTRODUCTION

This annex presents that literature which was discussed several times by LIME[16]**.** For each policy area, it provides an overview of the recent literature on the economic effects and the channels of transmission of structural reforms from both theoretical and empirical perspectives. It also spells out the conceptual links between policy interventions and growth components, and it reviews the various effects (and possibly estimated elasticities) on relevant growth components. The surveyed contributions cover the main academic papers as well as research undertaken by the services of the European Commission and other international institutions like the OECD, IMF and the World Bank. It finally identifies relevant policy and performance indicators that can used to monitor developments in each policy area.

The literature survey for each policy area is structured as follows:

- **Definition and scope of the policy area:** this section describes the policy area and to list the main reform measures that are linked to this particular policy area.
- **Related Integrated guidelines** This section makes reference to the relevant Integrated Guidelines that the policy area will address.
- **Impact on growth components:** this section aims at identifying the theoretical mechanism and the transmission channels through which the policy area could affect the growth components. Indirect and direct effects are identified and the limitations are also detailed.
- **Evidence and Estimated elasticities in the recent literature:** This section looks at the results of the most recent empirical studies. The purpose is here to clearly evaluate the measurement and econometric problems that could arise when one consider the impact of reforms measures in the policy area on the growth components. A distinction is made between on the one hand studies that look at the aggregate impact through macro and cross-country regressions analysis and on the other hand micro and sector level analysis.
- **Possible spillover and complementarities with other policy area: t**his section details the most important complementarities and the possible spillover with the other policy areas.
- **Drawing up a non exhaustive list of relevant indicators:** this section draws a list of indicators to be check as they have been identified in the literature as being particularly relevant for the policy area. This section mostly relies of the lists of indicators developed by the EPC and the EMCO committees. A distinction is made between performance indicators and policy indicators and the name, origin, geographical and time coverage of the indicators are described. Existing possible caveats known for the indicators are listed and alternatives to the indicator chosen are discussed.

16 The literature survey was presented and discussed at the LIME meeting of September and November 2007, on the bases of the notes ECFIN/REP/54988 and ECFIN/REP/54154. The choice of indicators was further discussed at the LIME meeting of November 2007, February and April 2008 on the bases of the notes ECFIN/REP/55035, ECFIN/REP/54988 ECFIN/REP/51584, ECFIN/REP/51961.

- **Choice of indicators used to assess the performance in each policy area:** this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.
- **Short list of recent references.**

2. LABOUR MARKET

2.1. Active labour market policies.

Definition and scope of the policy area

Active labour market policies (ALMPs) are public spending aiming at encouraging the unemployed to take up a job or remain in employment. "Active" spending is opposed to "passive" spending, i.e. benefits to unemployment. The five main traditional categories of policies distinguished by the OECD are to:

- Public employment services (PES) and administration: placement, counseling and vocational guidance, job-search courses, assistance with displacement costs, administration of unemployment benefits, all other administration costs of labour market agencies including running labour market programmes.
- Labour market training: training for unemployed adults and those at risk, training for employed adults.
- Youth measures: special programmes concerning measures for unemployed and disadvantaged youth, support of apprenticeship and related forms of general youth training.
- Subsidized employment: targeted measures to promote or provide employment for the unemployed and other priority groups (but not youth and the disabled).
- Measures for the disabled: special programmes concerning vocational rehabilitation and work for the disabled.

Related Integrated guidelines

(20) Improve matching of labour market needs.
(5) To promote greater coherence between macroeconomic, structural and employment policies.
(17) Implement employment policies aimed at achieving full employment, improving quality and productivity at work, and strengthening social and territorial cohesion.

Impact on growth components

ALMP could increase employment and decrease the unemployment rate especially for disadvantaged groups for several reasons:

- ***improving the efficiency of the job matching process*** between labour supply (job seekers) and labour demand(job vacancies) by increasing the efficiency of job-search (job placement services, counselling)
- ***improving the actual job-search effort*** **(counselling)** when conditioning the eligibility to unemployment insurance on the active participation in ALMP programmes (OECD, 2003).
- ***upgrading the skills of the job-seekers (vocational training; special measure for youth which dropped out of school)***
- ***cutting recruitment costs*** to encourage firms to recruit low-skilled job seekers and to provide them with a job experience such as apprenticeship (subsidies to private employment)

In practice, however, the effectiveness of ALMPs has been found to differ significantly between different types of programmes. In particular, the outcomes of public job creation and wage subsidy programmes, which often entail large dead-weight losses and substitution effects have often been disappointing in terms of bringing the unemployed back into to unsubsidised work. Furthermore, any beneficial effects of ALMPs need to be weighted against the costs of taxes required to finance them, which may in turn increase unemployment. Moreover, certain programmes may reduce search efforts, if not properly designed or subject to stigma (dead-end). In particular, measures for the disabled could be misused as a device to withdraw people form the labour market.

The efficiency of similar programmes crucially hinges upon the detailed programme design and in particular upon its targeting and its ability to foster proper work incentives (Arpaia and Mourre, 2005; OECD, 2005). The link with eligibility criteria for unemployment benefit is a key factor of success.

Evidence and Estimated elasticities in the recent literature

Empirical macroeconomic studies generally find a negative effect of ALMP spending on aggregate unemployment but fail to agree on its magnitude (Scarpetta, 1996; Nickell, 2005; Boone and van Ours, 2004) or find not robust effects (Mourre, 2005).

Jimeno and Rodrìguez-Palenzuela (2003): one point increase in ALMP as a percentage of GDP leads to 0.2 percentage point decline in the youth unemployment rate and to 0.1 percentage point decrease in the relative youth unemployment rate (youth unemployment rate minus prime-age unemployment rate). This represents a relatively weak improvement.

Possible spillover and complementarities with other policy area

Blanchard (2007) summarises the conditions for comprehensive labour market reforms. This requires the adequate combination of policies:

Job protection policy requires ALMPs (both training and career-advancement/job-placement assistance) to ensure secure career paths. A relaxed EPL would mean that a working life is likely to involve many jobs, and may include periods of unemployment. It is critical that many benefits which used to be associated with seniority in a given firm now be associated with seniority on the job market, and that these benefits can be transferred from one firm to another. This in turn implies that these benefits must be “mutualised”.

Making work pay policies: ALMPs should be accompanied by proper financial incentives to take a job, in order to become effective to reduce employment. For instance, the eligibility to (unemployment/inactivity) benefits should be conditioned with the active participation in Active Labour Market measures, which goes hand in hand with concrete enforcement measures to avoid the "unemployment/inactivity traps".

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Long-term unemployment rate: total long-term unemployed population (12 months or more) as a proportion of total active population. It is an indirect signal of insufficient Active Labour Market Policies. **Caveats**: different definitions in some MS of unemployment.

Youth unemployment ratio: total unemployed young people (15-24 years) as a share of youth population (15-24). It is also an indirect indication of insufficient Active Labour Market Policies.

Low-skilled employment rate: number of employed persons with pre-primary, primary and lower secondary education (i.e., ISCED levels 0-2) as percentage of the 15-64 population. It signals that Active Labour Market Policies are not focused enough on the most fragile groups, which require more effort in terms of training and job placement.

As regards policy indicators, a non-exhaustive list could include:

The following indicators measure the intensity of active labour market measures, in aggregate terms but also in its components (training, job-search assistance). Of course, as indicated in Arpaia and Mourre (2005), these macro indicators only give a broad measure of the financial effort put on these policies and cannot cover the quality of the microeconomic design, which is a key determinant of efficacy. Moreover, these indicators are also suffering from reverse causation issues: while they reflect the policy effort to raise the employability of the inactive and the unemployed, they could also capture the slack in the labour markets, due to other policy failures.
Active LMP expenditure as % of GDP. Active labour market policies are public spending aiming at encouraging the unemployed to take up a job or remain in employment.

Activation: Number of participants in LMP measures (categories 2-7: training, retraining, work experience or other employability measure) divided by the number of persons wanting to work (LFS unemployed plus labour reserve). Categories 2-7 refer to labour market interventions where the main activity of participants is other than job-search related and where participation usually results in a change in labour market status. An activity that does not result in a change of labour market status may still be considered as a measure if the intervention fulfils the following criteria: (i) the activities undertaken are not job-search related, are supervised and constitute a full-time or significant part-time activity of participants during a significant period of time, and (ii) the aim is to improve the vocational qualifications of participants, or (iii) the intervention provides incentives to take-up or to provide employment (including self-employment).

Active LMP expenditure per person wanting to work. Expenditure on Active LMP divided by the number of persons wanting to work (LFS unemployed plus labour reserve).

Employment service expenditure per person wanting to work. (i.e., LFS unemployed plus labour reserve).

Proportion of the unemployed in education and training. Participation of the unemployed aged 25-64 participating in education and training (over the four weeks prior to the survey).

Proportion of the inactive in education and training. Participation of the unemployed aged 25-64 participating in education and training (over the four weeks prior to the survey).

Regular activation in training. Number of participants in training divided by the number of persons wanting to work (i.e., LFS unemployed plus labour reserve). It is also useful to assess the weight of passive measures. The latter could indicate a misuse of resources, which could be better allocated to promote the employability of the inactive and the unemployed. In some cases, high level of passive measures could generate disincentives to work, especially in absence of eligibility conditions.

Passive LMP expenditure as % of GDP. Benefits from being unemployed.

Passive LMP expenditure per person wanting to work. Expenditure on Passive LMP divided by the number of persons wanting to work (LFS unemployed plus labour reserve). Passive expenditures include LMP categories 8 and 9 (i.e., support measures, which refer to interventions that provide financial assistance, directly or indirectly, to individuals for labour market reasons or which compensate individuals for disadvantage caused by labour market circumstance).

Ratio of active to passive LMP expenditures: Ratio of active LMP (categories 2-7) to passive LMP (categories 8-9).

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
ALMP expenditure as % of GDP (+)	EMCO	pol	20 MS	2000-2005
Number of participants in LMP measures divided by the number of persons wanting to work (+)	EMCO	pol	19 MS	2004-2005
Active LMP expenditure per person wanting to work (+)	EMCO	pol	22 MS	2004-2005
Passive LMP expenditures as % of GDP (-)	EMCO	pol	20 MS	2000-2005
Passive LMP expenditures per person wanting to work (-)	EMCO	pol	25 MS	2005
Employment service expenditure per person wanting to work (+)	EMCO	pol	21 MS	2004-2005
Proportion of the unemployed in education and training (+)	EMCO	pol	20 MS	2000-2006
Proportion of the inactive in education and training (+)	EMCO	pol	24 MS	2000-2006
Long-term unemployment rate (-)	EMCO, STRIND	perf	27 MS	2000-2006
Youth unemployment ratio (-)	EMCO	perf	27 MS	2000-2006
Low-skilled employment rate (%) (+)	LFS	perf	27 MS	1999-2006
Ratio of active to passive LMP expenditures (+)	ECFIN	pol	18 MS	2000-2005
Regular activation in training (+)	EMCO	pol	22 MS	2006

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

We have excluded from the narrow list the Passive LMP expenditure as % of GDP because of the difficulty of interpreting this indicator. The indicator on the Proportion of the Unemployed in Education and Training (EMCO 23.M4) has been replaced in the narrow list by Regular Activation in Training (EMCO 19.A2), because the latter is more closely related to ALMP (even if this indicator is less timely).

Redundancy criteria

There is a high correlation (above 60%) among LMP indicators. We retain the Active LMP expenditures wanting to work, which makes most sense from an economic point of view (and which is the most correlated with GDP components) and the Activation indicator which is a main EMCO indicator. We decide to split the weight between both indicators to avoid redundancy.

The Proportion of the inactive in education and training is highly correlated with the Proportion of the unemployed in education and training while Regular Activation in Training is not, so, we kept the later one.

The Long-term unemployment rate (main EMCO indicator) and the Youth unemployment ratio are very highly correlated with the Low skilled employment rate but, we have reinstated those relevant indicators in the narrow list by splitting the weight. This key point has been stressed by several Member States and it results in a richer narrow list while avoiding the pitfall of redundancy. Moreover, raising the employability of those potentially at risk of being durably excluded from the labour market is a key aspect of ALMP.

Inputs from associated stakeholders

Sixth indicators remained in the Narrow list. Concerning the youth unemployment rate (defined as youth unemployment over youth labour force) used earlier; it faces a number of criticism which questions its economic interpretation. Indeed, the dominator of the rate (i.e. youth labour force) might be strongly influenced by factors which are no related to the labour market. For instance, the reduction of youth participation to the labour market, which arithmetically increases the youth unemployment rate, could reflect a moderate cost of education, which provides incentives for youth to extend their studies. Hence, we use the youth unemployment ratio (proportion of unemployed youth over total youth population) instead, as it is not affected by the participation pattern of youth.

While the Commission would be happy to incorporate additional information on the efficiency of the LMP expenditures, there not seem to be available indicator of that kind. Therefore, qualitative country-specific information on the macroeconomic efficacy of the LMP polices will be useful to qualify the mechanical and quantitative assessment of this policy area.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
ALMP expenditure as % of GDP (+)	+	+	+	++	-	+	wider list	
Number of participants in LMP measures divided by the number of persons wanting to work (+)	+	+	+	+	-	+	**narrow list**	**0,33**
Active LMP expenditure per person wanting to work (+)	+	+	+	++	+	++	**narrow list**	**0,33**
Passive LMP expenditures as % of GDP (-)	-	+	+	++	-	++	wider list	
Passive LMP expenditures per person wanting to work (-)	+	+	+	++	-	+	wider list	
Employment service expenditure per person wanting to work (+)	+	+	+	++	-	++	wider list	
Proportion of the unemployed in education and training (+)	+	++	++	++	+	++	wider list	
Proportion of the inactive in education and training (+)	+	++	++	++	-	+	wider list	
Long-term unemployment rate (-)	+	++	++	++	-	++	**narrow list**	**0,33**
Youth unemployment ratio (-)	+	++	++	++	-	+	**narrow list**	**0,33**
Low-skilled employment rate (%) (+)	+	+	+	++	+	+	**narrow list**	**0,33**
Ratio of active to passive LMP expenditures (+)	+	+	+	+	++	++	wider list	
Regular activation in training (EMCO 19A2) (+)	+	+	-	++	+	-	**narrow list**	**0,33**

SHORT LIST OF RECENT REFERENCES

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2.2. Making work-pay: interplay of tax and benefit system

Definition and scope of the policy area

The objective of the so-called make-work pay policies is to attract more people in the labour market and to make the underlying incentive structure in the tax and benefit systems supportive to employment. This means modernising tax (direct taxation on labour income and social security contributions paid by employers and employees) and benefit systems (unemployment insurance, in-work benefits, disability and sickness schemes, means-tested benefits and other forms of social assistance), so that they reduce benefit dependency and provide effective incentives to take up jobs and remain in work by making work an economically attractive and rewarding option relative to welfare. This fiche concentrates on the labour supply effects of taxation and benefit systems. For the effects on labour costs and labour demand, see the accompanying fiche on labour taxation.

Related Integrated guidelines

(5) pursue labour and product market reforms that at the same time increase the growth potential and support the macroeconomic framework by increasing flexibility, factor mobility and adjustment capacity in labour and product markets. In particular, Member States should make an effort towards reforms of tax and benefit systems in order to make work pay and avoid any possible disincentive for labour market participation ...

(19) "… ensure inclusive labour markets, enhance work attractiveness and make work pay for job-seekers, including disadvantaged people and the inactive, through … continual review of the incentives and disincentives resulting from the tax and benefit systems, including the management and conditionality of benefits and a significant reduction of high marginal effective tax rates, notably for those with low incomes, whilst ensuring adequate levels of social protection.

(22) … efforts to reduce non-wage labour costs and to review the tax wedge may also be needed to facilitate job creation, especially for low-wage employment" and calls for the Member States to "… ensure employment-friendly labour costs developments and wage-setting mechanisms, by… reviewing the impact on employment of non-wage labour costs and where appropriate adjust their structure and level, especially to reduce the tax burden on the low-paid.

Impact on growth components

Like wages, institutions such as unemployment and other welfare-related benefits and labour taxation influence the equilibrium rate of unemployment because they affect both firms' hiring and firing decisions and individuals' readiness and willingness to take up a job. The design of tax and benefit systems (individually and through their interaction) has an influence in all labour market transitions, that is labour market participation, the schooling/work choice, the early retirement decision and the duration of unemployment. Thus, the scope of making work-pay policies is not limited to reducing unemployment, but extends also to raise the labour market participation of inactive and to address disincentives to work short hours, i.e. affecting all components of the contribution of labour utilisation to growth

More specifically, taxes and welfare schemes almost inevitably create disincentives to work in some segments of the labour market, thereby reducing the potential labour supply in terms of participation and/or hours worked. Their impact is particularly relevant for low-skilled persons (with low earnings prospects) and potential second earner in a couple (usually women).

Three typical situations can be isolated:

- If the level of unemployment benefit is high relative to earnings and its duration long, its effect on the participation decision of the unemployed is negative, discouraging or delaying the job search, because the benefit will be withdrawn when the unemployed person finds a job (***'unemployment trap'***).
- Similarly, *an* ***'inactivity trap'*** arises where a high level of income-tested benefits, which is withdrawn when non-active persons accept a job, reduces the economic incentives to work.
- Finally, ***a 'low wage trap'*** *(or* ***'poverty trap')*** is the situation where the increase in earnings due to higher work efforts (working longer, shifting from part-time to full-time or moving to a better job) leads to either no, or only a very small increase in disposable income, owing to the combined effect of higher taxes and the withdrawal of means-tested benefits.

Employment rates vary strongly across socio-economic groups in most countries. While employment rates of prime-aged males is often at or above 90%, the low employment rates of women, older workers, youth or immigrants considerably reduce overall employment rates. This observation has given rise to targeted policies that aim at improving the participation of groups in the working-age population who tend to be under-represented in employment. Therefore, make-work policies encompass all aspects of benefit systems.

Evidence and Estimated elasticities in the recent literature

According to the estimates in OECD (2005), a reduction of marginal effective tax rates by 20% raises the probability of moving from unemployment to employment by nearly 10%, i.e. from 45% to 49%. The strongest effects are found for the unemployed with a working partner, whose re-employment probability would increase by seven percentage points, from 51% to nearly 58%. With respect to transitions from inactivity to work, significant effects were found for single women only with a probability to move from inactivity to work increasing by almost 13%.

OECD (2006) finds that a “historically typical” reform reducing either the average gross replacement rate by 4.7 percentage points or the tax wedge by 2.8 percentage points would increase the employment rate by 1.1 percentage points in the average OECD country.

Bassanini and Duval (2006) identified a highly significant positive relationship between unemployment and benefit replacement rates. Their base-case estimates imply that a 10 percentage point reduction in the gross replacement rate would reduce the equilibrium unemployment rate by 1.2 percentage points and increase the employment rate by 1.7 percentage points for prime-age men and 3.2 percentage points for prime-age women.

When reviewing the results from the economic literature, OECD (2006) refers to an elasticity of unemployment benefit duration with respect to benefit generosity of approximately 1.0.

Possible spillover and complementarities with other policy area

The generosity of unemployment benefits (both levels and duration), by creating a reservation wage, may impact on wage claims. It also has implications for the sustainability of public finances. While the unemployment benefits system acts as an automatic stabiliser that cushions the impact of cyclical variation, an upward shift in the structural rate of unemployment may increases public expenditure and compensating measures, i.e. higher taxes or social security contributions, may further increase unemployment.

Benefit systems were designed to ensure social security and provide re-distribution. Making work pay policies therefore may impact on other policy objectives than growth and employment.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Long-term unemployment rate: Total long-term unemployed population (12 months or more) as a proportion of total active population. **Caveats**: different definitions in some MS of unemployment.

Low-skilled unemployment rate Number of unemployed persons with pre-primary, primary and lower secondary education (i.e., ISCED levels 0-2) as percentage of the 15-64 population.
It represents the unemployment rate of the low skilled workers (i.e., workers with at most lower secondary education).

Low-skilled employment rate Number of employed persons with pre-primary, primary and lower secondary education (i.e., ISCED levels 0-2) as percentage of the 15-64 population.

Labour reserve: Inactive persons wanting to work as a percentage of working age population 15-64.

As regards policy indicators, a non-exhaustive list could include:

Unemployment benefit duration. The indicator is calculated as the median of the minimum – maximum range of the distribution of unemployment benefit duration.

Unemployment benefit duration, months -Taxing wages report (2006) and MISSOC database 2004 (max range).

Average unemployment benefit duration (years). Note: unemployment benefits compensation includes all forms of cash benefit to compensate for unemployment, except early retirement. In addition to unemployment insurance and assistance, this covers publicly funded redundancy payments, compensation to workers whose employers go bankrupt, and special support of various groups such as construction workers laid off during bad weather.

Job availability requirement index. It's a weighted average of different aspects of both availability and possible sanctions in case of non-compliance. It takes values between 1 and 5, increasing with the strictness of availability requirements. This indicator is based on a questionnaire, send by the Ministry of Finance in Denmark to the present EU countries, the new EU countries and a few additional selected OECD countries in the winter of 2003/2004. The questions addressed the characteristics of the national unemployment benefit systems, the active labour market policies followed by a series of more specific questions concerning job availability criteria. The final part of the questionnaire addressed questions concerning complementary benefits as vacation benefits and supplementary benefits.

The indicator accounts for the following categories: 1. *Demands on job search activity* (i.e., whether the unemployed is in fact available for work during the unemployment spell); 2. *Availability during ALMP* (demands on availability during participation in active labour market programmes are regarded as strict if the unemployed must overtake job offers, even though he/she is participating in subsidised work or training); 3. *Occupational mobility* (if the unemployed must accept all kinds of job offers that he/she is capable of doing, the availability rules are regarded as strict). 4. *Geographical mobility* (the demands on geographic mobility are regarded as stricter, the longer transportation time the unemployed must accept); 5. *Extent of valid reasons for refusal of job offers* (a large list of valid reasons do help to secure the rights of the unemployed but will in this respect be regarded as an obstacle to the flexibility at the labour market); 6. *Benefit sanctions in case of self-induced resignation* (the strictness of the criterion has been determined by the duration of the sanctions); 7. *Benefit sanctions in case of refusals without valid reasons*; 8. *Benefit sanctions in case of repeated refusals*. **Caveats:** not full coverage of EU MS, only two observations over time.

The **marginal effective tax rates** indicators (METRs) are more specific quantitative indicators of progress towards removing financial disincentives to work, since they provide information on how financially rewarding is for an employee to increase working hours or for an unemployed/inactive person to take up employment. They measure what part of a change in earnings is 'taxed away' by the combined operation of taxes, social security contributions and any withdrawal of replacement or means-tested benefits when a person moves from one labour market status to another or increases his/her work effort (see Carone et al. 2003). **Caveats:** METR differ across income classes and family types.

- Unemployment trap (low wage earner). Calculated as one minus the ratio of change in net income (net in work income minus net out of work income) and change in gross income for a single person moving from unemployment to a job with a wage level of 67% of the APW.[17]

17 APW stands for "Average Productive Worker" and is defined as the average income of a skilled full time worker in manufacturing.

- Unemployment trap (average wage earner). Calculated as one minus the ratio of change in net income (net in work income minus net out of work income) and change in gross income for a single person moving from unemployment to a job with a wage level of 100% of the APW.[18]

- Inactivity trap (low wage earner): for a single person moving from social assistance to work (at wage level equal 67% of AW).

- Inactivity trap (average wage earner): for a single person moving from social assistance to work (at wage level equal 100% of AW).

- Unemployment trap (low wage earner; one earner couple with two children): Calculated as one minus the ratio of change in net income (net in work income minus net out of work income) and change in gross income for a one earner couple with two children moving from unemployment to a job with a wage level of 67% of the APW.[19]

- Unemployment trap (average wage earner; one earner couple with two children. Calculated as one minus the ratio of change in net income (net in work income minus net out of work income) and change in gross income for a one earner couple with two children moving from unemployment to a job with a wage level of 100% of the APW.[20]

- Inactivity trap (low wage earner; one earner couple with two children): for a one earner couple with two children moving from social assistance to work (at wage level equal 67% of AW).

- Inactivity trap (average wage earner; one earner couple with two children) for a one earner couple with two children moving from social assistance to work (at wage level equal 100% of AW).

As individuals' incentives to work largely depend on the shape of their budget constraint for a given hourly wage, we are interested in knowing the financial reward to doing any work, measured by some function of incomes in and out of work, and the incentive for those already in work to work harder or to progress in the labour market. A first measure of incentives to work can be provided by the **Net replacement rates**. These indicators are obtained by calculating the ratio of net income when not working (mainly unemployment benefits if unemployed or means-tested benefits if on social assistance) to net income in work. A lower replacement rate is associated with a greater incentive to return to work. It exists for different family types, income classes and duration of unemployment **- Alternatives**: Gross replacement rates.

- Net replacement rates for unemployed persons (67% AW, single person, after 2 months). The ratio of a single person's unemployment benefit after 2 months unemployed and the 67% average worker salary.

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18 APW stands for “Average Productive Worker” and is defined as the average income of a skilled full time worker in manufacturing.

19 APW stands for “Average Productive Worker” and is defined as the average income of a skilled full time worker in manufacturing.

20 APW stands for “Average Productive Worker” and is defined as the average income of a skilled full time worker in manufacturing.

- Net replacement rates for unemployed persons (100% AW, single person, after 7 months): The ratio of a single person's unemployment benefit after 7 months unemployed and the 100% average worker salary.

- Net replacement rates for unemployed persons (100% AW, single person, after 13 months): The ratio of a single person's unemployment benefit after 13 months unemployed and the 100% average worker salary.

Average unemployment benefit replacement rate. The ratio of an individual's (or a given population's (average) unemployment benefit in a given time period and the (average) income in a given time period.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Time coverage
Unemployment benefit duration, months (-median of the min-max range) (-)	OECD, MISSOC	pol	2004
Unemployment benefit duration, months, max range) (-)	OECD, MISSOC	pol	2004
Average unemployment benefit duration (years) (-)	OECD	pol	2003
Job availability requirement index (Søren Hasselpflug, "Availability criteria in 25 countries", Danish Finance Ministry Working Paper n°12/2005) (+)	Danish study	pol	2004
Unemployment trap (low wage-earner) (-)	EMCO STRIND, ECFIN/OECD	pol	2001-2006
Unemployment trap (average wage-earner) (-)	ECFIN/OECD	pol	2001-2006
Inactivity trap (low wage-earner) (-)	ECFIN/OECD	pol	2001-2006
Inactivity trap (average wage-earner)(-)	ECFIN/OECD	pol	2001-2006
Net Replacement Rates for unemployed persons (67% AW, single person) (-)	ECFIN/OECD	pol	2001-2006
Net Replacement Rates for unemployed persons (100% AW, single person, after 7 months) (-)	ECFIN/OECD	pol	2001-2006
Average unemployment benefit replacement rate (%) (-)	OECD	pol	2003
Long-term unemployment rate (-)	EMCO STRIND	perf	2000-2006
Low-skilled unemployment rate (%) (-)	LFS	perf	1999-2006
Low-skilled employment rate (%) (+)	LFS	perf	1999-2006
Labour reserve (total) EMCO19A9 (-)	EMCO	perf	2005-2006
Net Replacement Rates for unemployed persons (100% AW, single person, after 13 months) (-)	ECFIN/OECD	pol	2001-2006
Unemployment trap (low wage-earner, 1earner couple with 2 children) (-)	ECFIN/OECD	pol	2001-2006
Unemployment trap (average wage-earner, 1earner couple with 2 children) (-)	ECFIN/OECD	pol	2001-2006
Inactivity trap (low wage-earner, 1 earner couple with 2 children) (-)	ECFIN/OECD	pol	2001-2006
Inactivity trap (average wage-earner, 1 earner couple with 2 children) (-)	ECFIN/OECD	pol	2001-2006

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

Unemployment benefit duration (median of the min-max range) and (max range), the average unemployment benefit duration (years) (OECD), the Job availability requirement index, the Net Replacement Rates for unemployed persons, and the average unemployment benefit replacement rate (OECD) are excluded from the narrow list because of their insufficient time coverage.

Redundancy criteria

Concerning the Net replacement rate (not an EMCO indicator) the interpretation might be difficult, as it is the replacement rate recorded the first month of unemployment. It does not tell about its decrease overtime, in particular with long unemployment spells. The indicators of "traps" appear more useful.

There is a high correlation (above 60%) among (METR) Marginal effective tax rate indicators. However, we have reinstated several relevant indicators in the narrow list by splitting the weight. Indicators of making work pay in the narrow list should not only encompass the situation of low-wage earners (67% of average wages) but also that of the average earners (100% of average wages). They should also cover both the unemployment trap and the inactivity trap.

The Long-term unemployment rate and the Low skilled employment/unemployment rate are highly correlated with each others. The latter has been criticized on the ground that it is strongly correlated with a GDP component (initial education of labour) and it might give an incomplete picture as it excludes the medium-skilled (which are also experiencing a relatively high unemployment compared with the high-skilled). By contrast, the Long-term unemployment is the least correlated with the other indicators of the narrow list and is therefore retained in the narrow list.

Inputs from associated stakeholders

The ten remaining indicators qualify on both steps of the assessment. Although Eurostat considers its degree of reliability satisfactory, the "Unemployment trap for low wage-earner" has been criticized by Member States on the ground that METR indicators are not fully reliable since they do not take fully into account the effective coverage of the benefits and the heterogeneity of the institutions insuring against unemployment risks.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Unemployment benefit duration, months (-median of the min-max range) (-)	++	-	-	++	-	-	wider list	
Unemployment benefit duration, months - max range (-)	++	+	-	++	-	-	wider list	
Average unemployment benefit duration (years) (-)	++	+	-	-	+	-	wider list	
Job availability requirement index (Søren Hasselpflug, "Availability criteria in 25 countries", Danish Finance Ministry Working Paper n°12/2005) (+)	++	+	-	+	++	+	wider list	
Unemployment trap (low wage-earner) (-)	+	+	++	++	+	-	**narrow list**	**1/8**
Unemployment trap (average wage-earner) (-)	+	+	++	++	-	-	**narrow list**	**1/8**
Inactivity trap (low wage-earner) (-)	+	+	++	++	-	-	**narrow list**	**1/8**
Inactivity trap (average wage-earner) (-)	+	+	++	++	-	-	**narrow list**	**1/8**
Net Replacement Rates for unemployed persons (67% AW, single person) (-)	+	+	+	++	-	-	wider list	
Net Replacement Rates for unemployed persons (100% AW, single person, after 7 months) (-)	+	++	+	++	-	-	wider list	
Average unemployment benefit replacement rate (%)(-)	+	+	-	-	+	-	wider list	
Long-term unemployment rate (-)	+	++	++	++	++	++	**narrow list**	**0,5**
Low-skilled unemployment rate (%) (-)	+	++	++	++	-	+	wider list	
Low-skilled employment rate (%) (+)	+	++	++	++	-	+	wider list	
Labour reserve (total) (-)	+	+	+	++	++	-	**narrow list**	**0,5**
Net Replacement Rates for unemployed persons (100% AW, single person, after 13 months) (-)	+	++	+	++	+	-	wider list	
Unemployment trap (low wage-earner, 1earner couple with 2 children) (-)	+	+	++	++	-	-	**narrow list**	**1/8**
Unemployment trap (average wage-earner, 1earner couple with 2 children) (-)	+	+	++	++	-	-	**narrow list**	**1/8**
Inactivity trap (low wage-earner, 1 earner couple with 2 children) (-)	+	+	++	++	-	-	**narrow list**	**1/8**
Inactivity trap (average wage-earner, 1 earner couple with 2 children) (-)	+	+	++	++	-	-	**narrow list**	**1/8**

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2.3. Labour taxation to stimulate labour demand

Definition and scope of the policy area

Taxes on labour put a wedge between product wage paid by firms and the consumption wage received by employees. When increasing the total labour cost, taxes on labour (notably in the form of employer's social security contributions) tend to reduce labour demand. On the labour supply side, taxes levied on wages (both direct taxation on labour income and employee's social security contributions) reduce the net income and drive a wedge between the marginal product of labour and the marginal value of leisure. The effect of taxation on incentives to work is discussed in the accompanying fiche in combination with benefit systems under the heading of "make work pay policies". This fiche concentrates on labour demand effects.

Related Integrated guidelines

(19) "… continual review of the incentives and disincentives resulting from the tax and benefit systems, including the management and conditionality of benefits and a significant reduction of high marginal effective tax rates, notably for those with low incomes, whilst ensuring adequate levels of social protection.

(22) … efforts to reduce non-wage labour costs and to review the tax wedge may also be needed to facilitate job creation, especially for low-wage employment" and calls for the Member States to "… ensure employment-friendly labour costs developments and wage-setting mechanisms, by… reviewing the impact on employment of non-wage labour costs and where appropriate adjust their structure and level, especially to reduce the tax burden on the low-paid.

Impact on growth components

The effect of higher taxes and/or social security contributions ***on labour demand*** depends on whether and to what extent the tax burden increases the total labour cost for the employer or is transferred onto the worker, translating into a lower net wage. If wage earners succeed in shifting the tax burden onto employers, labour costs will increase, which reduces employment. This consideration appears to be particularly relevant in the presence of wage floors created by statutory minimum mages. While there is also a possibility that employers succeed in shifting higher taxes onto employees in the form of lower wages, therewith avoiding the negative impact on employment, this is likely to have consequences for ***labour supply***. Especially low-wage earners would face lower real net wages. Finally, a high tax burden on labour creates ***an incentive to resort to the shadow economy***.[21] Relevant in this context are not only pay roll taxes and social security contributions. Increases in personal income taxes and even consumption taxes may also translate into higher wages. The overall impact of labour taxation on labour supply may be substantially larger than that indicated by the impact of taxes on unemployment, since higher taxes may also tend to reduce annual hours worked for persons in employment.

Evidence and Estimated elasticities in the recent literature

Tax indicators tend to be significant in most cross-country studies that analyse the impact of labour market institutions on unemployment. The majority of these studies find evidence that a higher labour tax wedge increases unemployment. According to Layard et al. (2005), the empirical evidence suggests that a 10 percentage point increase in the labour tax wedge leads to between 1 and 2 percentage point higher rates of unemployment.

Bassanini and Duval (2006) find that higher labour taxes raise unemployment, with the baseline specification suggesting that a 10 percentage point reduction of the tax wedge in an average OECD country would reduce equilibrium unemployment by 2.8 percentage points and increase the employment rate by 3.7 percentage points.

Since the impact of taxation on labour demand works via labour costs, the literature reviewed in the fiches on wages is also relevant. The impact of an increase in the tax wedge on labour demand depends on whether higher labour costs can be shifted to consumers in form of higher prices. Arpaia and Carone (2004) estimate that a 10% increase in the tax wedge leads to an increase in real labour costs by 0.4% in the short run. In the long-run, the tax wedge is statistically insignificant, implying that any change in the tax wedge is eventually shifted to consumers in the form of lower after-tax real wages. A 10 percentage point decline in employers' social security contributions may reduce labour cots by about 0.5-0.7%. The impact of personal taxes is sensitive to estimation methods.

Possible spillover and complementarities with other policy area

The magnitude of the impact of tax wedges on unemployment appears to be affected by the institutional set-up for wage-setting as indicated by often significant interaction terms in empirical estimates. For example, Elmeskov et al. (1998) and Daveri and Tabellini (2000) find a strong impact of the tax wedge in countries with low or intermediate degree of centralisation/co-ordination of wage bargaining and high trade union membership. Bassanini and Duval (2006) find

21 See OECD (2006).

that increases in the tax wedge have a greater impact in raising unemployment the higher the minimum wage is set relative to average wages. The empirical literature points to important interaction effects between labour taxes and the design of the benefit system. See the fiche on "making-work-pay".

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Undeclared work. Size of undeclared work in national economy (e.g. as share of GDP or persons employed). **Caveats**: not sufficiently harmonized across the countries.

Long-term unemployment rate: Total long-term unemployed population (12 months or more) as a proportion of total active population. **Caveats**: different definitions in some MS of unemployment.

Youth unemployment ratio Total unemployed young people (15-24 years) as a share of youth population (15-24).

Low-skilled unemployment rate Number of unemployed persons with pre-primary, primary and lower secondary education (i.e., ISCED levels 0-2) as percentage of the 15-64 population.
It represents the unemployment rate of the low skilled workers (i.e., workers with at most lower secondary education).

As regards policy indicators, a non-exhaustive list could include:

On the tax side, the distortionary effect on labour demand can be measured by the 'tax wedge', the proportional difference between the costs of a worker to their employer (wage and social security contributions, i.e. the total labour cost) and the amount of net earnings that the worker receives (wages minus personal income tax and social security contributions, plus any available family benefits). Although the indicator of the tax wedge on labour may be correlated with the incentives to work and the unemployment traps (labour supply side), it primarily informs about the level of indirect labour costs, which is a key parameter in the firms' decision to hire new staff (labour demand side). In particular, for low-wage earners, whose labour incomes are close to the minimun wage (when it exists), lowering the tax wedge on labour (e.g. via cuts in social security contributions) is the main factor to curtail labour costs and stimulate labour demand for the low skilled.

Tax rate on low wage earners: Tax wedge on labour cost: ratio of income tax plus employee and employer social contributions including payroll taxes less cash benefits divided by the labour costs for a single earner earning 67% of the APW.

Implicit tax rate on employed labour: Ratio of total taxes on employed labour (personal income taxes plus employees' and employers' social security contributions plus payroll taxes) divided by the total compensation of employees plus payroll taxes. **Caveats**: METR differ across income classes and family types. See the fiche on "making-work-pay".

Social security paid by employer as % of total labour costs -Industry and services, excluding public administration. Labour Costs are the total expenditure borne by employers for the purpose of employing staff. They include employee compensation, with wages and salaries in cash and in kind, employers' social security contributions; vocational training costs, other expenditure such as recruitment costs and spending on working clothes and employment taxes regarded as labour costs minus any subsidies received.

Tax rate on average wage earners (single earner). Tax wedge on labour cost. Ratio of income tax plus employee and employer social contributions including payroll taxes less cash benefits divided by the labour costs for a single earner earning 100% of the APW.

Total tax wedge (including employers SSC). Married couple with 2 children, 100% and 67% of AW. Ratio of income tax plus employee and employer social contributions including payroll taxes less cash benefits divided by the labour costs for a married couple with two children earning 100% and 67% of the APW.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Tax rate on low wage earners: Tax wedge on labour cost (single earner) (-)	EMCO STRIND	pol	27 MS	1999-2006
Implicit tax rate on employed labour (-)	EMCO STRIND	pol	27 MS	1999-2005
Social security paid by employer as a % of total labour costs . Industry and services (excluding public administration) (-)	EUROSTAT	pol	20 MS	1999-2006
Undeclared work (-)	National sources	perf	22 MS	2003
Low-skilled unemployment rate (%) (-)	LFS	perf	27 MS	1999-2006
Youth unemployment ratio (-)	EMCO	perf	27 MS	2000-2006
Long-term unemployment rate (-)	EMCO STRIND	perf	27 MS	2000-2006
Tax rate on average wage earners: Tax wedge on labour cost (single earner) (-)	EMCO STRIND	pol	27 MS until 2005, 18 MS for 2006	2000-2006
Total tax wedge (including employers SSC) Married couple with 2 children, 100% and 67% of AW(-)	OECD	pol	27 MS until 2005, 20 MS for 2006	2000-2006

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards
Undeclared work does not meet the requirement of comparability and time coverage because it is fairly old and not sufficiently harmonised.

Redundancy criteria

The implicit tax rate and Social security contributions are redundant with the tax rate on low-wage earners and less correlated with GDP components. However, we decide to include in the narrow list the Implicit tax rate indicator because it is considered as a main EMCO indicator. We avoid overweighing by splitting the weight between these four indicators.

Inputs from associated stakeholders

The Long-term unemployment rate, the Low-skilled unemployment rate and the Youth unemployment ratio has been kept as background information in the wider list to follow a general issue raised by several Member States i.e. to avoid using the same indicators in too many policy areas. The four remaining indicators qualify on both steps of the assessment.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				**Removing redundant indicators**		**Final assessment**	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Tax rate on low wage earners: Tax wedge on labour cost (single earner) (-)	++	+	++	++	+	+	**narrow list**	**0,25**
Implicit tax rate on employed labour (-)	++	++	+	++	-	-	**narrow list**	**0,25**
Social security paid by employer as a % of total labour costs . Industry and services (excluding public administration) (-)	++	++	+	+	-	-	wider list	
Undeclared work (-)	++	-	-	++	++	+	wider list	
Low-skilled unemployment rate (%) (-)	+	+	++	++	++	+	wider list	
Youth unemployment ratio (-)	+	++	++	++	++	+	wider list	
Long-term unemployment rate (-)	+	+	++	++	++	++	wider list	
Tax rate on average wage earners: Tax wedge on labour cost (single earner) (-)	++	+	+	++	-	+	**narrow list**	**0,25**
Total tax wedge (including employers SSC) Married couple with 2 children, 100% and 67% of AW (-)	+	+	++	++	-	-	**narrow list**	**0,25**

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2.4. Job protection and labour market segmentation/dualisation

Definition and scope of the policy area

Job protection and labour market segmentation/dualisation comprises two dimensions. Job protection is also called employment protection legislation (EPL refers to regulatory provisions relating to "hiring and firing", particularly those governing unfair dismissals, termination of employment for economic reasons, severance payments, minimum notice periods, administrative authorization for dismissals, and prior consultations with trade union and/or labour administration representatives). Relaxing job protection will raise flexibility for firms to recruit and dismiss. On the other hand, this dimension is to be considered in close relation to the need of avoiding increasing dualisation of the labour market, which reduces labour market security, reduce firms' incentives to supply training and could lead to cost pressure.

Related Integrated guidelines

(5) Promote greater coherence between macroeconomic, structural and employment policies

(17) Implement employment policies aiming at achieving full employment, improving quality and productivity at work, and strengthening social and territorial cohesion.

(21) Promote flexibility combined with employment security and reduce labour market segmentation, having due regard to the role of social partners.

Impact on growth components

In general terms, as ELP reduces job creation and destruction will decrease as a result of an increase in labour adjustment costs for employers, it has an ambiguous and unclear impact on aggregate employment and on aggregate unemployment (Bentolila and Bertola (1990). The empirical literature stresses the lack of robustness across studies. (Nickell et al. (2005), Blanchard and Wolfers (2000) Mourre, 2006; Bassanini and Duval (2005), Morgan (2006); OECD employment outlook (2004 and 2006).

What is more certain is the adverse effects on:

- the dynamics of the adjustment to shocks, which is slowed down by high level of EPL (Morgan 2006). By reducing the inflows and outflows from unemployment, it might increase the unemployment spells and therefore raise ***the long-term unemployment rate.***
- employment rate of group at risks or with a weaker attachment to the labour market: ***youth*** in particular (Jimeno and Rodrìguez-Palenzuela, 2003) but also ***women, low-skilled, older workers***, (Bertola, Blau and Kahn, 2002; Bassanini and Duval, 2005). Moreover, if wages are not flexible enough to allow high dismissal costs to be reflected in lower wages, *e.g.* due to minimum wage, the job prospects of low-wage workers may be harmed.

Deregulating ELP only for fixed-term/temporary contracts is ***not satisfactory***, as it increases the inequality in the labour market (dualisation of the labour market), ***without delivering in terms of employment growth***. Easing EPL for fixed-term contracts strengthens the bargaining power of permanent workers with a risk of wage push. “Insiders” on permanent contracts can raise their wage claims without much risk of job losses as any resulting negative effects on employment will be borne mainly by the “outsiders” who work on temporary contracts. The trade unions might contribute to that further in the wage bargaining process, inasmuch as they mainly pursue the interests of permanent workers (Bentolila and Dolado, 1994). Moreover, deregulated temporary contracts may simple end up with increasing the turnover of the workforce, which reduces the incentive of employers to supply adequate level of training to staff in temporary contracts without being a stepping stone to permanent contracts, as long as these remain costly to break (Blanchard and Landier, 2002; Cahuc and Postel-Vinay, 2002; Cahuc and Carcilio, 2006). These rationales have raised concerns that a deregulation of EPL focused on temporary contracts may not improve labour market performance (Dolado *et al*., 2002; OECD, 2004)). Some leading economists like Blanchard (2007) advocate merging the different permanent and temporary contracts into a single contract in which the severance payment will rise according to seniority. He also suggests simplifying the judicial process, which introduces a lot of uncertainty on the eventual costs of a dismissal for a firm, in exchange of the increase in legal severance payments for lay-offs.

Evidence and Estimated elasticities in the recent literature

The impact of EPL on the unemployment rate is ambiguous. Scarpetta (1996) and Elmeskov *et al.* (1998) find a positive effect in some of their estimated equations, while Nickell (1997) and Nickel et al. (2003) find no significant effect. Moreover, in general the negative impact of EPL on total employment is not robust (Mourre, 2006). Conversely, the results are more robust when it comes to employment of disadvantaged groups. Bassanini and Duval (2005): one point rise in EPL leads to a decrease of 1.5 in full-time female employment rate, of-2.35 in youth employment (-5.4 when controlled for minimum wages). Bertola, Blau and Kahn (2002) found similar results but not statistically significant.

Possible spillover and complementarities with other policy area

Blanchard (2007) summarises the conditions for the EPL reforms to fit in with a "flexicurity" framework conducive to both flexibility for firms and security in employment. This requires the adequate combination of policies:

Active labour market policies (both training and career-advancement/job-placement assistance) are necessary to ensure secure career paths. Nowadays, a working life is likely to involve many jobs, and may include periods of unemployment. It is critical that many benefits which used to be associated with seniority in a given firm now be associated with seniority on the job market, and that these benefits can be transferred from one firm to another. This in turn implies that these benefits must be “mutualised”.

A more efficient unemployment insurance system (possibly coupled with a change in its funding) is also crucial to increase security while encouraging the unemployed to look for a job (and the firm not to misuse the dismissals). The substitution between unemployment benefits and EPL in the provision of insurance against labour market risks has been documented by many researchers (e.g. Buti et al (1998) Boeri et al. 2003, Arpaia and Mourre, 2005). The rate of substitutions between these two institutions is related to the extent individuals can self-insure against unemployment risks by accessing to developed financial market (e.g. Bertola 2004 and Boeri et al. (2003)) and to the existence of other instruments of insurance and income re-distribution. The substitution between these two institutions can also be related to the form of redistributive policies. The choice of redistributive institutions that smooth out unemployment risks reflects the efficacy of both market and non-market mechanism in delivering such redistribution. When redistribution policies are less efficiently managed through taxes and subsidies, insurance against income risks is usually provided via strong employment protection legislation. According to Blanchard (2007), a system which cuts the duration of unemployment benefits is unsatisfactory, because for some – those for whom there’s little or no work – the end of payouts can mean a dire straight and because it lets others abuse the system by waiting until their benefits run out before taking a job that they could have taken sooner. A good system is "a generous one, but one that requires the unemployed to get back to work if an acceptable job exists for them". As for the way the unemployment insurance system is funded, Blanchard suggests make firms pay more if they lay off more employees off. The current financing rests on contributions on wages salaries, which raises labour costs for firms and thereby reduces jobs.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Youth unemployment ratio: Total unemployed young people (15-24 years) as a share of youth population (15-24). **Caveats:** It is an imperfect but useful performance indicators, as stringent EPL is likely to reduce the employability of the youth, which are more vulnerable in the labour market because of their lack of professional experience. The more vulnerable groups (those suspected of being less productive in employment on average) are supposed to have a lower employability (Bertola, Blau and Kahn, 2002). However, the relationship is not one to one, as a high youth

unemployment ratio might be caused by other factor as strict EPL, such as the disincentives generated by the tax and benefit system.

Low-skilled unemployment rate Number of unemployed persons with pre-primary, primary and lower secondary education (i.e., ISCED levels 0-2) as percentage of the 15-64 population.
It represents the unemployment rate of the low skilled workers (i.e., workers with at most lower secondary education). It is linked with EPL with a similar relationship as just described above. The same **Caveats** apply.

Indicator of fluidity in the labour market: Proportion of the Long term unemployed over total unemployment.

Share of employees with a contract of limited duration. Share of salaried workers with a contract of limited duration over the total number of employees. Employees with temporary contracts are those who declare themselves as having a fixed term employment contract or a job which will terminate if certain objective criteria are met, such as completion of an assignment or return of the employee who was temporarily replaced. A high level of this indicator signals more flexibility but at the margin only with potential risks of increasing the segmentation of the labour markets.
Involuntary temporary employment (who could not find permanent job) as % of total employment. Involuntary temporary employed are those who declare that they have a temporary contract because they were unable to get an open ended one. The distinction between temporary and open ended is made on the basis of a spontaneous answer given by the respondent. It is a broader indicator of flexibility at the margin, including some flexible working time arrangements. Its effect are generally positive on flexibility but at the expense of the security in employment.

Involuntary part time employment as percentage of total employment. Persons working involuntary part-time are those who declare that they work part-time because they are unable to find full-time work. The distinction between full-time and part-time work is made on the basis of a spontaneous answer given by the respondent. It is an indicator of flexibility at the margin, which could potentially increase the dualisation of the labour markets. A high level might be interpreted as a deterioration of "flexicurity".

Transition from fixed term employment to permanent employment. Transition figures indicate the movement of persons between fixed term employment and permanent employment from year n to year n+1; e.g., from 2000 to 2001, 40% of Belgian temporary employees got a permanent contract. A high transition from fixed-term employment to permanent employment is also indicative of a low risk of dualisation.

In-work-poverty risk: Individuals who are classified as employed (distinguishing between "wage and salary employment plus self-employment" and "wage and salary employment" only) and who are at risk of poverty (i.e., whose equivalised disposable income is below 60% of national median equivalised disposable income). It is an overall performance indicator, which is likely to rise with a high level of dualisation in the labour markets. **Caveats**: The indicator, based on micro-data, is however fairly old.

Undeclared work: Size of undeclared work in national economy (e.g. as share of GDP or persons employed). It might be, among other things, the sign of stringent EPL, which could be bypassed by not declaring the workforce. **Caveats**: not sufficiently harmonized across the countries.

As regards policy indicators, a non-exhaustive list could include:

Regular EPL (Overall strictness of protection against dismissals) is a policy indicator available to capture many aspect of the Employment protection legislation (EPL) i.e. existence of collective dismissal procedure, notice, severance payments, administrative constraints. It refers to all types of employment protection measures, whether grounded primarily in legislation, court rulings, collectively bargained conditions of employment or customary practice. **Caveats:** The flip side of this indicator is that it is a synthetic one, which could be "too aggregate". However, it has been often used by academia and is very insightful. Although the indicator is not up-to-date(and has virtually no time-series dimension), it is still valid as a snapshot of the situation today, as only very few reforms have been carried out in 2004-2007 as regards the conditions attached to permanent contracts.

Temporary EPL (overall strictness of protection against dismissals for temporary employment) is not up-to-date and can be proxied by the share of fixed-term contracts, which is available timely. **Caveats:** Its interpretation is quite awkward: high temporary EPL might increase the dualisation of the labour market and reduce the pressure for implementing larger-scale reforms also covering permanent contracts.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Regular EPL (Overall strictness of protection against dismissals) (-)	OECD	pol	19 MS	2003
Temporary EPL (Overall strictness of regulation) (-)	OECD	pol	19 MS	2003
Youth unemployment ratio (-)	EMCO	perf	27 MS	2000-2006
Indicator of fluidity in the labour market : Proportion of the Long term unemployed over total unemployment (-)	EMCO STRIND	perf	27 MS	2000-2006
Low-skilled unemployment rate (%) (-)	LFS	perf	27 MS	1999-2006
Share of employees with a contract of limited duration (annual average) (-)	LFS	perf	27 MS	1999-2006
Involuntary temporary employment (who could not find permanent job) as % of total employment (-)	LFS	perf	26 MS	1999-2006
Involuntary Part-Time employment as % of total employment (-)	LFS	perf	26 MS	1999-2006
Transition from fixed-term employment to permanent employment(%) (-)	EMCO	perf	14 MS	2001
In-work-poverty risk (-)	EMCO	perf	25 MS	2005
Undeclared work(-)	National sources	perf	22 MS	2003

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

The two EPL indicators, Undeclared work and the Transition rate from fixed-term employment to permanent employment do not fulfil the requirement of comparability or/and time coverage.

Redundancy criteria

The Share of employees with a contract of limited duration is redundant with Involuntary fixed-term employment rate, while it is much less correlated with GDP components than the latter. This also echoes the remark that one of the three indicators regarding the employee should be taken out so as not to give too much prominence to this type of indicator.

The Low skilled unemployment rate is retained in the wider list as interesting background information.

Inputs from associated stakeholders

The five remaining indicators qualify on both steps of the assessment. The Indicator of fluidity in the labour market is useful as stringent Employment Protection Legislation is often said by the economic literature to reduce the employment inflows and outflows, reducing into higher long term unemployment.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				**Removing redundant indicators**		**Final assessment**	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Regular EPL (Overall strictness of protection against dismissals) (-)	+	-	-	+	+	+	wider list	
Temporary EPL (Overall strictness of regulation) (-)	-	-	-	+	-	+	wider list	
Youth unemployment ratio (-)	+	++	++	++	+	+	**narrow list**	**0,5**
Indicator of fluidity in the labour market : Proportion of the Long term unemployed over total unemployment (-)	+	+	++	++	+	-	**narrow list**	**0,5**
Low-skilled unemployment rate (%) (-)	+	++	++	++	-	-	wider list	
Share of employees with a contract of limited duration (annual average) (-)	+	++	++	++	-	-	wider list	
Involuntary temporary employment (who could not find permanent job) as % of total employment (-)	+	+	++	++	+	+	**narrow list**	**1**
Involuntary Part-Time employment as % of total employment (-)	+	+	++	++	+	+	**narrow list**	**1**
Transition from fixed-term employment to permanent employment (%) (-)	++	+	-	+	-	+	wider list	
In-work-poverty risk (-)	+	+	+	++	+	+	**narrow list**	**1**
Undeclared work (-)	+	-	-	+	-	+	wider list	

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2.5. Policies increasing working time

Definition and scope of the policy area

Policies increasing working time covers a number of policies. A first strand of policy is of legal or reglementary nature. Relevant policy measures may emerge either from legislative processes or as the outcome of the bargaining process between social partners. These measures could regard the regulation of overtime (such as legal ceilings and overtime rate), of daily working time or of public holidays. A second series of measure concerns incentives or desincentives to work longer provided by the tax system. A third aspects concerns the work conditions (e.g. the rate of serious or fatal accident at work), which could provides further incentives to work longer hours.

Related Integrated guidelines

(18) "promote a lifecycle approach to work through … better reconciliation of work and private life… ."

(21) Promote flexibility combined with employment security and reduce labour market segmentation, having due regard to the role of the social partners, through … the adaptation of employment legislation, reviewing [..] working time arrangements.

Impact on growth components

Average working hours have been on a trend decline in all developed countries and ***reduced the contribution from labour utilisation to growth***. This trend decline has been at a much faster pace in the EU compared to the USA and therewith explains an important part of the GDP per capita gap. However, average weekly hours of work have remained relatively unchanged in the major Continental EU Member States in the *last fifteen years*. The declining trend in average hours of work is to a large extent the result of the shift from full-time to part-time work and the observation of declining numbers of hours worked in part-time jobs. Against this background, OECD (2007) documents a strong negative relationship between employment rates and average hours worked, reasoning that workers that join the workforce tend to work shorter hours than established workers.

Workers and hours are not perfectly substitutable and one has to differentiate between costs arising from changes in workers and from changes in hours per worker. The demand of hours worked depend on the comparison between variable costs (wage for a normal hours of work and over time premium) and fixed cost (i.e. costs that do not depend on duration such as hiring firing training cost and some social security contributions) . A reduction of fixed costs gives firm the incentives to substitute workers for hours and thus favour employment. The opposite holds for changes in variable costs. Thus, ***the demand of workers and demand of hours naturally goes in the opposite directions. Lowering of the standard hours worked*** (i.e. France 35 hours) ***has ambiguous effect.*** When the optimal amount of hours worked is equal to the legal limit then its reduction may lead to a reduction in hours worked. When the optimal amount of hours worked is higher than the legal limit, its reduction increases overtime hours because it reduced the importance of variable costs while fixed costs remain unchanged.

There is some controversy behind the factors that determine the numbers of hours worked. For example, Blanchard (2004) argued that it could reflect societal preferences whereas Prescott (2004) saw an important impact of tax rates. Alesina et al. (2005) see that working time regulation and labour market institutions such as union bargaining power and employment protection are more

important determinants than taxes. The empirical analysis in OECD (2007) finds that all three factors are important, but affect males and females differently. Marginal tax wedges have a significant on average hours worked by females, working-time regulations, EPL and product market regulations influence average working hours by men, but not by women. Stronger unions affect hours worked of both sexes. The OECD estimates also reveal large country-specific factors, which may be due to societal preferences. This is in line with the findings of Algan and Cahuc (2005), which detect a strong impact of family attitudes on *inter alia* female employment.

Evidence and Estimated elasticities in the recent literature

When reviewing micro-econometric studies of the wage elasticity with respect to hours worked, Evers (2006) found that the elasticity for men is often around 0 whereas those for women vary between 0 and 0.4. OECD (2007) translates this into a tax-rate elasticity of -0.6, assuming a marginal tax rate of 0.5.

OECD (2007) documents that cross-country studies tend to find an elasticity of average hours worked with respect to taxation between -0.3 and -0.5. The elasticity is, however, lower or negative, if the estimate controls for country fixed effects.

The estimates in OECD (2007) suggest a tax elasticity of -0.7 for women and close to 0 for men.

Possible spillover and complementarities with other policy area

To the extent that changes to working time organisation are bargained by social partners, they are likely to affect wage developments. Changes in hours worked, when not accompanied by changes in wages, impact on both disposable income and labour costs, with further effects on aggregate demand and capital-labour substitution, respectively. In view of their impact on allowing organisational change, they may also have spill over on firm performance and policy measures that aim at improving productivity growth.

The inverse relationship between hours worked and employment rates suggest that changes to the determinants of hours worked will have spill over to other components of labour utilisation. The difference in tax elasticities suggests that all factors that impact on the labour supply decision of different socio-economic groups are likely to have an effect on hours worked of these groups.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Weekly usual working time (men). Average weekly number of hours usually worked per week defined as the sum of hours worked by full-time employees divided by the number of full-time employees.

Weekly usual working time (women). See above

Annual average working time. Effective annual working time per employed person, which is computed as the ratio of the total number of hours worked in the economy to total employment.

Share of overtime workers (men): Employees for whom the number of hours actually worked exceeds the number of hours usually worked due to overtime as a % of all employees.

Share of overtime workers (women) See above

Serious accidents at work: Index of the number of serious and fatal accidents at work per 100,000 persons in employment. Serious accidents exclude road traffic and transport accidents in the course of work, except candidate countries where they are included.

Fatal accidents at work See above

As regards policy indicators, a non-exhaustive list could include:

Low-wage (poverty) trap: disincentives to work longer or earn more (one earner couple with two children). The marginal effective tax rate on labour income taking account the combined effect of increased taxes on labour and in-work benefits withdrawal as one increases the work effort (increased working hours or moving to a better job). Calculated as the ratio of change in personal income tax and employee contributions plus change (reductions) in benefits, divided by increases in gross earnings, using the "discrete" income changes from 34-66% of AW.

Low-wage (poverty) trap: disincentives to work longer or earn more (single person with no children). Same definition as above, but calculated for a single person.

Low-wage trap for second earner income: The marginal effective tax rate on labour income faced by the second earner income taking account the combined effect of increased taxes on labour and in-work benefits withdrawal as one increases the work effort (increased working hours or moving to a better job). It is assumed that as a result of the increased work effort the first earner makes 67% of APW and the second earner goes from 33% to 67% of APW.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Low-wage (poverty) trap : disincentives to work longer or earn more (One earner couple with two children) (-)	EMCO STRIND	pol	27 MS	2001-2006
Low-wage trap : disincentives to work longer or earn more (Single person with no children) (-)	EMCO STRIND	pol	27 MS	2001-2006
Low-wage trap for second-earner income (first earner: 67% APW; second earner: 33% to 67%) (-)	ECFIN/OECD	pol	25 MS	2001-2006
Weekly usual working time (men) (+)	EMCO	perf	26 MS	2000-2006
Weekly usual working time (women) (+)	EMCO	perf	26 MS	2000-2006
Annual average working time (+)	EMCO	perf	26 until 2004, 21 in 2005, 10 in 2006	2000-2006
Share of overtime workers (men) (+)	EMCO	perf	25 MS	2000-2006
Share of overtime workers (women) (+)	EMCO	perf	22 MS	2000-2006
Serious accidents at work (-)	EMCO	perf	26 MS	1999-2004
Fatal accidents at work (-)	EMCO	perf	26 MS	1999-2004

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

Weekly usual working time and Share of overtime workers are not reliable measure of hours worked, as the former does not include day offs and the latter does not include unpaid overtime, which can be substantial in some countries.

Redundancy criteria

Low-wage traps for one-earner couple and single person are only related at 50%, so they are no fully redundant. As both cover a different category of the population, we assign them half weight. The Low-wage trap for second-earners is excluded from the narrow list because highly correlated (67%) with the Low wage earners for single person.

Inputs from associated stakeholders

The three remaining indicators qualify on both steps of the assessment. However, the Low wage trap on wage earners is criticised by some Member States and should be considered carefully.

Following the LIME meeting of 15 of April, we changed the title "Working time organisation" into "Policies increasing working time". Consequently, we dropped the (male and female) part-time employment rate, which correspond to the working time organisation but have a negative impact on average hours worked per person.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Low-wage (poverty) trap : disincentives to work longer or earn more (One earner couple with two children) (-)	++	+	++	++	+	+	**narrow list**	**0.5**
Low-wage trap : disincentives to work longer or earn more (Single person with no children)(-)	++	+	++	++	+	+	**narrow list**	**0.5**
Low-wage trap for second-earner income (first earner: 67% APW; second earner: 33% to 67%) (-)	++	+	++	++	-	+	wider list	
Weekly usual working time (men) (+)	++	- (excluded days off)	++	++	+	+	wider list	
Weekly usual working time (women) (+)	++	- (excluded days off)	++	++	+	+	wider list	
Annual average working time (+)	++	+	++	++	+	++	**narrow list**	**1**
Share of overtime workers (men) (+)	+	- (only paid overtime)	++	++	+	-	wider list	
Share of overtime workers (women) (+)	+	- (only paid overtime)	++	++	+	-	wider list	
Serious accidents at work (-)	+	+	-	++	++	-	wider list	
Fatal accidents at work (-)	+	+	-	++	++	-	wider list	

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2.6. Specific labour supply measures for women

Definition and scope of the policy area

Labour supply measures for women aim at encouraging women to enter the labour market and remain economically active. A couple of policy areas are involved: old-age pension systems; early retirement schemes, which should be phased out; the interplay of tax and benefit (making work pay policy); policy aiming at promoting a gradual withdrawal from the labour market, while combining working and private lives.

Related Integrated guidelines

(17) Implement employment policies aiming at achieving full employment, improving quality and productivity at work, and strengthening social and territorial cohesion;

(18) Promote a life-cycle approach to work, through, for instance, resolute action to increase female participation and reduce gender gaps in employment, unemployment and pay and better reconciliation of work and private life and the provision of accessible and affordable childcare facilities and care for other dependants;

(19) Ensure inclusive labour markets, enhance work attractiveness, and make work pay for jobseekers, including disadvantaged people, and the inactive;

(21) Promote flexibility combined with employment security and reduce labour market segmentation, having due regard to the role of social partners.

Impact on growth components

Labour supply measures for women could increase labour participation of women (in all age groups, including young and older women) and average hours worked by women. It could also influence growth by decreasing female unemployment of women[22]. These three GDP components could be affected through five channels[23]:

- ***Better reconcile the professional and family lives***. Women – especially married women and those with children – are still less attached to the labour market on average than men. The opportunity cost of employment is higher when there are viable alternatives in the form of home production or child care. Conversely, female participation may benefit from measures aimed at better reconciliation of work and family life. In particular, *childcare subsidies* cut the relative price of childcare, increasing the relative return of market work. The empirical evidence indicates that childcare subsidies raise female labour supply and that the employment rate of married women is higher in countries providing for subsidised childcare. *Maternity leave* (or short paid parental leave) helps women to reconcile working and family lives by reinforcing their attachment to the labour market while allowing them to take care of newborn children

22 Women who participate in the labour force also remain more likely to be unemployed than active men, though the gap between female and male unemployment rates has declined since the mid-1990s (in absolute terms and, to a lesser extent, in relative terms). The share of long-term unemployment in total unemployment is also higher for women (42% of total female unemployment in 2002 as compared with 38% for men).

23 It should be borne in mind that the efficiency of reforms crucially hinges upon the detailed programme design and in particular upon its targeting and its ability to foster proper work incentives (Arpaia and Mourre, 2005; OECD, 2005).

(Jaumotte, 2003; Pisarides 2003). *Part-time work* also appears to facilitate female labour force participation (Garibaldi and Mauro, 2003; Buddelmeyer et al., 2004 and 2007) Labour force surveys indicate that family responsibilities are one of the main reasons for working part-time and that only 14% of female part-time employees are seeking a full-time job. Part-time work is clearly associated with higher female participation and higher employment in persons. Nevertheless, a high share of part-time work is not a necessary condition for a high female employment rate, as the example of Finland shows. Likewise, *child benefits* reduce female participation by increasing the disposable income of families with children (by up to 10-20 percent on average in some EU countries). This income effect on participation may be combined with an inactivity trap effect in the case where child benefits are means-tested and are likely to decrease if the mother enters employment. In particular, child benefits deter women from taking up part-time work. Some of the evidence suggests that, other things equal, the availability of long paid parental leave may also lower female participation by encouraging women to withdraw from the labour market in the short run. In turn, withdrawal from the labour market is liable to reduce wage and career prospects in the longer run.

- ***Remove tax distortion and disincentive to work for the second member of the couple***. (Jaumotte, 2003). The tax system distorts the labour market participation decision of married women, who are more heavily taxed as second earners than men in many EU countries. There is sound evidence that high marginal tax rates reduce labour supply and, moreover, that labour supply is more elastic for women than for men. Only in a few countries (Finland, Sweden, Luxembourg and Greece), do second earners and single individuals face similar marginal tax rates. Almost all countries now have separate taxation for married individuals, but the total tax burden on second earners remains significantly higher than on single individuals owing to the loss of the dependent spouse allowance.
- ***Foster equal opportunity across gender and combat gender discrimination*** (Pissarides et al., 2003). Some reduction in the gender wage gap might be an additional factor behind the rise in female participation, although its magnitude should not be overstated. The narrowing in the wage gap is not fully explained by convergence in experience and education but may also be related to the decline in gender discrimination. Gender segregation by sector and relatively low wages in female-dominated sectors nevertheless explain a significant proportion of the remaining gender pay gap. There is still some evidence of *segmentation by gender*, especially in the southern Member States, where women are over-represented in involuntary part-time, temporary or casual jobs. Since these jobs tend to offer relatively poor pay, working conditions and prospects, there is a risk that many women's skills are under-utilised. *Anti-discrimination policies* are expected to lead to further increases in female participation and employment. Although there is a relatively well-developed legislative framework regarding equal pay and employment opportunities within the European Union, there remain substantial differences in enforcement (measured for example by the number of lawsuits) and public awareness of these problems.

- ***Increase the educational attainment of women and raise the investment in human capital through life long learning***. The rise in female education relative to males over recent decades is no doubt a factor that, along with broader cultural changes on the position of women in the society[24], has enabled women to opt increasingly for market employment. Improved education

24 The change in cultural attitudes and social norms regarding gender roles is clearly a major influence on female employment. Participation in the labour market is increasingly the norm for women of all ages. In most European countries, women try to plan motherhood in order to reconcile family and professional life. They tend to postpone

may also increase the returns to professional experience, as more women access higher responsibilities and more qualified occupations. Olivetti (2001) shows for the US that the increase in total hours worked by married women between 1970 and 1990 can be explained by a rise in returns to experience. As the opportunity cost of temporarily leaving the labour market increases, married women increasingly avoid interruptions to their professional life. Although young women are now on average better educated than their male counterparts, low-skilled women are still less attached to the labour market than their male counterpart. The high education of young female cohort will materialise in the short and medium run, as they replace retiring female cohorts, characterised by a lower educational attainment and a much weaker attachment to the labour market.

- ***Improve general labour market conditions.*** OECD (2003) finds that the prevalence of unemployment has an impact on the labour supply of women, probably through the 'discouraged worker' effect. The fall in overall unemployment signals greater employment opportunity for women, and may thus prompt 'discouraged workers' to return to the labour market from inactivity or long-term unemployment. This phenomenon also explains the pro-cyclical pattern of labour force participation, with a positive output gap or higher economic growth enhancing women's prospects of finding a job (see also Burniaux et al. 2003).

Evidence and Estimated elasticities in the recent literature

Empirical macroeconomic studies find that a number of policy variables and institutions are important determinants of females' labour force participation significant negative effect of implicit tax on continued work and an unambiguously positive impact of standard age of eligibility to pension benefits on the older worker employment rate. To quote recent studies, Jaumotte (2004) and Bassanini and Duval (2005) found very similar results both in terms of signs and statistical significance. According to the latter study, which is slightly more recent, a rise of 1 percentage point in tax wedge leads to a decline of 0.05 p.p. to 0.2 p.p. in female full-time employment rate and of 0.14 to 0.38 in female full-time employment rate.

Tax incentives significantly influence both females' decision to enter the labour force and the number of hours they are willing to work. The net impact of tax incentives to part-time on female employment rates is positive and significant, with the positive coefficient on part-time work (ranging from 0.27 to 1.35) more than offsetting the negative coefficient on full-time work (ranging from -0.58 to -0.21).

Parental leaves appear to be detrimental to part-time work, but they have a positive impact on full-time employment (representing a female employment rate increase ranging from 0.02 to 0.06 per week of leave).

Child benefits (for two children as a proportion of average earnings) are found to reduce aggregate female employment rates through their significant negative impact on part-time work a 10 percentage point rise in the child benefit indicator (child benefits, in per cent) is estimated to reduce the prime-age female employment rate by 2.4 percentage points, whereas an 1 percentage point increase in childcare subsidies per child is found to raise (full-time and) aggregate female employment by 0.2% (see also Jaumotte, 2004; Powell, 1998). Therefore, in order to boost female

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the first child, have children at shorter intervals and have fewer children in total . The change in cultural attitudes is reflected in differences between age cohorts, with married women from younger generations much more likely to participate in the labour force.

participation and employment, childcare subsidies are to be preferred to child benefits, as only the childcare subsidies increase the relative return of employment for mothers compared with household work.

Finally, education boosts female participation and employment through an increase in full-time employment rates: a one-year rise in female education length is estimated to raise the overall female employment rate by 2.3 percentage points.

In some European countries (Netherlands and, to a lesser extent, Denmark and the United Kingdom), changes in policies and institutions appear to have made a significant contribution to the rise in female employment rates over the past two decades (Bassanini Duval, 2005, but also Buddelmeyer et al. 2007 for part-time employment). The large increase in female employment experienced by the Netherlands seems to some extent to be explained by a combination of general (tax cuts, product market deregulation) and specific (increase in tax incentives for part-time work, decline in child benefits) policy reforms.

Possible spillover and complementarities with other policy area

Bertola, Blau and Kahn (2002) find that centralised wage-bargaining together with a high degree of unionisation lowers the female employment rate, while preserving a high employment rate for prime-age men. The idea is that unions purposely negotiate large wage premiums for those whose opportunity cost of employment is high, which results in wage compression, and increased female inactivity and unemployment. Bardasi and Gornick (2000) show the existence of an hourly wage penalty for women working part-time.

Apps and Rees (2004) find that female labour supply policies could have an impact on the fertility rate, which determines the future growth of working-age population.
Specific measures of older-workers may have a strong impact on the participation rate of older female workers.

Other labour market policies (making work pay, labour taxation, employment protection legislation, etc.) will affect female participation. Bassanini and Duval (2005) confirms that product market reforms could boost female employment through three channels. First, excessive regulation tends to restrict the supply and drive up the prices of services such as childcare and household services. Second, restricted opening hours of shops also make it difficult for women to reconcile work and family life. Third, product market reforms could foster the expansion of service sectors where female employment is concentrated.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

<u>As regards performance indicators, a non-exhaustive list could include:</u>

The three following indicators might indicate the magnitude of female discrimination. Gender pay gap in unadjusted form has to be combined with Gender segregation in occupations and in sectors which correct for the sectoral and occupational composition of male and female employment.

- Gender pay gap in unadjusted form: Difference between men's and women's average gross hourly earnings as percentage of men's average gross hourly earnings (for paid employees). **Caveats:** Gender pay gap in unadjusted form is not a reliable measure of pay gap, given the potential importance of composition effects.
- Gender segregation in occupations: Gender segregation in occupations/sectors, calculated as the average national share of employment for women and men applied to each occupation/sector; differences are added up to produce a total amount of gender imbalance presented as a proportion of total employment (ISCO classification/NACE classification).
- Gender segregation in sectors: Gender segregation in occupations/sectors, calculated as the average national share of employment for women and men applied to each occupation/sector; differences are added up to produce a total amount of gender imbalance presented as a proportion of total employment (ISCO classification/NACE classification).

The three following indicators are also interesting complementary "ex post" indicators of discrimination of female in the labour market.

- Employment gender gap in full time equivalent: The difference in employment rates measured in full-time equivalent between men and women in percentage points.
- Unemployment gender gap: The difference in unemployment rates between women and men in percentage points.
- Employment gender gap: The difference in employment rates between men and women in percentage points.

Employment impact of parenthood: The difference in percentage points in employment rates without the presence of any children and with presence of a child aged 0-6, by sex (age group 20-49). It is an ex post indicator of the difficulty to reconcile professional life and family life. It should be complemented by ex ante indicator of childcare polices. Its merit is its availability from 2000 to 2006.

Female part-time workers in % of total female employment: is half way between policy and performance indicator. Although it is very sensitive to the legislation on part-time work (see Buddelmeyer et al. 2008), it is also influenced by changes in mentality regarding the position of women in the society. In general, part-time employment is seen as an instrument for women to particpate in the labour market by making the family and professional life more compatible. The availability of such a work contract is correlated with a high female participation rate, although the causality seems to go both ways, and with lower average hours worked per person. It should be noted that there is no universally accepted definition of part-time work/employment. The distinction between full- and part-time working could be based on the perception of individuals (declarative definition) or on an hour cut-off considered most suitable for the country concerned (objective definition but varying from country to country).
Involuntary female part-time employees as a % of total female employees: Women working involuntary part-time are those who declare that they work part-time because they are unable to find full-time work. The distinction between full-time and part-time work is made on the basis of a spontaneous answer given by the respondent. It is a complementary indicator, allowing one to determine whether part-time employment is always a tool to help raise female participation or whether it is the result of discrimination towards women, who undergo "hidden" underemployment.

The two following indicators can be considered as indicator of the actual attachment of women to the labour market.

- Female employment rate: Women in employment in age groups 15-64 as a proportion of total population in the same age group.
- Female activity rate (15 to 64 years). Share of employed and unemployed women in age groups 15-64, as a proportion of total population in the same age group.

As regards policy indicators, a non-exhaustive list could include:

Childcare indicators: Children cared for (by formal arrangements other than by the family) less than 30 hours a usual week/30 hours or more a usual week as a proportion of all children of same age group. Breakdown by Children aged under 3 (0-2 years), Children aged between 3 years and admission age for compulsory school and age for compulsory school and 12 years. Formal arrangements refer to the EU-SILC survey reply categories 1-4 (pre-school or equivalent, compulsory education, centre-based services outside school hours, a collective crèche or another day-care centre, including family day-care organised/controlled by a public or private structure.
These indicators provide insights on the coverage of the childcare systems, which is a major factor to reconcile family life and private life. The higher the childcare system coverage is, the higher the labour participation of women is likely to be. **Caveats:** All these indicators are only available for 2005, and thus can only be used to give an indicator of the level of performance, but not changes.

Number of months of maternity/paternity/parental leave with benefits replacing at least 2/3 of salary: plays also a role in reconciling family and professional life just after the birth. The longer they are, the smaller is the incentive to interrupt one's career and to leave the labour market after child birth.

The two following indicators are indicative of the disincentive for the second member of a couple (often the female partner/spouse) to enter the labour force or to extend her working time.

- Inactivity trap for the second member of a couple: The marginal effective tax rate on labour income for a second member of a couple moving from social assistance to work. The wage level of the first earner is fixed at 67% of the APW, while the wage level of the second earner is 33% AW, for a couple with 2 children.
- Low wage trap for second earner income: The marginal effective tax rate on labour income faced by the second earner income taking account the combined effect of increased taxes on labour and in-work benefits withdrawal as one increases the work effort (increased working hours or moving to a better job). It is assumed that the first earner makes 67% of APW and the second earner goes from 33% to 67% of APW, as a result of increasing the work effort.

Life-long learning. For women: informs about the participation of the female adult population aged 25-64 in education and training (over the four weeks prior to the survey). The labour market participation of female seems to rise with the level of education.
The information collected relates to all education or training whether or not relevant to the respondent's current or possible future job. It includes initial education, further education, continuing or further training, training within the company, apprenticeship, on-the-job training, seminars, distance learning, evening classes, self-learning etc. It includes also courses followed for general interest and may cover all forms of education and training as language, data processing, management, art/culture, and health/medicine courses. Before 1998, education was related only to education and vocational training which was relevant for the current or possible future job of the respondent

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Childcare (0-2 years) for less than 30 hours (+)	EMCO	pol	25 MS	2005
Childcare (0-2 years) for 30 hours and more (+)	EMCO	pol	25 MS	2005
Childcare (3 years to compulsory school age) for less than 30 hours (+)	EMCO	pol	25 MS	2005
Childcare (3 years to compulsory school age) for 30 hours and more (+)	EMCO	pol	25 MS	2005
Childcare (compulsory school age up to 12 years) for less than 30 hours (+)	EMCO	pol	25 MS	2005
Childcare (compulsory school age up to 12 years) for 30 hours and more (+)	EMCO	pol	25 MS	2005
Number of months of maternity/paternity/parental leave with benefits replacing at least 2/3 of salary (+)	EMCO	pol	24 MS	2005
Inactivity trap for the second member of a couple (-)	ECFIN/OECD	pol	25 MS	2001-2006
Low-wage trap for second-earner income (first earner: 67% APW; second earner: 33% to 67%) (-)	ECFIN/OECD	pol	25 MS	2001-2006
Life-long learning. For women (+)	EMCO STRIND	pol	26 MS	2000-2006
Difference between male and female employment rate (Employment gender gap) (-)	EMCO 18A1	perf	27 MS	2000-2006
Gender pay gap in unadjusted form (-)	EMCO STRIND	perf	24 MS	2001-2006
Gender segregation in occupations (-)	EMCO	perf	27 MS	2000-2006
Gender segregation in sectors (+)	EMCO	perf	27 MS	2000-2006
Unemployment gender gap (-)	EMCO	perf	27 MS	2000-2006
Employment impact of parenthood (-)	EMCO	perf	24 MS	2000-2006
Employment gender gap in full-time equivalent (-)	EMCO	perf	26 MS	2000-2006
Female part-time workers in % of total female employment (+)	LFS	perf	26 MS	1999-2006
Involuntary female part-time employment as a percentage of female part-time employment (-)	LFS	perf	25 MS	1999-2006
Female Activity rate (15 to 64 years) (+)	EUROSTAT	perf	27 MS	1999-2006
Female employment rate (%) (+)	EMCO STRIND	perf	27 MS	2000-2006

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

Employment impact of parenthood is a performance indicator which is difficult to interpret. This is confirmed by the absence of correlation with employment participation. The share of involuntary female part-time employment is dropped for the same reason.

Redundancy criteria

There is a high correlation among the indicators of childcare. We have reinstated several relevant indicators in the narrow list by splitting the weight. This key point has been stressed by several Member States and it results in a more childcare indicators are taken on board in order to take account of various age-groups.

The female employment rate is highly correlated (49% and 72%) with Employment gender gap in full time equivalent and the Employment gender gap. An argument to drop the female employment is that is too a broad performance indicator, which is already largely covered by the GDP accounting with the component "prime-age female participation". However, LIME might want to retain this indicator as it is one of the emblematic Lisbon targets. The solution has been to play again with weights to keep different but broadly redundant indicators without "overweighing" them.

Likewise, the Low-wage trap for the second earner income is kept in the Narrow list, splitting the weight with the Inactivity trap.

Concerning indicators that points out the female discrimination, we chose to keep the Gender pay gap in unadjusted form and the Employment gender gap in full-time equivalent as they are main EMCO indicators.

Inputs from associated stakeholders

The twelve remaining indicators qualify on both steps of the assessment. The Narrow list includes emblematic Lisbon target, such as the female employment rate. We added also the difference in female and male employment rates (gender employment gap) to the employment rate of women. The rationale behind is to separate out the specific situation of the groups considered from the general labour market conditions prevailing in the country.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Childcare (0-2 years) for less than 30 hours (+)	+	+	+	++	-	-	**narrow list**	**0,25(correlated but complementary with the indicator beyond)**
Childcare (0-2 years) for 30 hours and more (+)	+	+	+	++	+	+	**narrow list**	**0,25**
Childcare (3 years to compulsory school age) for less than 30 hours (+)	+	+	+	++	-	-	wider list	
Childcare (3 years to compulsory school age) for 30 hours and more (+)	+	+	+	++	-	+	**narrow list**	**0,25**
Childcare (compulsory school age up to 12 years) for less than 30 hours (+)	-	+	+	++	++	-	wider list	
Childcare (compulsory school age up to 12 years) for 30 hours and more (+)	-	+	+	++	++	-	**narrow list**	**0,25**
Number of months of maternity/paternity/parental leave with benefits replacing at least 2/3 of salary (+)	-	+	+	++	-	+	wider list	
Inactivity trap for the second member of a couple (first earner: 67% APW; second earner: social assistance to 33%) (-)	++	+	++	++	+	+	**narrow list**	**0,5**
Low-wage trap for second-earner income (first earner: 67% APW; second earner: 33% to 67%) (-)	+	+	++	++	-	+	**narrow list**	**0,5(correlated but complementary with the indicator above)**
Life-long learning. For women (+)	++	+	++	++	+	+	**narrow list**	**1**
Female employment rate (%) (+)	++	++	++	++	-	++	**narrow list**	**0,33**
Gender pay gap in unadjusted form (-)	+	+ (caveats in mind)	++	+	+	+	**narrow list**	**1**
Gender segregation in occupations (-)	+	+	++	++	++	+	wider list	
Gender segregation in sectors (+)	+	+	++	++	+	+	wider list	
Unemployment gender gap (-)	+	+	++	++	+	+	wider list	
Employment impact of parenthood (-)	-	+	++	++	+	-	wider list	
Employment gender gap in full-time equivalent (-)	+	+	++	++	+	++	**narrow list**	**0,33**
Female part-time workers in % of total female employment (+)	+	++	++	++	-	+	**narrow list**	**1**
Involuntary female part-time employment as a percentage of female part-time employment (-)	-	+	++	++	+	-	wider list	
Female Activity rate (15 to 64 years)(+)	+	+	++	++	-	-	wider list	
The difference in employment rates between men and women in % (-)	++	++	++	++	-	-	**narrow list**	**0,33**

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2.7. Specific labour supply measures for older-workers

Definition and scope of the policy area

Labour supply measures for older workers aim at encouraging older workers to remain economically active. A couple of policy areas are involved: old-age pension systems; early retirement schemes, which should be phased out; the interplay of tax and benefits (making work pay policy); policy aiming at promoting a gradual withdrawal from the labour market, while combining working and private lives.

Related Integrated guidelines

(17) Implement employment policies aiming at achieving full employment, improving quality and productivity at work, and strengthening social and territorial cohesion;

(18) Promote a life-cycle approach to work, through, for instance, resolute action to increase female participation and reduce gender gaps in employment, unemployment and pay and better reconciliation of work and private life and the provision of accessible and affordable childcare facilities and care for other dependants;

(19) Ensure inclusive labour markets, enhance work attractiveness, and make work pay for job-seekers, including disadvantaged people, and the inactive).

(21) Promote flexibility combined with employment security and reduce labour market segmentation, having due regard to the role of social partners.

Impact on growth components

Labour supply measures for older workers could increase labour participation and employment of older worker through four channels[25]:

- ***remove the early retirement schemes***. They comprise a wide array of early retirement and other benefit schemes such as unemployment pensions or prolonged unemployment benefits, special contracted pensions to redundant workers, disability pensions awarded on the basis of labour market considerations, benefits provided in exchange for the employment of young workers. (Blöndal and Scarpetta (1999, Conde-Ruiz and Galasso 2002; Gruber and Wise, 1999; Pestieau 2001, OECD, 2003).
- ***encourage older-workers to stay in the labour market through reforming the old-age pension schemes and providing more financial incentive to work longer*** (Blöndal and Scarpetta, 1998; OECD, 2003; Duval, 2003). More precisely, the key determinants of early retirement appear to be: (i) the first age at which the benefits are available, i.e. statutory retirement age; (ii) the generosity of benefit systems (replacement ratio); and (iii) the implicit tax rate imposed on continued employment once an individual is eligible for benefits. An implicit tax on continued employment arises when the cost of working one additional year in terms of foregone benefits and additional contributions paid is not offset by higher future benefits. It becomes then necessary to reduce the implicit rate of taxation of pensions schemes by making the latter actuarially neutral (striking a better balance between contributions and benefits).

25 It should be borne in mind that the efficiency of reforms crucially hinges upon the detailed programme design and in particular upon its targeting and its ability to foster proper work incentives (Arpaia and Mourre, 2005; OECD, 2005).

- ***allow gradual retirement pathway through the development of part-time employment, change in firm organisation and change in the wage structure at the career end*** (Buddelmeyer et al. 2004). Improved health is also an important accompanying condition (Casey, 1998).
- ***improve general labour market conditions.*** OECD (2003) finds that the prevalence of unemployment has an impact on the labour supply of older workers, probably through the 'discouraged worker' effect.

Labour supply measures for older workers could incidentally increase labour productivity by stimulating human capital building. Investment in human capital becomes more profitable, because its return is based on a longer period of activity. However, there is only weak evidence of that. For instance, Bassanini (2004) finds low returns to training in the form of higher wages.

Evidence and Estimated elasticities in the recent literature

Empirical macroeconomic studies find a very significant negative effect of implicit tax on continued work and an unambiguously positive impact of standard age of eligibility to pension benefits on the older worker employment rate. Bassanini and Duval (2005) found that a rise of 1 percentage point in implicit tax on continued work leads to a rise of 0.10 p.p. to 0.14 p.p. in older worker employment rate, while a one-year decrease in the standard age of pension benefit eligibility increase the older worker employment rate by between 0.57 and 1.01 percentage point, which is substantial. The latter result is broadly consistent with Carone (2005).

Possible spillover and complementarities with other policy area

As pointed by European Commission (2006) and Economic Policy Committee and European Commission (2006), raising older worker employment is a key to reduce the future aged-related expenditures, reduce the implicit liability of the pension system and put the public finances in a more sustainable path.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Employment rate of older worker: Persons in employment in age groups 55-64 as a proportion of total population in the same age group.

Difference between the employment rate of older workers aged 55 to 64 and the employment rates of 15-64 workers. Men.

Difference between the employment rate of older workers aged 55 to 64 and the employment rates of 15-64 workers. Women.

Average exit age from the labour force. The average age of withdrawal from the labour market, based on a probability model considering the relative changes of activity rates from one year to another at a specific age.

Activity rate (55 to 64 years): Share of employed and unemployed in age groups 15-64, as a proportion of total population in the same age group.

As regards policy indicators, a non-exhaustive list could include:

Implicit tax on continued work. Net change in pension wealth if retiring at 65 instead of 62. This indicators provides insights on financial indicators to retire, and comes from a join OECD/ECFIN/EMPL research efforts (Carone, 2005).

Coverage of early retirement. Numbers receiving early retirement benefits as a % of the labour force. **Alternatives:** Following EMCO, we decide to take the Eurostat data on the coverage of early-retirement, instead of OECD data (Database on Active Labour Market Programmes) as previously shown.

Life-long learning: participation of the population aged 55-64 in education and training: Participation of the population aged 55-64 in education and training (over the four weeks prior to the survey). The information collected relates to all education or training whether or not relevant to the respondent's current or possible future job. It includes initial education, further education, continuing or further training, training within the company, apprenticeship, on-the-job training, seminars, distance learning, evening classes, self-learning etc. It includes also courses followed for general interest and may cover all forms of education and training as language, data processing, management, art/culture, and health/medicine courses. Before 1998, education was related only to education and vocational training which was relevant for the current or possible future job of the respondent.

Life long learning: participation of the population aged 45-54 in education and training: Participation of the population aged 45-54 in education and training (over the four weeks prior to the survey).

Summary table: source, type of indicator geographical coverage and time coverage:

Indicator	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Implicit tax on continued work (+)	OECD/ECFIN/EMPL	pol	19 MS	2006
Coverage of early retirement (-)	EUROSTAT, ECFIN	pol	14 MS	1999-2005
Life-long learning: Participation of the population aged 55-64 in education and training(+)	EMCO	pol	19 MS	2000-2006
Average exit age from the labour force- total(+)	EMCO STRIND	perf	24 MS	2001-2005
Difference between employment rate of older workers aged 55 to 64 and total 15-64- Men (+)	EMCO STRIND	perf	27 MS	2000-2006
Difference between employment rate of older workers aged 55 to 64 and total 15-64- Women (+)	EMCO STRIND	perf	27 MS	2000-2006
Life-long learning: Participation of the population aged 45-54 in education and training (+)	EMCO	pol	24 MS	2000-2006
Activity rate (55 to 64 years) 1999-2006 (+)	EUROSTAT	perf	27 MS	1999-2006
Employment rate of older workers aged 55 to 64- Total (+)	EMCO	Perf	27 MS	2000-2006

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards
All indicators passed the first screening successfully.

Redundancy criteria
The Employment rate of older workers (main EMCO indicator) is highly correlated with the Difference between the employment rates of older workers aged 55 to 64 and the employment rates of 15-64 workers by sex and also with the Average exit age from the labour market (main EMCO indicator), which directly measures the effect of the reforms of early and old-age pension schemes. However, LIME might want to retain these employment rates as they are one of the emblematic Lisbon targets. A solution has been to play with weights to keep different but broadly redundant indicators without "overweighing" them.

Inputs from associated stakeholders
The eight remaining indicators qualify on both steps of the assessment. The Narrow list includes emblematic Lisbon target, such as the older worker employment rate. We added the Difference in older worker employment rate and total employment rate to the employment rate of older workers. The rationale behind is to separate out the specific situation of the groups considered from the general labour market conditions prevailing in the country.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Implicit tax on continued work(+)	++	+	+ (level only)	+	+	-	**narrow list**	**1**
Coverage of early retirement (-)	++	+	+	+	+	-	**narrow list**	**1**
Life-long learning: Participation of the population aged 55-64 in education and training(+)	++	++	++	+	+	+	**narrow list**	**0,5**
Average exit age from the labour force- total(+)	++	++	+	++	+	++	**narrow list**	**0,25**
Difference between employment rate of older workers aged 55 to 64 and total 15-64- Men (+)	++	++	++	++	-	++	**narrow list**	**0,25**
Difference between employment rate of older workers aged 55 to 64 and total 15-64- Women (+)	++	++	++	++	-	++	**narrow list**	**0,25**
Life-long learning: Participation of the population aged 45-54 in education and training (EMCO 23M4)(+)	++	++	++	++	-	+	**narrow list**	**0,5**
Activity rate (55 to 64 years) (Eurostat) 1999-2006 (+)	+	+	++	++	-	++	wider list	
Employment rate of older workers aged 55 to 64- Total (+)	++	++	++	++	-	++	**narrow list**	**0,25**

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2.8. Wage bargaining and wage setting policies

Definition and scope of the policy area

Wage bargaining and wage setting policies refer to measures that impact on aggregate wage developments and the distribution of wages in the economy. Wage developments are typically the outcome of individual or collective bargaining between employees and employers or their respective associations. Governments can influence the outcome indirectly through the provision of information, moral suasion, their involvement in tripartite bargaining or other means. In many countries, public wage agreements may serve as a benchmark for private sector bargaining. Moreover, through legislation, governments set out policy frameworks to influence the bargaining power of social partners or the coverage of collective bargaining. Measures related to minimum wages, wage indexation or labour taxation may also have an effect on the outcome of wage bargaining. Finally, social partners may take the lead in introducing changes to the bargaining framework with more or less active involvement of governments, for example on opt-out clauses, non-wage benefits, more differentiated agreements.

Related Integrated guidelines

(4) To ensure that wage developments contribute to macroeconomic stability and growth and to increase adaptability Member States should encourage the right framework conditions for wage-bargaining systems, while fully respecting the role of the social partners, with a view to promote nominal wage and labour cost developments consistent with price stability and the trend in productivity over the medium term, taking into account differences across skills and local labour market conditions.

(22) Ensure employment-friendly labour cost developments and wage-setting mechanisms by: – encouraging social partners within their own areas of responsibility to set the right framework for wage bargaining in order to reflect productivity and labour market challenges at all relevant levels and to avoid gender pay gaps; – reviewing the impact on employment of non-wage labour costs and where appropriate adjust their structure and level, especially to reduce the tax burden on the low-paid.

Impact on growth components

- ***Employment.*** With wages being the price that clears the labour market, wage developments have a direct impact on employment in an economy. An indirect effect works via the impact of wage growth on inflation. Monetary policy can be more accommodative to growth in a low inflation environment. Pressure on prices from labour costs may lead to a less growth-supportive stance of monetary policies.
- ***Investment.*** Together with productivity, wage developments determine unit labour costs, which are inversely related to firms' profitability and international cost competitiveness. Thus, for a given labour productivity growth, higher wage growth is bound to squeeze profit margins, thereby having a negative impact on investment and export performance. On the other hand, wages are an important part of consumers' disposable income and therefore higher wage growth is widely assumed to be supportive to private consumption. The overall effect on domestic demand must be seen in conjunction with the effect on investment and export demand. Factors such as the size of the country, its degree of openness, and the relevant time horizon are key to determine the magnitude of the various demand components. Moreover, the effect of wage

developments on consumption is dampened by the inverse relationship to employment and the fact that labour income is only a part of disposable income.

- ***Productivity***. In competitive equilibrium, real wages are equal to productivity, while in a setting of imperfect competition bargaining power drives a wedge between wages and productivity. With constant bargaining power, real wage growth would be equal to productivity growth. In a dynamic setting, higher real may come at the expense of declining employment, at least in the short term. From a long time perspective, though, it may be the case that higher real wage growth spurs productivity growth, as high real wages could force firms to introduce more productive technologies and therefore foster innovative activity. Thus, it is generally agreed that wage developments should be aligned to productivity trends, and real wage growth even remain below productivity growth in case of high rates of unemployment.
- ***Reallocation and skills.*** Wages are also known to have an important impact on labour market incentives. Firms may be willing to pay higher wages in order to motivate staff (efficiency wages). The differentiation of wages across regions, sectors, firms, occupations and skills may be an important determinant of labour flows and of individuals' incentives to acquire higher skills.

The relationship between the outcome of the wage bargaining process and the institutional factors that shape wage bargaining is ambiguous (Calmfors and Drifill (1988). Both theoretical and empirical analyses have suggested that bargaining systems which are either highly centralised at national or multi-industry level or decentralised at the level of firms perform better than intermediate systems where bargaining takes place at the level of industries. The main advantage of centralised bargaining is that it allows labour representatives to take into account the negative impact that excessive wage claims would have on overall inflation and employment. Decentralised bargaining, on the other hand, means that wages are restrained by market forces and adjust better to local productivity and labour market conditions. Yet, this does not preclude wages from being consistent with the achievement of favourable macroeconomic outcomes provided some form of coordination is at work.

Evidence from OECD countries (Boeri et al. (2001)) suggests that highly coordinated, centralised systems tend to be associated with lower unemployment and, moreover, that the degree of coordination between different bargaining levels is a much more significant influence on performance than union density or coverage, i.e. the share of workers who belong to a union or are covered by collective agreements.

However, coordinated bargaining also entails greater wage compression, with negative effects on relative employment – especially at the bottom of the wage distribution (Blau and Kahn, 1996). Bargaining institutions tend to raise the relative wages of the young and less-educated, which results in lower employment, especially for men, though possibly higher employment for women, since higher relative wages encourage female labour supply (Kahn 2000). Wage compression also modifies the industry distribution of employment, shifting employment away from industries with low wages (Davis and Henrekson, 2000), and is liable to widen regional employment disparities. In contrast, decentralised bargaining allows higher relative wage flexibility and leaves wider room for bargaining on working conditions more generally. It also makes possible the introduction of performance-related pay schemes where wages are used to motivate and improve workers' productivity.

In practice, the distinction between centralised and decentralised systems is blurred, since bargaining often takes place at two or more levels. The kind of 'decentralisation' in two- or three-tier systems that involves local wage increases in excess of those agreed at higher levels, is liable

to discourage wage moderation (Calmfors, 1993). In the context of monetary union and large regional disparities within several EU countries, a shift from centralised towards more decentralised bargaining appears desirable. It is also worth saying that in order to deliver the necessary degree of differentiation at the disaggregated level, while at the same time ensuring that the overall wage developments are consistent with the achievement of favourable macroeconomic outcomes, it is of paramount importance that coordinated bargaining at the higher levels coexist with some form of organised decentralisation in bargaining at the lower levels (for instance, in the form of opening clauses).

Evidence and Estimated elasticities in the recent literature

From macro and cross-country regressions analysis

Most empirical studies find that higher wages are significantly correlated with higher unemployment. The significance of profitability (the inverse of real unit labour costs) in estimates of investment has faded over time whereas real effective exchange rate deflated with relative unit labour costs tend to be significant determinants in export equations.

An ECFIN estimate of a traditional labour demand equation for the euro area as a whole shows that the exogenous variables used (total factor productivity trend, lagged economic growth, lagged employment and lagged real unit labour costs explain most of the employment developments between 1970 and the early 1990s, and until 2004 provided a structural break in 1997 is included. According to the equation with break, a 1 percentage point decline in real labour cost growth leads to around a 0.4 % point increase in employment growth in the long run (with a mean lag of around two years).

An empirical study conducted on behalf of DG ECFIN by AQR and IWH yielded comparable results. The estimates suggest the elasticity be between -0.37 (short term response and -0.56 (long-term elasticity).

Micro estimates of wage equations usually confirm the finding of an elasticity of -0.1, meaning that 10% higher local unemployment coincides with 1% higher local pay (see Blanchflower and Oswald 2005).

From macroeconometric simulations

Due to the feedback effect of wages on other macroeconomic variables, macroeconomic simulations may give a more informative picture of the effect of changes to wage behaviour. Wage shocks are, however, not a standard feature in most macro-econometric models, because of the endogenous nature of wages. The impact of a wage shock in a model therefore depends crucially on how the shock is effectively modelled, i.e. shock to structural parameters, for instance, the bargaining power of workers, or shocks to exogenous variables entering the wage equations in the model, i.e. typically the residual terms.

Simulations of a 1% permanent wage increase in Germany in the Commission's Quest II model yielded a total output loss of 0.7 percentage point in the long run. Under standard assumptions in the model, even the short-run GDP effect is negative, 0.1 percentage point below base line in the first year and 0.2% in the second year. There is a negative effect of employment already in year 1 and in the long run, the rate of unemployment increases by almost 0.9 percentage point.

In a model simulation prepared for the 2007 Review with QUEST II, a one-time reduction in real wages by 0.3 percentage point yielded decline of 0.1 percentage point in the rate of unemployment

rate after 1 year and 0.5 percentage point after 10 years. GDP increases by about 0.2 per cent after 1 year and 0.4 percentage point after 10 years while real wages converge back to the base line. Labour productivity declines by around 0.2 percentage point.
In simulations with the ECB model (DIW Berlin 2004), a simultaneous permanent 1% nominal wage shock in four countries (DE, FR, ES, NL) lead to notably different GDP and employment responses across countries. In Germany, Spain and the Netherlands, the GDP effect is positive, albeit only marginally for Germany. In France it is nil. Whereas employment was ¾ of a percentage point lower in Germany and almost unchanged in France and the Netherlands, employment was markedly above the base line in Spain.

Simulations conducted by the DIW with the NiGEM model of a 1% higher nominal hourly wage growth over 5 years show a decline in real GDP of slightly more than 1 percentage point in Germany and slightly less than 1 percentage point in France and the Netherlands after 5 years. For Spain, the simulations yield a GDP more than 2.5 percentage point below the base line (see DIW Berlin 2004).

Possible spillover and complementarities with other policy areas

The analysis by Nunziata (2005) showed that labour market institutions have a significant impact, both directly and through their interaction with unemployment and taxation on the level of wages. For instance, bargaining coordination had a negative direct effect on labour costs, and also negative indirect effect in reducing the positive impact of taxation and increasing the negative impact of unemployment. Higher benefit replacement rates as well as employment protection legislation had a positive impact whereas benefit duration was insignificant in his estimates. In a related paper, Koening, Leonardi and Nunziata (2004) find evidence that stronger and more centralisation unions and minimum wages tend to compress the wage distribution.
The empirical estimates with macroeconomic data by AQR Barcelona and IWH Halle shows that adjustment of wages to shocks in EU labour markets is clearly influenced by labour market institutions. The response of real wages and employment to shocks is faster and larger in more deregulated labour markets, which also have a lower presence of trade unions. The empirical results suggested that union density and degree of coordination in wage bargaining were having offsetting effects on wage flexibility while taxation had an indirect effect through their interaction with other institutional variables.

Using data on hourly nominal wages at the industry level for 19 OECD countries, Holden and Wulfsberg (2005) find that downward nominal wage rigidity is more prevalent when union density is high and employment protection is strict. The analysis with micro data in the International Wage Flexibility Project (Dickens et al. 2007) suggests that higher unionization and collective bargaining coverage are associated with stronger downward nominal and real wage rigidity.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Nominal unit labour costs growth: Growth rate of the ratio: Compensation per employee (i.e. compensation of employees divided by domestic employment) divided by GDP in constant prices per person employed. It is more informative to use the rate of change. **Caveats:** In some countries, compensation is divided by full time equivalents. Moreover, the productivity tends to be more cyclical than wages, reducing the information content of single observations.

Real unit labour costs: compensation per employee (see above) divided by GDP in current prices per person employed, informative is the rate of change. **Caveats:** See above.

Nominal unit wage cost gap between services and manufacturing industry. Difference in average percentage change in 2000-2005 of the nominal unit wage cost in services and manufacturing industry. **Caveats**: incomplete harmonisation across sectors, wage differences may also reflect productivity differences; hourly productivity is not available for sectors in most countries.

Low-skilled unemployment gap relative to the high skilled unemployment rate. Difference between the unemployment rate of the low-skilled workers and the unemployment rate of the high-skilled workers.

Dispersion of regional unemployment rates. Standard deviation of unemployment rates divided by the national average (age group 15 + years) (NUTS III).

As regards policy indicators, a non-exhaustive list could include:

Relative minimum wage levels. Gross earnings of full-time minimum-wage earners as per cent of gross average wages (AW).**Caveats:** coverage and legal design different across countries.

Full time employees on the minimum wage. Proportion of full time employees earning the minimum wage.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicator	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Relative minimum-wage levels (-)	OECD	pol	13 MS	2000-2006
Real unit labour cost growth (%) (-)	EMCO STRIND	perf	25 MS	2000-2006
Nominal unit labour cost growth (-)	AMECO	perf	27 MS	2000-2006
Nominal unit wage cost gap between services and manufacturing industry (-)	AMECO	perf	22 MS	2005
Low-skilled unemployment gap relative to the high-skilled unemployment rate (-)	LFS	perf	24 MS	2006
Dispersion of regional unemployment rates (-)	EMCO	perf	24 MS	2000-2006
Full-time employees on the minimum wage - (%) (-)	EUROSTAT	pol	17 MS	1999-2006

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

Relative minimum-wage levels and Nominal unit wage cost gap between services and manufacturing are dropped because of lack of comparability. the Share of employees paid at the minimum wage was added in the wider list, as the existence and level of minimum wage are key features of the wage setting.

Redundancy criteria

Nominal unit labour cost growth appears highly correlated with Real unit labour cost growth, However, both have been reinstated in the narrow list by splitting the weight as they are main EMCO indicators.

Inputs from associated stakeholders

The four remaining indicators qualify on both steps of the assessment.

However, some Member States mentioned that important institutional aspects are missed out such as union membership coverage or the ratio of collective agreements. Unfortunately, the corresponding indicators are missing for the New member States or not available with sufficient timeliness.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Relative minimum-wage levels (-)	+	-	++	-	+	+	wider list	
Real unit labour cost growth (%) (-)	++	++	++	++	+	-	**narrow list**	**0,5**
Nominal unit labour cost growth (-)	++	++	++	+	-	-	**narrow list**	**0,5**
Nominal unit wage cost gap between services and manufacturing industry (-)	+	-	++	++	+	+	wider list	
Low-skilled unemployment gap relative to the high-skilled unemployment rate (-)	++	+	++	++	++	+	**narrow list**	**0.5 to give an equal weight to wage moderation (covered by 1 indicator) and wage differentiation (covered by 2 indicators)**
Dispersion of regional unemployment rates (-)	+	++	++	++	++	+	**narrow list**	**0.5 to give an equal weight to wage moderation (covered by 1 indicator) and wage differentiation (covered by 2 indicators)**
Full-time employees on the minimum wage - (%) (-)	+	+	++	+	++	-	wider list	

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2.9. Immigration and integration policies

Definition and scope of the policy area

Immigration policy measures aim at regulating transit of persons across the border, particularly of those who intend to work and remain in the country, and are likely to affect the labour market outcomes as far as immigrant workers are concerned. Immigration policy interventions can be classified as follows: 1) border controls, encompassing measures related to the entry, stay and access to the labour market, measures for users of clandestine labour force and their enforcement and regularisation programmes; 2) selective immigration policies, including quota systems aimed at the recruitment of foreign workers, easing of recruiting policies for highly skilled or for specific occupations, bilateral labour agreements on seasonal or temporary workers; 3) measures to facilitate the labour market integration of immigrants, ranging from ALMPs to the recognition of formal education attainments and the entitlement to benefits/ social assistance programmes specifically targeted at immigrant workers (and asylum seekers).

Related Integrated guidelines

(17) Implement employment policies aiming at achieving full employment, improving quality and productivity at work, and strengthening social and territorial cohesion).
(20) Improve matching of labour market needs.
(21) Promote flexibility combined with employment security and reduce labour market segmentation, having due regard to the role of the social partners.

Impact on growth components

The impact of migration on economic growth depends on how productivity and the labour market are affected. These effects would vary between countries depending on their particular migration model and its resulting composition of migrants in terms of age, gender and especially skills relative to the native population. Immigration and integration policy measures would primarily affect the following components of growth: labour quality; net migration; share of working age population; and unemployment rate. In particular, immigration policy ***affects both net migration and share of working age population*** through the following measures:

- Border controls and measures related to the entry, stay and access to the labour market. These encompass a wide array of measures such as regulations related to visa, residence and work permit requirements for immigrants; regulation of access to domestic labour market and employment of foreign workers, including quotas and restrictions; measures aimed at legalisation of immigrant workers.

- Measures to discipline the entry and residence of particular types of immigrants. Specific policies targeted at addressing existing labour shortages in the country, including measures targeted at specific types of works by area of activity (agriculture, research, construction, etc.) or education (tertiary, skilled workers, science and engineering graduates, etc.).

A considerable number of papers study the impact of immigration on wages and employment, most of them for the US, with some studies for other European countries.[26] Most papers find effects of immigration on wages and employment prospects of native workers which are either modest or absent. However, the general conclusion some draw from this evidence, that immigration has, at most, modest adverse effects on employment and wages, is not undisputed, and there is an ongoing debate about measurement and identification (Borjas, 2003).

Immigration policy can be expected to have some ***impact on unemployment rate*** through increase in the working-age population and labour force as described above, but also through measures to facilitate the labour market integration of immigrants (ALMPs, the recognition of formal education attainments, etc.). The size and direction of impact would depend on i) the extent to which immigrants complement or substitute nationals on the labour market27 and ii) flexibility of wage formation in the recipient economy. One should expect that the wage income of the migrating factor and of others with which it competes will fall in the destination country. However, if wages in the destination country are inflexible, unemployment will increase. The wage and income of complementary factors will move in the opposite direction, as production adjusts to the new factor intensities (Coppel et al. (2001); Borjas (1999)). It is estimated that the low-skilled workers are typically more affected by poorly functioning labour markets than high-skilled workers28.

It is difficult to evaluate the size and nature of these effects, since, apart from differences in skill and educational attainment, they also depend on the volume of immigrants, the different immigration waves, their settlement patterns, as well as the characteristics of migrants, such as sex, age, country of origin and legal status. Moreover, the effects are likely to vary over time as immigrants acquire new skills and experience in the local labour market. And as relative wages change, decisions on human capital investment by the native population are also likely to adjust.

Nonetheless, available empirical studies from the US fail to find that immigration has harmful effects in terms of raising unemployment in the receiving country (Borjas, 1990 and 1993; Friedberg and Hunt, 1995). In Europe, the results are less categorical, with a few studies reporting small negative effects of immigration on unemployment (Winkelman and Zimmerman, 1993). Others, however, distinguish between long run and short run impacts and find that while unemployment may initially increase, in the long run the overall rate of unemployment falls

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26 Studies for the US include Altonji and Card (1991), Borjas (1987; 2003), Butcher and Card (1991), Card (1990; 2001) and this Feature, and LaLonde and Topel (1991). Studies for Europe include Pischke and Velling (1997) for Germany, Hunt (1992) for France, Carrington and de Lima (1996) for Portugal and Winter-Ebmer and Zweimu¨ ller (1996; 1999) for Austria, Friedberg (2001) and Cohen-Goldner and Paserman (2004) for Israel. See Dustmann and Glitz (2005) for an extensive survey of the literature. Other surveys include Borjas (1994; 1999) and Friedberg and Hunt (1995).

27 Immigrants can be assumed to form a separate type of labour, imperfectly substitutable with natives' one (see e.g. Ottaviano and Peri, 2005, or Angrist and Kugler, 2003).

28 For example, unemployment rate of low-skilled workers in Europe is systematically higher than for high-skilled workers. This suggests that the labour market will be able to absorb high-skilled migrants more readily than low-skilled migrants. However, if the low-skilled unemployment is due to centralised wage setting coupled with low mobility, additional low-skilled immigration might actually reduce unemployment by reducing the marginal productivity differentials between regions (see Boeri and Bruecker, 2005). A study of German workers found that immigration depressed the wage rate of blue collar workers and increased that of white collar workers in the 1980s (De New and Zimmerman 1994). In the case of France, Garson et al. (1987) showed that immigration has a very small impact on nationals' wages.

permanently (Gross, 1999). These findings may reflect lower labour market flexibility and the slow speed of adjustment in EU economies compared with the US. Overall, positive labour market effects of immigration come from reducing skill shortages

Immigration policy can have ***impact on labour quality***, though the direction of this impact cannot be generalised and is measure-specific. This issue is framed in terms of the skill level of immigrants (OECD, 2006).

- Measures to discipline the entry and residence of particular types of immigrants could target specific skill groups, consequently having impact on overall labour quality. Above average skills go hand in hand with higher wages and better employment opportunities for such immigrants, thereby contributing to a rise in GDP per capita. The opposite holds for migrants with low skills or with skills, which become increasingly obsolete with technical progress. As Europe has largely taken in un- and semiskilled migrants, the skill structure as such has not promoted productivity growth. However, economies of scale as a result of migrant worker intake as well as a more efficient use of skilled native workers.
- General opening up of domestic labour market to foreigners via measures related to the entry, stay and access to the labour market is likely to increase labour supply of unskilled, thus depressing the overall labour quality.

Evidence and Estimated elasticities in the recent literature[29]

The macroeconomic aspects of immigration have been analysed primarily in terms of immigration's impact on wages and (un)employment. Longhi et al (2005, 2006) find that a one per cent increase in immigration only leads to a 0.12% decline in wages within the relevant skill segment and a 0.0034% decline in employment. Controlling for the endogeneity of migration (migrants tend to be attracted to locations that have the most vibrant local economies and most attractive wages), Borjas (2003) and Aydemir and Borjas (2006) obtain substantially higher estimates of the wage impact of migration for the US, Canada, and Mexico. According to these studies, immigration of 1% reduces wages at the respective skill level by between 0.3 and 0.4% and migration could explain up to 1/3 of the increase in the wage gap between low-skilled and high-skilled wages in the US over recent decades. Bonin (2005) applies Borjas' methodology to German data and finds much smaller effects. His results indicate that a 10 percent rise of the share of immigrants in the workforce would in general reduce wages by less than one percent and not increase unemployment. Finally, Ottaviano and Peri (2006) find significant complementarity of native and foreign workers within the same skill group and they argue that only the least skilled group of natives in the US are likely to experience a negative wage impact due to migration.

Possible spillover and complementarities with other policy area

Skilled people mostly move in response to economic opportunities abroad that are better than those available at home as well as in response to the migration policies in destination countries. Other factors, however, also play a role in the decision of the highly skilled to migrate. These include intellectual pursuits, be it education, research or language training. In the case of researchers and academics, the conditions in the host country regarding support for research and demand for R&D staff and academics can be an important determinant in the migration decision and destination.

29 Based on Weizsaeker (2006).

Among the entrepreneurially-minded, the climate for innovation generally, and for business start-ups and self-employment in particular, may play an important role in the decision of the highly skilled to move abroad (OECD, 2006).
The empirical analysis (e.g. Causa and Jean, 2007) suggests that general labour market policies can influence the labour market impact of immigration. Protection of incumbent workers through employment protection legislation may limit the impact of immigration on natives with characteristics similar to immigrants, but it does not affect significantly the aggregate impact of immigration, which remains transitory irrespective of the policy environment. Meanwhile, the adjustment to an increase in immigration appears to be hindered by excessive anticompetitive regulation on the product market.

Empirical findings (Causa and Jean, 2007) also suggest that reform of the labour market in general may be helpful in accommodating problems specific to migrants through two main channels: the impact on immigrants of policies that are not employment-friendly for certain groups of workers (like high unemployment benefit replacement rates) is qualitatively the same as on natives, but it is magnified; and immigrants suffer disproportionately from labour market dualism.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Share of employed foreign born population over total population. Employment of foreign born (as percentage of foreign born population) times the share of foreign born population over total population. The change is defined as the average crude rate of net migration 2001-2006 including corrections. **Caveats:** no time series-available for most countries for share of foreign-born population over total population - different data by country (generally 2005 but only 2001 for GR & IT, 2002 for PL, 2003 for DE, 2004 for SK, and 2006 for LV, LT, FI).

Employment rate gap between non EU and EU nationals. Difference between the employment rates of employed with same nationality as country of residence and workers of nationality outside the EU25.

Difference between unemployment rates of nationals and non-EU nationals: Difference between the unemployment rate of nationals and that of foreign residents whose nationality lies outside the EU25.

Difference between nationals and non EU25 nationals' participation rates': Difference between the participation rate of nationals and that of foreign residents whose nationality lies outside the EU25. Wide differences may indicate that immigrants are not well integrated into domestic labour market, that immigration is not complementary to domestic labour supply, and that the quality of immigrant labour is relatively low.

Difference between foreigners and nationals in the share of those with less than upper secondary education: Wide differences indicate that immigration may be related to the low quality of labour.

Share of foreign population over total population (citizenship criterion)

Employment rate gap between EU born and non EU born: Difference between the employment rate of employed born in the country and workers born outside the EU25.

Employment rate of foreign born (% of foreign born population): The proportion of foreign born employed over foreign-born working age population (15-64).

Proportion of foreign born population with primary education (% of total foreign born population): Foreign born population with primary education over total foreign born population.

Proportion of foreign born population with tertiary education (% of total foreign born population): Foreign born population with tertiary education over total foreign born population.

Crude rate of net migration (including corrections): The ratio of the net migration during the year to the average population in that year. The value is expressed per 1000 inhabitants. The crude rate of net migration is equal to the difference between the crude rate of increase and the crude rate of natural increase (that is, net migration is considered as the part of population change not attributable to births and deaths). It is calculated in this way because immigration or emigration flows are either unknown or the figures are not sufficiently precise. The net migration rate is positively related to net migration and share of working age population GDP components.

Share of foreign born population over total population (birth place criterion). Note: the change is defined as the average crude rate of net migration, including corrections.

As regards policy indicators, a non-exhaustive list could include:

Summary table: source, type of indicator geographical coverage and time coverage:

Indicator	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Share of employed foreign-born population over total population (+)	OECD, EUROSTAT	perf	17 MS	2005
Employment rate gap between non EU and EU nationals (-)	EMCO	perf	24 MS	2005-2006
Difference between unemployment rates of nationals and non-EU nationals (-)	EUROSTAT	perf	27 MS	2005-2006
Difference between nationals and non-EU25 nationals participation rates(+)	EUROSTAT	perf	25 MS	2005-2006
Difference between foreigners and nationals in the share of those with less than upper secondary education(+)	OECD/Sopemi	perf	17 MS	2003
Share of foreign population over total population (Citizenship criterion) (+)	EUROSTAT	perf	20 MS	1999-2006
Employment rate gap between EU born and non-EU born (-)	EMCO	perf	24 MS	2005-2006
Employment rate of foreign-born (% foreign-born population) (+)	OECD	perf	17 MS	2005
Proportion of foreign-born population with primary education (% total foreign-born population) (-)	OECD	perf	16 MS	2005
Proportion of foreign-born population with tertiary education (% total foreign-born population) (+)	OECD	perf	16 MS	2005
Crude rate of net migration (including corrections)(+)	Eurostat	perf	26 MS	1999-2006
Share of foreign-born population over total population (Birth Place criterion	EUROSTAT, ECFIN calculation	perf	23 MS	2005
Difference between native-borns and foreign-born of the share of those with primary education (-)	OCDE	perf	16 MS	2005

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

The difference between foreigners and nationals in the share of those with less than upper secondary education has insufficient time coverage (with data only available for 2003).

Redundancy criteria

Differences between unemployment rates of nationals and non-EU nationals and Difference between nationals and non-EU25 nationals participation rates are strongly correlated with the Employment rate gap between non-EU and EU nationals, which is less correlated with the other indicator of the Narrow list.

Inputs from associated stakeholders

The sixth remaining indicators qualify on both steps of the assessment. We took on board Member States' suggestion of adding an indicator of stock (namely the share of foreign population over total population - Citizenship criterion). We also kept the indicator of flows (rate of net migration) given the absence of high correlation, its higher statistical reliability (as the difference between change in total population size and natural increase of population) and its closer relationship with the concept to measure. Indeed, the share of foreign population captures part of the natives (that is, those born in the hosting country but not receiving the citizenship). New (updated) indicators coming from the OECD on the stock of foreign-born population and its decomposition by skilled and labour status have been included in the narrow list. They are used to better specify the contribution of migrants to growth but also to better analyse the efficiency of the integration policy. For this latter purpose, we consider the indicators in terms of difference with the native-born population.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Share of employed foreign-born population over total population (+)	++	+	+	+	+	+	**narrow list**	**1**
Employment rate gap between non EU and EU nationals(-)	++	+	+	++	-	-	**narrow list**	**0,5**
Difference between unemployment rates of nationals and non-EU nationals (-)	++	+	+	++	-	-	wider list	
Difference between nationals and non-EU25 nationals participation rates(+)	++	+	+	++	-	-	wider list	
Difference between foreigners and nationals in the share of those with less than upper secondary education(+)	++	+	-	+	+	+	wider list	
Share of foreign population over total population (Citizenship criterion) (+)	++	+	++	++	-	+	wider list	
Employment rate gap between EU born and non-EU born (EMCO19.M5) (-)	++	+	+	++	-	-	**narrow list**	**0,5**
Employment rate of foreign-born (% foreign-born population) (+)	++	+	+ (change unavailable)	+	+	+	**narrow list**	**0.5 for level (size of migration in stock)**
Proportion of foreign-born population with primary education (% total foreign-born population) (-)	+	+	+ (change unavailable)	+	++	-	**narrow list**	**0,25**
Proportion of foreign-born population with tertiary education (% total foreign-born population) (OECD 2008) (+)	+	+	+ (change unavailable)	+	+	-	**narrow list**	**0,25**
Crude rate of net migration (including corrections)(+)	++	+	+	++	+	+	wider list	
Share of foreign-born population over total population (Birth Place criterion) (+)	++	+	+	++	-	+	wider list	
Difference between native-borns and foreign-born of the share of those with primary education (-)	+	+	+ (change unavailable)	+	+	-	wider list	

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2.10. Labour market mismatch and labour mobility

Definition and scope of the policy area

Labour market mismatch and labour mobility policy refers to wide range of regulatory provisions that aim at stimulating labour movement across regions and across occupational sectors. Labour market mismatch and labour mobility aim at enhancing labour supply and closing jobs mismatch and refer to improving the conditions for workers to take up a job which is distant from the main centre of interest or in sectors other than sector of former employment. Labour market mismatch and labour mobility policies include a disparate set of measures ranging from those providing economic incentives for housing, to the recognition of acquired qualifications and skills or improving the portability of supplementary pension rights. Since sectors tend to be concentrated geographically, geographical and occupational mobility are interrelated.

Integrated Guidelines

(21) Promote flexibility combined with employment security and reduce labour market segmentation, having due regard to the role of the social partners.
(20) Improve matching of labour market needs.
(17) Implement employment policies aiming at achieving full employment, improving quality and productivity at work, and strengthening social and territorial cohesion.

Impact on growth components

Migration policy measures that increase regional migration would primarily affect the following components of growth: unemployment and labour market participation rates for females and males (see the section on elasticities below). If workers are more willing or able to move to different parts of the country, the component of the structural rate of unemployment attributable to geographic mismatch of jobs and workers would decline.

Economic incentives for housing*:* Overall, measures to increase supply of private rental housing ***should promote labour geographical mobility***. Housing is the largest non-tradable good in the household's consumption basket, and hence, is likely to be the largest source of differences in the real consumption wage across locations. Oswald (1996) finds a positive relationship across countries between home ownership levels and unemployment rates, suggesting that the fixed costs of home ownership discourage migration.

Using the UK BHPS data, Henley (1996) finds strong evidence for the negative impact on mobility of negative equity and obtains results suggesting that the home-owners do not tend to move in response to changing labour market conditions. Tatsiarmos (2004) confirms the negative impact of home ownership on mobility using the Eurostat's ECHP data for France, UK, Germany, and Spain. Empirical study based on the UK data (Hughes and McCormick, 1998) suggests that private rented sector has the highest geographical mobility rates, social housing and owner-occupied sectors have lower mobility rates (see also Cameron and Muellbauer, 2000). Greenaway et al. (1995) confirm this result but also find that owner-occupiers seem to have higher occupational mobility compared to private renters.

Other measures (portability of pensions, mobility and commuters allowances, recognition of professional qualifications, etc.). Measures that stimulate labour mobility ***would reduce***

unemployment through better match between labour supply and labour demand. Better mobility will also have a positive impact on participation rates of males and females.

Evidence and Estimated elasticities in the recent literature

Blanchard and Katz (1992) find that in response to a state-specific increase in unemployment, labour migration plays the major role in reducing the interstate unemployment differentials. They find that the migration response is strong even in the first year after a shock, and fully accommodating in the long run due to employment multiplier effect consistent with Diamond (1982) demand spillovers. Debelle and Vickery (1998) find similar results for Australia, though the adjustment cycle is longer than in the US. Decressin and Fatas (1995) find that a larger proportion of movements in employment growth is common to US states than to the EEC regions, while labour mobility plays a considerably smaller role in the adjustment of European labour markets to region-specific shocks. They find that in the first three years, in Europe most of the shock is absorbed by changes in participation rate, while in the US it is immediately reflected in immigration. Bentolila (1997), Faini et al (1997) and Pissarides and Wadsworth (1989) find negative correlation between migration and national unemployment level for Spain, Italy and the UK. Abraham and Houseman (1990) observe that in response to adverse regional labour demand shocks women are more likely to drop out of the labour fore than men.

Possible spillover and complementarities with other policy area

Unemployment benefits: available evidence is mixed. On the one hand, the conventional theory suggests that unemployment benefits increase the reservation wage and reduce the search effort exerted by benefit recipients (Lippman and McCall, 1979; Mortensen, 1977). Hassler et al. (2001) argue that the difference in the generosity of unemployment benefits between Europe and the US explains the difference in the mobility rates. On the other hand, non-conventional theory emphasises the positive effect of benefits on search effort since the increased expenditures may increase the productivity of the search process (Barron and Mellow, 1979; Ben-Horim and Zuckerman, 1987). Empirical work of Tatsiarmos (2004) and Ahn et al. (1999) find no significant difference in the likelihood to move between recipient and non-recipient of unemployment benefits. Goss and Paul (1990) obtain similar results for the US, although those involuntarily unemployed are indeed less likely to move relative to the non-recipients of unemployment benefits.

Migration and skills: McCormick (1997) finds that differences in regional unemployment rates in the UK are primarily the result of differences in the unemployment rate of manual workers. In response to an adverse region-specific shock, non-manual labour tends to migrate, whereas manual labour tends to leave the labour force. Counter to these results, Kilpatrick and Felmingham (1996) find that the likelihood of mobility is not affected by education levels or occupation.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Change in the sectoral employment shares: Shift share indicators based on 10 sectors: half the sum of the absolute changes of the employment shares across the 10 sectors. It measures the degree of employment reallocation.

Mismatch by education: variance of relative unemployment rate by educational attainment. The relative unemployment rate is just defined as the ratio of the unemployment rate for the given education attainment (lower secondary education and less, higher secondary education, tertiary education) to the total unemployment rate. This inidcator is almost This inidcator has been developped by Lipsey (1960). A higher value means a greater mismatch between the labour supply and labour demand structure by educational attainment, resulting in higher unemployment rate in some educational groups (e.g.the low educated).

Dispersion of regional unemployment rates, male 15+, NUTS II. Standard deviation of unemployment rates divided by the national average (age group 15 + years). (NUTS II)

Dispersion of regional unemployment rates, female 15+, NUTS II. Standard deviation of female unemployment rates divided by the national average (age group 15 + years). (NUTS II)

Dispersion of regional unemployment rates of age group 15-64 NUTS II. Standard deviation of unemployment rates divided by the national average (age group 15-64 years). (NUTS II)
Dispersion of regional unemployment rates of age group 15-64 NUTS III. Standard deviation of unemployment rates divided by the national average (age group 15-64 years). (NUTS III)

Vacancies per 1,000 unemployed. Ratio between the total number of the stock of vacancies compared to the total number of unemployed (v/1000 u ratio).

Change in the sectoral composition of unemployment (shift share) between 2006-2000; male: Shift share indicator based on 3 sectors: services, industry and agriculture half the sum of the absolute changes of male unemployment shares across the 3 sectors.

Change in the sectoral composition of unemployment (shift share) between 2006-2000; female: Shift share indicator based on 3 sectors: services, industry and agriculture half the sum of the absolute changes of female unemployment shares across the 3 sectors.

As regards policy indicators, a non-exhaustive list could include:

Summary table: source, type of indicator geographical coverage and time coverage:

Indicator	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Change in the sectoral employment shares (Shift-share indicator based on 10 sectors: half the sum of the absolute changes of the employment shares across all sectors) (+)	EUROSTAT/ECFIN	perf	19 MS	2000-2006
Mismatch by education (Variance of relative unemployment rate by educational attainment - ISCED decomposition)(-)	EUROSTAT/ECFIN	perf	26 MS	1999-2006
Dispersion of regional employment rates, male 15+, NUTS2 (-)	EMCO	perf	17 MS	2000-2006
Dispersion of regional employment rates, female 15+, NUTS2 (-)	EMCO	perf	17 MS	2000-2006
Dispersion of regional (NUTS level 2) unemployment rates of age group 15-64 (%) (-)	EMCO	perf	18 MS	2000-2006
Dispersion of regional (NUTS level 3) unemployment rates of age group 15-64 (%) (-)		perf	24 MS	2000-2006
Vacancies per 1000 unemployed (-)	EMCO	perf	< 14 MS until 2004, 19 MS in 2005 and 18 MS in 2006	2001-2006
Change in sectoral composition of unemployment (shift share) between 2006 and 2000 - Men (Eurostat, 3 sectors: services, industry and agriculture)	EUROSTAT	perf	23 MS	2006
Change in sectoral composition of unemployment (shift share) between 2006 and 2000 - Women (Eurostat, 3 sectors services: industry and agriculture)	EUROSTAT	perf	23 MS	2006

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

The change in sectoral composition of unemployment (for both genders) is not timely enough. It is not reliable either, as it is based only on very coarse three-sector decomposition, neglecting a great deal of intersectoral reallocation as pointed out by some Member States.

Redundancy criteria

The dispersions of regional employment and regional unemployment (NUTS level 2) are very redundant with the regional unemployment dispersion (NUTS level 3), which is considered more precise as it takes into account the mobility within economic regions.

Inputs from associated stakeholders

As often mentioned, the number of indicators covering this policy area appears fairly limited. For instance, the issue of intersectoral labour mobility is not really tackled. A solution has been to compute a shift share indicator based on ten-sector decomposition (NACE1) using Labour Force Survey data (see the first and second indicator).

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Change in the sectoral employment shares (Shift-share indicator based on 10 sectors: half the sum of the absolute changes of the employment shares across all sectors). (+)	+	+	++	+	++	+	**narrow list**	**1**
Mismatch by education (Variance of relative unemployment rate by educational attainment - ISCED decomposition)(-)	++	+	++	++	++	-	**narrow list**	**1**
Dispersion of regional employment rates, male 15+, NUTS2 (-)	+	++	++	+	+	+	wider list	
Dispersion of regional employment rates, female 15+, NUTS2 (-)	+	++	++	+	-	+	wider list	
Dispersion of regional (NUTS level 2) unemployment rates of age group 15-64 (%) (-)	+	++	++	+	-	+	wider list	
Dispersion of regional (NUTS level 3) unemployment rates of age group 15-64 (%) (-)	++	++	++	++	++	+	**narrow list**	**1**
Vacancies per 1000 unemployed (EMCO 20A2)(-)	+	+	++	+	++	+	**narrow list**	**1**
Change in sectoral composition of unemployment (shift share) between 2006 and 2000 - Men (Eurostat, 3 sectors: services, industry and agriculture)	+	-	-	++	++	+	wider list	
Change in sectoral composition of unemployment (shift share) between 2006 and 2000 - Women (Eurostat, 3 sectors services: industry and agriculture)	+	-	-	++	+	+	wider list	

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3. PRODUCT AND CAPITAL MARKET REGULATIONS

3.1. Competition policy framework

Definition and scope of the policy area

The development of a competition policy framework aims at fostering economic growth and innovation through a more effective state involvement in the economy and a better functioning of product markets. It encompasses measures to enhance competition such as liberalisation, reduce state aid and government subsidies, abolish restrictive public procurement rules, and ensure competition law enforcement in order to prevent anti-competitive or collusive behaviour.

Related Integrated guidelines

(13) To ensure open and competitive markets inside and outside Europe and to reap the benefits of globalisation.
(12) To extend and deepen the internal market

Impact on growth components

- improve growth and employment prospects: *g*enerally, a more competition friendly policy framework is expected to raise the level of competition in the product market which should positively have an effect on productivity. In particular, as state control and government restrictions are eased and competition increases, activity is expanded, total output is raised towards levels closer to the social optimum and employment rates tend to rise. However many interactions affect the channels through which the process is supposed to occur (Ahn 2002 ; Nicodeme and Sauner Leroy, 2007; Aghion and Griffith, 2006).

- increase efficiency and limit government failures: reducing the volume of state aid is not only a question of budget discipline it also reflects a wide-spread view that a significant proportion of state aid is inefficient and distortive. Hence, state aid control is seen as being concerned not only with minimising distortions of competition but also with limiting government failures (Buelens et al., 2007). A more transparent affectation of public procurement and less sectoral and had hoc state aid thus contribute to a more efficient working of the economy. This mainly occurs through an allocation of resources towards the most productive activities as distortions of competition and trade are avoided.

- contribute to limit inflation through reduced mark-ups: In a highly concentrated market where firms have higher market shares, they are more likely to influence the market price and mark-ups by their decisions and thereby directly affect any existing rivals. A framework more conductive to competition allows new comers to enter the market at lower cost, and decrease the significance of competition distortion as the degree of market concentration is lowered.

Evidence and Estimated elasticities in the recent literature

Empirical studies tend to confirm that the transmission channels may be complex and difficult to disentangle. Moreover the poor availability of comprehensive time series of product market

indicators and the difficulties of measuring efficiency are often recalled. Given these limitations, the following results emerge:

From macro and cross-country regressions analysis

Vagliasindi (2001), found that competition policy does have a significant effect on the intensity of economy-wide competition, as measured by two different indicators. Dutz and Hayri (1999), established a direct positive link between competition policy and real per capita GNP growth in the long-run.

Nicoletti et al. (2001), provided empirical evidence in favour of a negative effect of anti-competitive product market regulation on employment in a panel of OECD countries. The empirical results suggested that in some countries the product market regulatory environment may account for up to 3 percentage points of deviation of the employment rate from the OECD average.

Using a panel of 20 OECD countries for the period 1985-1995, Salgado (2002), estimated the impact of product market reforms (i.e. reductions in tariff rates as well as the deregulation and liberalisation of product markets) on total factor productivity growth to be between 0.2 and 0.3 percentage points a year in the long run.

Bayoumi et al (2004,) calculated that competition-friendly product market reforms, leading to a price mark-up in the euro area similar to the US level, would lead to a GDP level increase in the Euro-area of 8.6% (relative to its baseline level) in the long run.

Finally, the OECD (2005), estimated that the effect of reducing public ownership in the EU15 would bring the highest gains in term of the impact of inward oriented product market reforms as it could increase TFP levels by 1.7 per cent.

From micro and sector level analysis

Nickell (1996), showed that both the level and growth rates of firms' productivity are positively affected by measures of competition. The results in Nickell are confirmed by Disney, Haskel, and Heden (2000), and Bottasso and Sembenelli (2001).

Aghion et al (2002), found that productivity growth of incumbents reacts more positively to entry in industries close to or above the world technological frontier and emphasize the existence of an inverted U relationship between competition and innovation.

Griffith et al (2006), confirmed that competition increased innovative activity by incumbents, but if anything it decreased incentives for new firms to enter into the innovation process. They also found some indication that, within an industry, the effect of increasing competition on innovation is larger in countries that are closer to the global technological frontier.

Possible spillover and complementarities with other policy area

This area is strongly related to the area on barriers to entrepreneurship and improvement of the business environment as increase entry will generally induce more competition. A more competition friendly policy framework is also likely to increase entry and to encourage entrepreneurial activities. All other things being equal, a more open economy is also likely to be more attractive to foreign trade and investment if it has a more competition friendly policy framework (Nicodeme and Sauner Leroy, 2007).

Moreover, Blanchard and Giavazzi (2001), emphasized the importance of the link between product and labour market reforms. In particular they argued the importance of market contestability as a stimulus for competitive pressures and economic performance. Nicoletti and Scarpeta (2005), found a positive impact on employment rates of product market reforms aiming at increasing competition through easier entry or greater rivalry between firms in a similar panel, controlling for effects of labour market institutions.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Comparative price levels. Comparative Price Level Indices (PLIs) are spatial indicators that are used for the comparison of price levels across countries. PLIs provide a measure of one country's price level relative to another, or to a group of countries. The Comparative Price Levels included in the Structural Indicators refer to the National Accounts aggregate "Individual Consumption Expenditure by Households". The PLIs are derived from Purchasing Power Parities (PPPs). **Caveats:** include taxes - Wealth effect, only the deviation from the regression line with GDP per capita should be considered.

Average mark-up. Total industry, based on EU-KLEMs data. Ratio of the difference between price and marginal cost over price. Estimates are obtained using the methodology developed by Roeger (1995) to the EUKLEMS data. The assumptions on which this estimation is based are profit maximization, cost minimization and constant returns to scale. **Caveats:** also an indicator of profitability and usually calculated as the difference between price and average cost (instead of marginal). Cost could rise because inefficiency and low competitive pressure or strategic move to raise barrier to entry (advertising surplus capacity).

As regards policy indicators, a non-exhaustive list could include:

Total state aid, as % of GDP. The indicator covers State aid as defined under Article 87(1) EC Treaty (1) that is granted by a Member State and has been examined by the Commission. General measures and public subsidies that have no effect on trade or do not distort (or threaten to distort) competition are not included as they are not subject to the Commission's investigative powers. Community funding is also excluded. The numerator is the sum of all State aid granted to specific sectors (agriculture, fisheries, manufacturing, coal, transport except railways and other services), State aid given on an ad-hoc basis to individual companies e.g., for rescue and restructuring, and State aid for horizontal objectives such as research and development, safeguarding the environment, energy saving, support to small and medium-sized enterprises, employment creation, the promotion of training and aid for regional development. The denominator is GDP (gross domestic product), which is defined in conformity with the European System of National and Regional Accounts in the Community (ESA 95). All data are quoted at constant 1995 prices but have been re-referenced on the year 2004.

Sectoral and *ad hoc* state aid, as a percentage of GDP. The numerator is the sum of all State aid granted to specific sectors (agriculture, fisheries, manufacturing, coal, transport except railways

and other services), and State aid given on an ad-hoc basis to individual companies e.g., for rescue and restructuring. It therefore excludes State aid for horizontal objectives such as research and development, safeguarding the environment, energy saving, support to small and medium-sized enterprises, employment creation, the promotion of training and aid for regional development.

Public procurement. Value of public procurement which is openly advertised, as percentage of GDP. The numerator is the value of public procurement, which is openly advertised. For each of the sectors works, supplies and services, the number of calls for competition published is multiplied by an average based, in general, on all the prices provided in the contract award notices published in the Official Journal of the European Communities, Supplement S during the relevant year. **Caveats:** does not take into account the institutional settings of Member States, e.g. tenders managed by local authorities or regions, overall size of the public sector. Therefore, a comparison across Member States has to be dealt with care.

In the case of smaller countries (Greece, Ireland, Luxembourg and Portugal) the average is based on all available prices, including those for previous years. For Belgium, Denmark, the Netherlands and Finland the averages are based on all the prices from 1999 and 2000.

The definition of public procurement contracts, which should be published, is laid down by Council Directives 92/50/EEC, 93/36/EEC, 93/37/EEC and 93/38/EEC. The denominator is the GDP (gross domestic product), which is defined in conformity with the European System of National and Regional Accounts in the Community (ESA 95).

Public procurement. Value of public procurement which is openly advertised, as a percentage of total public procurement. Same as above, but the denominator is the total value of public procurement. This is the sum of utilities procurement and the ESA 95 data for the aggregates P2 (intermediate consumption), P51 (Gross fixed capital formation) and D6311_D63121_D63131PAY (social transfers in kind related to expenditure on products supplied to households via market producers, payable) for S.13 (general government sector) of table 2 ("main aggregates of general government") of the ESA95 transmission programme.

Barriers to competition-Legal barriers to entry (OECD): This indicator measures the scope of explicit legal limitations on the number of competitors allowed in a wide range of business sectors and is one of 16 low-level indicators in the OECD system of indicators of Product Market Regulation.

Barriers to competition-Antitrust exemptions (OECD). This indicator measures the scope of exemptions to competition law for public enterprises and is one of 16 low-level indicators in the system of indicators of Product Market Regulation.

State control –Involvement in business operation (OECD). This indicator measures the existence of government special voting rights in privately-owned firms, constraints on the sale of state-owned equity stakes, and the extent to which legislative bodies control the strategic choices of public enterprises, and is one of 16 low-level indicators in the system of indicators of Product Market Regulation.

Regulation impact. Total. The OECD regulation impact indicators (REGIMPACT) measure the burden of non-manufacturing regulations (in sectors covered by the REGREF and cross-section sectoral indicators) on sectors that use non-manufacturing output as intermediate input in the

production process. These indicators have been estimated over the period 1975 to 2003 for 36 ISIC rev 3 sectors in 21 OECD countries. **Caveats:** usual caveats associated to composite indicator.

The competition law and policy indicator. The indicator assesses policies aimed at preserving market competition in general (i.e., antitrust law and enforcement) or specifically designed to promote competitive pressures in network industries. The indicator ranges from 0 to 6, with 6 designating and overall framework least conductive to competition. **Caveats:** usual caveats associated to composite indicator.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Total State aid - as a percentage of GDP (-)	STRIND	pol	27 MS	1999-2005
Sectoral and ad hoc State aid - as a percentage of total GDP (-)	STRIND	pol	27 MS	1999-2005
Public procurement - Value of public procurement which is openly advertised, as a percentage of GDP (+)	STRIND	pol	16 MS	1999-2005
Public procurement - Value of public procurement which is openly advertised, as a percentage of total public procurement (+)	EUROSTAT	pol	14 MS	1999-2005
Barriers to competition - Legal barriers (-)	OECD	pol	19 MS	2003
Barriers to competition - antitrust exemptions (-)	OECD	pol	19 MS	2003
State control - Involvement in business operation (-)	OECD	pol	19 MS	2003
Regulation impact - average impact of regulation in non-manufacturing sectors (post and telecom ; energy, finance, transport, distribution, business services) on other industries (-)	OECD	pol	14 MS	1999-2003
The competition law and policy indicator - Indicator scale of 0-6 with 6 designating an overall framework least conducive to competition.(-)	OECD	pol	16 MS	2003
Comparative price levels - comparative price levels of final consumption by private households including indirect taxes corrected of wealth effect (EU-25=100) (-)	STRIND	perf	27 MS	1999-2006
Average Mark up - Total industry based on Euklems data (-)	ECFIN	perf	14 MS	2004

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

Responding to the concern express by some Members, ECFIN Mark up data using Euklems, and the OECD PMR indicators are excluded du to insufficient time coverage.

Redundancy criteria

The correlations between the indicators on Total state aid Sectoral and had hoc state aid is high. However, the two indicators are complementary which explains why we have decided to keep them in the narrow list, splitting the weight at ½..

Inputs from associated stakeholders

The five remaining indicators qualify on both steps of the assessment. Taking into account comments pros and cons raised by Members States on the Comparative price levels indicator, we decide to keep this indicator after having corrected it of wealth effects, as prices are a valuable outcome reflecting both policies and market performance.

Moreover, concerning other sources such as Fraser or the WEF, one should recall that these indicators are still highly contested in the academic sector and that they have not yet been widely used. We should thus remain cautious as long as a more in depth evaluation of their quality has not been carried out. Indeed, some Members States underlined the lack of transparency in the constructions of WEF indicators.

The indicator on Public procurement as percentage of GDP is complemented with Public procurement as a percentage of total public procurement, because the former does not take into account the institutional settings of Member States.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				**Removing redundant indicators**		**Final assessment**	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Total State aid	+	+	+	++	-	-	**narrow list**	**0,5**
Sectoral and ad hoc State aid	++	++	+	++	+	-	**narrow list**	**0,5**
Public procurement	++	+	+	+	-	-	**narrow list**	**0,5**
Public procurement	++	++	+	+	+	+	**narrow list**	**0,5**
Barriers to competition	++	+	-	+	++	-	wider list	
Barriers to competition	++	+	-	+	++	+	wider list	
State control	+	+	-	+	-	-	wider list	
Regulation impact	++	+	-	+	++	+	wider list	
The competition law and policy indicator	++	+	-	+	++	-	wider list	
Comparative price levels	+	++	++	++	+	-	**narrow list**	**1**
Average Mark up	+	+	-	+	++	+	wider list	

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3.2. Sector specific regulation (telecom, energy)

Definition and scope of the policy area

Even though the development of a competition friendly policy framework fosters growth and innovation through a more effective state involvement in the economy and a better functioning of product markets, the general business environment, the relative intensity in factor use, the incentives to pursue opportunities, and the specific capabilities required for transforming them into successful business vary between sectors. In particular, the efficiency of energy markets is of key importance to the EU economy as these sectors provide direct services for consumers and essential inputs for other industries.

Related Integrated guidelines

(13) To ensure open and competitive markets inside and outside Europe and to reap the benefits of globalisation.

Impact on growth components

Generally, more competition at the sectoral level is expected to raise the aggregate level of competition in the product market which should positively have an effect on productivity (Ahn 2002 ; Nicodeme and Sauner Leroy, 2007; Aghion and Griffith, 2006). However many interactions affect the channels through which the process is supposed to occur. On the one hand, in the literature, a main direct impact is identified due to the removal of barriers to penetrate new markets. This could:

- lower sectoral mark-ups: Regulation in non-manufacturing industries have important "knock on" effects throughout the industry. These effects arise because the sectors where competition is restricted supply intermediate inputs to other sectors (Convay and Nicoletti, 2006).
- foster innovation: although theoretically the effect of competition on innovation is ambiguous, it seems that high levels of market power are associated with weak incentives to innovate. In particular new endogenous models extend the basic Schumpeterian models and predict that more competition may end up fostering innovation. Recent literature suggests that the relationship between mark-ups and innovation is non linear and has an inverted U shape (Aghion et al., 2002).

***- increase employment and growth prospects*:** as state control and government restrictions are eased and competition increases, activity is expanded, total output is raised towards levels closer to the social optimum and employment rates tend to rise. However, employment in some large firms, particularly in the network sectors, where previous regulations were conducive to over manning, may be adversely affected by liberalisation (Convay et al., 2006).

- contribute to higher levels of investment: higher competition through liberalization is expected to significantly increase capital accumulation (Alesina et al., 2005). The effects are however complex and at times contradictory (Nicoletti and Scarpetta, 2005).

On the other hand, the following main indirect effects have been identified in the literature (Ahn 2002):
- Increased allocative efficiency*:* as a general rule, increased competition enhances allocative efficiency by reducing deadweight loss and forcing firms to allocate both inputs and goods more efficiently. Moreover, the opening up of market sheltered from competition provides an opportunity for new comers to entry and can lead to increased efficiency economy-wide as less

productive firms exit and market share moves from less productive to more productive firms (Melitz, 2003).

- ***Increased productive efficiency****:* competition has a corrective effect on the behaviour of managers and workers, helping them to minimise slack and thus leading to greater efficiency in the organisation of work.
- ***Enhanced dynamic efficiency****:* Intensified competition could force managers to speed up the adoption of new technologies to avoid loss of control and/or bankruptcy. Competition may also increase the incentive of each firm to innovate to escape competition, for instance if innovation translates into more sophisticated and differentiated products.

Evidence and Estimated elasticities in the recent literature

Empirical studies tend to confirm that the transmission channels may be complex and difficult to disentangle. The following results seem to emerge: Griffith and Harrison (2004), identified the level of competition (as measured by the markup or Lerner Index) as a key determinant of economic outcomes in that it determines firms' incentives to adopt best practice and to innovate. Using Griffith and Harrison (2004) results, Nicodeme and Sauner Leroy (2007), estimated that reforms that would put the EU15 at par with the US in the domain of the size of the public sector would boost labour productivity by 1.13 per cent.

The European Commission (2002), found that the liberalisation of the telecommunication and electricity markets would lead to GDP and employment levels increase of 0.4% and 0.6% respectively, 4 years after the liberalisation; a GDP level increase of 0.6%, 10 years after liberalisation. Another studies also pointed at the economic benefits associated with the liberalisation of the air transport (European Commission, 2005a).

The European Commission (2004), found that market structures in network industries are changing very gradually with new firms entering those markets that are open to competition. The restructuring process associated with the liberalisation of the network industries is accompanied by stronger productivity gains in these industries than those seen in the economy as a whole between 1996 and 2001, with productivity increasing most rapidly in the communications, air transport and energy sectors. Sauner-Leroy (2003), also showed that the rise in competition induced by the implementation of the Single Market Programme led EU manufacturing firms to increase their productive efficiency to compensate for lower prices and profit margins.

Alesina et al., (2005), looked at the effect of regulation on investment in the transport (airlines, road freight and railways), communication (telecommunications and postal services) and utilities (electricity and gas) sectors. They found that regulatory reforms have had a significant positive impact on capital accumulation in these industries. Using the results provided by Alesina et al., Nicoletti and Scarpetta (2005), derived some quantitative estimates of the potential effect of product market reforms on investment. They predict that if Germany, France and Italy were to align regulation in non-manufacturing industries with US standards their investment rate would increase by 2.3 percentage points in the long-run. Finally, the empirical results concerning the relationship between innovation and competition are mixed. Blundell, Griffith and Van Reenen (1999), emphasized, using UK firm level data, that firms with greater market share are more innovative, but that more competitive industries produce more innovation.

Possible spillover and complementarities with other policy area

Reform of anti-competition product market regulation may also be associated with short-run losses to the extent that the resources released from sheltered industries are not quickly re-deployed. To mitigate these concerns, reform might preferably be complemented by structural policy reform in other spheres. For example, short-run employment costs could be mitigated by reform to labour markets that improve their flexibility, while financing requirements to replace inefficient capital could be assisted by reforms in financial markets (European Commission, 2005b).

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed. Three sub-headings namely telecom, energy and others were added to improve the presentation of the list of indicators.

As regards performance indicators, a non-exhaustive list could include:

Market share of the incumbent in fixed telecommunications. Local calls (including calls to the internet), as percentage of the total market. This indicator shows the market share in the local calls market segment of the incumbent in each country. The incumbent is defined as the enterprise active on the market just before liberalisation. The market share is calculated as the share of the incumbent's share of minutes of connection. Where this is not available, retail revenues of the total market are used.

Market share of the incumbent in fixed telecommunications. Long distance calls -as percentage of the total market. This indicator shows the market share in the long distance calls market segment of the incumbent in each country. The incumbent is defined as the enterprise active on the market just before liberalisation. The market share is calculated as the share of the incumbent's share of minutes of connection. Where this is not available, retail revenues of the total market are used.

Market share of the incumbent in fixed telecommunications. International calls -as percentage of the total market. This indicator shows the market share in the international calls market segment of the incumbent in each country. The incumbent is defined as the enterprise active on the market just before liberalisation. The market share is calculated as the share of the incumbent's share of minutes of connection. Where this is not available, retail revenues of the total market are used, with footnotes.

Average of the market share of the incumbent in fixed telecommunications (local, national international). Arithmetic mean of the three previous indicators.

Market share of the leading operator in mobile telecommunication, as a percentage of the total market. This indicator measures the leading operator in mobile telecommunications' share of all subscriptions.

Price of telecommunications –local calls. Price level and evolution in the telecommunications market (in euro per 10 minute call). The indicator gives the price in Euro of a 10 minute call at 11 am on a weekday (including VAT) for a local call. The prices refer to the month of August each year.
Price of telecommunications –national calls. Price level and evolution in the telecommunications market (in euro per 10 minute call). The indicator gives the price in Euro of a 10 minute call at 11

am on a weekday (including VAT) for a national call (200 km) and an international call (to USA). The prices refer to the month of August each year.

Price of telecommunications –calls to USA. Price level and evolution in the telecommunications market (in euro per 10 minute call). The indicator gives the price in Euro of a 10 minute call at 11 am on a weekday (including VAT) for an international call (to USA). The prices refer to the month of August each year.

Market share of the largest generator in the electricity market –as a percentage of the total generation. This indicator shows the market share of the largest electricity generator in each country. The indicator is measured as a percentage over total net electricity generation of the country. The electricity used by generators for own consumption in not taken into account.

Electricity prices –industrial users. Price level and evolution in the electricity market (in euro per kWh). This indicator presents the electricity prices charged to final industrial consumers. For the purpose of the Structural Indicators only one standard consumer has been selected with an annual consumption of 2000 MWh, maximum demand of 500kW and annual load of 4000 hours. Prices are given in Euro (without taxes) per kWh.

Electricity prices –households. Price level and evolution in the electricity market (in euro per kWh). This indicator presents the electricity prices charged to final domestic consumers. For the purpose of the Structural Indicators only one standard consumer has been selected with an annual consumption of 3500 kWh among which 1300 kWh overnight (standard dwelling of 90m²). Prices are given in Euro (without taxes) per kWh (electricity).

Gas prices –industrial users. Price level and evolution in the gas market (in euro per Gigajoule). This indicator presents the natural gas prices charged to final industrial consumers. For the purpose of the Structural Indicators only one standard consumer per group has been selected with an annual consumption of 41860 GJ, and load factor of 200 days (1600 hours). Prices are given in Euro (without taxes) per) and GJ. Natural gas prices for Greece are not available due to the very limited distribution of this type of energy in this country.

Gas prices –households. Price level and evolution in the gas market (in euro per Gigajoule). This indicator presents the natural gas prices charged to final domestic consumers. For the purpose of the Structural Indicators only one standard consumer has been selected with an annual consumption of 83.7 GJ (equipment: cooking, water heating and central heating). Prices are given in euro (without taxes) per GJ. Prices are available for all EU Member States except Greece, Cyprus, Malta and Finland. Natural gas prices in Greece and in Finland for domestic consumers are not available due to the very limited distribution of this type of energy in those countries.

As regards policy indicators, a non-exhaustive list could include:

Indicator of regulatory conditions in retail distribution. The Indicators of Product Market Regulation Database is a comprehensive and internationally-comparable set of information about the state of regulation and market structures in OECD countries. The cross-section sectoral indicators measure regulatory conditions in the retail sectors. The retail indicators have been estimated for 1998 and 2003. The OECD cross-section sectoral indicators measure regulatory conditions in the professional services and retail distribution sectors. The retail indicators cover *barriers to entry*, *operational restrictions*, and *price controls* and exist for 1998 and 2003.

Regulatory conditions in professional services sectors (accounting, architect, engineer, legal). The OECD cross-section sectoral indicators measure regulatory conditions in the professional services, covering the entry and conduct regulation in the legal, accounting, engineering, and architectural professions and have been estimated for 1996 and 2003.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Telecom				
Market share of the incumbent in fixed telecommunications - local calls (including calls to the Internet) - as a percentage of the total market (-)	STRIND	perf	14 MS	2001-2005
Market share of the incumbent in fixed telecommunications - long distance calls - as a percentage of the total market (-)	STRIND	perf	14 MS	2001-2005
Market share of the incumbent in fixed telecommunications - international calls - as a percentage of the total market (-)	STRIND	perf	15 MS	2001-2005
Average of the market share of the incumbent in fixed telecom (local, national, international) own calculations using STRIND indicators (-)	STRIND	perf	13 MS	2001-2005
Market share of the leading operator in mobile telecommunication - as a percentage of the total market (-)	STRIND	perf	19 MS	2001-2006
Price of telecommunications - local calls - Price level and evolution in the telecommunications market (in Euro per 10 min call) (-)	STRIND	perf	25 MS	2001-2006
Price of telecommunications - national calls - Price level and evolution in the telecommunications market (in Euro per 10 min call) (-)	STRIND	perf	23 MS	1999-2006
Price of telecommunications - calls to USA - Price level and evolution in the telecommunications market (in Euro per 10 min call) (-)	STRIND	perf	24 MS	1999-2006
Energy				
Market share of the largest generator in the electricity market - as a percentage of the total generation (-)	STRIND	perf	22 MS	1999-2006
Electricity prices - industrial users - Price level and evolution in the electricity market (in Euro per kWh) (-)	STRIND	perf	23 MS	1999-2007
Electricity prices - households - Price level and evolution in the electricity market (in Euro per kWh) (-)	STRIND	perf	24 MS	1999-2007
Gas prices - industrial users - Price level and evolution in the gas market (in Euro per Gigajoule) (-)	STRIND	perf	20 MS	1999-2007
Gas prices - households - Price level and evolution in the gas market (in Euro per Gigajoule) (-)	STRIND	perf	19 MS	1999-2007
Other				
Indicator of regulatory conditions in retail distribution - Barriers to entry (-)	OECD	pol	17 MS	2003
Indicator of regulatory conditions in retail distribution - Operational restrictions (-)	OECD	pol	17 MS	2003
Indicator of regulatory conditions in retail distribution - Price controls (-)	OECD	pol	17 MS	2003
Regulatory conditions in professional services sectors (Accounting, Architect, Engineer, Legal) (-)	OECD	pol	19 MS	2003

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

Indicators on Regulatory conditions in retail distribution have insufficient time coverage (with data only available for 2003).

Redundancy criteria

As expected and as rightly pointed by some members, the correlations between the indicators on prices and market shares are sometimes very high. Thus, building on the suggestions made by some Members States, we have regrouped the indicator on market shares in the Telecom (Average market share of the incumbent in fixed telecom) and we have included, by splitting the weight at 1/3, the three disaggregated structural indicators on prices in telecom. Following the same argument, we split the weight of prices in electricity and in gas.

Inputs from associated stakeholders

The reference to retail and professional services was deleted in the title. Consequently, the indicators on these sectors are in the wider list and, as a result, they are thus not used to compute the aggregate score for the policy area. Three sub-headings namely telecom, energy and others were added to improve the presentation of the list of indicators.Ten indicators qualify on both steps of the assessment.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Telecom								
Market share of the incumbent in fixed telecommunications - local calls (-)	++	+	+	+	-	-	wider list	
Market share of the incumbent in fixed telecommunications - long distance calls (-)	++	+	+	+	-	-	wider list	
Market share of the incumbent in fixed telecommunications (-)	++	+	+	+	-	+	wider list	
Average of the market share of the incumbent in fixed telecom (local, national, international) (-)	++	+	+	+	+	-	**narrow list**	**1**
Market share of the leading operator in mobile telecommunication - as a percentage of the total market (-)	++	+	++	+	+	-	**narrow list**	**1**
Price of telecommunications - local calls - Price level and evolution in the telecommunications market (in Euro per 10 min call) (-)	++	+	++	++	++	-	**narrow list**	**0,33**
Price of telecommunications - national calls - Price level and evolution in the telecommunications market (in Euro per 10 min call) (-)	++	+	++	++	+	-	**narrow list**	**0,33**
Price of telecommunications - calls to USA - Price level and evolution in the telecommunications market (in Euro per 10 min call) (-)	++	+	++	++	+	-	**narrow list**	**0,33**
Energy								
Market share of the largest generator in the electricity market (-)	++	+	++	++	+	-	**narrow list**	**1**
Electricity prices - industrial users - (in Euro per kWh) (-)	++	+	++	++	-	-	**narrow list**	**0,5**
Electricity prices - households - (in Euro per kWh) (-)	++	+	++	++	-	-	**narrow list**	**0,5**
Gas prices - industrial users - (in Euro per Gigajoule) (-)	++	+	++	++	-	-	**narrow list**	**0,5**
Gas prices - households - (in Euro per Gigajoule) (-)	++	+	++	+	-	-	**narrow list**	**0,5**
Other								
Indicator of regulatory conditions in retail distribution - Barriers to entry (-)	++	+	-	+	+	+	wider list	
Indicator of regulatory conditions in retail distribution - Operational restrictions - (-)	++	+	-	+	+	-	wider list	
Indicator of regulatory conditions in retail distribution - Price controls - (-)	++	+	-	+	+	+	wider list	
Regulatory conditions in professional services sectors (Accounting, Architect, Engineer, Legal) (-)	++	+	-	+	+	+	wider list	

SHORT LIST OF RECENT REFERENCES

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3.3. Business environment – Regulatory barriers to entrepreneurship

Definition and scope of the policy area

The cumulative impact of regulations and of an insufficiently supportive business environment may impose substantial economic costs and hinder entrepreneurship. This is especially important for small and medium-sized enterprises, which usually have only limited resources to deal with the administration resulting from legislation and tax regulations. Thus, measures to reduce regulatory and tax barriers to entrepreneurship, to ease start up conditions, to simplify existing regulations and to enhance entrepreneurial activities are likely to spur economic growth.

Related Integrated guidelines

(14) To create a more competitive business environment and encourage private initiative

through better regulation.

(15) To promote a more entrepreneurial culture and create a supportive environment for

SMEs.

Impact on growth components

The impact of reforms that that improve the business environment and that increase firm entry and exit are generally decomposed into various effects (Melitz, 2003 ; Hajkova et al., 2006). On the one hand, they will have a main direct impact on productivity due to the decrease in the cost of doing business. This could:

- ***contribute to higher levels of trade and investment:*** easing the burden on business is widely viewed as an effective way to encourage investment and regulatory reforms, especially those that liberalise entry, are likely to spur fixed investment in some industries (Alesina et al., 2003 ; Kox, 2005).

- ***Increase growth and employment prospects:*** high relative level of regulation in a country or a sector play as a hindrance to growth and discourage entrepreneurship as it leads on average to lower entry and exit rates (Scarpetta, et al., 2002 ; Djankov et al., 2006).

On the other hand, competition level may be affected by the removal of barriers to entrepreneurship as market contestability increases.. This generally affects efficiency through two main channels (Cincera and Galgau, 2005).

- ***'within effect' or internal restructuring*** refers to productivity growth of individual firms in the industry. It comes from factors internal to the firm such as organisational change, the introduction of new technologies, increased competition, R&D activities or a change in the mix of labour and capital.

- ***'external restructuring'*** whereby the process of market selection leads to a reallocation of resources among individual firms. This in turn is done in two ways. First, there is a process of

creative destruction by which low productivity firms exit the market and are replaced by new entrants that are themselves heterogeneous. Among them, the most efficient ones will survive, while the least efficient ones will exit the market in subsequent periods. Second, there is a change in market shares among incumbents, which will also have an impact on aggregate productivity growth.

Estimated elasticities in the recent literature

The estimated impact of a better business environment and less regulation and barriers to entrepreneurship is generally found to be significant although it vary from one study to another, depending on the method of decomposition used, on the measurement of aggregate productivity, the time horizon over which changes occur, the business cycle, as well as on the country or industry under investigation.

From macro and cross-country regressions analysis

Research from Reynolds et al., (1999), suggested that a third to a half of the differences in economic growth rates among industrialized countries could be attributed to differences in the level of entrepreneurship.

Grilo and Thrurik (2005) also show that administrative complexities have a significant negative impact on higher entrepreneurial engagement levels. Their results suggest a clear underperformance of Europe relative to the US in less mature entrepreneurial phases.

The direct and indirect effects of reducing the administrative costs on firms have been analysed empirically by Tang and Verweij (2004). They estimated that reducing the administrative burden by 25% would eventually lead to an increase in EU GDP of 1.6%. Recent work carried out by the European Commission (2006), building up on CPB estimates, indicates that a 25% reduction in the administrative burden in the EU would result in a 1% increase in real GDP (1.4% in the long run).

Finally, evidence of the impact of regulatory reforms on productivity for the EU in particular can be found in European Commission (2003), which estimated that moving to US levels of regulation would result in a 0.15 percentage point increase in the long-run productivity growth rate of the EU economy. These gains would mostly occur through increased investment, since the regulatory environment is identified in the study as a key determinant of capital deepening.

From micro and sector level analysis

Hahn (2000), found a very positive effect of entry/exit on aggregate productivity growth with larger role of within effect. In the same vein, Scarpetta et al., (2002), analysed several OECD countries and found that entry and exit contributed to between 20% to 40% of aggregate productivity growth. The results show that exit of low productivity firms has a positive contribution to aggregate growth across all countries and that in high technology sectors, the entry of new firms has a larger than average contribution to total growth, whereas in mature industries the exit of firms has larger contributions to growth. Overall, within firm labour productivity is estimated to account for 50% to 85% of aggregate productivity growth

Scarpetta et al. (2002), emphasized that excessive administrative regulations of entrepreneurial activity have a strong negative impact on firm entry and this effect is even larger for small and medium sized firms. Bartelsman et al. (2003), found successful firms in the US grow faster than in

the EU, which could partly be explained by the fact that regulation is more business friendly in the US.

Finally, the link between taxation and entrepeneurship has been reviewed in de Mooij and Nicodème (2006) who show that there is a negative effect of taxation on business creation. They also point out to an increased in incorporation (self-employed take a corporate status) due to an increasing gap between personal and corporate tax rates.

Possible spillover and complementarities with other policy area

There is a strong complementary between this policy area and the area on business dynamics- start-up conditions as the later look more into details at regulatory barriers that prevent entry exit.

Moreover, it should be pointed out that the evidence tend to show that positive economic effects of reforms reducing the regulatory barriers towards entrepreneurship may be dependent on labour market institutions and on supporting microeconomic policies such as those relating to education and training provision. (Stevens, 2005).

In the same vein, Blanchard and Giavazzi (2001), emphasized the importance of the link between product and labour market reforms. In their model, product market reforms take the form of an increased substitutability between goods. In the short run, such reforms lead to lower mark-ups, reduced unemployment and higher real wages. In the long term, however, this result is conditional on a reduction in barriers to entrepreneurship.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Propensity towards entrepreneurship. Total population considering self-employment (in %). Percentage of people interviewed who prefers being an entrepreneur over being an employee. The wording of the question is 'Suppose you could choose between different kinds of jobs, which one would you prefer: … being an employee, being self-employed, none of these'.**Caveats:** limitation related to survey and could be biased by country specific social factors.

Business demography. Survival rate. The percentage of all real enterprise births of year n which are still active in year n+2. In the Business Demography context, survival occurs if an enterprise is active in terms of employment and/or turnover in the year of birth and the following year(s). Two types of survival can be distinguished:
1) An enterprise born in year xx is considered to have survived in year xx+1 if it is active in terms of turnover and/or employment in any part of year xx+1 (= survival without changes).
2) An enterprise is also considered to have survived if the linked legal unit(s) have ceased to be active, but their activity has been taken over by a new legal unit set up specifically to take over the factors of production of that enterprise (= survival by take-over).

As regards policy indicators, a non-exhaustive list could include:

Doing business indicators caveats: 1) the collected data refer only to businesses in the country's most populous city 2) the data often focus on a specific business form - a limited liability company of a specified size 3) transactions described in a standardized case study refer to a specific set of issues and may not represent the full set of issues a business encounters. 4) usual limitation of surveys for some questions.

Registering property. World Bank Doing Business records the full sequence of procedures necessary when a business purchases land and a building to transfer the property title from another business so that the buyer can use the property for expanding its business, as collateral in taking new loans or, if necessary, to sell to another business.

- Number of procedures. A procedure is defined as any interaction of the buyer or the seller, their agents (if an agent is legally or in practice required) or the property with external parties, including government agencies, inspectors, notaries and lawyers. Interactions between company officers and employees are not considered. All procedures that are legally or in practice required for registering property are recorded, even if they may be avoided in exceptional cases. It is assumed that the buyer follows the fastest legal option available and used by the majority of property owners. Although the buyer may use lawyers or other professionals where necessary in the registration process, it is assumed that it does not employ an outside facilitator in the registration process unless legally or in practice required to do so.
- Registering property. Time (days).Time is recorded in calendar days. The measure captures the median duration that property lawyers, notaries or registry officials indicate is necessary to complete a procedure. It is assumed that the minimum time required for each procedure is 1 day. Although procedures may take place simultaneously, they cannot start on the same day. It is assumed that the buyer does not waste time and commits to completing each remaining procedure without delay. If a procedure can be accelerated for an additional cost, the fastest legal procedure available and used by the majority of property owners is chosen. If procedures can be undertaken simultaneously, it is assumed that they are. It is assumed that the parties involved are aware of all regulations and their sequence from the beginning. Time spent on gathering information is not considered.
- Registering property. Cost (% of property value). Cost is recorded as a percentage of the property value, assumed to be equivalent to 50 times income per capita. Only official costs required by law are recorded, including fees, transfer taxes, stamp duties and any other payment to the property registry, notaries, public agencies or lawyers. Other taxes, such as capital gains tax or value added tax, are excluded from the cost measure. Both costs borne by the buyer and those borne by the seller are included. If cost estimates differ among sources, the median reported value is used.

Paying taxes. Doing Business records the taxes and mandatory contributions that a medium-size company must pay or withhold in a given year, as well as measures of the administrative burden in paying taxes and contributions. Taxes and contributions measured include the profit or corporate income tax, social contributions and labor taxes paid by the employer, property taxes, property transfer taxes, the dividend tax, the capital gains tax, the financial transactions tax, waste collection taxes and vehicle and road taxes.

- Paying taxes. Payments (number of). The tax payments indicator reflects the total number of taxes and contributions paid, the method of payment, the frequency of payment and the number of agencies involved for this standardized case during the second year of operation. It includes payments made by the company on consumption taxes, such as sales tax or value added tax. These taxes are traditionally withheld on behalf of the consumer. Although they do not affect the income statements of the company, they add to the administrative burden of complying with the tax system and so are included in the tax payments measure.
- Paying taxes. Time (hours). Time is recorded in hours per year. The indicator measures the time to prepare, file and pay (or withhold) 3 major types of taxes and contributions: the corporate income tax, value added or sales tax and labor taxes, including payroll taxes and social contributions. Preparation time includes the time to collect all information necessary to compute the tax payable. If separate accounting books must be kept for tax purposes—or separate calculations made—the time associated with these processes is included. This extra time is included only if the regular accounting work is not enough to fulfill the tax ac counting requirements. Filing time includes the time to com-plete all necessary tax forms and make all necessary calculations. Payment time is the hours needed to make the payment online or at the tax office. Where taxes and contributions are paid in person, the time includes delays while waiting.
- Paying taxes . Total tax rate (% profit). The total tax rate measures the amount of taxes and mandatory contributions payable by the business in the second year of operation, expressed as a share of commercial profits. The total amount of taxes is the sum of all the different taxes and contributions payable after accounting for deductions and exemptions. The taxes withheld (such as sales or value added tax or personal income tax) but not paid by the company are excluded. The taxes included can be divided into 5 categories: profit or corporate income tax, social contributions and labour taxes paid by the employer (for which all mandatory contributions are included, even if paid to a private entity such as a requited pension fund), property taxes, turnover taxes and other small taxes (such as municipal fees and vehicle and fuel taxes).

Dealing with licences: Doing Business records all procedures required for a business in the construction industry to build a standardized warehouse. These procedures include submitting all relevant project-specific documents (for example, building plans and site maps) to the authorities; obtaining all necessary clearances, licenses, permits and certificates; completing all required notifications; and receiving all necessary inspections.

- Dealing with licences. Procedures (number). A procedure is any interaction of the company's employees or managers with external parties, including government agencies, notaries, the land registry, the cadastre, utility companies, public and private inspectors and technical experts apart from in-house architects and engineers. Interactions between company employees, such as development of the warehouse plans and inspections conducted by employees, are not counted as procedures. Procedures that the company undergoes to connect to electricity, water, sewerage and phone services are included. All procedures that are legally or in practice required for building a warehouse are counted, even if they may be avoided in exceptional cases.
- Dealing with licences. Time (days). Time is recorded in calendar days. The measure captures the median duration that local experts indicate is necessary to complete a procedure in practice. It is assumed that the minimum time required for each procedure is 1 day. If a procedure can be accelerated legally for an additional cost, the fastest procedure is chosen.

- Dealing with licences. Cost % of income per capita). Cost is recorded as a percentage of the country's income per capita. Only official costs are recorded. All the fees associated with completing the procedures to legally build a warehouse are recorded, including those associated with obtaining land use approvals and preconstruction design clearances; receiving inspections before, during and after construction; getting utility connections; and registering the warehouse property.

Enforcing contracts Indicators on enforcing contracts measure the efficiency of the judicial system in resolving a commercial dispute.

- Enforcing contracts. Procedures (number). A procedure is defined as any interaction between the parties, or between them and the judge or court officer. This includes steps to file the case, steps for trial and judgment and steps necessary to enforce the judgment.
- Enforcing contracts. Time (days). Number of calendar days for dispute resolution counted from the moment of the lawsuit by the plaintiff until the moment of settlement. This includes both the days when actions take place and the waiting periods between. The respondents make separate estimates of the average duration of different stages of dispute resolution: the completion of service of process (time to file the case), the issuance of judgment (time for the trial and obtaining the judgment) and the moment of payment (time for enforcement).
- Enforcing contracts. Cost (% of debt). Cost is recorded as a percentage of the debt, assumed to be equivalent to 200% of income per capita. Only official costs required by law are recorded, including court and enforcement costs and average attorney fees where the use of attorneys is mandatory or common.
- Regulatory and administrative opacity. Regulatory and administrative opacity is one of the sub indicators within the OECD's Product Market Regulation (PMR) System indicator. It is calculated as a weighted average of the following two components: (i) licenses and permits systems, which reflects the use of 'one-stop shops' and 'silence is consent' rules for getting information on and issuing licenses and permits; (ii) communication and simplification of rules and procedures, which reflects aspects of government's communication strategy and efforts to reduce and simplify the administrative burden of interacting with government.

Regulation impact. Total. The OECD regulation impact indicators (REGIMPACT) measure the burden of non-manufacturing regulations (in sectors covered by the REGREF and cross-section sectoral indicators) on sectors that use non-manufacturing output as intermediate input in the production process. These indicators have been estimated over the period 1975 to 2003 for 36 ISIC rev 3 sectors in 21 OECD countries.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Registering Property - Procedures (number) (-)	World Bank	pol	24 MS	2004-2007
Registering Property - Time (days) (-)	World Bank	pol	24 MS	2004-2007
Registering Property - Cost (% of property value) (-)	World Bank	pol	24 MS	2004-2007
Paying Taxes - Payments (number) (-)	World Bank	pol	24 MS	2005-2007
Paying Taxes - Time (hours) (-)	World Bank	pol	24 MS	2005-2007
Paying Taxes -Total tax rate (% profit) (-)	World Bank	pol	24 MS	2005-2007
Dealing with Licenses - Procedures (number) (-)	World Bank	pol	24 MS	2005-2007
Dealing with Licenses - Time (days) (-)	World Bank	pol	24 MS	2005-2007
Dealing with Licenses - Cost (% of income per capita) (-)	World Bank	pol	24 MS	2005-2007
Enforcing Contracts - Procedures (number) (-)	World Bank	pol	24 MS	2003-2007
Enforcing Contracts - Time (days) (-)	World Bank	pol	22 MS	2003-2007
Enforcing Contracts - Cost (% of debt) (-)	World Bank	pol	24 MS	2003-2007
Regulatory and administrative opacity (-)	OECD	pol	19 MS	2003
Regulation impact - average impact of regulation in non-manufacturing sectors (post and telecom ; energy, finance, transport, distribution, business services) on other industries (-)	OECD	pol	14 MS	1999-2003
Propensity towards entrepreneurship - Total population considering self-employment (in %) (+)	Eurobarometer	perf	25 MS	2004-2007
Business demography - Survival rate - The percentage of all real enterprise births of year n which are still active in year n+2 (+)	STRIND	perf	12 MS	2000-2005

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

Business demography - Survival rate, Regulatory and administrative opacity, REG Impact and propensity towards entrepreneurship are excluded from the narrow list because of their insufficient time coverage/geographical coverage.

Redundancy criteria

The correlations between some of the indicators on Doing Business are sometimes close to the threshold of 60%, in particular with the indicator on dealing with licences. In order to avoid some redundancy of information we thus remove the indicator from the narrow list.

Inputs from associated stakeholders

Thus eight indicators qualify on both steps of the assessment. Enforcing contracts and Registering property indicators address relevant aspects of the business environment. In order to make sure of not computing scores with ranking, we dropped the synthetic World Bank indicators to take into account the disaggregated form of these and split the weight at 1/3 to avoid redundancy.

Finally, we share some Member States views as to the usefulness and the need to look at the OECD PMR indicator. However, given the limited time coverage, the World Bank doing business remain the most up to date source of information.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Registering Property - Procedures (number) (-)	++	+	++	++	+	++	**narrow list**	**0,33**
Registering Property - Time (days) (-)	++	+	++	++	++	-	**narrow list**	**0,33**
Registering Property - Cost (% of property value) (-)	++	+	++	++	++	-	**narrow list**	**0,33**
Paying Taxes - Payments (number) (-)	++	+	++	++	+	-	wider list	
Paying Taxes - Time (hours) (-)	++	+	++	++	-	-	wider list	
Paying Taxes -Total tax rate (% profit) (-)	++	+	++	++	++	-	wider list	
Dealing with Licenses - Procedures (number) (-)	++	+	++	++	++	-	**narrow list**	**0,5**
Dealing with Licenses - Time (days) (-)	++	+	++	++	-	-	wider list	
Dealing with Licenses - Cost (% of income per capita) (-)	++	+	++	++	+	-	**narrow list**	**0,5**
Enforcing Contracts - Procedures (number) (-)	++	+	++	++	+	-	**narrow list**	**0,33**
Enforcing Contracts - Time (days) (-)	++	+	++	++	+	-	**narrow list**	**0,33**
Enforcing Contracts - Cost (% of debt) (-)	++	+	++	++	++	-	**narrow list**	**0,33**
Regulatory and administrative opacity (-)	++	+	-	+	+	+	wider list	
Regulation impact - average impact of regulation in non-manufacturing sectors on other industries (-)	++	+	-	+	+	+	wider list	
Propensity towards entrepreneurship -(+)	+	-	++	++	+	++	wider list	
Business demography - Survival rate (+)	+	+	+	-	-	-	wider list	

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3.4. Start-up conditions

Definition and scope of the policy area

The level of new firm activity and creation contribute to the economic activity as a constant flow of start-up companies fuels competition and fosters innovation. Friendly start-up conditions i.e. low time and cost to start a business, low capital requirement and reduced administrative burden on start-ups are thus required to produce an environment favourable to entrepreneurship and innovation.

Related Integrated guidelines

(14) To create a more competitive business environment and encourage private initiative through better regulation.

Impact on growth components

The reduction of start-up times and costs should make firm entry into the market easier and thereby contribute to a better and more competitive business environment conducive to improved management practices and higher productivity. This is generally decomposed into various effects, which could in turn, positively affect macroeconomic performance (Nicodeme and Sauner Leroy, 2007):

- Increase growth and employment prospects: unfriendly start-up conditions leads on average to lower entry and exit rates (Scarpetta, et al., 2002). In the same vein, overly complicated regulation and tax system discourages the creation of new enterprises (Brandt, 2004), and recent research suggests that easier regulation of entry into product markets can have significant positive effects on employment (Haefke and Ebell, 2004; Nicoletti and Scarpetta, 2004).

- facilitate innovation: the entry of new firms plays an important role in the adoption of new technologies since, unlike incumbents; they do not have to incur the costs of upgrading their capital (Aghion and Howitt, 1992). In particular emerging high-growth companies are particularly important in creating value and economic prosperity by bringing new ideas to the market, such as new technologies or business models, or new and improved ways of meeting customer needs.

- increase the level of competition and investment: competition level may be affected by unfriendly start-up condition as market contestability generally increases through an increase in the number of competitive firms on the market as well as in the threat of firm entry (Cincera and Galgau, 2005). Thus internal restructuring does not occur because of the low level of threat from new entrants and external restructuring is perturbed because potentially more productive new entrants are discouraged to enter the market.

Estimated elasticities in the recent literature

The ease of starting a new business is generally found to have significant impact on the aggregate productivity of an economy. However the quantification of this impact is sometimes difficult as the transmission channels from the micro level to aggregate productivity are difficult to disentangle statistically.

From macro and cross-country regressions analysis

Djankov et al., (2002 and 2006), focussed on regulations that affect how easy it is to start a business. Using objective measure of business regulations they established that countries with more friendly business start-up conditions grow faster: improving from the worst quartile of regulations to the best implies a 2.3 percentage point increase in annual growth.

As regards the effects of overall product market reforms on firm entry, Nicoletti and Scarpetta (2003), found that reducing barriers to entry in service in certain European countries, most notably Germany, France, Italy and Greece, would boost annual multi-factor productivity growth in the overall business sector by about 0.1 to 0.2 percentage points. Indirect effects would boost manufacturing-wide annual productivity growth by 0.1 to 0.2 percentage points

From micro and sector level analysis

Klapper et al. (2004), looked at the interaction effect between regulation and the "normal" rate of entry in an industry, proxied by the corresponding entry or turnover rate for the US. The results suggest that regulation reduces entry relative to the "normal" industry specific rate one observes in a country (the US) with low barriers to entry.

Ciccone and Papaioannou (2006), combined the time needed to comply with government entry procedures in 45 countries with industry-level data on employment growth and growth in the number of establishments during the 1980s. They found that countries where it takes less time to register new businesses have seen more entry in industries that experienced expansionary global demand and technology shifts

Aghion et al. (2002), provided one of the most recent models on the impact of firm entry or the threat of entry on incumbent firms' incentives to innovate which in turn affects aggregate productivity growth. Using micro-level data for productivity growth and patenting activity for UK firms over the 1987-1993 period, the results confirmed the positive and significant effect on TFP growth and a positive and significant effect of the import share variable on TFP growth showing that firm entry leads to a similar reaction of domestic incumbents as a stronger trade inflow.

Cincera (2004), explained that reforms aiming at facilitating the entry and exit of firms could significantly increase growth prospect. Cincera and Galgau (2005), also showed that reforms aiming at facilitating entry and exit of firms may have an impact on economic performance. They found that a 1% increase in the entry rate leads to a contemporary increase in output, employment and labour productivity growth rate of 2.2%, 2.7% and 0.6% respectively and that a 1% increase in exit rate reduces output growth rate of 0.8% (one year lag), while increases labour productivity growth by 0.7% (2-year lag)

Possible Spillover and complementarities with other policy area

A strong complementary between this policy area and the realisation of a more competition friendly policy framework is also likely as both are likely to increase entry and to encourage entrepreneurial activities. All other things being equal, a more open economy is also likely to be more attractive to foreign trade and investment if it has less barriers to entrepreneurship and a more attractive business environment (Nicodeme and Sauner Leroy, 2007).

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Business demography. Birth rate. Number of enterprises births of year n, divided by the population of active enterprises of year n. A birth amounts to the creation of a combination of production factors with the restriction that no other enterprises are involved in the event. Births do not include entries into the population due to mergers, break-ups, split-off or restructuring of a set of enterprises. It does not include entries into a sub-population resulting only from a change of activity. A birth occurs when an enterprise starts from scratch and actually starts activity. An enterprise creation can be considered an enterprise birth if new production factors, in particular new jobs, are created. If a dormant unit is reactivated within two years, this event is not considered a birth. **Caveats:** could be affected by social factors, level of economic development.

Business demography. Death rate. Number of enterprises deaths of year n, divided by the population of active enterprises of year n. A death amounts to the dissolution of a combination of production factors with the restriction that no other enterprises are involved in the event. Deaths do not include exits from the population due to mergers, take-overs, break-ups or restructuring of a set of enterprises. It does not include exits from a sub-population resulting only from a change of activity. An enterprise is included in the count of deaths only if it is not reactivated within two years. Equally, a reactivation within two years is not counted as a birth.

Rate of early-stage entrepreneurial activity (TEA). Prevalence rates of entrepreneurial activity. Early stage entrepreneurial activity (% of adult population between 18-64 years). The rate of early-stage entrepreneurial activity (TEA) is a percentage of 18-64 population who are either a nascent entrepreneur (i.e. actively involved in setting up a business they will own or co-own; this business has not paid salaries, wages, or any other payments to the owners for more than 3 months) or owner-manager of a new business (i.e. owning and managing a running business that has paid salaries, wages, or any other payments to the owners for more than three months, but not more than 42 months).

As regards policy indicators, a non-exhaustive list could include:

Doing Business records all procedures that are officially required for an entrepreneur to start up and formally operate an industrial or commercial business. These include obtaining all necessary licenses and permits and completing any required notifications, verifications or inscriptions for the company and employees with relevant authorities. **Caveats:** 1) the collected data refer only to businesses in the country's most populous city 2) the data often focus on a specific business form - a limited liability company of a specified size 3) transactions described in a standardized case study refer to a specific set of issues and may not represent the full set of issues a business encounters. 4) usual limitation of surveys for some questions

> Starting a business. Time (days). Time is recorded in calendar days. The measure captures the median duration that incorporation lawyers indicate is necessary to complete a procedure with minimum follow-up with government agencies and no extra payments.

Starting a business. Cost. Cost includes all official fees and fees for legal or professional services if such services are required by law. In all cases the cost excludes bribes.

Doing Business also studies the time, cost and outcomes of bankruptcy proceedings involving domestic entities.

Closing a business. Time (years). The indicator reflects the sequence of bankruptcy procedures and on whether they can be carried out simultaneously. Potential delay tactics by the parties, such as the filing of dilatory appeals or requests for extension, are taken into consideration.

Closing a business. Cost (% of estate). The cost of the proceedings is recorded as a percentage of the firm's major asset value.

Closing a business. Recovery rate (cents on the dollar). The recovery rate is recorded as cents on the dollar recouped by creditors through the bankruptcy or insolvency proceedings.

Administrative burdens on start-ups. Administrative burden on start-ups is one of the sub indicators within the OECD's Product Market Regulation (PMR) System indicator. It is calculated as a weighted average of the following three components: (i) Administrative burdens for corporations, which measures the administrative burdens on the creation of corporations; (ii) Administrative burdens for sole proprietors, which measures the administrative burdens on the creation of sole proprietor firms; (iii) Sector-specific administrative burdens, which reflects administrative burdens in the road transport and retail distribution sectors. **Caveats:** usual caveats associated to composite indicator.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Starting a Business - Time (days) (-)	ENTR	pol	27 MS	2006
Starting a Business - Cost (-)	ENTR	pol	27 MS	2006
Closing a Business Time (years) (-)	World Bank	pol	24 MS	2003-2007
Closing a Business Cost (% of estate) (-)	World Bank	pol	24 MS	2003-2007
Closing a Business Recovery rate (cents on the dollar) (+)	World Bank	pol	24 MS	2003-2007
Administrative burdens on startups (-)	OECD	pol	19 MS	2003
Business demography - Birth rate - Number of real enterprise births of year n, divided by the population of active enterprises of year n (+)	STRIND	perf	14 MS	1999-2005
Business demography - Death rate - Number of real enterprise deaths of year n, divided by the population of active enterprises of year n (-)	STRIND	perf	14 MS	1999-2005
Prevalence Rates of Entrepreneurial Activity - Early –stage Entrepreneurial Activity -(% of adult population between 18-64 years) (+)	GEM	perf	17 MS	2007

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

Business demography - Birth rate/Death rate and Administrative burdens on start-ups are excluded from the narrow list because of their insufficient time and geographical coverage.

Redundancy criteria

The correlations between the remaining indicators are low.

Inputs from associated stakeholders

Four indicators thus qualify on both steps of the assessment. Some Member States emphasized that in this area**,** the World Bank indicators on starting a business should be replaced by the data submitted to DG ENTR, and which are used by the Commission to assess the compliance with the 2006 Spring Council conclusions for start-up procedure. The Commission recalled that DG ENTR figures are based on information provided by Member States which have not been fully validated. The Commission nevertheless agree with the proposal as the data are currently used and proposes to replace the indicators from the World Bank on start-up by the two indicators from DG ENTR.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				**Removing redundant indicators**		**Final assessment**	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Starting a Business - Reported time (minimum in days) (-)	++	+	++	++	+	-	**narrow list**	**1**
Starting a Business - Cost (minimum - Eur) (-)	++	+	++	++	+	-	**narrow list**	**1**
Closing a Business Time (years) (-)	++	+	++	++	+	-	**narrow list**	**0,5**
Closing a Business Cost (% of estate) (-)	++	+	++	++	+	+	**narrow list**	**0,5**
Closing a Business Recovery rate (cents on the dollar) (+)	++	+	++	++	-	-	wider list	
Administrative burdens on startups (-)	++	+	-	+	-	-	wider list	
Business demography - Birth rate - (+)	++	+	+	-	+	+	wider list	
Business demography - Death rate - (-)	++	+	+	-	++	-	wider list	
Prevalence Rates of Entrepreneurial Activity - Early –stage Entrepreneurial Activity -(% of adult population between 18-64 years) (+)	++	+	-	+	++	-	wider list	

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3.5. Financial markets and access to finance

Definition and scope of the policy area

Efficient financial market and sufficient access to finance are crucial elements for growth as they will reduce the cost of capital and enhance the development of the financial sector. Thus measures that aim at increasing efficiency in the transformation of savings, at increasing efficiency in the allocation of capital and at reducing risks by more well developed finance markets should have positive effects on the overall growth performance of the economy.

Related Integrated guidelines

(12) To extend and deepen the internal market.

Impact on growth components

A smoothly-functioning financial system is universally accepted as a prerequisite for realising an economy's growth potential. Most of the theoretical mechanisms point to a positive link between financial development and growth; relatively few propose negative influences on growth from financial development. On the one hand, the economic literature indicates a link from financial development to economic growth and welfare via the following channels (Thiel, 2001 ; ECB, 2005 ; De Serres et al., 2007):

Increase investment through effects on the efficiency in the transformation of savings: the more efficiently the financial system can intermediate savings (i.e. the lower the transaction costs and the higher the return available to the savers), the more savings are available to support productive investment. A durable positive feedback effect between finance and growth is demonstrated in the model of Harrison et al. (1999).

Increase investment through effects on the rate of savings: in theory, the effect of financial systems on saving rates could be ambiguous. On the one hand, reduction in idiosyncratic risks by more well-developed insurance and finance markets might lower precautionary saving by households. On the other hand, a well developed financial market could increase the returns to saving and therefore the opportunity costs of current consumption; if its substitution effect exceeds its income effect then the increased 'price' of current relative to future consumption will act to increase saving (Ahn and Hemmings, 2000).

Support the development of innovation activities: efficiency in the financial system not only maximises the opportunities for capital formation but is essential for embedding technical advances in the capital stock – especially in periods of rapid technological change – thereby allowing countries to convert technical development into higher rates of economic growth (Pelgrin et al., 2002).

In addition to these effects, the financial system can improve investment performance and capital productivity via more efficiency in the allocation of capital (European Commission, 2001). This mainly occurs through the following channels:

Portfolio diversification: the opportunity to share risks via the financial system may induce savers to allocate a higher fraction of savings to riskier projects, which on average tend to be more profitable. Furthermore, a capacity to hedge against project-specific events tends to stimulate the undertaking of specialised investments with a beneficial impact on the economy's division of labour and growth.

Enhanced quality of investment: the availability of financial intermediaries may allow an enhanced evaluation and selection of projects, raising the profitability of investment. Average capital productivity will be raised through the selection and monitoring of the most profitable projects, while more unprofitable investment projects will be disregarded.

More long-term projects: the availability of a liquid financial markets allows a larger proportion of savings to be invested in projects of a longer-term duration, which are typically more productive than shorter-term projects.

Evidence and Estimated elasticities in the recent literature

A number of researchers have found positive links between growth and various indicators of financial development. The results are consistent with a view that financial markets provide important services for growth, and that stock markets provide different services from banks. However it is also noted that stock market size, volatility, and international integration are not robustly linked with growth. Moreover, while the capital productivity channels are likely to be most significant in mature economies, they are also the most difficult to assess empirically.

From macro and cross-country regressions analysis

Levine and Zervos (1998), found that stock market liquidity and banking development are significantly and positively related to growth, capital accumulation, and productivity improvements in cross-section analysis based on 49 countries. However Garretsen et al. (2000), argued that the positive link between stock market liquidity and economic growth found for instance disappears if the estimate is controlled for legal and societal indicators.

Levine et al. (2000), found a significant impact of financial intermediation indicators on real GDP growth and productivity but an ambiguous effect on physical capital growth and saving.

Rousseau and Sylla (2001), found that financial variables are important for early stages of development.

Wurgler (2000), found a positive relation between financial development and the efficiency of capital allocation, which is derived as the elasticity between the capital formation of an industrial's sector and the growth rate of its value added.

Denizer et al. (2000), analysed the impact of financial variables on macroeconomic volatility, which is supposed to be inversely related with economic growth. Their estimates show that countries with a developed financial system are less exposed to severe business cycle fluctuations. A developed banking system goes hand in hand with lower consumption and investment volatility, private sector credit is inversely related to consumption and output volatility.

Bekaert et al. (2001), compared the growth performance before and after equity market liberalisation. Their estimates point to an important transmission channel from equity market

liberalisation. Rising international capital inflow increases the availability of resources, this induces a rising investment share that spurs real output growth.

Strahan (2003), quantified the growth and productivity effects of banking deregulation in the United States in the period 1970 to 1995 and estimated that annual average state gross product increased after the reforms by approximately 1 percentage point. The evidence suggests that the growth gains stemmed from enhanced productivity rather than from increased investment.

Favara (2003), and Aghion et al., (2005), suggested that economies with more liquid capital markets and developed banking systems grow on average more rapidly. They estimated that growth accelerates by approximately 0.8 percentage point in countries which have adopted measures to enhance their integration into global financial markets.

From micro and sector level analysis

Rajan and Zingales (1998), showed that industries more dependent on external finance grow faster in countries with more developed banks (measured by the ratio of credit to private business to GDP) or stock markets (measured by stock market capitalisation).

Guiso et al. (2005), calculated that raising the level of financial development may result in an increase in firm value-added growth of approximately 0.5 to 0.9 percentage point in the countries that made up the EU before 1 May 2004. Also, research by London Economics (2002), found that the benefits of integration in the European bond and equity markets would be equal to around 1% of GDP over a 10 year period, or approximately €100 billion.

Carlin and Mayer (1999), analysed the relation between the growth rates of 27 industries in 14 OECD countries and the interaction of industry-specific characteristics with financial variables. They found that in particular the growth of industries relying on R&D is strongly affected by financial variables.

Demirguc-Kunt and Maksimovic (2000), found that firms in countries with better-functioning banks and equity markets grow faster than predicted by individual firm characteristics. In particular, they explained that a larger proportion of firms obtain external financing in a legal environment conducive to finance, that the relative size of banking to market activity is not important in general, but that firms requiring long term finance benefit from strong securities market.

Cetorelli and Gambera (2001), found a positively significant relation of all financial variables (private domestic credit to GDP, stock market capitalisation, banking concentration) on the growth of real value added in manufacturing industries

Possible spillover and complementarities with other policy area

There are strong interactions between financial markets and other policy areas. Well developed financial markets play an important role in an economy as an effective channel of savings into investment. Product market reforms stimulating competition through easier market entry might have only a limited impact if the potential start-ups have difficulties in accessing the capital market to raise the necessary resources.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed. Two sub-headings, namely competition-efficiency and development-access to finance were added to improve the presentation of the list of indicators.

As regards performance indicators, a non-exhaustive list could include:

International competition in banking. Share of cross border loans in total domestic borrowing – average 2000-2003.Transactions between residents of different countries; Measured as foreign banks' cross-border claims on non-banks as a percentage of all commercial banks' local; also referred to as "international" operations, which include, in addition to external business, positions vis-à-vis residents in foreign currency. Loans should comprise those financial assets which are created through the lending of funds by a creditor (lender) to a debtor (borrower) and which are not represented by negotiable securities.

International competition in banking. Foreign bank's penetration of domestic loan market average 2000-2003.Measured as foreign banks' local claims in local currencies as a percentage of all commercial banks' local claims on non-bank sectors (i.e. household, non-bank corporations and public sectors). Since the data on local claims in local currencies are not broken down by sector, they include lending to banks as well as to non-bank sectors. As a result, the measure over-estimates the underlying rate of foreign penetration of non-bank domestic loan market.

Net interest margin. The raw data is taken from the Fitch's BankScope database. The ratio is the net interest income expressed as a percentage of total assets. The net interest margin equals the accounting value of a bank's net interest revenue as a share of its total assets.

Bank overhead costs/total assets. Accounting value of a bank's overhead costs as share of its total assets. An overhead cost is tan indirect recurring costs of running a business that are not linked directly to the goods or service produced and sold. Overhead costs can include payments for the rent of premises, utility bills, and employees' salaries.

Stock market capitalization/GDP. Value of listed shares divided by GDP. Both numerator and denominator are deflated appropriately, with the numerator equalling the average of the end-of year value for year t and year t-1, both deflated by the respective end-of-year CPI, and the GDP deflated by the annual value of the CPI.

Bond market capitalization/GDP. As indicators of the size of the domestic bond market we use the private and public bond market capitalization to GDP, which equals the total amount of outstanding domestic debt securities issued by private or public domestic entities divided by GDP. Both numerator and denominator are deflated appropriately, with the numerator equalling the average of the end-of-year value for year t and year t-1, both deflated by the end-of-year CPI, and the GDP deflated by the annual value of the CPI.

Insurance Premium Volume -Life and nonlife-/GDP. Data are based on direct premium volume of commercially active insurers, regardless of whether they are in state or private ownership. Only domestic insurance business, regardless whether conducted by domestic or foreign insurers, is included.

Financial System Deposits/GDP. Demand, time and saving deposits in deposit money banks and other financial institutions as a share of GDP. Both numerator and denominator are deflated appropriately, with the numerator equalling the average of the end-of-year value for year t and year t-1, both deflated by the end-of-year CPI, and the GDP deflated by the annual value of the CPI.

Total loans to private sector and securities market capitalisation 2000-2003.

Business investment. Gross fixed capital formation by the private sector as a percentage of GDP. Business investment is defined as the gross fixed capital formation by the private sector. Gross fixed capital formation consists of resident producers' acquisitions, less disposals, of fixed assets during a given period plus certain additions to the value of non-produced assets realised by the productive activity of producer or institutional units. As such, gross fixed capital formation includes acquisition less disposals of, for example, buildings, structures, machinery and equipment, mineral exploration, computer software, literary or artistic originals and major improvements to land such as the construction of dikes, the clearance of forests or the draining of marshes. GFCF is a part of Gross capital formation (ESA 1995, 3.100), the other parts being changes in inventories and acquisitions less disposals of valuables. The private sector consists of non-financial corporations, financial corporations, households and non-profit organisations serving households, i.e. all sectors of a national economy except general government.

Venture capital investments –early stage- relative to GDP. Breakdown by investment stages. Venture capital investment is defined as private equity raised for investment in companies. Management buy-outs, management buy-ins, and venture purchase of quoted shares are excluded. Early stage venture capital investments comprise seed and start-up venture capital. Seed is defined as financing provided to research, assess and develop an initial concept before a business has reached the start-up phase. Start-up is defined as financing provided for product development and initial marketing, manufacturing, and sales. Companies may be in the process of being set up or may have been in business for a short time, but have not sold their product commercially. The indicators are presented in EUR million and as a percentage of GDP.

Venture capital investments –expansion &replacement-relative to GDP; breakdown by investment stages. Venture capital investment is defined as private equity raised for investment in companies. Management buy-outs, management buy-ins, and venture purchase of quoted shares are excluded. Expansion is defined as financing provided for the growth and expansion of a company which is breaking even or trading profitably. Capital may be used to finance increased production capacity, market or product development, and/or provide additional working capital. It includes bridge financing for the transition from private to public quoted company, and rescue/turnaround financing. Replacement capital is defined as purchase of existing shares in a company from another private equity investment organisation or from another shareholder or shareholders. It includes refinancing of bank debt. The indicators are presented in EUR million and as a percentage of GDP.

As regards policy indicators, a non-exhaustive list could include:

Banking regulation indices 2003 –Overall regulatory barriers to competition average index. This indicator includes regulatory barriers on domestic and foreign entry, restrictions on banking activities and the extent of government ownership. **Caveats:** usual caveats associated to composite indicator.

- Domestic entry index gathers information about licensing requirement of setting up a bank in each country. The requirement may range from drafting by-laws and preparing financial

projections to collecting background information of executive members and disclosing sources of capital. The index also contains information about regulatory structure in granting licenses. Most countries require quite extensive documentation.

- Foreign entry index shows how restrictive it is for foreign entities to enter domestic banking system. First, it examines restrictions on foreign ownership in the form of limits on the share of banks. equity that can be held by non-residents. Second, it looks into screening and approval procedures of foreign entry, including requirements to show economic benefits of foreign takeover. Third, other formal barriers such as restrictions on the membership of the board of directors and the employment of foreign nationals are examined.
- Banking Activity index shows the level of regulatory restrictiveness for bank participation in securities activity (ability of banks to engage in the business of securities underwriting, brokering, dealing, and mutual fund operations), and insurance activity (ability of banks to engage in insurance underwriting and selling). Each activity is categorised into four levels: unrestricted (a full range of activity can be conducted directly), permitted (a full range of activity can be conducted, but all or some must be conducted *via* subsidiaries), restricted (less than full activity can be conducted directly or *via* subsidiaries), and prohibited (activity cannot be conducted either directly or *via* subsidiaries). Securities activity is most liberal, while insurance activity remains most restrictive in many countries.
- Government ownership index measures the amount of assets held by banks (among the ten largest) where government ownership is at least 20% as a ratio of total assets (of the ten largest banks). This index does not reflect competition arrangements *per se*, but it is an important indicator that proxies the extent to which competition might be distorted by the existence of government-owned entities.

The scale of the indicator is 0-1 from least to most restrictive. A higher value indicates more competition-restraining regulation.

Securities market regulation indices 2005 –Overall securities market regulation average index. The overall indicator of securities market regulation can be further decomposed into four broad sub-indices:

- Contract enforcement. Captures essentially the efficiency of commercial contract enforcement based on the number of procedures, the number of calendar days for dispute resolution and the official cost of court procedures.
- Access to credit. Captures two broad elements in assessing the ease of access to credit: the amount of credit information available through public registries or private bureaus; the strength of legal underpinnings in arranging collateral in protecting secured lenders.
- Investor protection. Captures the strength of minority shareholder protection against directors' misuse of corporate asset for personal gain from three perspectives: transparency of transactions, liability for self-dealing and shareholders' ability to sue directors for misconduct.
- Bankruptcy procedures. Captures the efficiency of bankruptcy laws and its proceedings with respect to the time required to go through the bankruptcy procedure, the overall cost of procedures and the recovery rate.

The scale of the indicator is 0-1 from least to most demanding. A higher value indicates regulation that is more conducive to financial development.

Getting credit –legal rights index. The strength of legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate lending. The index includes 7 aspects related to legal rights in collateral law and 3 aspects in bankruptcy law. A score of 1 is assigned for each of the following features of the laws:

- General rather than specific description of assets is permitted in collateral agreements.
- General rather than specific description of debt is permitted in collateral agreements.
- Any legal or natural person may grant or take security in the property.
- A unified registry operates that includes charges over movable property.
- Secured creditors have priority outside of bankruptcy.
- Secured creditors, rather than other parties such as government or workers, are paid first out of the proceeds from liquidating a bankrupt firm.
- Secured creditors are able to seize their collateral when a debtor enters reorganization; there is no "automatic stay" or "asset freeze" imposed by the court.
- Management does not stay during reorganization. An administrator is responsible for managing the business during reorganization.
- Parties may agree on out-of-court enforcement by contract.
- By law, and without the need for a contract, creditors may both seize and sell collateral out of court without restriction.

Getting credit –Credit information index. The depth of credit information index measures rules affecting the scope, accessibility and quality of credit information available through either public or private credit registries. A score of 1 is assigned for each of the following 6 features of the public registry or the private credit bureau (or both):

- Both positive credit information (for example, loan amounts and pattern of on-time repayments) and negative information (for example, late payments, number and amount of defaults and bankruptcies) are distributed.
- Data on both firms and individuals are distributed.
- Data from retailers, trade creditors or utility companies as well as financial institutions are distributed.
- More than 2 years of historical data are distributed. Registries that erase data on defaults as soon as they are repaid obtain a score of 0 for this indicator.
- Data on loans below 1% of income per capita are distributed. A registry must have a minimum coverage of 1% of the adult population to score a 1 for this indicator.
- By law, borrowers have the right to access their data in the largest registry in the country.
- The index ranges from 0 to 6, with higher values indicating the availability of more credit information, from either a public registry or a private bureau, to facilitate lending decisions. If the registry is not operational or has coverage of less than 0.1% of the adult population, the score on the depth of credit index is 0.

Getting credit –Public registry coverage (%adults). The public credit registry coverage indicator reports the number of individuals and firms listed in a public credit registry with current information on repayment history, unpaid debts or credit outstanding. The number is expressed as a percentage of the adult population. A public credit registry is defined as a database managed by the public sector, usually by the central bank or the superintendent of banks that collects information on the creditworthiness of borrowers (persons or businesses) in the financial system and makes it available to financial institutions.

Getting Credit –Private bureau coverage (% adults). The private credit bureau coverage indicator reports the number of individuals and firms listed by a private credit bureau with current information on repayment history, unpaid debts or credit outstanding. The number is expressed as a percentage of the adult population. The coverage is 0, if no public registry exists. A private credit bureau is defined as a private firm or nonprofit organization that maintains a database on the creditworthiness of borrowers (persons or businesses) in the financial system and facilitates the

exchange of credit information among banks and financial institutions. Credit investigative bureaus and credit reporting firms that do not directly facilitate information exchange among banks and other financial institutions are not considered.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Competition - efficiency				
International competition in banking - Share of cross-border loans in total domestic borrowing - average 2000-2003 (+)	BIS and IMF	perf	19 MS	2003
International competition in banking - Foreign banks' penetration of domestic loan market average 2000-2003 (+)	BIS and IMF	perf	19 MS	2003
Banking regulation indices 2003 - Overall regulatory barriers to competition average index (-)	OECD and WB	pol	19 MS	2003
Securities market regulation indices 2005 - Overall securities market regulation average index (+)	OECD and WB	pol	18 MS	2005
Net Interest Margin (-)	Ross Levine database	perf	27 MS	1999-2005
Bank Overhead Costs / Total Assets (-)	Ross Levine database	perf	27 MS	1999-2005
Getting Credit - Legal Rights Index (+)	World Bank	pol	24 MS	2004-2007
Getting Credit - Credit Information Index (+)	World Bank	pol	24 MS	2005-2007
Getting Credit - Public registry coverage (% adults) (+)	World Bank	pol	24 MS	2005-2007
Getting Credit - Private bureau coverage (% adults) (+)	World Bank	pol	23 MS	2005-2007
Development - access to finance				
Stock Market Capitalization / GDP (+)	Ross Levine database	perf	27 MS	1999-2005
Bond Market Capitalization / GDP (+)	Ross Levine database	perf	18 MS	1999-2005
Insurance Premium Volume / GDP (+)	Ross Levine database	perf	26 MS	1999-2005
Financial System Deposits / GDP (+)	Ross Levine database	perf	27 MS	1999-2005
Total loans to private sector and securities market capitalisation 2000-2003 (+)	World Bank	perf	16 MS	2003
Business investment - Gross fixed capital formation by the private sector as a percentage of GDP (+)	STRIND	perf	27 MS	1999-2006
Venture capital investments - early stage - relative to GDP, breakdown by investment stages(+)	STRIND	perf	19 MS	1999-2006
Venture capital investments - expansion & replacement - relative to GDP, breakdown by investment stages (+)	STRIND	perf	18 MS	1999-2006

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

Due to the time coverage, the indicators on Total loans to private sector and securities market capitalisation, International competition in banking and Banking regulation are excluded. Moreover, taking into account the comments made by some Members on the reliability of the indicator on Banking regulation and of the indicator on Security market regulation, we have also excluded these two indicators from the narrow list (not fully comparable and reliable). Finally, as suggested by some Members, a series of additional indicators is included. They mainly serve as proxies for the size of the market and for the access to finance and they have been extracted from the newly updated Ross Levine database, which is a fully accepted and recognize source of data on the subject.

Redundancy criteria

An analysis of the high correlations between some of the remaining indicators lead us to exclude Insurance Premium Volume/GDP. Thus the two indicators on Bond and Stock Market Capitalization / GDP will be the proxies for the size of the financial market, by splitting the weight we decide to reinstate both.

Inputs from associated stakeholders

A number of Member States explained that bias could affect some of the World Bank doing business indicators. In particular, they point at weaknesses in the indicators Getting credit – credit information, public and private registry coverage where some of the information used on coverage registry does not seem to ensure a sufficient degree of cross country comparability. The Commission thus proposes to move the three indicators in the wider list. The other indicators selected in the narrow list give a comprehensive and detailed picture on the situation as regards competition and efficiency in the financial markets as well as on the level of development and on access to finance.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Competition - efficiency								
International competition in banking - Share of cross-border loans in total domestic borrowing (+)	++	+	-	+	-	-	wider list	
International competition in banking - Foreign banks' penetration of domestic loan market average 2000-2003(+)	++	+	-	+	+	-	wider list	
Banking regulation indices 2003 (-)	++	-	-	+	+	-	wider list	
Securities market regulation indices (+)	++	-	+	+	-	-	wider list	
Net Interest Margin (-)	++	+	+	++	+	-	**narrow list**	**1**
Bank Overhead Costs / Total Assets (-)	++	+	++	++	+	-	**narrow list**	**1**
Getting Credit - Legal Rights Index (+)	++	+	++	++	+	-	**narrow list**	**1**
Getting Credit - Credit Information Index (+)	++	+	++	++	++	-	wider list	
Getting Credit - Public registry coverage (% adults) (+)	++	+	++	++	+	-	wider list	
Getting Credit - Private bureau coverage (% adults) (+)	++	+	++	++	+	-	wider list	
Development - access to finance								
Stock Market Capitalization / GDP (+)	++	+	+	++	-	-	**narrow list**	**0,5**
Bond Market Capitalization / GDP (+)	++	+	+	+	++	-	**narrow list**	**0,5**
Insurance Premium Volume / GDP (+)	++	+	+	++	-	-	wider list	
Financial System Deposits / GDP (+)	++	+	+	++	+	-	wider list	
Total loans to private sector and securities market capitalisation 2000-2003 (+)	++	+	-	+	-	-	wider list	
Business investment - Gross fixed capital formation by the private sector as a percentage of GDP (+)	++	++	++	++	+	-	**narrow list**	**1**
Venture capital investments - early stage (+)	++	++	++	+	-	-	**narrow list**	**0,5**
Venture capital investments - expansion & replacement (+)	++	++	++	+	-	-	**narrow list**	**0,5**

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3.6. Market integration - Openness to trade and investment

Definition and scope of the policy area

Market integration - openness to trade and investment refers to measures that liberalize trade and investment flows. These types of measures are generally part of the same set of reforms as the two phenomena appear to be closely linked (Nicoletti et al., 2003). In practice, a numbers of policies are involved in the removal of barriers to trade and investment such as foreign ownership barriers, discriminatory procedures and tariffs and regulatory barriers at both national and international levels.

Related Integrated guidelines

(12) To extend and deepen the internal market.

Impact on growth components

The mechanism through which openness to trade and investment could affect productivity growth are not always clear cut and always interconnected, although different main channels have been identified in the economic literature (Bassanini and Scarpetta, 2001). On the one hand, more openness to trade and investment will have a direct impact on productivity due to the removal of barriers to penetrate new markets. This could:

- give the opportunity to fully exploit comparative advantage: the classic argument for gains from trade being based on the notion that as long as there are differences in specialisation or in resource endowments between countries, there is room for mutual gain through trade, and thus removing barrier to trade allow for a full exploitation of these gains. Moreover consumers' welfare will be boosted by the availability of a greater variety of products (Amiti and Wakelin, 2002 ; Romalis, 2007).

- contribute to higher levels of investment: better access to foreign capital inflows allows to achieve investment levels beyond the existing domestic savings. (Carr, Markusen and Maskus, 2001 ; Nicoletti et al., 2003). However if barriers deter "greenfield" FDI aimed at establishing new firms or creating new production plants, they can actually encourage inward FDI aimed at acquiring existing local firms, or merging foreign parents with these firms (Nicoletti et Scarpetta, 2005).

- incentive to pursue more virtuous macroeconomic policies and to better domestic regulation: openness may create incentives for policy makers to pursue and adopt less distortionary domestic policies and more disciplined type of macroeconomic management, either because of the threat of capital flight or because of international agreement that act as a check on policy (Wacziarg, 2001).

- improve the overall growth and employment prospects: outward investment and import flows enable domestic economies to remain competitive and thus supports domestic employment. Inward investment and exports flows directly benefit the domestic economy by stimulating growth and creating jobs. Despite these overall gains, some particular sectors could experience high adjustment costs and income losses as a result of trade and investment liberalisation (European Commission, 2005).

On the other hand the following main indirect effect could occur:

- increase efficiency through entry and exposure to competition: competition from imported goods can discipline the monopolistic or oligopolistic behaviour of domestic firms, forcing them to behave in a more competitive way. In particular, the increased competition could forces firms to seek new ways of doing business to remain competitive and the reduction of rent seeking activities inspired by trade and investment restrictions could spur entrepreneurial activities (Harrison, 1994 ; Tybout, 2003 ; Pavnick, 2002 ; Bernard et al., 2003).

- give the ability to benefit from economies of scale: By increasing the size of the market, trade openness allows domestic firms to better capture the potential benefits of increasing return to scale. For example, extended markets due to trade enable producers to benefit from significant scale effects, both in production as well as in distribution and marketing. (Ades and Glaeser, 1999 ; Alesina et al, 2000).

- encourage innovation and absorption of knowledge: endogenous growth theory has expanded on the notion of scale economies, suggesting that trade may increase the generation and diffusion of knowledge. Indeed, larger markets integrated via trade will allow successful producers to increase their production scale and thus to have more gains from learning-by-doing. Moreover openness and in particular openness to foreign investment is a major source of technology transfer and managerial skills in host countries and the more people there are around to invent things and the bigger the market for inventions, the greater the rate at which inventions will be discovered (Ahn and Hemmings, 2000).

Evidence and Estimated elasticities in the recent literature

The most recent empirical studies find that, while there are problems with the exact measurement of openness and while establishing causality from openness to growth is sometimes difficult, the weight of the evidence from a variety of sources is strong to the effect that increased openness has long term economic benefits.

From macro and cross-country regressions analysis

Sachs and Warner (1995), found that growth is positively related to an openness indicator based on a number of policies that affect international economic integration and argued that "closed" countries experienced annual growth rates a full 2 percentage points below "open" countries in the period 1970-1989.

Barro and Sala-i-Martin (1997), showed that countries that are more open to the rest of the world have a greater opportunity to absorb technological advances generated in leading nations, either by exchange of ideas or by spread of technology through investment and exposure to new goods.

Frankel and Romer (1999), using geographic variables as an instrument for trade openness, estimated that a 1 percentage point increase in the trade to GDP ratio causes almost a 2 percent increase in the level of per capita income.

Nicoletti et al., (2003), results, suggest that bringing FDI restrictions down to the level of the UK could increase OECD-wide inward positions by almost 20% and that overall, relatively restrictive countries could increase their total FDI inward position by between 60% and 80%.

Wacziarg and Welch (2003), in a panel of countries extending from 1950 to 1998, found that on average, a country grows at 1.5 percent per annum higher rate in the liberalized phase than in the protected phase, controlling for country and year effects. The post-liberalization increase in investment rates was between 1.5 and 2 percentage points, confirming past findings that liberalization works to foster growth in part through its effect on physical capital accumulation.

According to the OECD (2005), the lowering of barriers to foreign direct investment to best practice levels could raise GDP per capita by 0.5 per cent in the EU 15. Cuts in tariff rates would give a boost to output, even if tariff rates are already relatively low in some countries, increasing GDP per capita in the EU 15 by 0.4 per cent.

From micro and sector level analysis

According to Griffith and Simpson (2003), firms engaged in international trade end to be more productive, have higher employment growth, and are higher wage firms than domestically oriented firms.

Pavnic (2002), and Bernard et al. (2003), allows for entry and exit of firms and show that a lowering of trade barriers generates a reallocation of resources in favour of more productive firms. Bernard and al. found that when aggregated, these reallocation effects could be quite large, making up over 40% of total factor productivity growth in the manufacturing sector.

Bassanini and Ernst (2002) presented direct evidence for 18 manufacturing industries in 18 OECD countries on the effect of product and labour market regulation on R&D intensity. The results suggest that non-tariff barriers have a negative effect on R&D intensity.

Possible spillover and complementarities with other policy area

Rodriguez and Rodrik (2000) conclude from a review of the literature that policy designed to liberalize trade does not automatically increase trade. Trade may also be endogenous to the process of growth and the relationship between increased trade and growth seems to depend on country-specific circumstances (pattern of growth, geography, size, transport cost).

Moreover, Rodriguez and Rodrik (2000) suggest that trade restrictions are only one among a "basket" of growth-reducing policies and as a result that the coefficient related to the effect attributed to trade liberalization are often overestimated. Complementarities with other policy areas such as those aiming at fostering competition, increasing entrepreneurship and improving the business environment, are also likely.

It is however possible to think of mechanisms whereby trade may have a negative influence on growth. Grossman and Helpman (1991) cite various examples: i) intensified competition due to openness could discourage efforts for invention by lowering expected potential profitability of a successful invention; ii) international competition with a technologically advanced country can bring about a slowdown of innovation and growth in a country with a disadvantage in research productivity; and, iii) a country with abundant unskilled labour may be led by trade to specialise in traditional low-tech manufacturing.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Market integration –trade integration of goods: Average value of imports and exports of goods divided by GDP, multiplied by 100. **Caveats:** size effect, it is not conceptually correct to compare small and large country as the second tend to have smaller degrees of openness. Moreover trade openness measures based on actual trade volume are not necessarily related to policy and they are largely endogenous: a country can distort trade heavily and still have a high ratio of trade to GDP.

Market integration. Trade integration of services. Average value of imports and exports of services divided by GDP multiplied by 100.

Market integration. Foreign Direct Investment intensity. Average value of inwards and outwards Foreign Direct Investment flows divided by GDP, multiplied by 100. **Caveats:** The indicator biased towards economies specialised in tradable services (finance, ITC, business services). Data on FDIs (establishments) in the service sector could be integrated in future

Exports of goods and services at 2000 prices. National currency, annual percentage change.

Growth of direct interment inward stocks by main origin of investment, (million ECU/EUR), partner: all countries of the world.

As regards policy indicators, a non-exhaustive list could include:

Barriers to trade and investment indicators. Ownership barriers. Barriers to international trade and investment indicator includes detailed indicators of (a) barriers to share-ownership for non-resident operators; (b) discriminatory procedures in international trade and competition policies; (c) regulatory barriers to trade; and (d) average (production weighted) tariffs. The barriers to share-ownership for non-resident reflects legal restrictions on foreign acquisition of equity in public and private firms and in the telecommunications and airlines sectors. Foreign ownership barriers typically take the form of limiting controlling equity stakes by non-residents in domestic companies. Obligatory screening and approval procedures may also constrain FDI to the extent that they raise entry costs, although the impact of such procedures on FDI flows may be quite limited in practice. Other formal constraints on FDI include restrictions on the ability of foreign nationals to work in affiliates and regulations that nationals or residents must form a majority of the board of directors. In addition, FDI flows may be hampered by informal barriers such as opaque application of regulatory procedures. **Caveats:** usual caveats associated to composite indicator.

Barriers to trade and investment indicators. Discriminatory procedures. Barriers to international trade and investment indicator includes detailed indicators of (a) barriers to share-ownership for non-resident operators; (b) discriminatory procedures in international trade and competition policies; (c) regulatory barriers to trade; and (d) average (production weighted) tariffs. Discriminatory procedures in international trade and competition policies reflects the extent of discrimination against foreign firms at the procedural level.

Barriers to trade and investment indicators. Regulatory barriers. Barriers to international trade and investment indicator includes detailed indicators of (a) barriers to share-ownership for non-resident operators; (b) discriminatory procedures in international trade and competition policies; (c) regulatory barriers to trade; and (d) average (production weighted) tariffs. Regulatory barriers to trade reflects other barriers to international trade (e.g. international harmonisation, mutual recognition agreements). extent of discrimination against foreign firms at the procedural level.

Barriers to trade and investment indicators. Tariffs. Barriers to international trade and investment indicator includes detailed indicators of (a) barriers to share-ownership for non-resident operators; (b) discriminatory procedures in international trade and competition policies; (c) regulatory barriers to trade; and (d) average (production weighted) tariffs. Average production tariffs reflect the (simple) average of most-favoured-nation tariffs.

Foreign Direct Investment restrictiveness indicator. Indicator scale of 0-1 from least to most restrictive. This indicator takes into account policy variables other than bilateral taxation that may have a bearing on FDI by affecting the host-country business environment and rates of return on investment in foreign affiliates. These cover three broad areas: border barriers, domestic product market regulation and labour market arrangements.

Number of infringement cases open. Open infringement cases for misapplication of Internal Market Rules. Infringement cases refer to those situations where, in the Commission's opinion, the transposition is not in conformity with the directive it transposes or cases where Internal Market legislation is not correctly applied and where a letter of formal notice has been sent to the Member State. Cases of non-communication, i.e. concerning directives counted in the transposition deficit are excluded from this indicator.

Average transposition delay in months for overdue directives –in months. The average delay in the implementation of a directive, once the deadline has passed, is 13 months.

Single market directives -% implemented The Single market directives -% implemented shows the percentage of Internal Market directives communicated as having been fully transposed, in relation to the total number of Internal Market directives which should have been transposed by the deadline.

Number of two years overdue directives Shows the number of Directives overdue by over 2 years.

Trading Across borders –Documents for import (number). Doing Business compiles procedural requirements for exporting and importing a standardized cargo of goods by ocean transports. All documents required to export and import the goods are recorded. Documents include bank documents, customs declaration and clearance documents, port filing documents, import licenses and other official documents exchanged between the concerned parties. Documents filed simultaneously are considered different documents but with the same time frame for completion.

Trading Across borders –Cost to import (US$ per container). Doing Business compiles procedural requirements for exporting and importing a standardized cargo of goods by ocean transport. Cost measures the fees levied on a 20-foot container in U.S. dollars. All the fees associated with completing the procedures to export or import the goods are included. These include costs for documents, administrative fees for customs clearance and technical control, terminal handling

charges and inland transport. The cost measure does not include tariffs or trade taxes. Only official costs are recorded.

Trading Across borders –Time for import (days). Doing Business compiles procedural requirements for exporting and importing a standardized cargo of goods by ocean transport. Time is recorded in calendar days. The time calculation for a procedure starts from the moment it is initiated and runs until it is completed. If a procedure can be accelerated for an additional cost, the fastest legal procedure is chosen. Procedures that can be completed in parallel are measured as simultaneous. The waiting time between procedures—for example, during unloading of the cargo—is included in the measure.

Protecting investors –Disclosure index. Doing Business measures the strength of minority shareholder protections against directors' misuse of corporate assets for personal gain. The extent of disclosure index has five components, which assess:

- What corporate body can provide legally sufficient approval for the transaction in which a company's controlling shareholder misuses corporate assets for personal gain. A score of 0 is assigned if it is the controlling shareholder or the managing director alone; 1 if the board of directors or shareholders must vote and the controlling shareholder is permitted to vote; 2 if the board of directors must vote and the controlling shareholder is not permitted to vote; 3 if shareholders must vote and the controlling shareholder is not permitted to vote.
- Whether immediate disclosure of the transaction to the public, the regulator or the shareholders is required. A score of 0 is assigned if no disclosure is required; 1 if disclosure on the terms of the transaction but not the controlling shareholder 's conflict of interest is required; 2 if disclosure on both the terms and the controlling shareholder's conflict of interest is required.
- Whether disclosure in the annual report is required. A score of 0 is assigned if no disclosure on the transaction is required; 1 if disclosure on the terms of the transaction but not the controlling shareholder's conflict of interest is required; 2 if disclosure on both the terms and the controlling shareholder's conflict of interest is required.
- Whether disclosure by the controlling shareholder to the board of directors is required. A score of 0 is assigned if no disclosure is required; 1 if a general disclosure of the existence of a conflict of interest is required without any specifics; 2 if full disclosure of all material facts relating to the controlling shareholder's interest in the transaction is required.
- Whether it is required that an external body, for example, an external auditor, review the transaction before it takes place. A score of 0 is assigned if no; 1 if yes.

Caveats: 1) the collected data refer only to businesses in the country's most populous city 2) the data often focus on a specific business form - a limited liability company of a specified size 3) transactions described in a standardized case study refer to a specific set of issues and may not represent the full set of issues a business encounters. 4) usual limitation of surveys for some questions.

Protecting investors –Director Liability index. Doing Business measures the strength of minority shareholder protections against directors' misuse of corporate assets for personal gain. The extent of director liability index has 7 components:

- Whether a shareholder plaintiff is able to hold the controlling shareholder liable for damage the transaction causes to the company. A score of 0 is assigned if the controlling shareholder cannot be held liable or can be held liable only for fraud or bad faith; 1 if the

controlling shareholder can be held liable only if he influenced the approval of the transaction or was negligent; 2 if the controlling shareholder can be held liable when the transaction is unfair or prejudicial to the other shareholders.

- Whether a shareholder plaintiff is able to hold the approving body (the CEO or board of directors) liable for damage the transaction causes to the company. A score of 0 is assigned if the approving body cannot be held liable or can be held liable only for fraud or bad faith; 1 if the approving body can be held liable for negligence; 2 if the approving body can be held liable when the transaction is unfair or prejudicial to the other shareholders.
- Whether a court can void the transaction upon a successful claim by a shareholder plaintiff. A score of 0 is assigned if rescission is unavailable or is available only in case of fraud or bad faith; 1 if rescission is available when the transaction is oppressive or prejudicial to the other shareholders; 2 if rescission is available when the transaction is unfair or entails a conflict of interest.
- Whether the controlling shareholder pays damages for the harm caused to the company upon a successful claim by the shareholder plaintiff. A score of 0 is assigned if no; 1 if yes.
- Whether the controlling shareholder repays profits made from the transaction upon a successful claim by the shareholder plaintiff. A score of 0 is assigned if no; 1 if yes.
- Whether fines and imprisonment can be applied against the controlling shareholder. A score of 0 is assigned if no; 1 if yes.
- Whether shareholder plaintiffs are able to sue directly or derivatively for damage the transaction causes to the company. A score of 0 is assigned if suits are unavailable or are available only for shareholders holding more than 10% of the company's share capital; 1 if direct or derivative suits are available for shareholders holding 10% or less of share capital.

Protecting investors –Shareholder suits index. Doing Business measures the strength of minority shareholder protections against directors' misuse of corporate assets for personal gain. The ease of shareholder suits index has 6 components.

- What range of documents is available to the shareholder plaintiff from the defendant and witnesses during trial. A score of 1 is assigned for each of the following types of documents available: information that the defendant has indicated he intends to rely on for his defence; information that directly proves specific facts in the plaintiff's claim; any information relevant to the subject matter of the claim; and any information that may lead to the discovery of relevant information.
- Whether the plaintiff can directly examine the defendant and witnesses during trial. A score of 0 is assigned if no; 1 if yes, with prior approval of the questions by the judge; 2 if yes, without prior approval.
- Whether the plaintiff can obtain categories of relevant documents from the defendant without identifying each document specifically. A score of 0 is assigned if no; 1 if yes.
- Whether shareholders owning 10% or less of the company's share capital can request that a government inspector investigate the transaction without filing suit in court. A score of 0 is assigned if no; 1 if yes
- Whether shareholders owning 10% or less of the company's share capital have the right to inspect the transaction documents before filing suit. A score of 0 is assigned if no; 1 if yes.
- Whether the standard of proof for civil suits is lower than that for a criminal case. A score of 0 is assigned if no; 1 if yes.

Protecting investors –Investor Protection index. Doing Business measures the strength of minority shareholder protections against directors' misuse of corporate assets for personal gain. The strength

of investor protection index is the average of the extent of disclosure index, the extent of director liability index and the ease of shareholder suits index.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Barriers to trade and investment indicators - Ownership barriers (-)	OECD	pol	19 MS	2003
Barriers to trade and investment indicators - Discriminatory procedures (-)	OECD	pol	19 MS	2003
Barriers to trade and investment indicators - Regulatory barriers (-)	OECD	pol	19 MS	2003
Barriers to trade and investment indicators - Tariffs (-)	OECD	pol	19 MS	2003
Foreign direct investment restrictiveness indicator - Indicator scale of 0-1 from least to most restrictive (-)	OECD	pol	18 MS	2006
Number of infringements cases open - Open infringement cases for misapplication of Internal Market rules (-)	DG MARKT	pol	25 MS	2005-2006
Average transposition delay in months for overdue directives - in months (-)	DG MARKT	pol	25 MS	2005-2006
Single market directives - % implemented (+)	DG MARKT	pol	15 MS until 2004; then 25 MS	1999-2007
Number of 2 years overdue directives (-)	DG MARKT	pol	15MS ; 25 MS every 2 years	2002-2006
Trading Across Borders - Documents for import (number) (-)	World Bank	pol	24 MS	2005-2007
Trading Across Borders - Cost to import (US$ per container) (-)	World Bank	pol	24 MS	2005-2007
Trading Across Borders - Time for import (days) (-)	World Bank	pol	24 MS	2005-2007
Protecting Investors - Disclosure Index (+)	World Bank	pol	24 MS	2005-2007
Protecting Investors - Director Liability Index (+)	World Bank	pol	24 MS	2005-2007
Protecting Investors - Shareholder Suits Index (+)	World Bank	pol	24 MS	2005-2007
Protecting Investors - Investor Protection Index (+)	World Bank	pol	24 MS	2005-2007
Market integration - trade integration of goods - Average value of imports and exports of goods divided by GDP, multiplied by 100 (+)	STRIND	perf	26 MS	1999-2006
Market integration - Trade integration of services - Average value of imports and exports of services divided by GDP, multiplied by 100 (+)	STRIND	perf	27 MS	1999-2006
Market integration - Foreign Direct Investment intensity - Average value of inward and outward Foreign Direct Investment flows divided by GDP, multiplied by 100 (+)	STRIND	perf	25 MS	1999-2006
Exports of goods and services at 2000 prices - National currency; annual percentage change (+)	AMECO	perf	27 MS	1999-2007
Growth of direct investment inward stocks by main origin of investment, (million ECU/EUR), partner: All countries of the world (+)	EUROSTAT	perf	23 MS	2000-2005

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

Four indicators namely the barriers to trade and investment indicators from the OECD, are dropped due to their insufficient time coverage.

Redundancy criteria

The correlations between the remaining indicators do not indicate highly redundant indicators except for Trading Across Borders - Documents for import (number) highly correlated with (76%) Trading Across Borders - Time for import (days).

Inputs from associated stakeholders

However, taking into account the comments made by some Members, we have excluded two partially redundant indicators, in particular as regards growth rates, namely Exports of goods and services and Growth of direct investment inward stocks by main origin of investment. Following the suggestion of some Members, we also excluded the four indicators on the Single market directive. Some concerns were also expressed towards the indicators on Protecting investors, which could be biased towards countries relying more heavily on stock market financing and towards countries being more favourable to minority shareholders. As a result, the Commission proposes to move the three corresponding indicators in the wider list.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Barriers to trade and investment indicators - Ownership barriers (-)	++	+	-	+	++	-	wider list	
Barriers to trade and investment indicators - Discriminatory procedures (-)	++	+	-	+	++	+	wider list	
Barriers to trade and investment indicators - Regulatory barriers (-)	++	+	-	+	++	-	wider list	
Barriers to trade and investment indicators - Tariffs (-)	++	+	-	+	++	-	wider list	
Foreign direct investment restrictiveness indicator - Indicator scale of 0-1 from least to most restrictive (-)	++	+	+	+	++	-	wider list	
Number of infringements cases open - Open infringement cases for misapplication of Internal Market rules(-)	+	++	++	++	+	+	wider list	
Average transposition delay in months for overdue directives - in months(-)	+	++	++	++	+	-	wider list	
Single market directives - % implemented (+)	+	++	++	++	+	+	wider list	
Number of 2 years overdue directives (-)	+	++	++	++	+	-	wider list	
Trading Across Borders - Documents for import (number) (-)	++	+	++	++	-	-	wider list	
Trading Across Borders - Cost to import (US$ per container) (-)	++	+	++	++	+	-	**narrow list**	**0,5**
Trading Across Borders - Time for import (days) (-)	++	+	++	++	+	+	**narrow list**	**0,5**
Protecting Investors - Disclosure Index (+)	++	+	++	++	++	-	wider list	
Protecting Investors - Director Liability Index (+)	++	+	++	++	+	+	wider list	
Protecting Investors - Shareholder Suits Index (+)	++	+	++	++	+	-	wider list	
Protecting Investors - Investor Protection Index (+)	++	+	++	++	+	-	wider list	
Market integration - trade integration of goods (+)	+	++	++	++	++	-	**narrow list**	**0,5**
Market integration - Trade integration of services (+)	+	++	++	++	-	-	**narrow list**	**0,5**
Market integration - Foreign Direct Investment intensity (+)	+	++	++	++	-	-	**narrow list**	**1**
Exports of goods and services at 2000 prices - National currency; annual percentage change (+)	++	++	++	++	+	-	wider list	
Growth of direct investment inward stocks by main origin of investment, (million ECU/EUR), partner: All countries of the world (+)	++	++	+	++	++	-	wider list	

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4. INNOVATION AND KNOWLEDGE

4.1. R&D and innovation

Definition and scope of the policy area

R&D is the discovery, usually by specialised units in state agencies, companies or universities, of new knowledge, and the application of that knowledge to create new and improved products, processes, and services that fill market needs. Innovation can be both technological and non-technological. Technological innovation relates directly to R&D activities and leads to the creation of new or upgraded products and services (product innovation) or new or improved production ways (process innovation). Non-technological innovation relies, on the other hand, on improved management practises, organisational changes or marketing innovations. The link between R&D and innovation is that the latter builds on the knowledge that results from cumulative R&D effort, as well as itself adding to that knowledge. Consequently, an economy's productivity level depends on its cumulative R&D effort and its effective stock of knowledge, and the two are interrelated by innovation.

Integrated Guidelines

(7) To increase and improve investment in R & D, in particular by private business.
(8) To facilitate all forms of innovation.

Impact on growth components

The generation, exploitation, and diffusion of knowledge are fundamental to economic growth. There are five ways in which R&D and innovation can together drive growth (Schumpeter, 1936):

1. By introducing g a new good or a new quality of a good;
2. By introducing a new method of production (although this does not have to be founded upon a scientifically new discovery due to R&D) or a new way of marketing;
3. By opening up new markets;

4. By making possible the conquest of a new source of supply of raw materials or half-manufactured goods;
5. By leading to the reorganisation of an industry.

In terms of growth components, there are several channels through which the effect of R&D and innovation materilises:

- R&D and innovation, as main determinants of technological progress, are considered to increase economic growth by shifting the production frontier upward, ***mainly through boosting TFP.*** New knowledge (e.g. technologies, process innovations, organisational innovations) allows more effective and therefore more productive use of existing resources. In addition, emergence of new products and markets in response to preferences of the economic agents leads to a higher allocative efficiency in the economy. Technological progress thus increases productivity of production factors.
- Technological progress generates changes in the relative prices of production factors and results in changes in the volume of these factors. Relative decline of prices of investment goods (e.g. new (more productive) products and services) leads to an increased investment and ***deepening of the capital stock.***
- R&D and innovation activities are complementary with policies to improve human capital and can have a positive impact on the ***labour quality***. Researchers undertaking R&D and innovation activities acquire new knowledge which can be further disseminated due to their mobility or teaching activities. At the same time, efforts to boost R&D need to be backed up with a sufficient supply of highly qualified researchers. Moreover, introduction of new products and processes also requires that workers possess appropriate knowledge and skills.

Possible spillover and complementarities with other policy area

Effects of R&D and innovation on growth materialise through a complex system whose effectiveness depends on a number of determinants. The ability of a country to fully exploit the growth potential of R&D and innovation activities depends on whether it can:
1) effectively stimulate R&D and exploit the acquired knowledge for production of new products, services and technologies; and
2) ensure dissemination of knowledge and technologies (both, domestically generated and imported) within the economy.
As regards production and exploitation of knowledge, policy interventions are motivated by the notion of positive externalities. Markets may undersupply investment in research and human capital because the agents that undertake this investment will only accrue part of the fruits.

Other agents will also benefit and the economy would be better off, if public activity corrects for this market failure:

- This is usually done by governments getting involved in financing of research. Public R&D usually takes place through support to (public) universities or research institutes and often focuses on basic research. Private R&D, generally of a more applied kind, can be stimulated either through direct measures (like grants targeted at a specific technologies, academic disciplines or industries) or through indirect measures which aim to reduce the costs of R&D investment (tax incentives).

- Another important tool is the protection of patent rights that allow researchers to either restrict use of their inventions or to benefit financially from the imitation of their products.

- R&D and innovation can also be supported through facilitation of emergence of innovation-driven lead markets. Public procurement may also be exploited for this purpose.

- In addition, framework conditions play a crucial role (Aghion, 2006). In this respect, institutional environment (e.g. innovative framework, linkages between public research and private sector, availability of capital for R&D and innovative activities and sufficient supply of educated workforce) the competitive pressures incumbent firms are exposed to are important determinants of incentives to innovate.

On the other hand, public interventions need to driven by an objective to maximise efficiency of R&D spending. It is not always clear whether public and private R&D are complements or substitutes. On the one hand, public R&D often concentrates in the area of basic research which produces relatively easily accessible general knowledge. Such knowledge opens up new avenues for applied research but usually has a limited commercial use in itself. Therefore, the social returns of such public R&D investment greatly exceed private returns and it is complementary to the private investments. On the other hand, public R&D can replace private R&D. Some firms may merely use public support to cut their own funding, while undertaking the same amount of R&D. Furthermore, governments may not necessarily allocate resources more efficiently than market forces do. In addition, public funds allocated to R&D projects induce higher demand for researchers, which drives the researchers' salaries up and thus increases the costs of R&D. In reaction to higher R&D costs, firms may reallocate their funds to other investment projects, i.e. a classical "crowding-out" effect.

The importance of the diffusion of knowledge rests on the existence of strong knowledge spillovers. First, R&D not only stimulates growth for the organisation engaged in R&D itself, but also triggers knowledge diffusion throughout the economy, benefiting other technology users. Second, adoption of advanced technologies developed elsewhere (i.e. imitation) allows catching up countries, below the global technology frontier, to boost productivity through approaching the frontier. This usually happens through acquiring existing knowledge (e.g. through licences) or importing physical capital. This, however, does not reduce the need for catching up countries to get actively involved in R&D activities since the ability of a country to exploit the new knowledge and technologies depends on the existing stock of knowledge. Also developed countries can learn from the latest technological and innovative advances of their peers.
Empirical literature has confirmed the importance of such R&D spillovers. For instance the initial contribution of Coe and Helpman (1995) tests the idea that the productivity of a country depends on the stock of past accumulated R&D of the country as well as on that of its trading partners. More recent research, like Im et al., 2003 and Bottazzi and Peri (2005), analyze the long run relation between R&D spending and productivity. Bottazzi and Peri find that a country's stock of knowledge, its R&D resources and the stock of international knowledge move together in the long run and that international knowledge has a very significant impact on innovation. Jungmittag (2004) analyses the effects of innovations, technological specialisation and technology diffusion on economic growth and convergence of the EU countries from 1969 to 1998. The results show that technology diffusion is a main driving force for the convergence of labour productivities. Griffith et al (2004), show that indeed, R&D based in the leading country (technology sourcing) benefits other countries.

Evidence and Estimated elasticities in the recent literature

As regards the impact of R&D on growth, the European Commission (2007) looks at the effects of increasing total EU R&D spending from 1.9% of GDP in 2002 to 2.7% in 2010. If Member States achieve their targets, R&D activities will rise by 50% in 2025 generating—through technological progress—an increase of between 2.6% and 4.4% in GDP on the basis of conservative assumptions. Moreover, as technological progress benefits from the R&D activities elsewhere, there are large benefits from spillovers across countries and sectors. International spillovers account for some 25-30% of the overall effect on GDP for the EU25, with their scale depending upon the intensity of trade across countries. This points to potential synergies between R&D policy and internal market measures that increase market opening and therefore magnify R&D spillovers.
Empirical research also confirms that the social returns of R&D exceed the private returns by a wide margin. Different methods, however, yield a wide variation of results, with private returns from R&D in the range of 10 to 30% and social returns varying from 10 to above 100%.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

Summary innovation index 2006. The summary innovation index measures aggregate national innovation performance. The summary innovation index is calculated as a weighted average of a series of innovation indicators, which are assigned to five dimensions and grouped in two main themes: inputs and outputs. Innovation inputs cover three innovation dimensions: (i) innovation drivers measure the structural conditions required for innovation potential; (ii) knowledge creation measures the investments in R&D activities, considered as key elements for a successful knowledge-based economy; and (iii) innovation & entrepreneurship measures the efforts towards innovation at firm level. Innovation outputs cover two innovation dimensions: (i) applications measures the performance, expressed in terms of labour and business activities, and their value added in innovative sectors; and (ii) intellectual property measures the achieved results in terms of successful know-how.

Gross Domestic expenditure on R&D (GERD). Percentage of GDP. Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications" (Frascati Manual, § 63). The four indicators provided are GERD as a % of GDP, % of GERD financed by industry, % of GERD financed by government and % of GERD financed by abroad.

Gross Domestic expenditure on R&D (GERD) by sources of funds –industry –Percentage of GDP.

Gross Domestic expenditure on R&D (GERD) by sources of funds –government –Percentage of GDP.

Gross Domestic expenditure on R&D (GERD) by sources of funds –abroad–Percentage of GDP.

Science and technology graduates –total- Tertiary graduates in science and technology per 1,000 population aged 20-29. Data are collected through the joint UIS (UNESCO Institute of Statistics)/OECD/Eurostat (UOE) questionnaires on education statistics, which constitute the core database on education. Countries provide data, coming from administrative records, on the basis of commonly agreed definitions. The number of tertiary graduates in science and technology includes all graduates during the reference year, both first and second (and further) degree graduates in tertiary university education (ISCED 5A), tertiary non-university education (ISCED 5B) and advanced research education (ISCED 6).

Patents

Patents reflect a country's inventive activity. Patents also show the country's capacity to exploit knowledge and translate it into potential economic gains. In this context, indicators based on patent statistics are widely used to assess the inventive performance of countries.

Patent statistics provide a measure of innovation output, as they reflect the inventive performance of countries, regions, technologies, firms, etc. They are also used to track the level of diffusion of knowledge across technology areas, countries, sectors, firms, etc., and the level of internationalisation of innovative activities. Patent indicators can serve to measure the output of R&D, its productivity, structure and the development of a specific technology/industry. Conversely, patents can also be used as an input indicator, as they represent a source of information for subsequent inventors.

Notice that when a patent was invented by several inventors from different countries, the respective contributions of each country is taken into account. This is done in order to eliminate multiple counting of such patents.

- Patent applications to the European Patent Office (EPO): Number of applications per million inhabitants. Data are given at the national level and cover the period from 1977 onwards. EPO data refer to patent applications as opposed to patents granted, which is the case of USPTO data. Data are recorded by priority year.
- Patents granted by the United States Patent and Trademark Office (USPTO) - Number of patents per million inhabitants. This indicator provides users with data concerning patents of the US Patent & Trademark Office - USPTO. Data are given at the national level. USPTO data refer to patents granted by priority year as opposed to patent applications by priority year, which is the case of EPO data
- Triadic patents - The disadvantage of both the EPO and USPTO patent indicator is that European countries and the US respectively have a ‘home advantage’ as patent rights differ among countries. A patent family is a group of patent filings that claim the priority of a single filing, including the original priority filing itself, and any subsequent filings made throughout the world. Trilateral patent families are a filtered subset of patent families for which there is evidence of patenting activity in all trilateral blocks (USPTO, EPO, JPO). No country will thus have a clear ‘home advantage’. Besides total number of patent data of triadic patent families (EPO - USPTO - JPO) this figures are also related to million inhabitants and million labour force at the country level.

Venture capital investments - early stage - Percentage of GDP. Venture capital investment is defined as private equity raised for investment in companies. Management buy-outs, management buy-ins, and venture purchase of quoted shares are excluded. Early stage venture capital investments comprise seed and start-up venture capital. Seed is defined as financing provided to research, assess and develop an initial concept before a business has reached the start-up phase.

Start-up is defined as financing provided for product development and initial marketing, manufacturing, and sales. Companies may be in the process of being set up or may have been in business for a short time, but have not sold their product commercially. The indicators are presented in EUR million and as a percentage of GDP.

High-tech exports: Exports of high technology products as a share of total exports (in national currency and current prices). High-technology products" means all movable goods belonging to the following sectors: aerospace, computers and office machines, electronics and telecommunications, pharmacy, scientific instruments, electrical and non-electrical machinery, chemistry and armament. These sectors are defined on the basis of SITC product codes (Standard International Trade Classification - Rev. 3). The indicator measures the technological competitiveness of the EU i.e. the ability to commercialise the results of research and development (R&D) and innovation in the international markets. It also reflects product specialisation by country. Creating, exploiting and commercialising new technologies is vital for the competitiveness of a country in the modern economy. This is because high technology sectors are key drivers for economic growth, productivity and welfare, and are generally a source of high value added and well-paid employment. The Brussels European Council (2003) stressed the role of public-private partnerships in the research area as a key factor in developing new technologies and enabling the European high-tech industry to compete at the global level.

Scientific articles per million population. Article counts are based on science and engineering (S&E) articles, notes and reviews published in a set of the world's most influential scientific and technical journals, as tracked by the Institute for Scientific Information (ISI at www.isinet.com). This set of over 5,000 journals is continuously expanding. It excludes all documents for which the central purpose is not the presentation or discussion of scientific data, theory, methods, apparatus or experiments. Fields are determined by the classification of each journal. Articles are attributed to countries by the author's institutional affiliation at the time of publication. A paper is considered co-authored only if its authors have different institutional affiliations or are from separate departments of the same institution. The same logic applies to cross-sectoral or international collaboration.

Employment in High-tech sectors. Employment in high-tech manufacturing and knowledge-intensive high-technology services as percentage of total employment. The high technology services provide services directly to consumers, such as telecommunications, and provide inputs to the innovative activities of other firms in all sectors of the economy. The latter can increase productivity throughout the economy and support the diffusion of a range of innovations, in particular those based on ICT.

SMEs innovating in-house (% total SMEs). Sum of SMEs with in-house innovation activities. Innovative firms are defined as those who introduced new products or processes either 1) in-house or 2) in combination with other firms. This indicator does not include new products or processes developed by other firms. This indicator measures the degree to which SMEs, that have introduced any new or significantly improved products or production processes during the period 1998-2000, have innovated in-house. The indicator is limited to SMEs because almost all large firms innovate and because countries with an industrial structure weighted to larger firms would tend to do better.

Sales of new -to-market products as a percentage of total turnover. This indicator measures the turnover of new or significantly improved products, which are also new to the market, as a percentage of total turnover (in national currency and current prices). The product must be new to the firm, which in many cases will also include innovations that are world-firsts. **Caveats:** The

main disadvantage is that there is some ambiguity in what constitutes a 'new to market' innovation. Smaller firms or firms from less developed countries could be more likely to include innovations that have already been introduced onto the market elsewhere.

Sales of new -to-firm products as a percentage of total turnover. This indicator measures the turnover of new or significantly improved products to the firm as a percentage of total turnover. These products are not new to the market. Sales of new to the firm but not new to the market products are a proxy of the use or implementation of elsewhere already introduced products (or technologies). This indicator is thus a proxy for the degree of diffusion of state-of-the-art technologies.

Innovation expenditures as a share of total turnover. Innovation expenditures includes the full range of innovation activities: in-house R&D, extramural R&D, machinery and equipment linked to product and process innovation, spending to acquire patents and licenses, industrial design, training, and the marketing of innovations. Several of the components of innovation expenditure, such as investment in equipment and machinery and the acquisition of patents and licenses, measure the diffusion of new production technology and ideas. Overall, the indicator measures total expenditures on many activities of relevance to innovation. Caveats: The indicator partly overlaps with the indicator on business R&D expenditures.

As regards policy indicators, a non-exhaustive list could include:

Gross Domestic expenditure on R&D (GERD) by sources of funds –government–Percentage of GDP.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
Summary Innovation Index 2006 (+)	European Innovation Scoreboard	perf	27 MS	2002-2006
Gross domestic expenditure on R&D (GERD) - Percentage of GDP (+)	STRIND	perf	25 MS	1999-2006
Gross domestic expenditure on R&D (GERD) by source of funds - industry - Percentage of GDP (+)	STRIND	perf	17 MS	1999-2005
Gross domestic expenditure on R&D (GERD) by source of funds - government - Percentage of GDP (+)	STRIND	pol	17 MS	1999-2005
Gross domestic expenditure on R&D (GERD) by source of funds - abroad - Percentage of GDP (+)	STRIND	perf	17 MS	1999-2005
Science and technology graduates - total - Tertiary graduates in science and technology per 1000 of population aged 20-29 (+)	STRIND	perf	25 MS	1999-2005
Patent applications to the European Patent Office (EPO) - Number of applications per million inhabitants(+)	STRIND	perf	27 MS	1999-2005
Patents granded by the United States Patent and Trademark Office (USPTO) - Number of patents per million inhabitants (+)	STRIND	perf	27 MS	1999-2005
Triadic patents - Patents all applied for at the EPO, USPTO and JPO - Number of patents per million inhabitants (+)	OECD	perf	27 MS	1999-2005
Total innovation expenditure as a share of total turnover (+)	EUROSTAT	perf	18 MS	2004
Venture capital investments - early stage - Percentage of GDP(+)	STRIND	perf	27 MS	1999-2006
High-tech exports - Exports of high technology products as a share of total exports (+)	STRIND	perf	21 MS	1999-2006
Sales of new-to-firm products, as a percentage of total turnover (+)r	EUROSTAT	perf	27 MS	2004
Sales of new-to-market products, as a percentage of total turnover (+)	EUROSTAT	perf	26 MS	2004
Scientific articles per million population (+)	OECD	perf	26 MS	2003
Employment in High-tech sectors (high-tech manufacturing and knowledge-intensive high-technology services - Percentage of total employment) (+)	OECD	perf	27 MS	1999-2006
SMEs innovating in-house (% total smes) (+)	EUROSTAT	perf	27 MS	2004

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

Indicators on High-tech exports, Gross domestic expenditures on R&D (by industry, by government, by abroad), Science and technology graduates, Patent applications to the EPO and Patent applications to the USPTO were excluded on the basis of their unsatisfactory time coverage.

Redundancy criteria

In line with Members States comments, the Summary Innovation Index was excluded as it is a composite indicator and as such difficult to interpret, though it can certainly provide useful indication of the aggregate position of a country in terms of innovativeness. Moreover, the indicator was highly correlated with some other indicators (especially those that form part of it).

Inputs from associated stakeholders

Responding to the need expressed by some Member States to have more indicator on innovation and to have of better coverage in terms of output, three indicators from the European Innovation Scoreboard, namely Total innovation expenditure as a share of total turnover; Sales of new-to-firm products, as a percentage of total turnover and Sales of new-to-market products, as a percentage of total turnover have been added in the wider list. The indicators selected in the narrow list describe the level of knowledge and innovative capacity in each Member State.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
Summary Innovation Index 2006 (+)	+	+	++	++	-	-	wider list	
Gross domestic expenditure on R&D (GERD) - Percentage of GDP (+)	++	++	++	++	-	-	**narrow list**	**1**
Gross domestic expenditure on R&D (GERD) by source of funds - industry - Percentage of GDP (+)	++	++	+	+	-	-	wider list	
Gross domestic expenditure on R&D (GERD) by source of funds - government - Percentage of GDP (+)	++	++	+	+	-	-	wider list	
Gross domestic expenditure on R&D (GERD) by source of funds - abroad - Percentage of GDP (+)	+	++	+	+	-	-	wider list	
Science and technology graduates - total - Tertiary graduates in science and technology per 1000 of population aged 20-29 (+)	++	++	+	++	+	-	**narrow list**	**1**
Patent applications to the European Patent Office (EPO) - Number of applications per million inhabitants(+)	++	++	+	++	-	-	**narrow list**	**1**
Patents granded by the United States Patent and Trademark Office (USPTO) - Number of patents per million inhabitants (+)	++	++	+	++	-	-	wider list	
Triadic patents - Patents all applied for at the EPO, USPTO and JPO - Number of patents per million inhabitants (+)	++	+	+	++	-	-	wider list	
Venture capital investments - early stage - Percentage of GDP(+)	++	++	++	+	+	-	wider list	
High-tech exports - Exports of high technology products as a share of total exports (+)	++	++	++	++	+	-	wider list	
Scientific articles per million population (+)	+	+	-	++	-	+	wider list	
Employment in High-tech sectors (high-tech manufacturing and knowledge-intensive high-technology services - Percentage of total employment) (+)	++	++	++	++	-	-	**narrow list**	**1**
SMEs innovating in-house (% total smes) (+)	++	+	-	++	-	-	wider list	
Innovation expenditures (+)	++	++	-	++	+	-	wider list	
Sales of new -to-market products (+)	++	+	-	++	++	-	wider list	
Sales of new -to-firm products (+)	++	+	-	++	++	-	wider list	

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4.2. ICT

Definition and scope of the policy area

While information and telecommunication technologies (ICT) can be considered as integral part of R&D and innovation activities their considerable impact on growth over the past years justifies a separate treatment. ICT can be considered as general-purpose technology with an impact on a wide number of sectors going well beyond the ICT-producing industry itself.

Integrated Guidelines

(9) To facilitate the spread and effective use of ICT and build fully inclusive information society.

Impact on growth components

ICT have an important impact on economic growth through two basic channels:

- Productivity (TFP) in the ICT producing industries. These industries are a dynamic part of the economy and their growth has contributed significantly to the overall economic performance over the last two decades.

- IT-capital deepening. Many sectors increase their ICT use (in particular in the services sector) which boosts their production and efficiency.

Nevertheless, there are additional channels due to the specific nature of the ICT:

- There may be considerable organisational capital linked to ICT as successful implementation of ICT projects in a firm may require reorganisation of the firm around the new technology ("ICT as a tip of the iceberg"). For example, Brynjolffson, Hitt and Yang (2002) estimate that with 1$ investment in the ICT a total of 9$ of investments are associated.

- ICT can be regarded as a general-purpose technology, i.e. they entail a significant jump in technological development and they have a potential to influence the performance of the whole economy. Consequently, adoption of ICT requires experimentation which further boosts TFP growth. Moreover, there may exist spillovers as firms learn from (successful or unsuccessful) experiences of the others. Finally, there is a scope for network externalities (in particular, for specific forms of ICT such as operating systems or communications).

- Use of ICT in the public sector should increase its efficiency and reduce the related costs. At the same time, it leads to the reduction of administrative burden on companies and thus increases their efficiency as well.

Given these facts, the ICT may require certain aggregate threshold investment in the whole economy before its growth enhancing potential fully manifests itself (this can be an explanation of the famous Solow paradox).

Possible spillover and complementarities with other policy area

Policies to promote ICT:

- General policies aiming at better business environment (i.e. leading to greater ability to react to market signals) and general framework conditions for investment are also important in the area of ICT (e.g. stable and transparent investment environment, available venture capital and financing for the development of innovative firms).

- Promote of ICT literacy among the population (e.g. in the school curricula).

- Promote ICT use in the public sector (e.g. e-government).

- In the telecommunications, sufficient level of competition and appropriate regulation of the market need to be ensured in order to allow new firms enter the market and introduce new services and technologies.

Evidence and Estimated elasticities in the recent literature

With respect to the ICT sector, the growth accounting estimates reported in Colechia and Schreyer (2002), van Ark et al. (2003) Basu et al., (2003) show that IT investment typically accounts for between 0.3 and 0.8 of a percentage point of growth in GDP per capita over the 1995-2001 period, with the US receiving a larger boost than most EU-15 countries (see also OECD (2004)). Denis et al., (2004 and 2005), show that ICT has indeed been a significant driver of labour productivity trends in both the US and the EU. They estimate that around 60 per cent of US labour productivity growth at the end of the 1990s can be attributed to ICT with a contribution of roughly 40 per cent in the case of the EU. They conclude that the post-1995 differences in EU-US productivity patterns are fundamentally driven by the US's superiority in terms of its capacity to produce and absorb new technologies, most notably in the case of ICT.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

ICT expenditure –IT- Expenditure on Information Technology as a percentage of GDP. The indicator gives the annual data on expenditure for Information and Communication Technology (ICT) hardware, equipment, software and other services as a percentage of Gross Domestic Product. The indicator comprises expenditure for telecommunications (telecommunication equipment and services) and IT expenditure (hardware, software and other services). The data cover the total market (expenditure of the public and private sector (enterprises, as well as those of individuals and households).

ICT expenditure –Telecommunications –Expenditure on Telecommunications Technology as a percentage of GDP. The indicator gives the annual data on expenditure for telecommunications (telecommunication equipment and services) as percentage f GDP. The data cover the total market (expenditure of the public and private sector (enterprises, as well as those of individuals and households).

Level of internet access –households- Percentage of households who have internet access at home. Target population considered is between 16-74 years.

E-commerce via internet. Percentage of enterprises' total turnover from e-commerce via internet. The survey population consists of enterprises with 10 or more full-time employees. Concerning economic activity standards, enterprises having their main activity in NACE sections: D (Manufacturing); G (distributive trades); H (hotels and accommodation (groups 55.1 and 55.2 only); I (transport and communication); K (real estate, renting and business activities).

E-government usage by enterprises. Percentage of enterprises which use the internet for interaction with public authorities. Percentage of enterprises using the Internet to interact with public authorities (obtaining information, downloading forms, filling-in web-forms, full electronic case handling). For the sake of reducing the statistical burden, Eurostat has set a threshold number concerning both the size and the economic activity of the enterprises to be surveyed. More specifically, the survey population consists of enterprises with 10 or more full-time employees. NACE sections manufacturing, construction, distributive trades, hotels and accommodation (groups 55.1 and 55.2 only), transport and communication, real estate, renting and business activities, motion picture and video activities, radio and television activities are covered.

E-government usage by individuals –total- Percentage of individuals aged 16 to 74 using the internet for interaction with public authorities. Percentage of individuals (aged 16-74) using the Internet to interact with public authorities (i.e. having used the Internet for one or more of the following activities; “obtaining information from public authorities web sites”, “downloading official forms”, “sending filled in forms”).

Broadband penetration rate: Number of broadband lines subscribes in percentage of the population. Broadband lines are defined as those with a capacity equal or higher than 144 Kbits/s.

As regards policy indicators, a non-exhaustive list could include:

E-government on line availability –Percentage of online availability of 20 basic public services. This indicator measures the on-line availability of 20 basic public services. Public authorities' web sites are web sites of public authorities such as central government, regional and local administration, police and social security organisations. The following public services for citizens

were measured: Income taxes; job search services; social security benefits 1); personal documents 2); car registration; application for building permission; declaration to the police; public libraries; birth and marriage certificates; enrolment in higher education; announcement of moving; health-related services. The public services for businesses were: Social contribution for employees; corporate tax; VAT; registration of a new company; submission of data to statistical offices; customs declarations; environment-related permits; public procurement.

There are four levels of sophistication: (i) Information: The information necessary to start the procedure to obtain this public service is available on-line; (ii) One-way Interaction: The publicly accessible website offers the possibility to obtain in a non-electronic way (by downloading forms) the paper form to start the procedure to obtain this service. An electronic form to order a non-electronic form is also considered as stage 2; (iii) Two-way Interaction: The publicly accessible website offers the possibility of an electronic intake with an official electronic form to start the procedure to obtain this service. This implies that there must be a form of authentication of the person (physical or juridical) requesting the services in order to reach stage 3; (iv) Full electronic case handling: The publicly accessible website offers the possibility to completely treat the public service via the website, including decision and delivery. No other formal procedure is necessary for the applicant via "paperwork".

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
ICT expenditure - IT - Expenditure on Information Technology as a percentage of GDP (+)	STRIND	perf	23 MS	2002-2006
ICT expenditure - Telecommunications - Expenditure on Telecommunications Technology as a percentage of GDP (+)	STRIND	perf	23 MS	2002-2006
Level of Internet access - households - Percentage of households who have Internet access at home (+)	EUROSTAT	perf	22 MS	2002-2007
E-commerce via Internet - Percentage of enterprises' total turnover from e-commerce via Internet (+)	STRIND	perf	14 MS	2002-2007
E-government on-line availability - Percentage of online availability of 20 basic public services(+)	STRIND	pol	25 MS	2002-2007
E-government usage by enterprises - Percentage of enterprises which use the Internet for interaction with public authorities (+)	STRIND	perf	25 MS	2003-2007
E-government usage by individuals - total - Percentage of individuals aged 16 to 74 using the Internet for interaction with public authorities (+)	STRIND	perf	20 MS	2002-2007
Broadband penetration rate - Number of broadband lines subscribed in percentage of the population (+)	STRIND	perf	22 MS	2002-2007

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards
All indicators fulfil the minimum statistical standards.

Redundancy criteria
The indicator on Internet access by household was excluded as it was highly correlated (75%) with the Broadband penetration rate and did not provide additional information (out of these two indicators, the former exhibited higher correlation coefficients with other indicators). Also, the indicator on E-government use by individuals was eliminated from the narrow list due to its high correlation with the other indicators of E-government and thus limited informational content.

Inputs from associated stakeholders
The remaining indicators have been retained for the Narrow list. Nevertheless, weights have been assigned to some of them to reflect their potential complementarity – inform about different aspects of the same phenomena (this approach was deemed more appropriate rather then choosing one of the indicators with similar information content as the choice between them was not obvious on the basis of the used criteria). Two indicators namely ICT expenditures (IT and telecommunications) were assigned weights of ½ as well as indicators describing the various aspects of e-government (availability and use by enterprises.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				**Removing redundant indicators**		**Final assessment**	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
ICT expenditure - IT - Expenditure on Information Technology as a percentage of GDP(+)	++	++	+	++	+	++	**narrow list**	**0,5**
ICT expenditure - Telecommunications - Expenditure on Telecommunications Technology as a percentage of GDP(+)	++	++	+	++	++	-	**narrow list**	**0,5**
Level of Internet access - households - Percentage of households who have Internet access at home (+)	++	++	+	++	-	++	wider list	
E-commerce via Internet - Percentage of enterprises' total turnover from e-commerce via Internet(+)	++	++	++	+	++	+	wider list	
E-government on-line availability - Percentage of online availability of 20 basic public services(+)	++	++	++	++	++	-	**narrow list**	**0,5**
E-government usage by enterprises - Percentage of enterprises which use the Internet for interaction with public authorities(+)	++	++	++	++	++	+	**narrow list**	**0,5**
E-government usage by individuals - total - Percentage of individuals aged 16 to 74 using the Internet for interaction with public authorities (+)	++	++	++	++	-	+	wider list	
Broadband penetration rate - Number of broadband lines subscribed in percentage of the population(+)	++	++	++	++	+	++	**narrow list**	**1**

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4.3. Education and life-long learning

Definition and scope of the policy area

The quality of human capital has a significant impact on economic growth. In this respect, human capital is associated with the knowledge and skills embodied in people and accumulated through schooling, training and experience that are useful in the production of goods, services and further knowledge (de la Fuente and Ciccone, 2002). The quality of human capital rests on three types of skills: general skills (basic language and quantitative literacy and the ability to process information), specific skills (operation of particular technologies or production), and technical and scientific knowledge (mastery of specific bodies of organized knowledge).

These skills can be acquired both in the process of formal initial education (pre-primary, primary, secondary and tertiary) as well as during professional life (through further vocational training or specific courses). Initial education and later training should be seen as two complementary forms of human capital investment. Education tends to be general-purpose and can be used in a variety of different activities, while training often provides skills and competencies useful for specific tasks.

Related Integrated guidelines

(23) Expand and improve investment in human capital.
(24) Adapt education and training systems in response to new competence requirements.

Impact on growth components

Efforts to raise educational levels of population and promote the life-long learning approach impact growth through several channels:

- Higher levels of education and skills contribute to ***higher productivity***. Higher qualified workers are better able to take advantage of the existing technologies and thus, at a given level of technological development, their productivity is higher. Moreover, higher analytical skills developed in the education process allow workers to undertake more sophisticated activities or produce innovations.

- Highly qualified labour force ***generally increases the adjustment capacity*** in the labour market. The production processes have become increasingly knowledge-intensive as there is a shift to more sophisticated goods and services. There is more emphasis on explicit R&D activities, more closely intertwined with formal science. In addition, the wide spread of ICT technologies induces technological and organisational change in production processes and places extra premium on the skills of the workforce. Therefore, higher quality of human capital including the appropriate skill mix of the workers eases the adjustment of the economy in the face of technological skill-biased progress. Empirical results confirm that higher education leads to higher wages, lower probability of becoming unemployed and higher participation in labour market.

- ***Investment in education is complementary with efforts to boost R&D*** as there is a need for highly qualified R&D personnel ***to produce innovations*** as well as high average skills of the workforce to effectively use new technologies.

The state involvement in the educational system is justified by the existence of strong externalities due to which social returns on education tend to exceed private returns. Consequently, privately decided level of education would be lower than is socially optimal. On the other hand, this raises issues of ensuring quality of the education provided by the system and also efficiency of the use of public money invested in the educational system.

While the optimal set-up of the educational system as a whole is crucial[30], in practice, decisions need to be made as to what should be the role of the government in the different levels of education. On this account, OECD(2005) and de la Fuente and Jimeno (2005) claim that the social returns to schooling are the highest for the pre-primary and primary education, then the returns somewhat drop for the secondary education and rise again in the case of tertiary education. In comparison to this, private returns to education (basically, computed on the basis of wages) are relatively low for the initial levels of education while they increase considerably for tertiary

[30] Investment in various stages of education is complementary as learning is a life cycle process. An investment in one stage of education raises not only the skills and competences attained at that stage but builds the foundation for the acquisition of further skills and competences at the next level. Underinvestment at a certain stage may, therefore, bear considerable costs linked to the need to compensate for this at higher levels at education.

education.[31] Therefore, the highest return on public money appears to be in the initial levels of education.

However, it needs to be recognised that the role of different levels of education for promoting growth varies. Aghion (2006) takes the view that higher education investment increases a country's ability to make leading-edge innovations, whereas primary and secondary education are more likely to make a difference in terms of the country's ability to implement existing technologies. In this respect, for countries that are close to the world technological frontier it is crucial to develop tertiary education.

Life-long learning can help prevent the deterioration of the human capital due to fast technological progress. Their role is increasing in the context of globalisation and the need for greater flexibility of the workforce. They can be seen as a useful part of the "flexicutity" approaches with their emphasis on active labour market policies.

In addition, the quality of education is very important (e.g. Hanushek and Kimko, 2000) and the contribution of human capital to growth is likely to be underestimated in most of the econometric studies as they rely of quantity based measures of schooling.[32] Also, the quality of education is not systematically correlated with the amount of public investment confirming the concerns about efficiency of spending (e.g. too high a proportion of money is spent on salaries while the investment in infrastructure and teaching equipment is insufficient).

As regards the implications for policy-making, a comparison with financial assets confirms that investments in education are worthwhile. The private returns of schooling are higher than e.g. for equity and bonds. Given strong complementarities between various levels of education attention needs to be paid to the design of the education system as a whole. However, the highest social returns and positive impact on social cohesion and equity warrant concentration of public investment on pre-primary and primary levels. Moreover, underinvestment in previous stages of education usually needs to be rectified at higher stages at considerably higher costs (European Commission, 2006). Nevertheless, the need for highly qualified workforce in light of fast technological advances requires high quality and well-performing tertiary education. In this respect, given the high private returns, also in comparison to social ones, there is some room for private participation on the costs of tertiary education (e.g. tuition fees).[33] From a policy perspective, framework conditions that would encourage excellence and establishment of links with public sector are desirable.

Evidence and Estimated elasticities in the recent literature

At macroeconomic level, recent studies show that, in the short-run, one additional year of average education leads to productivity increase of around 5-6% in the EU. In the long-run, another 3-5% increase can materialise through the impact of higher education on technological progress (de la Fuente and Ciccone, 2002). De la Fuente and Jimeno (2005) calculate private returns under different scenarios. The private returns are between 7.56% (without government interventions) and

[31] In particular, due to the fact that in Europe the costs of tertiary education are largely covered from the public sources which increases the *private* rate of return.

[32] Usually, average years of schooling are used as a measure of quality of human capital.

[33] According to OECD's Education at Glance 2005, the average private returns on higher education for 10 OECD countries is close to 9% while social rates of return are around 7.5%.

13.16% (incl. subsidies and taxes) on EU-14 average. They also provide estimates of fiscal returns which capture the long-term effects of a marginal increase in attainment on public finances (they take into account personal taxes, unemployment benefits, consumption taxes, employer social security contributions, retirement benefits). The fiscal returns are between 2.35% and 3.58% (average EU-14) and there are important differences across countries. In Sweden, fiscal returns are negative (the net costs of schooling exceed its direct costs because the present value of induced current and future net tax revenues is negative). In Austria, Denmark, France, Greece, Italy, Netherlands, Portugal, the returns are low (the present value of induced current and future net tax revenues is positive but smaller than the direct costs of education). In Belgium, Finland, Germany, Ireland, Spain, UK, fiscal returns are clearly positive.

POSSIBLE SPILLOVER AND COMPLEMENTARITIES WITH OTHER POLICY AREA

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Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

PISA average score (reading, mathematics and science). The Programme for International Student Assessment (PISA) is an internationally standardised assessment that was jointly developed by participating countries and administered to 15-year-olds in schools. PISA assesses how far students near the end of compulsory education have acquired some of the knowledge and skills that are essential for full participation in society. In all cycles, the domains of reading, mathematical and scientific literacy are covered not merely in terms of mastery of the school curriculum, but in terms of important knowledge and skills needed in adult life. The indicator gives the average score in the reading, mathematics and science sections.

Participation in continuous vocational training. Continuing vocational training measures in enterprises can fall into the following categories: a) Training programmes in the form of courses and seminars: This form of continuing training takes place in a location spatially separate from the workplace, for example in a classroom or training centre, in which a group of people receives instruction from trainers/tutors/lecturers for a period of time specified in advance by the course organisers. There are external courses and internal courses: (i) External training courses are designed and carried out by organisations external to the enterprise; (ii) Internal training courses are designed and carried out by the enterprises themselves. b) Continuing vocational training in the workplace. In this case, employees participate in systematic training over a period of time specified in advance in order to acquire new knowledge and to collect practical experience with normal working materials in the workplace or working environment. c) 'Other' forms of continuing training in enterprises: (i) Participation in conferences, workshops, seminars etc. (information courses). The primary purpose of participation is continuing training; (ii) Job rotation and exchange programmes with other enterprises; (iii) Learning circles/quality circles; (iv) Self-directed learning through open and distance learning, video/audio material, correspondence courses, computer-based learning or the use of learning resources centres.

Investment by enterprises in training of adults. Direct costs and labour costs of participants divided by total labour costs.

Share of graduates over working age population. Graduates correspond to ISCED categories 5, i.e., first stage of tertiary education (not leading directly to an advanced research qualification) and 6, i.e., second stage of tertiary education (leading to an advanced research qualification). Working age population is the population between 15 and 64 years.

Share of tertiary educated employment over total employment.

Life long learning. Medium educational attainment (i.e., up to upper secondary education)

As regards policy indicators, a non-exhaustive list could include:

Spending on human resources. Total public spending on education as a percentage of GDP. Generally, the public sector funds education either by bearing directly the current and capital expenses of educational institutions (direct expenditure for educational institutions) or by supporting students and their families with scholarships and public loans as well as by transferring public subsidies for educational activities to private firms or non-profit organisations (transfers to private households and firms). Both types of transactions together are reported as total public expenditure on education.

Life long learning. Females. Percentage of the female population aged 25-64 participating in education and training over the four weeks prior to the survey. The information collected relates to all education or training whether or not relevant to the respondent's current or possible future job. It includes initial education, further education, continuing or further training, training within the company, apprenticeship, on-the-job training, seminars, distance learning, evening classes, self-learning etc. It includes also courses followed for general interest and may cover all forms of education and training as language, data processing, management, art/culture, and health/medicine courses. Before 1998, education was related only to education and vocational training which was relevant for the current or possible future job of the respondent.

Life long learning. Males.

Life long learning 25-34. Percentage of the population aged 25-34 participating in education and training over the four weeks prior to the survey. The information collected relates to all education or training whether or not relevant to the respondent's current or possible future job. It includes initial education, further education, continuing or further training, training within the company, apprenticeship, on-the-job training, seminars, distance learning, evening classes, self-learning etc. It includes also courses followed for general interest and may cover all forms of education and training as language, data processing, management, art/culture, and health/medicine courses. Before 1998, education was related only to education and vocational training which was relevant for the current or possible future job of the respondent

Life long learning 35-44 years / Life long learning 45-54 years / Life long learning 55-64 years: see above

Life long learning. Low educational attainment (i.e., less than upper secondary education)

Life long learning. High educational attainment (i.e., tertiary education)

Youth education attainment levels. Males. Percentage of the male population aged 20 to 24 having completed at least upper secondary education. Youth male education attainment level is defined as the percentage of young male people aged 20-24 years having attained at least upper secondary education attainment level, i.e. with an education level ISCED 3a,[34] 3b[35] or 3c[36] long minimum (numerator). The denominator consists of the total population of the same age group, excluding no answers to the questions 'highest level of education or training attained'.

Youth education attainment levels. Females. Percentage of the male population aged 20 to 24 having completed at least upper secondary education. Youth male education attainment level is defined as the percentage of young male people aged 20-24 years having attained at least upper secondary education attainment level, i.e. with an education level ISCED 3a, 3b or 3c long minimum (numerator). The denominator consists of the total population of the same age group, excluding no answers to the questions 'highest level of education or training attained'.

Early school leavers. Females. Percentage of the female population aged 18-24 with at most lower secondary education and not in further education or training. Early school leavers is the percentage of the population aged 18-24 with at most lower secondary education and not in further education or training. It refers to persons aged 18 to 24 in the following two conditions: the highest level of education or training attained is ISCED 0,[37] 1,[38] 2[39] or 3c[40] short and respondents declared not having received any education or training in the four weeks preceding the survey (numerator). The denominator consist in the total population of the same age group, excluding no answers to the

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[34] ISCED 3A: Programmes designed to provide direct access to ISCED 5A (i.e., programmes that are largely theoretically based and are intended to provide sufficient qualifications for gaining entry into advanced research programmes and professions with high skills requirements).

[35] ISCED 3B: Programmes designed to provide direct access to ISCED 5B (i.e., Programmes that are practically oriented/ occupationally specific and are mainly designed for participants to acquire the practical skills and know how needed for employment in a particular occupation or trade or class of occupations or trades, the successful completion of which usually provides the participants with a labour market relevant qualification)

[36] Programmes not designed to lead to ISCED 5A or 5B.

[37] ISCED 0 — PRE-PRIMARY EDUCATION. Programs at level 0, (pre-primary) defined as the initial stage of organised instruction are designed primarily to introduce very young children to a school-type environment, i.e. to provide a bridge between the home and a school based atmosphere.

[38] ISCED 1 — PRIMARY EDUCATION OR FIRST STAGE OF BASIC EDUCATION. Programmes at level 1 are normally designed on a unit or project basis to give students a sound basic education in reading, writing and mathematics along with an elementary understanding of other subjects such as history, geography, natural science, social science, art and music. In some cases religious instruction is featured. The core at this level consists of education provided for children, the customary or legal age of entrance being not younger than five years or older than seven years. This level covers, in principle, six years of full-time schooling.

[39] ISCED 2 — LOWER SECONDARY EDUCATION OR SECOND STAGE OF BASIC EDUCATION. The contents of education at this stage are typically designed to complete the provision of basic education which began at ISCED level 1. In many, if not most countries, the educational aim is to lay the foundation for lifelong learning and human development. The programmes at this level are usually on a more subject-oriented pattern using more specialised teachers and more often several teachers conduct classes in their field of specialisation. The full implementation of basic skills occurs at this level. The end of this level often coincides with the end of compulsory schooling where it exists.

[40] ISCED 3 — (LOWER / UPPER) SECONDARY EDUCATION. This level of education typically begins at the end of full time compulsory education for those countries that have a system of compulsory education. More specialisation may be observed at this level than at ISCED level 2 and often teachers need to be more qualified or specialised than for ISCED level 2. The entrance age to this level is typically 15 to 16 years. The educational programmes included at this level typically require the completion of some 9 years of full-time education (since the beginning of level 1) for admission or a combination of education and vocational or technical experience. ISCED 3C: Programmes not designed to lead to ISCED 5A or 5B.

questions 'highest level of education or training attained' and 'participation to education and training'

Early school leavers. Males. Percentage of the male population aged 18-24 with at most lower secondary education and not in further education or training. Early school leavers is the percentage of the population aged 18-24 with at most lower secondary education and not in further education or training. It refers to persons aged 18 to 24 in the following two conditions: the highest level of education or training attained is ISCED 0, 1, 2 or 3c short and respondents declared not having received any education or training in the four weeks preceding the survey (numerator). The denominator consist in the total population of the same age group, excluding no answers to the questions 'highest level of education or training attained' and 'participation to education and training'

Graduates (ISCED 5-6)[41] aged 20-29 per 1,000 of the corresponding age population.

Annual expenditure in public and private educational institutions per student compared to GDP per capita, at tertiary level of education (ISCED 5-6), based on full time equivalent.

[41] ISCED 5 — FIRST STAGE OF TERTIARY EDUCATION (NOT LEADING DIRECTLY TO AN ADVANCED RESEARCH QUALIFICATION). This level consists of tertiary programmes having an educational content more advanced than those offered at levels 3 and 4. Entry to these programmes normally requires the successful completion of ISCED level 3A or 3B or a similar qualification at ISCED level 4A. They do not lead to the award of an advanced research qualification (ISCED 6). These programmes must have a cumulative duration of at least two years.

ISCED 6 — SECOND STAGE OF TERTIARY EDUCATION (LEADING TO AN ADVANCED RESEARCH QUALIFICATION) This level is reserved for tertiary programmes which lead to the award of an advanced research qualification. The programmes are therefore devoted to advanced study and original research and not based on course-work only. They typically require the submission of a thesis or dissertation of publishable quality which is the product of original research and represents a significant contribution to knowledge. They prepare graduates for faculty posts in institutions offering ISCED 5A programmes, as well as research posts in government, industry, etc

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
PISA average score (reading, mathematics and science)(+)	OECD	perf	20 MS	2003; 2006
Spending on Human Resources - Total public expenditure on education as a percentage of GDP(+)	EMCO STRIND	pol	27 MS	1999-2004
Life-long learning - females - Percentage of the female population aged 25-64 participating in education and training over the four weeks prior to the survey (+)	EMCO STRIND	pol	26 MS	1999-2006
Life-long learning - males – 25-64(+)	EMCO STRIND	pol	26 MS	1999-2006
LLL 25-34(+)	EMCO	pol	26 MS	2000-2006
LLL 35-44 (+)	EMCO	pol	24 MS	2000-2006
LLL 45-54 (+)	EMCO	pol	22 MS	2000-2006
LLL 55-64 (+)	EMCO	pol	17 MS	2000-2006
Participation in continuous vocational training (+)	EMCO	perf	22 MS	1999-2005
Investment by enterprises in training of adults - Direct costs and labour costs of participants divided by total labour costs (+)	EMCO	perf	26 MS	1999-2005
Share of graduates over working age population (15-64) (+)	EUROSTAT, ECFIN calculation	perf	25 MS	1999-2005
LLL - Low educational attainment (+)	EMCO	pol	18 MS	2000-2006
LLL - Medium educational attainment(+)	EMCO	perf	25 MS	2000-2006
LLL - High educational attainment (+)	EMCO	pol	26 MS	2000-2006
Share of tertiary-educated employment over total employment(+)	LFS	perf	27 MS	1999-2007
Youth education attainment level - females - Percentage of the female population aged 20 to 24 having completed at least upper secondary education (+)	EMCO STRIND	pol	27 MS	1999-2006
Youth education attainment level - males - (+)	EMCO STRIND	pol	27 MS	1999-2006
Early school-leavers - females - Percentage of the female population aged 18-24 with at most lower secondary education and not in further education or training(-)	EMCO STRIND	perf	25 MS	1999-2006
Early school-leavers - males (-)	EMCO STRIND	perf	25 MS	1999-2006
Graduates (ISCED 5-6) aged 20-29 per 1000 of the corresponding age population(+)	EUROSTAT	pol	20 MS	1999-2004
Annual expenditure on public and private educational institutions per student compared to GDP per capita, at tertiary level of education (ISCED 5-6), based on full-time equivalents(+)	EUROSTAT	pol	23 MS	1999-2004

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

Due to insufficient time coverage, we excluded indicators on spending on human resources, Annual expenditure on tertiary educational institutions and Graduates aged 20-29. (Moreover, these indicators did not also qualify for the narrow list given their high correlation with some other indicators.)

Redundancy criteria

We excluded the disaggregated indicators on various aspects of long-life learning from the narrow list, as they are highly correlated with the headline indicator of long-life learning (percentage of those aged 25-64). We thus retained the headline indicator on life-long learning (disaggregated by gender) in the narrow list. This also responds to queries of several Member States.

Inputs from associated stakeholders

The eleven remaining indicators qualify on both steps of the assessment: PISA average score on reading, mathematics and science; Life-long learning for men and women - Percentage of the female population aged 25-64 participating in education and training over the four weeks prior to the survey; Share of tertiary-educated employment over total employment; Youth education attainment level for men and women; Male and female early school-leavers; Share of graduates over working age population; participation in CVT (suggested by EMCO); Investments by enterprises in training of adults (suggested by EMCO). In the narrow list, some of the indicators are available by gender and provide complementary information: they were assigned a weight of one half to avoid their overrepresentation. In line with the Members states' comments, more indicators focusing on tertiary education were added.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
PISA average score (reading, mathematics and science)(+)	++	+	+	++	+	+	**narrow list**	**1**
Spending on Human Resources - Total public expenditure on education as a percentage of GDP(+)	++	++	-	++	-	+	wider list	
Life-long learning - females - Percentage of the female population aged 25-64 participating in education and training over the four weeks prior to the survey(+)	++	++	++	++	+	+	**narrow list**	**0,5**
Life-long learning - males - Percentage of the male population aged 25-64 participating in education and training over the four weeks prior to the survey(+)	++	++	++	++	-	+	**narrow list**	**0,5**
LLL 25-34(+)	+	+	++	++	-	+	wider list	
LLL 35-44(+)	+	+	++	++	-	+	wider list	
LLL 45-54(+)	+	+	++	++	-	+	wider list	
LLL 55-64(+)	++	+	++	+	-	+	wider list	
Participation in continuous vocational training (EMCO 23.A2)(+)	++	+	+	+	+	-	**narrow list**	**0,5**
Investment by enterprises in training of adults - (EMCO 23.A1)(+)	++	+	+	+	-	-	**narrow list**	**0,5**
Share of graduates over working age population (15-64) (+)	++	++	+	++	++	+	**narrow list**	**1**
LLL - Low educational attainment (+)	++	+	++	+	-	+	wider list	
LLL - Medium educational attainment(+)	+	+	++	++	-	-	wider list	
LLL - High educational attainment (+)	+	+	++	++	-	-	wider list	
Share of tertiary-educated employment over total employment (LFS)(+)	++	++	++	++	+	++	**narrow list**	**1**
Youth education attainment level - females - Percentage of the female population aged 20 to 24 having completed at least upper secondary education(+)	++	++	++	++	+	++	**narrow list**	**0,5**
Youth education attainment level - males - Percentage of the male population aged 20 to 24 having completed at least upper secondary education(+)	++	++	++	++	-	++	**narrow list**	**0,5**
Early school-leavers - females - (-)	++	++	++	++	+	-	**narrow list**	**0,5**
Early school-leavers - males - (-)	++	++	++	++	-	+	**narrow list**	**0,5**
Graduates (ISCED 5-6) aged 20-29 per 1000 of the corresponding age population(+)	++	++	-	++	-	+	wider list	
Annual expenditure on public and private educational institutions per student (+)	++	++	-	++	-	+	wider list	

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5. MACROECONOMY

5.1. Orientation and sustainability of public finances

Definition and scope of the policy area

Europe's ageing population poses serious risks to the long-term sustainability of the European Union economy in the form of an increased debt burden, lower potential output per capita, due to the reduction in the working age population, and difficulties in financing the pension, social insurance and health care systems. A substantial "sustainability gap" for the EU in aggregate is likely to emerge (As documented in the Commission's Sustainability Report).In order to accomplish a satisfactory pace of debt reduction budgetary consolidation is necessary resulting in the attainment of the MTO's by all Member States. In addition, fiscal restraint, effective financial supervision and promoting competitiveness are essential in order to contain external and internal imbalances. A cautious fiscal stance is one important way to keep external deficits within the range where sound external financing can be secured. Fiscal restraint can also limit the risk of surging domestic demand causing persistently higher inflation and the occurrence of macro-financial risks which could cause swings in real exchange rates and a protracted loss of competitiveness.Challenges to stabilisation should be addressed by macroeconomic measures as well as by implementing structural reforms in product and labor markets. Monetary policies can contribute by pursuing price stability and, without prejudice to this objective, by supporting other general economic policies with regard to growth and employment. Securing sound budgetary positions allow the full and symmetric play of the automatic budgetary stabilisers over the cycle with a view to stabilising output around a higher and sustainable growth trend.

Related Integrated guidelines

(1) To safeguard economic and fiscal sustainability
(2) To safeguard economic and financial sustainability as a basis for increased employment.
(3) To promote a growth and employment orientated efficient allocation of resources.

Impact on growth components

A macro-economic setting that includes financially sustainable public finances and stability oriented policies is an important framework condition in the economy. Policies that improve the sustainability of public finances and reduce volatility of imbalances mainly impact the following growth components: 1) Capital deepening through neo-Ricardian effects (expected tax rise following lack of fiscal consolidation) and the crowding out effects of budget deficits on private investment, generated by a possible rise in uncertainty premium on real interest rates; 2) Unemployment rate (indirect). The main links through which this takes place are:

- ***Lower degree of crowding out of private investments.*** Persistent deficits increase public borrowing which put upward pressure on interest rates (public demand higher real returns) and reduce savings available for investments.

- ***Reducing risk premiums.*** On the one hand, Sustainable public finances contribute to reduce default risk premiums and thus keep the cost of borrowing lower relative to what would otherwise been the case. In the same vein, sustainable public finances reduce the risk

of an inflation based bail out, contributing to lower expected inflation rates and thus lower long term interest rates. On the other hand, less volatility contributes to reduce the exchange rate and interest rate risk premiums.

- ***Extending the planning horizon in the economy.*** Sustainable public finances and stability oriented policies reduce the risk of future shocks to tax and benefit systems thus making it easier to plan for risk adverse agents. A longer planning horizon allows firms to engage in longer term commitments such as investments and the creation of stable full-time jobs.

- ***Avoiding large internal or external imbalances which would seriously disrupt the smooth functioning of the economy*** (indirect link)**.**

Evidence and Estimated elasticities in the recent literature

The PFR 2004 studies the link between budget balances and private investment shares and find that it is fairly strong and robust, as is the link between budget balances and subsequent trend growth. In spite of the fact that such bivariate relations do not account for other possible factors other than budget balances that may have helped to shape developments in private investment, current accounts or trend growth, they are consistent with the expectation that persistent budget deficits may compromise income prospects via investment crowding out.

Budget deficits crowd out private investment via higher interest rates. Although the issue is quite contentious and there is a relatively wide range of magnitude for the existing estimates, most of the analyses on the subject report significant effects of budget deficits on interest rates. Econometric analysis carried out in the PFR 2004 shows that, on average, in euro-area countries, one additional point of (expected) deficit is associated with an increase in the interest rate spread between long and short-term government bonds of 15–20 basis points. Correlation analysis shows a robust negative relation (current and past) between budget deficits and private investment shares, which is consistent with the finding that deficits raise interest rates.

There are also estimations on what is the impact on growth from a reduction in risk premiums. For example, Langedijk and Roeger (2007) estimates that a reduction in risk premiums by 0.5% point increase investments and consumption positively in the short term. However, investments growth fall back rather quickly while the consumption increase is more long term leading also to a deterioration in the current account.

Finally, there are a number of efforts to estimate the cost from cases with large imbalances. For example, in the 1990s the world economy was hit by a series of unusually deep crises with far-reaching consequences, the first of which occurred in Finland and Sweden. The Finnish-Swedish experience is much more volatile than the average boom-bust pattern. Jonung (2005) compares the cost of the crisis of the 1990s and finds that it was comparable in depth with the crisis of the 1930s. The highly volatile character of the Finnish and Swedish boom-bust episode by the design of economic policies in the 1980s and 1990s. The boom-bust cycle in Finland and Sweden 1984-1995 was driven by financial liberalization and a hard currency policy, causing large pro- cyclical swings in the real rate of interest transmitted via the financial sector into the real sector and then into the public finances.

Possible spillover and complementarities with other policy area

As a macro-economic situation with Sustainable public finances and stability oriented policies can be seen as a "framework condition" improving the financing conditions (public and private) reducing the volatility and increasing the planning horizon for all other policy reform areas linked to the growth and jobs agenda.

In addition, arguably, spillovers are larger across the euro area which shares a common currency. In the euro area, government debt will affect long-term interest rates. Spillover will occur if financial markets do not price the risk of government debt of individual countries appropriately due to, e.g., the possibility that the no-bail out clause is not perfectly credible. In that case, excessive fiscal debt in individual countries leads to higher real interest rates in all euro area countries.

Drawing up a non exhaustive list of relevant indicators

This section aims at providing a complete list of indicators to be used in the LAF in order to be able to compute a score for each policy areas. A detailed definition of each indicator is given and the possible caveats identified in the literature are listed.

As regards performance indicators, a non-exhaustive list could include:

General Government gross debt (% of GDP). General government debt refers to consolidated gross debt at nominal value as of December 31. It includes the total nominal value of all debt owed by public institutions in the Member State, except that part of the debt which is owed to other public institutions in the same Member State. The gross debt ratio, being the accumulation of historical deficits, serves as an indicator on the budgetary pressures in the longer term as it has to be repaid or stabilised. A high current debt ratio risk increasing the premiums when financing the deficit and contribute to higher real interest rates.

Sustainability indicator: S2 component –long term changes in the primary balance. The sustainability indicators are broken down into different components to determine the extent to which the sustainability gaps can be attributed to (i) the relative position of the current primary budget balance (Initial Budgetary Position) compared to the primary balance that stabilises the debt as a share of GDP and/or to (ii) the increase in age related expenditure in the future.

Projected change in the labour force between 2003 and 2050. Budgetary projections. Ageing Working Group variant scenario year 2005. Projected change in the number of people who are either in work or are available and actively seeking work (that is, employed or unemployed) between 2003 and 2050.

Sustainability indicator S2 (overall). S2 gives the size of the permanent budgetary adjustment necessary to fulfil the inter-temporal budget constraint. The sustainability indicators are broken down into different components to determine the extent to which the sustainability gaps can be attributed to (i) the relative position of the current primary budget balance (IBP) compared to the primary balance that stabilises the debt as a share of GDP and/or to (ii) the increase in age related expenditure in the future (LTC).
The S2 sustainability indicator provides an estimate of the gap between current policies and sustainable policies, which expresses the current level of debt plus the net present value of all future primary deficits as a flow measure i.e. as a perpetual annuity, constant as a share of GDP.

The changes in the primary balance include the estimated changes in age related public expenditures (pension, health care etc) expressed as a constant change in the primary balance as a share of GDP. Overall, a positive value of S2 indicates that a budgetary improvement would close the gap, while a negative value indicates that a budgetary weakening would close the gap.

Sustainability indicator: S2 component. The initial budgetary position. The sustainability indicators are broken down into different components to determine the extent to which the sustainability gaps can be attributed to (i) the relative position of the current primary budget balance (Initial Budgetary Position) compared to the primary balance that stabilises the debt as a share of GDP and/or to (ii) the increase in age related expenditure in the future.

Nominal long term interest rate (average). Nominal long term interest rate include the central government benchmark bond of 10 years in BE, DK, DE, ES, FR, IE, IT, NL, AT, PT, FI, SE and UK. It also includes the central government bonds, based on 12 month treasury bonds for EL and the central government OLUX bonds for 10 years, secondary market for LU.
Difference in the long-term interest rates indicates (partially) to what extent the long-term financial risks feed into the risk premiums. The higher the financial sustainability risks in an economy, the higher the risk premiums. However, clearly observed interest rates are an imperfect measure to this extent as a number of different risk premiums are involved.

Sustainability indicator: S1 (overall). The sustainability S1 indicator shows the permanent budgetary adjustment, often presented as an increase in the tax burden required to reach a debt ratio in 2050 of 60% of GDP.

Sustainability indicator: required primary balance. The structural primary budgetary position over the medium-term that is consistent with sustainable public finances as measured by the S2 indicator.

Projected old age dependency ratio in 2025. Dependency ratio: population aged 65 and over as a percentage of the population aged 15-64. Ageing Working Group projection. Note: the change score is the change in the dependency ratio between 2003 and 2025.

Net lending (+), net borrowing (-). General government – ESA 1995. Percentage of gross domestic product at market prices: The balance between total public expenditure and revenue in a specific year, with a positive balance indicating a surplus and a negative balance indicating a deficit. Large imbalances in the external position of the economy can indicate unsustainable macro economic policies. However, any value of the external position can not be analysed in isolation but should be read against the overall economic situation of the country (i.e. being in a catching up process, the level of the overall foreign debt etc). Nevertheless, in general a positive external position would normally be seen as "better" than a "negative" position.

Primary budget balance as percentage of GDP (net lending excluding interest, general government –ESA 1995). The budget balance net of interest payments on general government debt.

As regards policy indicators, a non-exhaustive list could include:

Distance of the Cyclically Adjusted Balance from the Growth and Stability Pact's Medium Term Objective. Measures the difference between the CAB and the medium-term objective in the SGP. Cyclically adjusted balance is the actual budget balance net of the cyclical component and one-off and other temporary measures. The MTO is an indicator of the medium-term budgetary position that would include also room of manoeuvre for the automatic stabilisers to operate freely. According to the reformed Stability and Growth Pact, stability programmes and convergence programmes present a medium-term objective for the budgetary position. It is country-specific to take into account the diversity of economic and budgetary positions and developments as well as of fiscal risks to the sustainability of public finances, and is defined in structural terms.
Thus, the difference between the CAB and the MTO is an indicator of the room for fiscal stabilisation.

Fiscal stance: change in the structural budget balance. A measure of the effect of discretionary fiscal policy. In this report, it is defined as the change in the primary structural budget balance relative to the preceding period. More specifically, the structural budget balance is measured as the CAB adjusted for larger one-off items. Clearly, the appropriateness of the size or sign of the stance must be assessed against the stability challenge at hand as well as consolidation concerns. When the change is positive (negative) the fiscal stance is said to be expansionary (restrictive).

Cyclically adjusted balance. The CAB indicates the underlying strength of the current budgetary position. The CAB is the net borrowing/lending of the general government sector as a percentage of GDP adjusted with the estimated budgetary impact of the cycle (in principle a budgetary sensitivity to the cycle times the output gap). Policies to ensure a strong underlying budgetary position improve the capacity to meet the budgetary costs of ageing and challenges of financing the welfare state.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
General Government Gross Debt (% of GDP)(-)	AMECO STRIND	perf	27 MS	1999-2006
Distance CAB from SGP Medium Term Objective(+)	ECFIN	pol	26 MS	1999-2006
Fiscal stance: change in Structural budget balance (+)	AMECO	pol	27 MS	2004-2006
Cyclically Adjusted Balance	AMECO	pol	27 MS	1999-2006
Sustainability indicator: S2 component - long-term changes in the primary balance (LTC)	Commission (Sustainability report)	perf	25 MS	2005-2007
Projected change in Labour force between 2003 and 2050 (Budgetary projections: AWG variant scenario Year: 2005)(+)	Commission and AWG	perf	25 MS	2006
Sustainability indicator: S2 (overall)	Commission (Sustainability report)	perf	25 MS	2005-2007
Sustainability indicator: S2 component - the initial budgetary position (IBP)(-)	Commission (Sustainability report)	perf	25 MS	2005-2007
Nominal long-term interest rate (average)(-)	AMECO	perf	25 MS	1999-2006
Sustainability indicator: S1 (overall)(-)	Commission (Sustainability report)	perf	25 MS	2005-2007
Sustainability indicator: Required Primary Balance (RPB)(-)	Commission (Sustainability report)	perf	25 MS	2006-2007
Projected old-age dependency ratio in 2025 = Population aged 65 and over as a percentage of the population aged 15-64 *) (AWG projection) (NOTE: the change is the change in the dependency ratio between 2003 to 2025)	Commission and AWG	perf	25 MS	2005-2006
Net lending (+) ; general government - ESA 1995 (Percentage of gross domestic product at market prices)	ESA	perf	27 MS	1999-2007
Primary budget balance as percentage of GDP (Net lending excluding interest, general government - ESA 1995) (+)	AMECO	perf	27 MS	1999-2007

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards

All indicators passed the first screening successfully, except the Nominal long-term interest rate, given its loose link to sustainability of public finance, as suggested by some Members States.

Redundancy criteria

The Distance of the cyclically-adjusted Budget balance from SGP Medium Term Objective is correlated with the cyclically Adjusted Balance at more than 95%. Consequently, we dropped the former from the narrow list as the latter is easier to interpret in purely economic terms.

Inputs from associated stakeholders

The sixth remaining indicators (General Government Gross Debt as % of GDP, Change in Structural budget balance, Cyclically Adjusted Balance, Sustainability indicator S2, Projected growth in labour force and the Primary budget balance) qualify on both steps of the assessment.

We have added indicators of sustainability both in the narrow list and the wider list. Indeed, many countries would like to have a more forward-looking approach in the sustainability section. The problems with sustainability are also related to ageing and future spending pressures, and not only on the current liabilities. Therefore, the long-term S2 component (long-term changes in the primary balance) and economic indicators stemming from the AWG projections (projected growth in labour force) have been added to the narrow list. We also added the Primary budget balance (Net lending excluding interest, general government) and assigned to it a weight of ½ , because of the redundancy with cyclically adjusted balance (80%).

We placed Projected old-age dependency ratio in 2025 in the wider list, as it is a demographic constraint more than a projection of public finances. S1 and the general government balance (net lending) were added to the wider list. However, some Members States stresses that the interpretation of sustainability indicators should not be mechanical and includes qualitative elements to evaluate long-term risks for public finance.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
General Government Gross Debt (% of GDP) (-)	++	++	++	++	+	-	**narrow list**	**1**
Distance CAB from SGP Medium Term Objective(+)	++	++	++	++	-	-	wider list	
Fiscal stance: change in Structural budget balance (+)	++	++	++	++	++	-	**narrow list**	**1**
Cyclically Adjusted Balance (+)	++	++	++	++	-	-	**narrow list**	**0,5**
Sustainability indicator: S2 component - long-term changes in the primary balance (LTC) (-)	++	+ **(change to be interpreted carefully due to methodological changes)**	++	++	+	-	**narrow list**	**1**
Projected change in Labour force between 2003 and 2050 (Budgetary projections: AWG variant scenario Year: 2005)(+)	++	+	+	++	+	-	**narrow list**	**1**
Sustainability indicator: S2 (overall) (-)	++	+ (change to be interpreted carefully due to methodological changes)	++	++	-	-	wider list	
Sustainability indicator: S2 component - the initial budgetary position (IBP)(-)	++	+ (change to be interpreted carefully due to methodological changes)	++	++	-	-	wider list	
Nominal long-term interest rate (average)(-)	+/-	++	++	++	+	-	wider list	
Sustainability indicator: S1 (overall)(-)	++	+ (change to be interpreted carefully due to methodological changes)	++	++	-	-	wider list	
Sustainability indicator: Required Primary Balance (RPB)(-)	++	+ (change to be interpreted carefully due to methodological changes)	++	++	-	-	wider list	
Projected old-age dependency ratio in 2025 = Population aged 65 and over as a percentage of the population aged 15-64 *) (AWG projection) (NOTE: the change is the change in the dependency ratio between 2003 to 2025) (-)	+	+	++	++	+	-	wider list	
Net lending (+) or net borrowing (-); general government - ESA 1995 (Percentage of gross domestic product at market prices) (+)	+	++	++	++	-	-	wider list	
Primary budget balance as percentage of GDP (Net lending excluding interest, general government (+)	+	++	++	++	-	-	**narrow list**	**0,5**

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6. OTHER

6.1. Macroeconomic background information

Definition and scope of the policy area

As pointed out by many Member States, it often appears difficult to interpret some macroeconomic indicators contained in the macroeconomic policies areas in terms of good or bad performance. Therefore, the fiscal policy area is completed by another "policy area" entitled "Macroeconomic background information", for which no narrow list is selected and no aggregate score is calculated, given their very heterogeneous (albeit insightful) nature. These indicators provide useful information on the general macroeconomic context in which reforms are (not) taken.
The scores presented under each indicator are not interpreted normatively but purely statically (positive above the average/negative below). Moreover, this should not be considered a real growth-enhancing policy area, but rather as first indication on the broad orientation of the macroeconomic framework.

Related Integrated guidelines

(1) To secure economic stability for sustainable growth

Impact on growth components

Not applicable

Evidence and Estimated elasticities in the recent literature

Not applicable

Possible spillover and complementarities with other policy area

Not applicable

Drawing up a non exhaustive list of relevant indicators

As regards macroeconomic background information it is difficult to find indicators that signal a good or bad performance in isolation. An unsustainable economic position has many characeristics and can be of different natures. For example, there is nothing per se better in policy terms with a positive or negative output gap. Therefore, the performance grading across individual indicators in this area should not be read in isolation but broadly and against other indicators to build "a case".

As regards performance indicators, a non-exhaustive list could include:

Real effective exchange rate (unit labour costs). The REER is calculated by dividing the home country's nominal effective exchange rate by an index of the ratio of average foreign unit labour costs to home unit labour costs.
The REER aims to assess a country's (or currency area's) price or cost competitiveness relative to its principal competitors in international markets. It corresponds to the NEER deflated by selected relative price or cost deflators (here the nominal unit labour cost).

Average of absolute value of output gap 1999-2006. Output gap is the difference between actual output and estimated potential output at any particular point in time. It is a simple way to capture the volatility of the cycle. In general, successful stabilisation policies should contribute to smooth the cycle and reduce the size of output gaps.

Real long term interest rate (deflator GDP). Nominal long term interest rate minus the GDP deflator. Nominal long term interest rate include the central government benchmark bond of 10 years in BE, DK, DE, ES, FR, IE, IT, NL, AT, PT, FI, SE and UK. It also includes the central government bonds, based on 12 month treasury bonds for EL and the central government OLUX bonds for 10 years, secondary market for LU.

Business investment. Gross fixed capital formation by the private sector as a percentage of GDP. Business investment is defined as the gross fixed capital formation by the private sector. Gross fixed capital formation consists of resident producers' acquisitions, less disposals, of fixed assets during a given period plus certain additions to the value of non-produced assets realised by the productive activity of producer or institutional units. As such, gross fixed capital formation includes acquisition less disposals of, for example, buildings, structures, machinery and equipment, mineral exploration, computer software, literary or artistic originals and major improvements to land such as the construction of dikes, the clearance of forests or the draining of marshes. GFCF is a part of Gross capital formation (ESA 1995, 3.100), the other parts being changes in inventories and acquisitions less disposals of valuables. The private sector consists of non-financial corporations, financial corporations, households and non-profit organisations serving households, i.e. all sectors of a national economy except general government.

Trade deficit. Net exports of goods and services at current prices (national accounts) in % of GDP at market prices.

Balance on current transactions with the rest of the world (national accounts) in % of GDP at market prices. The difference between the nation's total exports of goods, services, factor income revenues and current transfers and its total imports of them.

As regards policy indicators, a non-exhaustive list could include:

HICP. Harmonised Indices of Consumer Prices (HICPs) are harmonized inflation figures required under Article 121 of the Treaty of Amsterdam (109j of the Treaty on European Union). They are designed for international comparison of consumer price inflation. HICPs are compiled on the basis of a legislated methodology, binding for all Member States (MSs). The focus is on quality and comparability among the indices of different countries as well as on their relative movements. The HICPs are Laspeyres-type indices. In most countries, in particular EMU member states, an inflation rate close to 2% would be in line with the monetary policy objectives. However, clearly in some catching up economies a higher inflation would be expected.

Summary table: source, type of indicator geographical coverage and time coverage:

Indicators	Source	Policy or Performance indicators	Geographical coverage	Time coverage
HICP (positive difference to the ECB target of 2% means a good performance) (+)	AMECO STRIND	pol	27 MS	1999-2006
Real Effective Exchange Rate (unit labour costs) (-)	ECFIN	perf	26 MS	1999-2006
Average of absolute value of output gap 1999-2006 (-)	AMECO	perf	27 MS	2006
Real long term interest rate, deflator GDP (-)	AMECO	perf	26 MS	1999-2006
Business investment - Gross fixed capital formation by the private sector as a percentage of GDP (+)	STRIND	perf	27 MS	1999-2006
Trade deficit : Net exports of goods and services at current prices (National accounts) in % GDP at market prices.	National accounts	perf	27 MS	1999-2007
Balance on current transactions with the rest of the world (National accounts) in % GDP at market prices. (+)	National accounts	perf	27 MS	1999-2007

Choice of indicators used to assess the performance in each policy area

In this section we recall the criteria applied to select the "narrow list" of indicators used to calculate the aggregate score for each policy areas identified by LAF. We have distinguished between three criteria namely: (i) minimum statistical standards (ii) redundancy (iii) inputs from associated stakeholders: especially, the LIME and EMCO members.

Minimum statistical standards
All indicators fulfil the minimum statistical standards.

Redundancy criteria
This is not applicable. However, the real effective exchange rate is highly correlated with the average of absolute value of output gap.

Summary table: selection of indicators in the narrow list:

	Minimum statistical standards				Removing redundant indicators		Final assessment	
	Economic rationale	Comparability and reliability	Time coverage	Geographical coverage	Absence of redundancy (corr between indicators)	Correlation with relevant GDP components	Assessment	Weight
HICP (positive difference to the ECB target of 2% means a good performance) (+)	++	++	++	++	Not applicable			
Real Effective Exchange Rate (unit labour costs) (-)	++	+	++	++	Not applicable			
Average of absolute value of output gap 1999-2006 (-)	+	+	++	++	Not applicable			
Real long term interest rate, deflator GDP (AMECO) (-)	+	++	++	++	Not applicable			
Business investment - Gross fixed capital formation by the private sector as a percentage of GDP (STRIND er070)) (+)	++	++	++	++	Not applicable			
Trade deficit : Net exports of goods and services at current prices (National accounts) in % GDP at market prices.(+)	+	++	++	++	Not applicable			
Balance on current transactions with the rest of the world (National accounts) in % GDP at market prices. (+)	+	++	++	++	Not applicable			

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ANNEX III:

ROBUSTNESS CHECK AND SENSITIVITY ANALYSIS OF THE SCORES USED FOR THE ASSESSMENT IN LAF.

1. INTRODUCTION

Following the suggestions made by some LIME delegates on the construction of the aggregate score for each policy area, we investigate further the robustness and the sensitivity of the results to changes in the way the scores are computed. The comparison is simply done in terms of indicator-based assessment (over, neutral or under performance) as it is given by the aggregate score for each Member States. We test the robustness using different set of indicators and also alternative aggregation methods. In particular, we address two main questions:

1) What is the robustness of the results if we change the list of indicators to be used to compute the aggregate score? This involves two types of analysis when:

- the number of indicators to compute the aggregate score is increased - wide list versus narrow list,
- the number of indicators to compute the aggregate score is decreased - reduced narrow list versus existing narrow list.

2) What is the sensitivity of the results to using alternative methods to compute the aggregate scores? 5 different statistical methods are tested to compute the scores:

- standardized scores (existing methodology)
- min max method,
- average country rankings,
- benefit-of-the-doubt,
- random weights.

The results are compared using the robustness percentage, which gives an indication of the concordance (in terms of over, neutral or under performance) between the results of each approach. A priori, a percentage above 80% (stability for at least 22 Members States out of 27) could be considered as robust, a percentage below 60% as weak robustness and a percentage between 60% and 80% as relatively robust. The analysis is carried out in levels only but it could be extended to growth rates.

Concerning the first question, the results show that the assessments measured by the aggregate score are quite consistent and relatively robust. Concerning the second question, the existing aggregates that have been obtained seem to characterize the assessments of countries in a relatively robust way. In particular, it does not seem that moving to one of the more refined approach would significantly increase robustness.

The summary of the robustness percentage are presented in the tables below.

	ALMP's	Making work-pay: interplay of tax and benefit system	Labour taxation to stimulate labour demand	Job protection and labour market segmentation/ dualisation	Policies increasing working time
Average robustness between all the methods	80,7%	65,9%	87,4%	83,7%	84,4%

	Specific labour supply measures for women	Specific labour supply measure for older workers	Wage bargaining and wage-setting policies	Immigration and integration policies	Labour market mismatch and labour mobility
Average robustness between all the methods	84,4%	67,4%	74,1%	71,6%	70,4%

	Competition policy framework	Sector specific regulation (telecom, energy)	Business environment - Regulatory barriers to entrepreneurship	Business Dynamics - Start-up conditions	Financial markets and access to finance
Average robustness between all the methods	82,1%	71,6%	73,3%	75,6%	68,5%

	Market integration - Openness to trade and investment	R&D and Innovation	ICT	Education and life long learning	Orientation and sustainability of public finances
Average robustness between all the methods	59,3%	92,6%	65,2%	79,3%	75,6%

2. HOW ROBUSTNESS AND SENSITIVITY ARE ASSESSED?

On the one hand, one has to define exactly what a significant change in the aggregate score means in practice. Given the objective of the LAF, i.e. to assess if a country over perform, neutral perform or under perform in a policy area, it appears quite straightforward to consider moving from one of these category to another as the criteria which define a significant change. Indeed, the fact that the aggregate score for one country varies slightly is not a major source of concern in the LAF, as long as this variation is not bringing the aggregate score for this country from one category of performance to an other.

On the other hand, in order to be able to compare the results obtained through various approaches, it is necessary to measure the aggregate score in a similar and comparable way. One mean of comparison currently found in the literature consists of ranking the values. However, the score computed in the LAF are much more detailed than simple rank as they give a quantification of the distance to the average for the EU15. As a result, when necessary, the same standardization procedure than the one applied in the LAF i.e. looking at the distance from the average using the standard deviation, is also used to define if the scores given by other methods show that a country is over, neutral or underperforming in a particular policy area. The robustness is thus conducted as follow:

1- The aggregate scores for each Member State are computed using the existing approach on the bases of the narrow list.
2- The aggregate score for each Member State is computed using different lists of indicators or alternative aggregation methods.
3- The score are then compared.
    a. First we determine if, according to the results given by the various methods, each country is either over, neutral or under performing.
    b. Then we compared the results of each alternative method with the results given by the current approach.
    c. The robustness score is finally computed by adding for each methodology the numbers of concordant results and by divided by the number of countries (27) to obtain a robustness percentage.

The result of the robustness check thus allow us to determine to what extent the aggregate scores, as they are currently computed, are giving a correct picture for each country in terms of over, neutral or under performance.

3. ROBUSTNESS ANALYSIS BETWEEN THE ASSESSMENTS OF COUNTRY PERFORMANCE USING DIFFERENT NUMBERS OF INDICATORS

The LIME working group has reached agreement on a set of relevant indicators for each policy areas. However, in order to ensure the comparability and a minimum of robustness, the assessment of performance for each policy area is computed on the basis of the narrow list of indicators. This means that a number of indicators have been excluded from the calculation. However, lowering the required minimum level of statistical standards could lead to reinstate some of the excluded indicators in the narrow list.

There is therefore a need to test if there is a significant impact on the aggregate score when the number of indicators used for the computation is increased or decreased. A comparison between the narrow list and the wide list of indicators is thus conducted in terms of assessment (over, neutral or under performance) as it is given by the aggregate score for each Member States. For each country, the aggregate score is obtained by averaging the score for all indicators in the narrow list and in the wider list. According to the value of the score the performance of the country is assessed (score below -4 = under performance, between -4 and 4 = neutral performance, above 4 = over performance). The results are then compared and the final robustness percentage, which gives an indication of the concordance between the results, is calculated.

The results show a good overall level of robustness, with on average 70.4% of the scores which give the same assessment (over, neutral or under performance) if we use the wide list of indicators instead of the narrow list. The weakest robustness is occurring for the policy area on labour market mismatch and mobility which is not surprising as indicators of dispersion of employment and unemployment rates at level NUTS 2 have been excluded from the narrow list of these policy areas. As regards the other policy areas, their relative weak robustness could mainly be explained by the reinstatement of indicators which are highly correlated with indicators which are already in the narrow list, hence giving too much weight to these indicators. When theses indicators are taken into account in the calculation of the aggregate score, the picture was expected to change significantly for a number of countries.

A second set of robustness analysis involves comparing the assessment with the one given by a reduced set of indicators which are available for at least 22 countries (instead of presently 14). This represents a tightening of the conditions of inclusion of an indicator in the narrow list and, as such, is thus a test of the impact of a decrease in the number of indicators to compute the aggregate score. For each country, the aggregate score is obtained by averaging the score given for all indicators in the reduced narrow list. According to the value of the score the performance of the country is assessed (score below -4 = under performance, between -4 and 4 = neutral performance, above 4 = over performance). The results are then compared and the final robustness percentage, which gives an indication of the concordance between the results, is calculated. For some policy areas, it could however happen that the reduced narrow list and the narrow list are identical due to the fact that all indicators in the narrow list have data for at least 22 countries (this is the case for ALMP's, Making work pay: interplay of tax and benefit system, Labour taxation to stimulate labour demand, Job protection and labour market segmentation/dualisation, Policies increasing working time, Specific labour supply measure for women, Wage bargaining and wage setting policies, Business environment - Regulatory barriers to entrepreneurship, Business dynamics - Start-up conditions, Market integration - Openness to trade and investment, R&D innovation, ICT, Education and life long learning, and Orientation and sustainability of public finances). In this case, the robustness score is 100% and it is not calculated.

Again the results show a good level of robustness, with on average 75% of the score which point at the same assessment if we use a reduced list of indicators instead of the narrow list. The high robustness for the policy area on competition policy framework is not a surprise as the existing narrow list has already been reduced to the minimum.

4. ROBUSTNESS CHECK OF THE METHOD USED FOR THE CALCULATION OF THE AGGREGATE SCORE BY POLICY AREA

As agreed with the LIME Members, a standardised continuous scoring system has been applied to assess performance of both GDP components and policy areas. It simply consists in standardising the value of the considered indicator by subtracting the mean, dividing by the standard deviation and multiplying the result by ten. More formally, it can be expressed as:

*Individual score for each indicator = [(value indicator - EU15 average)/Standard deviation] *10.*

To avoid giving too much weight to outliers, the score is capped at three standard deviations. Thus scores range from +30 to -30: a score of 0 implies that value for the indicator in question is the same than the EU15 average, whereas a score of for instance -10, implies that the indicator is one standard deviation below the EU15 average. Standardised thresholds have also been used to determine categories of performance. Any score below – 4 is a priori considered to represent underperformance (-): any score between +3 and -3 is a priori considered to represent a neutral performance (=): any score above +4 is a priori considered to represent over performance (=). These thresholds have been chosen because, assuming a normal distribution of results, one third of outcomes should be found in each of the categories. The aggregate score for each policy area is then simply computed as a simple average of the score of the indicators that have been retained in the narrow list for this policy area[42].

Aggregate score for each policy area = simple average (Individual score for each indicator)

There is therefore a need to test if the results given by this simple aggregation method are sufficiently robust, or if they would significantly change if an other aggregation method was used. In this section, 5 statistical methods are applied namely:

- standardized scores (existing methodology) used as a reference for the comparison
- min-max scores,
- average country rankings,
- benefit-of-the-doubt approach,
- random weights approach.

The comparison of is conducted in terms of assessment (over, neutral or under performance) as it is given by the aggregate score for each Member States. For each country, the aggregate score is obtained by averaging the score for all indicators. According to the value of the score the performance of the country is assessed (score below -4 = under performance, between -4 and 4 = neutral performance, above 4 = over performance). The results are then compared and the final robustness percentage, which gives an indication of the concordance between the results, is calculated.

[42] Weights attached to correlated indicators may apply but they are not giving more importance to some indicators as they always sum to one.

4.1. Min Max method

This procedure computes the aggregate score as a simple average over the set of normalised indicators. The values for each indicator are normalised by the min-max method that rescales the values of indicators to the closed interval [0, 100].

Individual score for each indicator =100 [(value indicator – Min (of EU27 values of the indicator)] / (Max - Min).*

The value 0 is assigned to the worst performing country and the value 100 corresponds to the best performing country. The results are then standardized and the assessment is compared with the one given by the existing scores. We obtain a relatively good robustness with on average of more than 73% of the score which give the same assessment if we use the min max method to calculate the scores instead of the existing approach.

4.2. Average country rankings

The average country rankings procedure is, as its name indicates, based on the calculation of ranks. First, the countries are ranked according to the value in level for each indicator. The composite indicator for a country is calculated as the simple average over all the rankings for that country. The composite indicator is not affected by any method of data normalization. However, in order to be able to do a comparison with the existing scores, the average ranks are standardized. The average robustness score is still relatively high at 73%.

4.3. Benefit-of-the-doubt

The benefit-of-the-doubt procedure aggregates the scores for a given country by using the best set of weights, which maximises the composite aggregate score for that country. On the contrary of the two preceding approaches, the starting points are thus here the standardized scores computed in the methodology. Only the aggregation method is tested. As regards the calculation, weights are country-specific. In general, even using the best combination of weights for a given country, other countries may show better performance. The optimization process could lead to many zero weights if no restrictions on the weights were imposed. In such case many countries would have the value of composite equal to one. Bounding restrictions on weights are hence necessary for this method to be of practical use. We assume that each country is choosing the weights according to the following rules: score below -10 = weight of 5%; below -4 = weight of 10%; between -4 and 0 = weight of 12.5%; between 0 and +4 = weight of 20%; above +4 = weight of 22.5%; above +10 = weight of 30%. The average robustness score decreased at 68% but still indicates relatively robust results.

4.4. Random weights.

The random weights approach does not allow the countries to choose the set of weight that maximise their scores as instead, the weights are attributed randomly. As a result, the aggregate score for a given country is calculated by using multiple random set of weights for each indicator. Each set is applied to all country and the procedure is repeated for all sets of weights. We have limited the computation to 50 sets of random weights, which is a minimum to ensure some statistical reliability. Once the weights are given the scores are simply computed applying the random weights for all the countries and the process is repeated for each set of weight, i.e. 50 times. The final score is then obtained by averaging the scores for each country. They confirm the relative robustness of the existing approach with an average robustness of 87%.

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