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An application of the LIME Assessment Framework (LAF): The Case of Cyprus*

Louis N. Christofides and Maria Michael

Abstract

This study presents results for the Cypriot economy relative to the EU countries, based on the LIME Assessment Framework (LAF). LAF is a tool developed by the Lisbon Methodology (LIME) Working Group of the Economic Policy Committee (EPC), in order to evaluate the economic progress of all Member States and their structural reforms, using the Lisbon Strategy targets and guidelines.

The LAF results are summarized in three tables. The first part is a growth accounting exercise, which includes twelve indicators related to demographic, labour market and labour productivity components. The second part is an analysis based on 282 indicators in 20 policy areas related to: (i) Labour market, (ii) Product and capital market regulations, (iii) Innovation and knowledge and (iv) Macroeconomy. Finally, the third part is a screening exercise, which relates underperformance in the first two parts based on the literature.

The study aims to evaluate the results for Cyprus, providing policy recommendations when possible. In addition, we suggest ways of improving the approach and provide corrections when further data are available.

* This study is part of a project is sponsored by the Planning Bureau and funded by the Research Promotion Foundation (RPF) through the Economics Research Center (ERC). It aims to reach a better appreciation of the LAF methodology and, following a critical assessment, to propose improvements to this approach. Its application to Cyprus is scrutinised and several suggestions are offered and quantified.

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ΠΕΡΙΛΗΨΗ

Η μελέτη αφορά τα αποτελέσματα που προκύπτουν από το Πλαίσιο Αξιολόγησης της Λισσαβόνας (LAF), για την περίπτωση της Κύπρου. Το πλαίσιο αξιολόγησης της Λισσαβόνας είναι ένα εργαλείο, που δημιουργήθηκε από την Ομάδα Εργασίας για τη Μεθοδολογία της Λισσαβόνας της Επιτροπής Οικονομικής Πολιτικής (Lisbon Methodology (LIME) Working Group of the Economic Policy Committee (EPC)), με στόχο την αξιολόγηση της προόδου των χωρών μελών σχετικά με τους στόχους της Στρατηγικής της Λισσαβόνας.

Το πλαίσιο αξιολόγησης της Λισσαβόνας αποτελείται από τρία μέρη. Το πρώτο μέρος εξετάζει τα συστατικά της οικονομικής ανάπτυξης, με τη χρήση "λογιστικής ανάπτυξης" (growth accounting). Στο μέρος αυτό περιλαμβάνονται δείκτες που επηρεάζουν το ΑΕΠ της χώρας, όπως η αρχική εκπαίδευση, η συσσώρευση κεφαλαίου, η συνολική παραγωγικότητα, η συμμετοχή στην αγορά εργασίας ανά ομάδα πληθυσμού, η ανεργία και κάποια δημογραφικά στοιχεία όπως η γεννητικότητα, η καθαρή μετανάστευση, και το ποσοστό του εργάσιμου πληθυσμού. Στο δεύτερο μέρος εξετάζονται 282 οικονομικοί δείκτες που αφορούν 20 περιοχές πολιτικής και σχετίζονται με την αγορά εργασίας, την αγορά προϊόντος και κεφαλαίου, την έρευνα και ανάπτυξη και τη μακροοικονομική πολιτική. Στο τρίτο μέρος συγκρίνονται τα αποτελέσματα που προκύπτουν από τα δύο πρώτα μέρη και εντοπίζεται πιθανή συσχέτιση, με βάση τη βιβλιογραφία, μεταξύ των συστατικών του ΑΕΠ και των 20 περιοχών πολιτικής.

Τα αποτελέσματα για τις χώρες μέλη υπολογίζονται αυτόματα σε μια βάση δεδομένων τύπου Excel, που ετοιμάστηκε από την ομάδα εργασίας του LIME και ανανεώνεται ανά εξαμηνία. Τα αποτελέσματα για κάθε χώρα είναι συγκριτικά και υπολογίζονται σε σχέση με τον μέσο όρο των ΕΕ15.

Στόχος της παρούσας μελέτης είναι η εφαρμογή του εργαλείου αυτού για την περίπτωση της Κύπρου και ο σχολιασμός της προόδου στην κυπριακής οικονομίας, παραθέτοντας όπου κρίνεται απαραίτητο τα προβλήματα στη μεθοδολογία, που οδηγούν σε παραπλανητικά ή ανακριβή αποτελέσματα για την Κύπρο.

1 INTRODUCTION

This study presents results for the Cypriot economy relative to the EU countries, based on the LIME Assessment Framework (LAF). LAF is a tool developed by the Lisbon Methodology (LIME) Working Group of the Economic Policy Committee (EPC), in order to evaluate the economic progress of all Member States (MSs) and their structural reforms, based on the Lisbon Strategy targets and guidelines.

The LAF country results are summarized in three tables for each country. The first table is the result of the first part of LAF, namely the assessment of GDP components (Section 2). The assessment of GDP components is a growth accounting exercise, which includes twelve indicators related to demographics, labour market and labour productivity components. The second part is summarized in the second LAF table and describes performance in policy areas (Section 3). This analysis is based on 282 indicators in 20 policy areas related to: (i) Labour market, (ii) Product and capital market regulations, (iii) Innovation and knowledge and (iv) Macroeconomy. Finally, the third part is a screening exercise, which relates underperformance in the first two parts based on the literature (Section 4).

The data for all MSs and the calculations for all indicators are included in the LAF database or "Maquette", which is an automated Excel based application[1]. The "Maquette" is updated every 6 months for all MSs. The results presented in the following subsections refer to December 2009, which is the most updated version currently in hand.

It is also important to note that all score results presented in the LAF tables are relative to a benchmark. Maquette users can vary the benchmark option[2], choosing from the following: Euro area 16, EU5, EU15, EU12, EU27. The default benchmark is the EU15, which is the one used for the calculations presented in this paper. More specifically, the formula used to calculate the score for each indicator relative to the EU15 average is [(Indicator value- EU15 average) / EU15 standard deviation] x10.

The study aims to evaluate the results for Cyprus, providing policy recommendations when possible. In addition, we suggest ways of improving the approach and provide corrections when data are available.

[1] The LAF database ("Maquette") with all data and LAF calculations is publically available at the LIME Working Group website and can be downloaded at the following link: *http://ec.europa.eu/economy_finance/db_indicators/laf/index_en.htm*

[2] To change the benchmark, go to the "Parameters" worksheet of each Excel file and choose the preferred benchmark from the dropdown list provided.

2 PART 1: THE ASSESSMENT OF GDP COMPONENTS

The first part of LAF is a growth accounting exercise, which examines the sources of GDP per capita and GDP growth, for all MSs. The decomposition is based on a detailed growth accounting methodology developed by the LIME Working Group[3]. The results for Cyprus are presented in Section 2.1 and commented on in more detail in Section 2.2 following.

2.1 Presenting the LAF results for part 1

As shown in Table 1, GDP per capita is decomposed into 12 components; namely fertility, share of foreign population, share of working age population, youth participation, male participation 25-54, female participation 25-54, Older worker participation, employment rate, average hours worked, capital intensity, TFP and initial education of labour.

Table 1: LAF Part 1- Assessment of GDP components
(In LAF: "Table 1: Relative performance of GDP components vis-à-vis the EU15 both in level and growth (scores)")

	I			II	III
	GDP decomposition scores		**Absolute contribution to annual growth**	**Qualification**	**Overall assessment**
	Level	**Growth**			
Demographic components	**19**	**30**	**2,4**		
Fertility / Native Population	-4	19	0,5		
Share of foreign population / Net Migration	30	18	1,1		
Share of Working age Population	30	30	0,7		
Labour market components	**20**	**-5**	**0,0**		
Youth Participation	-6	0	0,0		
25-54 Male Participation	9	-8	-0,2		
25-54 Female Participation	2	8	0,4		
55-64 Participation	7	-14	0,1		
Unemployment Rate	8	5	0,2		
Average Hours Worked	16	-7	-0,4		
Labour productivity components	**-23**	**1**	**1,2**		
Capital Deepening	-30	15	0,8		
Total Factor Productivity	-20	-7	-0,1		
Initial education of labour (Labour quality)	10	18	0,5		
GDP per capita (level) / GDP (growth)	**-13**	**22**	**3,6**		

Source: LAF Country Results- Cyprus – December 2009

[3] The description of the growth accounting methodology is out of the scope of this paper. More details on the LAF growth accounting exercise can be found in Christofides and Michael (2009b), or the original paper written by Gilles Mourre (2009).

The first column in Table 1 (Column I- GDP decomposition scores -level) shows the score of each GDP per capita component, relative to a benchmark (in this case the EU15 average). The Score implies a relative performance for each country[4]. A positive score implies that Cyprus performs above the EU15 average, while a negative score implies that Cyprus underperforms compared to the EU15 average. For outliers, a score of 30 is assigned to countries performing far above the EU15 average (more than 3 standard deviations), while a score of -30 is assigned to low-performing countries (more than 3 standard deviations below the EU15 average).

The second column (Column I- GDP decomposition scores -growth), shows the score on the growth of each GDP growth component, relative to a benchmark. GDP growth is decomposed into 12 components as well (Native population growth, net migration, share of working age population growth, youth participation growth, male participation growth 25-54, female participation growth 25-54, older worker participation growth, employment rate growth, average hours worked growth, capital deepening, TFP growth and initial education of labour growth). Again, all values indicated show a relative performance for Cyprus as described above.

The third column, named as the absolute contribution of each component to GDP growth, gives the growth of each of the 12 components (i.e. the change between the years 2001-2008). Note that the absolute contributions of all components should sum up to 3,6, which is the value for per capita GDP growth for Cyprus (see last cell of the third column).

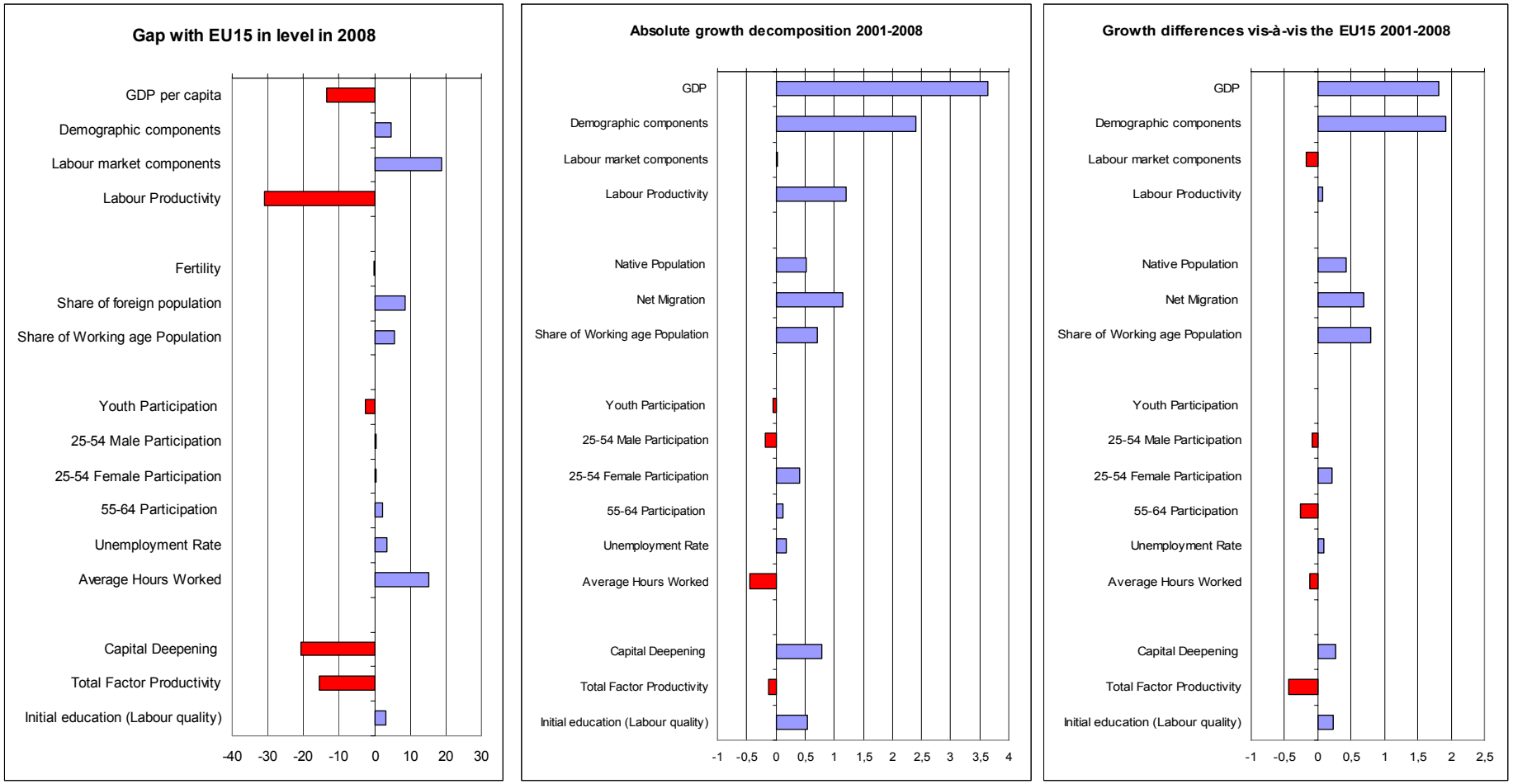
For an easier view, the first three columns are presented in diagrams as well (LAF Figure 1), where red (black) indicates a negative value and light purple (gray) a positive value. Figure 1 presents:

- The “GAP with EU15 in level in 2008” (GDP decomposition score on level),
- “Absolute growth decomposition 2001-2008” (Absolute contribution to annual growth) and
- “Growth differences vis-a-vis the EU15 for 2001-2008” (GDP decomposition score on growth).

[4] Each component is standardized using the formula:

[(Country value- EU15 average) /EU15standard deviation] x10

Figure 1: LAF figures on the assessment of GDP components (In LAF: "Figure 1: An overview of income and growth differentials and sources")



Source: LAF Country Results- Cyprus – December 2009

Finally, the assessment for each GDP component is presented in column III of Table 1. In general, the assessment is derived using the score in level terms (first column in Table 1). If this score is less than or equal to -4, then overall performance is evaluated as negative and marked with a negative sign ("-") in column III. Column II indicates whether the aggregate score should be revised downwards or upwards due to either the results in terms of changes (growth) or country specific reasons. For example, in the case study report for Cyprus June 2008, the fertility score in level terms was -4, implying a negative performance. However, the score was upgraded to neutral (marked with "=" in column III), due to a positive absolute contribution to annual growth. The explanation was denoted as "↑Growth" in the Qualification column (column II in Table 1), where "↑" means upgrading performance and "Growth" the reason for upgrading. There are no entries in columns II and III of the December 2009 assessment for Cyprus.

2.2 Comments and discussion

GDP per capita for Cyprus is below the EU15 average, which gives Cyprus a poor relative score of -13 (for 2008). On the other hand GDP growth over the years 2000-2008 is 3,6%, which is much higher than the EU 15 average. Consequently, the relative score on growth is 22, which is evaluated as good compared to the EU15. Nowadays, these numbers have dropped significantly for all countries due to the financial crisis. Based on Eurostat, GDP growth for Cyprus in 2009 was -1,7%, which still compares favorably to the EU15 average.

According to the decomposition for GDP per capita (score in levels), Cyprus is relatively weak in the components of youth participation, capital deepening and TFP. Youth participation is relatively lower in Cyprus than the EU15 countries due to a higher percentage of youth in tertiary education. Since more highly educated youth is desirable for an economy, a negative performance there can be upgraded to neutral as a country specific reason. This was the case in the latest Case Study Report for Cyprus (June 2008). Low performance in capital deepening on the other hand is expected due to the structure and size of the economy. Cyprus has a small economy, based on services, and the majority of firms are very small. The nature of the economy also explains to some extent the low TFP performance.

Regarding the absolute contribution of each component to GDP growth (column 3, Table 1), three components are found to contribute negatively to growth. 25-54 male participation, average hours worked and TFP. In terms of the relative growth score compared to the EU15 countries (column 2, Table 1), one more component is underperforming, namely the participation of older workers, which contributes positively to GDP growth, but not as much as in the EU15 countries.

Hours worked is perhaps the most problematic variable. There are large reporting and measurement errors and data are continuously revised. For example, revision of this variable transformed an extremely good performance in growth of hours worked in the Case Study Report of June 2008 to an underperformance in the December 2009 update. Hence, this indicator should not be given much attention. Moreover, from a welfare point of view more hours of work would induce a welfare reduction, since more hours are associated with lower levels of leisure. Welfare maximization is an important missing dimension from LAF, which strictly focuses on income per capita and its relation to production, rather than utility (welfare) maximization.

In growth terms capital deepening gets a score of 15, despite the poor performance. This is mainly due to the negative growth in hours worked, which affects inversely capital deepening[5].

Finally, Cyprus is among the best performers in terms of all demographic components. The fertility rate is evaluated with a neutral; an extremely good performance in the share of working age population in combination with a continual increase in foreign immigrant workers makes the demographic component for Cyprus well above the EU15 average. It is worth noting that, based on LAF, net migration has a 1,1% absolute contribution to growth (indicated in the third column of Table 1) which is 30% of total GDP growth.

For more details on the data and the methodology for this part please see Christofides and Michael (2009b).

3 PART 2: THE ASSESSMENT OF PERFORMANCE IN POLICY AREAS

The second part of LAF evaluates the relative performance of each country in each of the 20 chosen policy areas. LAF includes (i) 10 policy areas that have to do with the Labour market, (ii) 6 policy areas related to Product market and Regulations, (iii) 3 policy areas on Innovation and Knowledge and (iv) 1 policy area on the Macroeconomy.

Each policy area contains multiple indicators, which are used to calculate an aggregate score for each policy area putting different weights on each indicator. Indicators with no weight are called “wider list” indicators, while indicators with positive weight are called “narrow list” indicators. Table 2 in the country results presents only the aggregate score for each policy, both in terms of levels and changes (see Table 2 following). For example, the first policy area “Active labour market policies” contains 20 indicators, from which only 6 are included in the narrow list. Hence, the aggregate score for this policy area, presented in Table 2, is the

[5] Capital deepening is defined as the growth in capital stock minus the growth in hours worked

weighted average of the score of these 6 indicators only. As in the previous table, the score indicates a relative performance vis-à-vis the EU15 average as a benchmark. Weights given to each narrow list indicator are not necessarily equal.

3.1 Presenting the LAF results for part 2

In Table 2 the score in levels refers to the relative performance of the country in the last year available (in this case in 2008 or before if not available). The score in changes refers to the relative progress of the country between the years 1999-2008. Columns II and III have to do with the assessment for each policy area. A priori, a policy area is considered underperforming if the score is equal to or less than -4. Column II indicates whether the aggregate score should be revised downwards or upwards (using arrows, e.g."↑"), due to country specific info, statistical issues, specific indicator, recent reforms and benchmark issue. Columns III is the overall assessment evaluation denoted with "=", "+" and "-", for a neutral, positive and negative performance respectively. There are no entries in columns II and III in the December 2009 assessment.

The shaded cells in Table 2 emphasise the underperforming areas. The stars next to the name of the policy area indicate the quality of coverage. More specifically, "*" means poor coverage, "**" medium coverage and "***" broad coverage.

Table 2: LAF Part 2 - Assessment of performance in policy areas
(In LAF:"Table 2: An overview of performance in each policy area at aggregate level")

	Indicator-based assessment (LAF)		Qualification of aggregate score	Overall assessment
	I		II	III
Policy areas -- Aggregate scores for CY	**Level**	**Change**		
Labour market				
Active labour market policies**	1	-2		
Making work-pay: interplay of tax and benefit system***	8	2		
Labour taxation to stimulate labour demand ***	28	19		
Job protection and labour market segmentation/dualisation**	10	3		
Policies increasing working time***	10	-8		
Specific labour supply measures for women***	-2	5		
Specific labour supply measures for older-workers***	1	-3		
Wage bargaining and wage-setting policies**	14	13		
Wage moderation	*14*	*9*		
Wage differentiation	*16*	*22*		
Immigration and integration policies***	10	-23		
Labour market mismatch and labour mobility**	-7	-10		
Product and capital market regulations				
Competition policy framework*	16	13		
Sector specific regulation (telecom, energy)**	-15	-2		
Sub-aggregate I: telecommunications	*-13*	*1*		
Sub-aggregate II: energy	*-17*	*-17*		
Sub-aggregate III: others				
Business environment - Regulatory barriers to entrepreneurship**	-4	1		
Business Dynamics - Start-up conditions***	0	5		
Financial markets and access to finance*	-1	-2		
Sub-aggregate I: competition-efficiency	*4*	*-2*		
Sub-aggregate II: financial market integration	*2*			
Sub-aggregate III: Competition on financial retail markets	*-7*			
Market integration - Openness to trade and investment**	12	6		
Innovation and knowledge				
R&D and Innovation***	-21	4		
ICT**	-13	3		
Education and life-long learning***	2	8		
Sub-aggregate I: education	*6*	7		
Sub-aggregate II: life-long-learning	-5	13		
Macroeconomy				
Orientation and sustainability of public finances ***	5	3		
Sub-aggregate I: consolidation of pf	*3*	*2*		
Sub-aggregate II: sustainability	*8*	*5*		

Source: LAF Country Results- Cyprus – December 2009

3.2 Comments and discussion

LABOUR MARKET

In most of the labour market policy areas, Cyprus performs above the EU15 average. There is a worsening over time, however, which results in lower growth scores for some areas. Each policy area is individually analysed in detail in the following paragraphs.

Active labour market policies

The aggregate score for the whole policy area is neutral, both in levels and growth (level 1, change -2). In terms of participation in Active Labour Market Policies (ALMPs) [6] , Cyprus underperforms compared to the EU15. More specifically, participation in ALMPs was 11,6% of the people wanting to work in 2007, compared to 41% in the EU15. Expenditures on ALMPs have been relatively low because, until recently, Cyprus had no more than frictional unemployment. Based on LAF, Cyprus is well above the EU15 average in terms of the Long-term Unemployment Rate (0,5% of total active population in 2008) and the Youth Unemployment Ratio (3,8% of youth population in 2008), which are among the narrow list indicators. In addition, the employment rate of the low-skilled was 50,9% of the working age population, which is around the EU15 average. Nevertheless, unemployment has been increasing during the last two years, which is not yet reflected in the LAF data.

Making work-pay: interplay of tax and benefit system

This is a rich policy area with 20 indicators, of which 10 are included in the narrow list for the aggregate scores[7]. The resulting overall level score for 2008 is fairly good, while the score in changes is neutral (level 8, changes 2).

The income tax system in Cyprus has a relatively high personal exception level which gives incentives for increasing participation. Additionally, the short duration of unemployment benefits in Cyprus discourages long-run unemployment.

[6] Active labour market policies (ALMPs) are government programs that intervene in the labour market to help the unemployed find work or encourage people remain in employment. There are three main categories of ALMP: (i) Public employment services, such as job centers and labour exchanges, help the unemployed improve their job search effort by disseminating information on vacancies, (ii) Training schemes, such as classes and apprenticeships, help the unemployed improve their vocational skills and hence increase their employability and (iii) Employment subsidies, either in the public or private sector, directly create jobs for the unemployed.

[7] The majority of indicators are unemployment and inactivity traps, which are based on calculations coming from the OECD Tax and Benefit Database. Based on the description given, we are unable to replicate any of the results. Hence, more information needs to be provided regarding the computations.

The social welfare system, however, is perhaps more generous. Based on LAF, this is especially true in the case of one-earner couples with children, since the amount of the total family benefit would compare favourably to the total family income obtained once the second earner enters the labour force. In general, increasing the amount of the public assistance benefit should be done with more caution, taking into account other factors, such as minimum wages in the market. In order to encourage the inactive to enter the labour market, in-work benefits should replace the public assistance benefit, especially in cases where the person has no physical disabilities, or health problems. Moreover, when a person moves from inactivity to work, a gradual reduction of the public assistance benefit should be perhaps extended to two years instead of one[8], providing a further incentive to leave inactivity. An additional modification to the system, such that individuals who quit a job can only be entitled to reduced benefits from public assistance, would encourage individuals to hang on to existing jobs (except perhaps where overwhelmingly important reasons can be provided. Other support measures could be provided to the inactive who enter the labour market, such as psychological support, training, free childcare facilities etc.

Labour taxation to stimulate labour demand

This is a policy area with four equally weighted indicators. Cyprus has an extremely good score in this area compared to the EU15 average, both in levels and changes (level 28, changes 19). Based on LAF, the tax wedge[9] on labour cost for Cyprus is the lowest in the EU for all categories of employees. In the case of a single low wage-earner the tax wedge is 11,9% of total labour cost, compared to 40,8% which is the EU15 average. Respectively, for single average wage-earners, this number becomes 13,9% for Cyprus compared to 44,1% for the EU15. The total tax wedge for a married couple with two children is 11,9% for Cyprus, while the EU15 average is 40,2%. Finally, the implicit tax rate on employed labour is the second lowest in the EU after Malta.

Job protection and labour market segmentation/dualisation

The five narrow list indicators result in a good level performance for Cyprus compared to the EU15. However, this is believed to give an unduly favourable rating for Cyprus, since indicator 8 (involuntary part-time employment as a percentage of total employment) reflects the low level of part-time employment opportunities in Cyprus relative to total employment. In Cyprus, temporary employment is not

[8] There has been a 2006 amendment of the Public Assistance Law aiming to facilitate public assistance recipients to keep their job, while benefits are gradually reduced, up until one year after the job is acquired.

[9] The tax wedge on labour cost is defined as income tax plus employee and employer social contributions including payroll taxes less cash benefits divided by the labour costs.

desirable in general and there is a preference towards permanent positions of employment. In particular, 12,6% of total employment are involuntary in temporary jobs, compared to 8,2% which is the EU15 average. The same holds for part-time employment despite the fact that the performance in this indicator is very good. An improvement for this indicator would be "Involuntary part-time employment as a percentage of total part-time employment".

The score on growth is, on the other hand, neutral. This score may have to be moderated if we consider that indicator 4 (Proportion of the Long-term Unemployed over Total Unemployed) should be interpreted in the opposite direction in terms of growth. For example, a decreasing relative long-term unemployment does not always imply an improving labour market situation as this might reflect increasing short-run unemployment. As indicated in Table 3, we observe that in 2009 the indicator is significantly reduced for Cyprus despite the economic crisis!

Table 3: Registered unemployed by duration

	Less than 3 months unemployed	*Unemployed for 12 months and over*	*Total number of unemployed*	**Long-term unemployment over total unemployment**
2007	6.461	1.204	12.017	0,10
2008	6.564	1.049	11.541	0,09
2009	9.261	1.072	16.048	0,06

Source: Statistical Services of the Republic of Cyprus

This implies a good performance for Cyprus based on this indicator. However, the short-term unemployment rate has risen over the corresponding period.

Policies increasing working time

Increasing working time is considered another way to increase labour supply, although from a welfare perspective, higher hours worked indicate a cost in terms of leisure and perhaps imply a smaller number of people employed. Hence, the interpretation of indicators in this policy area should be made with caution. It is also a very poorely covered area, since only three indicators are included in the narrow list (Annual Working Time and Poverty Trap indicators). Based on these, performance in levels for 2008 is good (level score 10), while fairly poor in changes (change score -8). However, data on working hours are continuously updated and are more likely to suffer from reporting and measurement errors.

In addition, all indicators in this policy area, are based on full-time equivalents and do not take into account flexible forms of employment. In Cyprus, flexible forms of employment are relatively scarce. This will not only increase working time for those working, but will also help some of the inactive to enter the labour market. Cyprus can further increase working time by promoting flexible hours of work. Indicators

related to flexibility in working hours, or part-time job opportunities should be added in this policy area.

Other wider list indicators that are not used for the calculations of the aggregate scores, such as serious or fatal accidents at work, indicate a poor performance for Cyprus relative to the EU countries. The government should continue promoting measures for safety at work.

Specific labour supply measures for women

Specific Labour Supply Measures for Women is one of the biggest policy areas, with 21 indicators, of which 12 are included in the narrow list. This policy area was found to be the only underperforming labour market area in the Case Study Report of June 2008 with aggregate scores -4 in levels and 3 in changes. According to the updated version (December 2009), the aggregate scores are slightly improved and the area is evaluated as neutral in levels and fairly good in growth (level -2, changes 5).

Female participation in Cyprus has increased over time mainly as a result of an increase in female education. The female employment rate was 62,9% in 2008, which is above the Lisbon employment target by 2010 (60%) and above the EU15 average. However, the gender pay gap is still a problem that needs to be addressed. Based in LAF, the gender pay-gap in unadjusted form was 23,1% in 2007 compared to 18,1% which is the EU15 average. It would be more useful to measure the gender pay gap taking into account educational attainment and other productive characteristics, in order to determine whether the conditional gap is larger or smaller than the unconditional gap that is normally and erroneously used.

More accurate estimates on the gender gap are provided in a recent econometric study by Christofides L.N, P. Pashardes, A. Polycarpou and K. Vrahimis (2009) who examine the gender wage gap in Cyprus and the EU using data up to 2007. The results show that the wage gap is estimated to be around 0,5 (log-wage points) of which 0,22 is the explained part (explained by differences in characteristics such as education) and 0,27 is the unexplained (perhaps due to gender discrimination). Based on their estimates, Cyprus ranks last out of 24 EU countries in the total wage gap, while 23rd after the Heckman correction for sample selection bias. Moreover, Cyprus is found to be 24th in terms of wage discrimination against women. The authors estimate that the gender pay gap in Cyprus is mainly attributed to the “sticky floor” effect in the sense that most of the professions selected by women have no opportunities for professional development (e.g. secretaries). This can also be supported by higher “gender segregation on occupations” in Cyprus compared to the EU15, which is one of the wider list indicators for this policy area.

In terms of childcare Cyprus underperforms, especially in the cases of (i) children aged 0-2 years cared for less than 30 hours a week and (ii) children 6-12 years cared for 30 hours per week and more. This might be related to part-time employment opportunities. Since full-time employment is around 40 hours per week, women that need less than 30 hours are usually women that work part-time which is not very popular in Cyprus. It could also be the case that childcare by family members (e.g. grandparents) is more common in Cyprus, especially for children aged 0-2 years.

More childcare facilities for mothers should be introduced in order to help women reconcile work and family. For example, an increase in working hours for public pre-primary schools, or the application of day-long school for all primary schools, will reduce the opportunity cost for women and increase female participation in the labour market. In addition, flexible hours of work will help women reconcile family and career. This will be more desirable to women compared to part-time employment, since the offered wage is not necessarily low, as is the case for most part-time job opportunities. Flexible hours of work will also help in reducing the gender pay gap, by giving the opportunity to women to get more responsible and well-paid jobs.

Specific labour supply measures for older-workers

The employment rate for older workers is relatively high in Cyprus (54,8% compared to 47,4% which is the EU15 average) and the average exit age from the labour force is also higher than the EU average (63,5 years for CY, 61,5 for the EU15). Older women seem to have a higher inactivity rate than men but this is due to lower education levels and patriarchic beliefs and hence this is expected to improve over-time. Aggregate scores for this policy area are neutral both in levels and changes. Cyprus needs to continue life-long learning and continuous training for older workers to help them remain at work or work more efficiently. Health issues and policies might also be relevant to this policy area; however, no health-related indicators are currently in the narrow or wider list.

Wage bargaining and wage-setting policies

This section is not sufficiently well developed. The policy area is quite poor in terms of the number of indicators available (only four indicators in the narrow list – two in each sub-category), as well as in terms of their usefulness or interpretation. This policy area is controversial mainly because of the choice of indicators and the ambiguous interpretation that could be given to the two indicators related to labour costs, which form the “wage moderation” sub-category. The methodology should recognize that high wages even relative to the EU average is a positive state of affairs provided it is justified by the size of the capital stock, productivity developments, etc. High real wage growth relative to productivity should count as a

negative development. Nominal wage growth may be justified by inflation but there is no recognition of this here. In addition, the sub-category of Wage Differentiation consists of only one indicator for Cyprus (Low-skilled Unemployment Gap Relative to High-skilled Unemployment Rate). The second indicator of this policy area, namely Dispersion of Regional Unemployment Rates is not available (or useful) for Cyprus due to the small size of the country.

Immigration and integration policies

Immigration and integration policies are very important for Cyprus. The introduction of foreign workers to Cyprus is one of the most important developments in the Cypriot labour market over the last two decates. In 2008, foreign workers in Cyprus amounted to 96.324, which was approximately 25,5% of total employment. Based on a recent study by Gregoriou P., Z. Kontolemis and M. Matsi (2009) foreign workers come to Cyprus mainly due to high income levels and income gaps and other non-economic factors such as a common spoken language between the sending countries and Cyprus, the distance between them and network effects generated from the stock of migrants in Cyprus.

Due to its importance, the impact of foreign workers in Cyprus has been studied intensively. Christofides L., S. Clerides, C.Hadjiyiannis, M. Michael and M. Stefanides (2005) estimated that the contribution of foreign workers' employment to the growth rate of total gross value added in 2004 compared to 1995 was 54,2% which was the highest contribution among all factors of production. Christofides L., S. Clerides, C.Hadjiyiannis, M. Michael, M. Michalopoulou and M. Stefanides (2006) showed that workers with no skills and less than secondary education have been affected negatively from the increase of foreign workers, skilled-workers with secondary education have benefited marginally from the increase of foreign workers, while skilled-workers with college or university education have benefited a lot from the increase in the number of foreign workers. In addition, Christofides L., S. Clerides, C.Hadjiyiannis, M. Michael and M. Stefanides (2009) found that the presence of foreign workers in Cyprus has not affected total unemployment or total labour force participation. However, the presence of foreign workers negatively affected some specific age and education groups. For instance, the increase in foreign workers has decreased the labour force participation of domestic low-skilled people aged 20-39 (with primary education). As explained, people in this group have the same skills as foreign workers and thus are competing against them.

The introduction of foreign workers in Cyprus has created some social concerns and increased the availability of low-cost unskilled labour, discouraging capital deepening. Additionally, an enormous number of foreign workers (perhaps 50.000) are estimated to work illegally in the country. Cyprus is vulnerable because of illegal immigration

channeled through the occupied north. Better border control and immigration policies are necessary to prevent illegal stay of foreign workers and other undesirable social effects.

In LAF, this policy area is covered very poorly. The choice of indicators in the narrow list and the absence of data for Cyprus in most of the indicators leaves the total evaluation of the policy area captured only by the Employment Rate Gap indicators, as indicated in Table 4 below. Moreover, these indicators are perhaps of ambiguous interpretation, since a much higher employment for nationals compared to foreigners might not necessarily be a good condition for a country. This possibly implies that immigrants are not well integrated in the market or that the quality of labour is low.

Table 4: Immigration and integration policies – Aggregate scores

Indicators	*Share of employed foreign-born population over total population (OECD)*	*Employment rate gap between non EU and EU nationals*	*Employment rate gap between EU born and non-EU born*	*Employment rate of foreign-born - % of foreign-born population (OECD)*	*Proportion of foreign-born population with primary education (OECD)*	*Proportion of foreign-born population with tertiary education (OECD)*	*Aggregate score*
Indicator type	performance	performance	performance	performance	performance	performance	
Weights	1,0	0,5	0,5	0,5	0,25	0,25	
Aggregate score on LEVEL							
CY	n.a.	9,50	10,19	n.a.	n.a.	n.a.	9,8
Aggregate score on CHANGES/GROWTH							
CY	n.a.	-24,98	-20,18	n.a.	n.a.	n.a.	-23

Source: LAF Maquette, December 2009

An alternative narrow list for the area could also include performance indicators that indicate the importance of the policy area for a country, such as the employment of foreign workers as a proportion of total employment and the human capital embodied in foreign labour (e.g. the proportion of foreign born population with tertiary education). Human capital indicators are already included, but with no data for Cyprus and other non-OECD countries.

Labour market mismatch and labour mobility

Labour mobility is not so relevant for Cyprus because of its small size. In particular, Cyprus is considered as one region based on NUTS[10]. Labour market mismatch, however, is more relevant. This policy area is also poorly covered and in combination

[10] NUTS IS a hierarchical classification of administrative boundaries developed by Eurostat. The idea behind NUTS is to provide a common designation for different levels of administrative geographic boundaries across the EU regardless of local language and naming conventions. The NUTS levels are defined in terms of minimum and maximum population sizes:

Level	Population
NUTS 1	3,000,000 - 7,000,000
NUTS 2	800,000 - 3,000,000
NUTS 3	150,000 - 800,000

with data unavailability, aggregate scores for Cyprus are based on only two indicators, as shown in Table 5 below. Cyprus performs fairly poorly compared to the EU and this is the only underperforming policy area in the labour market section. Data on sectoral employment shares are available and adding this indicator will perhaps improve the aggregate score.

Table 5: Labour market mismatch and labour mobility – Aggregate scores

Indicators	*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).*	*Mismatch by education (Variance of relative unemployment rate by educational attainment - ISCED decomposition)*	*Dispersion of regional (NUTS level 3) unemployment rates of age group 15-64 (%)*	*Vacancies per 1000 unemployed (EMCO 20A2)*	*Aggregate score*
Indicator type	performance	performance	performance	performance	
Weights	1,0	1,0	1,0	1,0	
Aggregate score on LEVEL					
CY	n.a.	8,06	n.a.	-22,95	-7
Aggregate score on CHANGES/GROWTH					
CY	n.a.	9,49	n.a.	-30	-10

Source: LAF Maquette, December2009

PRODUCT AND CAPITAL MARKET REGULATIONS

In the latest Case Study Report for Cyprus (June 2008) two policy areas were identified as underperforming relative to the EU15 (Competition policy framework and Sector specific regulation), while there was no aggregate score due to unavailability of data for one policy area (Business environment - Regulatory barriers to entrepreneurship). (See Table 6). In the latest data update in December 2009 (Table 2), most of the data missing have been added and Cyprus is found to be relatively underperforming only in the area of Sector Specific Regulation (telecom, energy).

Table 6: Product and capital market regulations aggregate results –June 2008

Product and capital market regulations	**Indicator-based assessment**		**Qualification**	**Overall assessment**
	Level	**Change**		
-Competition policy framework*	**-18**	**0**		-
-Sector specific regulation (telecom, energy)**	**-11**	**-2**		-
-Business environment - Regulatory barriers to entrepreneurship**	No score	No score		=
-Business Dynamics - Start-up conditions***	3			=
-Financial markets and access to finance**	-7	3	↑ country-specific[a]	=
-Market integration - Openness to trade and investment**	6	2		+
Qualifications: a) the score was reversed to a neutral (=) overall assessment because of country specific issues: the venture capital market is Cyprus is inexistent due to lack of demand for such products. The size of the market cannot support any venture capital firms and because of their small size, the SMEs that comprise the quasi-totality of Cyprus businesses, cover all their financial needs by accessing the usual investment loan products of the banks and financial institutions				

Source: LAF Case Study Report for Cyprus –June 2008

Competition policy framework

This policy area was found be one of the 6 underperforming areas for Cyprus with an aggregate level score equal to -18, based on the case study report (June 2008)[11]. There has been a dramatic improvement, especially after the entering of Cyprus in the EU. Cyprus is currently evaluated much-above the EU15 average, with a level score equal to 16 (See Table 2).

This policy area includes five indicators in the narrow list, with a higher weight given to the indicator Comparative Price Levels. Based on this selection of indicators, the LIME Working Group marked this area with "*", implying poor coverage, which is true since many important measures of competition and competition policy effectiveness are absent due to unavailability of comparable data for all MSs .

The aggregate score in terms of changes is 13, which implies a higher progress compared to the EU15 countries. This aggregate score should be 19, if we correct for mistreatment in the calculations for the indicator Sectoral and Ad Hoc State Aid. As seen in Table 7, a missing value for 1999 is treated as zero, which has implications in the calculations for the score in changes. In particular, the score for the change in this indicator should be 30 instead of -6,58, which affects the aggregate score for the whole policy area significantly (See Table 8).

Table 7: Sectoral and ad hoc state aid for Cyprus and the EU15 average (% of GDP)

	1999	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*
CY	0,00	1,49	1,77	1,78	1,61	0,56	0,54	0,02	0,01
CY*		1,49	1,77	1,78	1,61	0,56	0,54	0,02	0,01
EU15	0,14	0,13	0,15	0,16	0,09	0,09	0,07	0,06	0,06
Note: *Indicates the corrected data									

LAF Maquette, December 2009

Cyprus has obviously improved in the area. However, there are still things that need to be improved, which are not measured by the indicators used for the calculations of the aggregate score. Ideally, indicators that measure mark-ups for all MSs in specific industries, or an index for the efficiency of the national committees for the protection of competition, might improve the evaluation of this area. More attention should be given to oligopolistic markets with homogeneous products like gas retailers, pharmacy stores etc.

[11] This was a combined result of unavailability of data (public procurement as a percentage of total public procurement), low quality of data (comparative price levels of final consumption) and poor performance (total state aid as a percentage of GDP).

Table 8: Competition policy framework– Aggregate scores on growth/changes

Indicators	*Total State aid - as a percentage of GDP (-)*	*Sectoral and ad hoc State aid - as a percentage of GDP (-)*	*Public procurement - as a percentage of GDP (+)*	*Public procurement - as a percentage of total public procurement (+)*	*Comparative price levels – of final consumption by private households including indirect taxes (-)*	*Aggregate score*
Indicator type	policy	policy	policy	policy	performance	
Weights	0,5	0,5	0,5	0,5	1,0	
CY	30,00	-6,58	30,00	30,00	-3,96	13
CY*	30,00	30,00	30,00	30,00	-3,96	19
Note: "*" indicates the corrected score.						

Source: LAF Maquette, December 2009

Sector specific regulation, telecom and energy

Cyprus has a poor performance in Sector Specific Regulation such as telecommunications and energy, compared to the EU15 average. According to the LAF choice of indicators and weights, Cyprus is evaluated below the EU15 average in both telecom (-13) and energy (-17). In terms of changes over time, there has been a slight improvement in telecommunications (1), but not in the energy sector (-17). "This situation reflects the dominance of large incumbents in Cyprus' utilities industries. However, this reality has to be analysed in the context of a very small island economy, where up-front costs and the small market size are dissuasive factors to new entrants" (*Case Study Report for Cyprus, June 2008*).

In the energy sector, the Electricity Authority of Cyprus (EAC) is still the only domestic provider in the market, according to the data. Other companies such as Vassilikos Cement Works Public Company Ltd are also licensed to produce electricity; however, they use the amount generated for their own (industrial) purposes. Hence, the demand faced by EAC is inelastic and any price increases are borne by the consumers. Cyprus needs to promote structural reforms in the sector to increase competition in the market and promote the use of renewable energy sources of production. The small size of the market is a problem, but there is room for improvement.

The Cyprus Telecommunications Authority (CYTA), which is the first telecommunication provider in the island, is no longer the only provider (since 2003). However, CYTA had been charging the lowest price in Europe for fixed telecommunication, local, calls. After 2003, prices gradually increased (though prices are still much lower than the EU average). Hence, Cyprus is evaluated as the worst in terms of growth in fixed telecommunication prices of local calls. On the other hand, international fixed telecommunication prices have been decreasing, after the liberalisation of the market. Due to the small size of the island and the already well-

developed telecommunication infrastructure[12], the Cypriot telecom market cannot absorb a big number of new entrants. Hence, market shares of the leading telecommunication operator are not expected to decrease much more. What matters is the provision of good services at low prices, which is so far achieved for Cyprus.

Following the above reasoning, the weights given to market shares should be lower and a higher weight must be given on prices. If we give lower weights to the market shares of the leading companies (e.g. 2/5) and higher to prices (3/5), the aggregate score in levels becomes -8 and the corresponding sub-scores are -1 for telecom and -16 for energy. If the weights cannot change, then the score for the telecommunication sector should be revised upwards in the Qualification column of Table 2, due to country specific reasons (small size of the country and good price performance).

Table 9: Sector Specific Regulation– Sub- aggregate scores on levels

	Average of the market share of the incumbent in fixed telecom (local, national, international)	*Market share of the leading operator in mobile telecom*	*Price of telecom - local calls*	*Price of telecom - national calls*	*Price of telecom - calls to USA*	***Sub-aggregate I: Telecom***
Sub-heading	telecom	telecom	telecom	telecom	telecom	
Indicator type	performance	performance	performance	performance	performance	
Weights	3,0	3,0	1,0	1,0	1,0	
CY	-28,09	-30,00	18,91	22,45	11,66	-13
Weights2	1,0	1,0	1,0	1,0	1,0	
CY*	-28,09	-30,00	18,91	22,45	11,66	-1

	Market share of the largest generator in the electricity market	*Electricity prices industrial users*	*Electricity prices - households*	*Gas prices - industrial users*	*Gas prices - households*	***Sub-aggregate I: Energy***	***Aggregate***
Sub-heading	energy	energy	energy	energy	energy		
Indicator type	performance	performance	performance	performance	performance		
Weights	3,0	1,5	1,5	1,5	1,5		
CY	-22,23	-16,98	-5,13	n.a.	n.a.	-17	-15
Weights2	2,0	1,5	1,5	1,5	1,5		
CY*	-22,23	-16,98	-5,13	n.a.	n.a.	-16	-8
Note: "*" indicates the scores using alternative weight allocations							

Source: LAF Maquette – December 2009

[12] It is worth noting that CYTA is a member of the European Foundation for Quality Management and in 2007, CYTA was "Recognized for excellence" with the highest ranking of 5 stars.

Moreover, more indicators on mark-ups, innovating behavior of the firms in the sector, and measures on effective control of the regulating bodies are perhaps necessary to complete the picture for this policy area.

Business environment- Regulatory barriers to entrepreneurship

The business environment in Cyprus is characterised by a large number of small and medium sized enterprises (SME´s) with a very small number of employees (99,9% of the companies have less than 10 employees). Regarding the number of procedures and the time necessary to register property or obtain a license, Cyprus performs around the EU average according the data. These need to be improved though, since Cyprus is a service-oriented economy and bureaucracy might prevent domestic and foreign investment and hence delay growth. We spot great inefficiency of the judicial system in resolving commercial disputes compared to the rest of the EU countries.

Business dynamics- Start-up conditions

This is a policy area with only four indicators in the narrow list and only two of them have scores in changes. On aggregate, Cyprus scores around average in level terms and fairly good in change terms (level 0, changes 5). Based on these indicators, on average, you need seven[13] working days to start-up and formally operate a business in Cyprus, compared to eight needed in the EU15 countries. Moreover, the cost of a new start-up is much lower in Cyprus (265 euro), than in the EU15 (750 euro). On the other hand Cyprus slightly underperforms in closing a business, both in terms of the time required and cost. The One-Stop Shop which started to operate in April 2007, offering a range of government services at one place, is expected to reduce the time necessary to complete these procedures.

Financial markets and access to finance

This policy area has been reconstructed, using different indicators from those initially agreed by the LIME Working Group members. Hence, basic information regarding definitions and other data information are missing in most cases. The newly added indicators are divided into three sub-categories instead of two, namely (i) Efficiency of the domestic financial system, (ii) Financial market integration and (iii) Competition in financial retail markets. Cyprus gets a neutral evaluation in the first two sub-categories in terms of levels, while fairly poor in the third. The score on growth is only based on 2 indicators instead of 17, because the remaining indicators have only one value available for all MSs. Consequently, the growth score for this policy area

[13] These values refer to 2006, which is the only year that Cyprus has data for this indicator.

should be ignored at the moment. For Cyprus, the growth score is actually based on only one indicator because data are not unavailable.

The financial sector in Cyprus is mostly comprised of the banking sector, which provides insurance and asset management services as well. According to the IMF, "there are 43 banks operating in Cyprus, of which eight have Cyprus as their home country; the rest are branches or subsidiaries of foreign banks. Non-bank financial institutions include pension funds, insurance companies, and investment companies". In addition, as mentioned in the last LAF Case Study Report, "the size of the market cannot support venture capital firms because of their small size. In reality, the SMEs (that comprise the quasi-totality of Cyprus businesses) cover their financial needs by accessing the usual investment loan products from banks and financial institutions."

Based on the LAF indicators, the financial size of the market is relatively large compared to the EU15 average. In terms of the efficiency of the domestic financial system, the only indicator in which Cyprus underperforms is Stock Market Liquidity (with a score of -30). The venture capital market, on the other hand, is non-existent in Cyprus and hence one of the main narrow list indicators is missing for Cyprus.

Regarding financial market integration, Cyprus performs well in foreign bank activity as already mentioned above. However, no foreign companies are listed in the Cyprus Stock Exchange, which gives a score of -18 to the indicator Share of Foreign Listed Companies on Equity Exchanges.

Finally, in terms of competition in the financial retail market, Cyprus is technically evaluated as fairly poor (level score -7)[14], which however could be revised to neutral. The banking sector is relatively more concentrated with the highest 5 banks holding 65% of the market. Nevertheless, foreign presence in the market (especially from Greek banks) is growing and significant, which increases competition among banks. Moreover, most narrow list indicators are related to technical advances in the sector, which are not yet reflected in the data. Online bank services are now offered by all banks and the number of online banking users has increased over the last two years. The same holds for the number of cashless transactions, since nowadays most retailers accept credit cards as method of payment, while this was not the case a couple of years ago. These changes are not yet reflected in the LAF data and hence the score is expected to improve in the next updates.

[14] The corrected score is -6. The reason is that the last three indicators are omitted from the calculation of the sub-aggregate score, while they are included in the total aggregate score for the policy area. When, we include them the score becomes -6, instead of -7.

Market integration - openness to trade and investment

On aggregate, Cyprus scores better than average in level and change terms (level 12, changes 6). In general, Cyprus is a highly open economy. Due to its small domestic market and the open nature of its economy, access to international markets is very important. Cyprus performs above average in terms of both cost and time needed for imports. Moreover, good performance is observed in the trade integration of goods and services. More specifically, the average value of imports/exports of goods was 25% of GDP in 2008. The average value of imports/exports of services is 30% of GDP, which is among the highest in the EU.

Based on LAF, the strong integration of the economy of Cyprus with the rest of the world is also reflected in its high FDI Intensity (15,6% GDP in 2008) which exceeds the EU15 Intensity (2,3% GDP). Foreign Direct Investment (FDI) has been liberalized, since the 1st of October 2004. According to additional information from the Cyprus Investment Promotion Agency (CIPA), in 2009, Cyprus attracted a total of 4.493 million euro in Foreign Direct Investment (FDI) compared to 3.112 million euro in 2008 and 1.725 million euro in 2007. Hence, higher scores are expected in the next updates. In 2008, the top three FDI sectors were Financial Intermediation (1.315,2 million euro), Real Estate and Business Activities (817,9 million euro) and Trade and Repairs (415,9 million euro).

From a technical point of view, we observe that some indicators in the narrow list have an enormous standard deviation, which causes most MSs to have a neutral score performance. Some examples are Activity of Foreign Banks as a Percentage of GDP, Financial Openness indicators and The Use of Technical Advances- Cashless Transactions. In general, indicators with a wide dispersion among MSs fail to rank countries and should be modified when possible.

Moreover, in the calculations of the score for the two Market Integration indicators, we observe mistakes in the formulas used in the Maquette. In particular, the EU average used corresponds to 2004 instead of 2008. This has implications on the scores for all MSs, including Cyprus. Since these two indicators are narrow list indicators, the aggregate score of the policy area is also affected.

All changes in aggregate scores discussed in the six policy areas related to product and capital market regulations are summarized in Table 10. Corrected scores are in bold fonts.

Table 10: Product and capital market regulations aggregate results (corrected) – December 2009

Product and capital market regulations	Indicator-based assessment		Qualification	Overall assessment
	Level	Change		
-Competition policy framework*	16	**19**		
-Sector specific regulation (telecom, energy)**	-15	-2		
Sub-aggregate I: telecommunications	*-13*	*1*		
Sub-aggregate II: energy	*-17*	*-17*		
Sub-aggregate III: others	*n/a*	*n/a*		
-Business environment - Regulatory barriers to entrepreneurship**	-4	1		
-Business Dynamics - Start-up conditions***	0	5		
-Financial markets and access to finance*	-1	n/a		
Sub-aggregate I: competition-efficiency	*4*	*n/a*		
Sub-aggregate II: financial market integration	*2*	*n/a*		
Sub-aggregate III: Competition on financial retail markets	***-6***	*n/a*		
-Market integration - Openness to trade and investment**	**11**	**5**		

Source: LAF Country Results- Cyprus – December 2009

INNOVATION AND KNOWLEDGE

All three policy areas in this section were identified as underperforming in the latest LAF Case Study Report for Cyprus (June 2008). In Table 11 below we present part of the LAF results from June 2008 when the report was written. Looking at Table 2, which is the latest update (LAF results in December 2009), we observe that there is a slight improvement in most scores.

However, part of this negative performance is due to statistical inaccuracies and miss-measurement issues, which affect mainly the scores for the areas R&D and Innovation and Education and Life-long learning.

Table 11: Innovation and Knowledge aggregate results –June 2008

	Indicator-based assessment		Qualification	Overall assessment
	Level	Change		
-R&D and Innovation* **	**-22**	**-1**		-
-ICT**	**-13**	**-4**		-
-Education and life-long learning* **	**-1**	**4**	↓ country-specific[b]	-
Qualifications: b) The score was reversed to fairly poor (-) overall assessment, due to country specific issues: there is an underperformance in several dimensions of the policy area (such as rate of early school leavers, lifelong learning, participation in continuous training, investment by enterprises in training of adults, share of graduates over working age population) which is crucial to explain poor labour productivity. In addition, there are dimensions not captured by the indicators used which points to challenges of increasing employment and training opportunities for young people as well as further enhancing the responsiveness of the education and training system to the labour market needs.				

Source: LAF Case Study Report- Cyprus –June 2008

R&D and Innovation

The aggregate score for this policy area is calculated by using four indicators with equal weights, as shown in Table 12. The score for this policy area should be -16 instead of -21 due to wrong data values used for the indicator Science and Technology Graduates. More specifically, this indicator includes only graduates from tertiary institutions in Cyprus, which is highly misleading since more than half of the Cypriot tertiary students study abroad. By estimating the total number of graduates both in Cyprus and abroad, we provide the corrected score as shown in Table 12 below. Despite this correction, performance in this policy area remains poor in levels. In terms of change, there is a slight improvement.

For an economy like Cyprus, this policy area is not considered a great concern. Private R&D activities are limited. The Cypriot economy is based on services and 99% of private companies are smaller than 10 employees in size, so the creation of private R&D units is not possible. The government can only encourage the creation of private research units in very few fields with high-tech potential that can be developed in Cyprus. The pharmaceutical industry, for example, seems to grow and according to Cyprus external trade statistics for 2007, 20,6% of Cyprus exports are pharmaceutical products. Incentives to pharmaceutical industries for private R&D may increase the employment of scientists in the field, possibly increase the number of patents gained for Cyprus, and help the sector grow further since now it is mainly based on replicating existing medical products. However, this requires careful studies, organization and work to achieve the necessary infrastructure and the minimum standards to compete internationally.

Table 12: "R&D and Innovation" policy area– Corrected aggregate scores

	Gross domestic expenditure on R&D	*Science and technology graduates*	*Patent applications to the European Patent Office*	*Employment in High-tech sectors*	*Aggregate score*
Aggregate score on LEVEL					
Aggr. weights	1,0	1,0	1,0	1,0	
CY	-22,98	-21,94	-13,14	-27,27	-21,3
CY*	-22,98	0,04	-13,14	-27,27	-15,8
Aggregate score on GROWTH					
Aggr. weights	1,0	1,0	1,0	1,0	
CY	5,40	-5,72	N/a	11,24	4
CY*	5,40	3,74	N/a	11,24	7
* Estimates of the true value based on the corrections made					

Source: LAF Maquette, December 2009

R&D funded by the government is what Cyprus has to focus on. During the last few years, the government has been contributing to R&D expenditures by founding the Open University of Cyprus in 2006 and the Cyprus Technological University in 2007, which are the second and third public universities in Cyprus respectively. Moreover,

the Engineering School at the University of Cyprus was created and it accepted its first students in 2007, while the new campus for the University of Cyprus is under construction. These are expected to have a positive effect on the score values in the future.

Investing in universities and research centers should be the main target of the government in the near future. This will increase employment opportunities for Cypriot scientists and prevent them from working abroad or find employment in other sectors irrelevant to their field. In other words, Cyprus needs to fully exploit its tertiary graduates. This will possibly increase the number of patents gained for Cyprus, since many patents invented by Cypriots are now attributed to other countries or foreign companies.

Information and Communication Technology -ICT

From a technical point of view, this area is of poor coverage, despite the fact that the area is marked with two stars ("**"), which means medium coverage. For Cyprus, coverage is reduced due to unavailable data for two of the five narrow list indicators. Hence, the aggregate score on this policy area is based on only three indicators for levels and two indicators for the score in changes. The negative score for the level assessment (-13) indicates that Cyprus underperforms compared to the EU15 countries. The rate of the sector's improvement though is around the EU15.

It should be noted that, there much recent activity in this sector is not yet reflected in the data. The University of Cyprus, for example, upgraded its online services with the online registration possibility, starting January 2009. The same holds for many government departments. Other private companies such as real estate and electronics stores now provide their services online and the government keeps increasing the online possibilities.

However, there remains a vast potential for higher utilization of the opportunities offered by information technologies. The government should create more IT units responsible for the creation and support of online services in all the basic public services. If most government services can be done online, people will save valuable time and avoid part of the bureaucratic procedures needed during work hours. Moreover, tourism and the real estate sectors can largely benefit from the use of online advertising and other facilities. Most people now book and pay their flights, hotels and transportation services online, since it is much more convenient. Since tourism is an important sector for the Cypriot economy all companies should be able to provide online services if they want to remain in the market. The same holds for all real estate companies. The government could promote the use of online services offered by hotels and private companies through seminars and advising offices if

necessary. Online sales and purchases offered by private stores are not popular mainly because of the very small size of the country. A more efficient operation of the postal services in Cyprus might help in increasing the benefits from online purchases.

Education and life-long learning

Cyprus scores around average in level terms and better than the average in change terms (level 2, changes 8). This neutral overall score in levels is the result of one the one hand negative performance in issues related to LLL and training (-5) and on the other hand, a positive performance in educational attainment (6).

As shown in Table 11, based on the latest Cyprus Case Study Report of June 2008, it was concluded that Cyprus is under-performing in this policy area, even though the score was neutral. The main reason given was that "... a weak performance in several dimensions (such as rate of early school leavers, life-long learning, participation in continuous training, investment by enterprises in training of adults, share of graduates over working age population) of the policy area explain the weak labour productivity performance in Cyprus… In addition, underperformance in dimensions not captured by the indicators used points to the challenges of increasing employment and training opportunities for young people as well as further enhancing the responsiveness of the education and training system to the labour market needs."

This quotation from the June 2008 case study is based on several indicators which were not available for Cyprus and appeared with zero values thereby affecting the overall assessment[15]. In addition, some other indicators are unreliable. The rate of early school leavers, life-long learning and the share of graduates over working age population are biased downwards for Cyprus due to measurement and sample selection issues in the EU LFS. We can provide more accurate estimates for the share of graduates, like we did for R&D and Innovation. Using our estimates for the share of graduates, the sub-aggregate score for education improves (level terms from 6 to 12, change terms from 7 to 10) and performance is good both in level and changes. The partly corrected aggregate scores of Table 2 for all three policy areas are provided in Table 13. Due to these issues both subcategories should be marked with "↑ due to specific indicator" (upgrading performance) in the Qualification column.

[15] In June 2008, both indicators: "participation in continuous training" and "investment by enterprises in training of adults", were assigned a poor score without any data available for Cyprus, because of treating the missing values as zeros in the Maquette. In the latest versions of the Maquette this was corrected, which improved aggregate performance.

Table 13: Innovation and Knowledge aggregate results (corrected) –December 2009

Innovation and knowledge	Indicator-based assessment		Qualification	Overall assessment
R&D and Innovation***	**-16**	**7**		
ICT*	-13	3		
Education and life-long learning***	**6**	**11**		
Sub-aggregate I: education	***12***	**10**		
Sub-aggregate II: life-long-learning	-5	13		

Source: LAF Country Results- Cyprus – December 2009

It is true that Cyprus has an extremely good performance in education, evaluated as above the EU15 average. Therefore, the weak productivity performance cannot be explained by the low qualified personnel, but possibly other factors, such as the inefficient usage of tertiary graduates in public sector services, lack of infrastructure and organization. The government needs to provide the means and infrastructure, in order to fully exploit its tertiary graduates. Creating job opportunities for researchers and scientists will prevent tertiary graduates from working in jobs irrelevant to their field of study, or looking for a job abroad. In other words, what the government needs to do is to give the opportunity to all qualified Cypriots to apply their knowledge and contribute to economic growth. Failure to do so, results in pure waste of resources.

Regarding the education system there are still things that need to be done such as improving the vocational training system.

MACROECONOMY

Large and persistent budget deficits have generated considerable concern. It is widely believed that they reduce growth and they could lead to a crisis, if they go on for too long or become too large. Hence, macroeconomic and fiscal measures are important and necessary to be included in a framework like LAF.

As indicated in Table 2, there is only one policy area included in the case study, under this section, namely Orientation of Public Finances[16]. This policy area is covered by six indicators in the narrow list, of which four are included in the first sub-category (Consolidation of Public Finances). Based on the choice of indicators in LAF the performance in this area is evaluated as fairly good on levels and neutral in changes (level 5, changes 3). The sub-category score for the consolidation of public finances is evaluated as neutral (level 3, changes 2), while the score for sustainability is fairly good (level 8, changes 5). Note, however, that sub-aggregate growth score II is based only on the score for indicator 9 (Sustainability S2 Long term).

[16] Under the macroeconomy section there is one more policy area, namely "Macroeconomic background information", which is not included in the LAF country tables. This is just complementary.

Looking at the budget measures, Cyprus performs relatively well, though we observe an important deterioration in 2009, which is not reflected yet in the last LAF update. The gross debt ratio, which reflects the accumulation of past debts, was 48% of GDP in 2008, while in 2009 this number increased to 56%. Despite this sharp worsening, Cyprus still performs above the EU15 average and below the target of 60% of GDP. Net lending as a percentage of GDP (or actual public balance) was 0,9% of GDP in 2008, while -6,1% in 2009. If we exclude interest payments, these numbers become 3,72% for 2008 and -3,6% in 2009 respectively (Primary Balance). As indicated by these numbers, there was a surplus for Cyprus in 2008, even when interest payments are included. In 2009, however, both indicators show a deficit in public balances. Taking into account the effects of the business cycle, the cyclically adjusted balance (CAB), was -0,2% in 2008 and - 5,8% for 2009. Cyprus shows an expansionary fiscal position for 2008 since the primary structural budget balance (CAB net of one-off items) has increased significantly in 2008 relative to 2007 (a change of -2,84 % GDP). This continued to hold in 2009 as well, with a change of -5,4% in GDP.

In terms of sustainability, the adjustment to the structural budget balance that is required to reach the target debt/GDP ratio of 60% by 2060 (finite horizon budget constraint) is 4,6% of GDP, despite the fact that the current government debt is below 60%. This is because of the large adjustment needed to cover age-related expenditures by 2060. Alternatively, the adjustment required to fulfill the infinite horizon budget constraint is 8,79% of GDP for 2008. This can be broken down to the adjustment due to the initial budgetary position, which is 0,52% GDP and the long-term adjustment due to the increase in age-related expenditures, which is 8,28%. This long-term component is almost double the EU15 average and indicates that Cyprus needs to urgently address the increasing age-related expenditures issue. A structural reform on the social security and pension schemes is necessary.

The LAF aggregate score fails to show the necessity of social security and pension reforms, as indicated by many indicators in this policy area. The Sustainability Report 2009 of the Commission evaluates Cyprus as “high risk” with regards to the long-term sustainability of public finances. This should be reflected in LAF; hence, a change in the choice of indicators and weights for this policy area is suggested. The Projected Change in the Labour Force indicator should be reconsidered, or given less weight in the narrow list. It is not clear whether performance for Cyprus in this indicator is based on an extrapolation from the recent dramatic increases in the number of foreign workers. If so, it is not likely to speak to natural population increases for the local population. When splitting the weight given to these projections (See Table 14), the aggregate score becomes 2, while the sub-aggregate for sustainability becomes 0.

Table 14: "Orientation and Sustainability of public finances"– Aggregate scores on levels

Indicators	*General Government Gross Debt (% of GDP)*	*Fiscal stance: change in Structural budget balance*	*Cyclically Adjusted Balance (CAB)*	*Primary budget balance as % of GDP (Net lending excluding interest)*	*Sustainability indicator: S2 - long-term changes in the primary balance (LTC)*	*Projected change in labour force between 2008 and 2050 (AWG baseline scenario Year: 2009)*	*Sub-aggregate I: consolidation of public finances*	*Sub-aggregate II: Sustainability*	*Aggregate*
Indicator type	performance	policy	policy	performance	performance	performance			
Weights	1,0	1,0	0,5	0,5	1,0	1,0			
CY	7,4	-10,8	12,6	11,9	-14,3	30,0	3,0	7,9	4,9
Weights2	1,0	1,0	0,5	0,5	1,0	0,5			
CY*	7,4	-10,8	12,6	11,9	-14,3	30,0	3,0	0,0	2,1
Note: "*"indicates aggregate scores using a different weight on the projected change in labour force.									

Source: LAF Maquette, December 2009

Moreover, more indicators could be included, e.g. the Required Primary Balance Projections on expenditure might be more direct measures that take into account the increase in the labour force, as well. It would be perhaps more informative if we split the sustainability indicators based on the sources of the expenditure.

4 PART 3: SCREENING- THE LINK BETWEEN UNDERPERFORMANCE IN POLICY AREAS AND RELEVANT GDP COMPONENTS

Screening is the third part of LAF, which is summarized in LAF Table 3. This part connects and relates any underperformance in the first two parts. The purpose of screening is to help in establishing priorities among underperforming policy areas. As shown in Table 15, the first column contains all 20 policy areas included in the second part of LAF. The first row on the other hand, includes all 12 GDP components included in the first part of LAF. Underperforming areas for each country are highlighted in bold fonts. The shaded grey cells indicate cases where the economic literature establishes theoretical channels that link underperformance in a policy area to underperformance in a GDP component. Finally, crosses indicate country-specific cases of coincidence between underperformance in policy areas and GDP components, either in levels or changes, based on the qualified assessment of the first two parts of LAF.

The screening table is not completed for the December 2009 data update. Based on the results and the discussion in the previous sections, four policy areas are identified as underperforming for Cyprus: (i) Labour market mismatch and labour mobility, (ii) Sector Specific Regulation (iii) R&D and Innovation and (iv) ICT. On the other hand two GDP components are identified as underperforming namely (i) Capital Deepening and (ii) Total Factor Productivity. According to the Screening table, underperformance in both components is related to low performance in sector specific regulation, R&D and Innovation and ICT policies, as indicated by the shaded

cells. Accordingly, we complete this table by inserting crosses in these cells, as shown in Table 15.

Part of the analysis included in the Case Study Report of June 2008 applies here: "*First, the main issue that is signaled for Cyprus is clearly the nexus between the underperformance of product market policies and innovation and knowledge policies on the one hand and the underperformance in capital deepening and TFP on the other hand…Second, the feature of the Cyprus island economy of being, simultaneously, very small and very open, must be properly taken into account when designing and analysing policies. The openness to international trade, good higher education of youth, and competitiveness pressures are positive features…Third, while labour market policies and labour market growth components perform well, there might still be scope for improvement. In particular, efforts to reduce labour market segmentation and gaps between men and women could be beneficial.*"

Table 15: LAF Part 3 - Screening (In LAF "Table 3: Screening of coincidence between underperformance in policy areas and relevant GDP components")

	Demographic components			**Labour market components**						**Labour Productivity**		
	Fertility / Native Population	Share of foreign population / Net Migration	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												
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												
Competition policy framework												
Sector specific regulation (telecom, energy)										**X**	**X**	
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										**X**	**X**	
ICT										**X**	**X**	
Education and lifelong learning												
Orientation and sustainability of public finances												

Note: This is LAF Table 3 completed by the authors based on the country results for Cyprus for December 2009.

5 CONCLUSIONS

Based on LAF and the discussion followed in this study, the economy of Cyprus needs to focus on policies related to R&D and Innovation, ICT, and Sector-Specific Regulation in order to increase productivity and growth. Keeping in mind the small size of the Cypriot economy and its service orientation, R&D will in practice be largely concentrated (at least initially) on public expenditures on education and research infrastructures. This will (i) maintain the highly educated labour force in Cyprus (ii) produce knowledge and patents and, in time, achieve the full exploitation of the research output by Cypriots, (iii) encourage the employment of highly educated labour in the country instead of exporting it to other countries, (iv) use highly educated labour force in their field of study and avoid underemployment, and (v) establish a tradition in the exportation of educational and other related services through the attraction of foreign *bona fide* students. In terms of sector specific regulations, particular attention should be given to the energy sector. All of the above could improve productivity and increase growth.

Despite the fact that Cyprus performs relatively well in labour market issues, a number of policies could be undertaken in order to improve, or sustain, labour market conditions. Some of the measures mentioned earlier in our analysis are the following: (i) Promoting more active labour market policies and replacing social assistance benefits with in-work benefits to prevent inactivity traps (which will become more prominent in the upcoming years), (ii) Better border control and regulation of immigration policies in order to prevent illegal immigration and undesirable social conditions, (iii) More childcare facilities offered to working women and introduction of flexible hour of work, in order to increase female participation and reduce the gender pay gap.

Lastly, in terms of macroeconomic and fiscal policy, Cyprus needs to pay special attention to the sustainability of the Social Security Funds by promoting pension reform. In addition, a better managing of public finances could be achieved by cutting unnecessary public expenditure and better management in public sector services.

Regarding the Lisbon Methodology Framework we can conclude that it is a useful tool to evaluate all MSs in terms of their progress with the Lisbon Strategy targets and guidelines and progress with structural reforms. The main advantage of this tool is that it achieves comparability among MSs, through a transparent methodology. However, it should be used with caution. All data refer, on average to periods two years back. This might lead to misleading conclusions and delay policy reforms. In addition, LAF users should be careful to investigate data and indicator definitions

before deciding whether a policy area or a GDP component is underperforming. A variety of examples have been analysed in the current application for Cyprus.

Moreover, not all dimensions are included in LAF. For example, environmental considerations are absent from this framework despite the fact that renewable energy use is among the headline EU targets.

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