Dynamic Factor Models for Survey-based Confidence Indicators

Final Report

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Contents

1 Introduction

Monitoring the current status of the economy is quite relevant for policy making but also for the decisions of private agents, consumers and firms. Unfortunately, there is no consensus in the literature on the selection of a measure of the current status of the economy, i.e., of a coincident indicator.

Paralleling the work by Moore and Shiskin (1967) for leading indicators, it is possible to list a set of properties that coincident indicators should exhibit. They include: (i) consistent timing as a coincident indicator (i.e., to systematically coincide with peaks and troughs in economic activity); (ii) economic significance (i.e., being supported by economic theory as good measures of economic activity); (iii) statistical reliability of data collection (i.e., provide an accurate measure of the quantity of interest); (iv) prompt availability without major later revisions (i.e., being timely and regularly available, without requiring subsequent modifications of the initial statements); (v) smooth month to month changes (i.e., being free of major high frequency movements).

Given these requirements, a natural choice for a coincident indicator is gross domestic product (GDP) or its growth rate, since it is typically considered as a reliable summary of the current economic conditions. Unfortunately, GDP is not available on a monthly basis and, although both in the US and in Europe there is a growing interest in increasing its sampling frequency from quarterly to monthly, the current results are still too preliminary to rely on them. Moreover, there are typically long delays in the release of GDP data and the preliminary values can be subject to subsequent large revisions. Both these features of the GDP data production process make it hardly usable as a timely coincident indicator.

In the past, variables such as industrial production, sales, real personal or employment were used as coincident indicators. However, since none of them satisfies all the requirements listed above, it can be preferable to consider a combination of several coincident indicators, i.e., a composite coincident index (CCI).

A characteristic of the literature on CCIs is that most of the studies, with the exception of Altissimo et al. (2001), focus on the US experience. This is due to the availability of better and longer time series for the US than for European countries, to the necessity of analyzing a variety of different countries in the case of Europe while for the US the focus is typically on the aggregate US data, and to the long established interest in the US for this topic, starting at least with Burns and Mitchell (1946). There is therefore a clear necessity to compare and compute reliable CCIs also for European countries and for Europe as a whole, possibly at a disaggregate sectoral level.

Another characteristic of the literature on CCIs is that typically the focus is on the combination of macroeconomic variables rather than survey answers. However, the latter has the key advantage of being timely available, based on a very large information set, and not subject to subsequent data revisions. The European Commission (more specifically, DG-ECFIN) computes a variety of survey based CCIs, using mostly a non-model based procedure. Basically, the percentage of positive, negative and equal answers are computed for each question in the questionnaire, the balance percentage (positive minus negative) is

obtained, and it is linearly aggregated over questions to compute the CCI. Notwithstanding the simplicity of the method, it performs rather well in general, see e.g. Gayer and Genet (2006). A possible explanation for such a good performance is that this type of aggregation is similar to pooling in the forecasting literature, which is known to work quite well in general, see e.g. Clemen (1989) for an overview or Stock and Watson (1999) and Marcellino (2004) for empirical results on, respectively, the US and Europe.

Since dynamic factor models are particularly suited to extract summary information from large datasets, they represent an alternative natural statistical tool to derive model based CCIs using survey data. Gayer and Genet (2006) compare the non-model based procedure followed by DG-ECFIN with several factor based CCIs, finding that the more sophisticated methods yield no gains for the Industry sector, and limited gains for other sectors, which increase a bit for some European countries.

We start the Report with a description of the factor-based methodological approach, in Section 2, and of the available data to be combined into a CCI using alternative methods, in Section 3.

We then provide results about the performance of alternative factor based CCIs for Europe at the sectoral/country level, in Section 4. This analysis is interesting for a disaggregate evaluation of business cycle conditions, e.g., for monitoring sectors that typically anticipate the global cycle, such as building, or that represent important engines of growth, such as services, or consumption from a demand perspective. Moreover, the national sectoral indexes can be used as input series for the construction of global national or euro area /EU CCIs. Finally, the temporal dimension of the sample at the sectoral level is often larger than at global level, due to national and sectoral heterogeneities in the starting dates of the surveys, so that the results can be more reliable from a statistical point of view.

To start with, we repeat the comparison of factor based sectoral CCIs and Confidence indicators reported in Gayer and Genet (2006) on a slightly different sample, finding similar results. Then, we evaluate a set of extensions, as required in the Call for Tenders. In particular, we evaluate whether the results change when:

(a) The equal percentage of answers is also taken into account. The use of only the balance series could miss relevant information since the latter cannot fully summarize the content of the series of positive, negative and equal answers. Since the sum of these three series is equal to 100, at least two series are needed to fully summarize their content. Therefore we will construct CCIs based on the balance and equal series of answers.

(b) The variables are preselected prior to factor extraction based on their either contemporaneous or leading/lagging correlation with the target series. The factor based methods do not take into consideration the target series in the estimation of the factor(s). Therefore, if series unrelated with the target are included in the dataset used to estimate the factor model, the estimated factor(s) could be unrelated with the target. Boivin and Ng (2005) suggested to preselect the variables based on their correlation with the target. We apply their suggestion, and also consider excluding lagging variables with respect to the target, to avoid the CCIs to have lagging rather than coincident features.

(c) More disaggregate information is considered, at the subsector (branch specific) level. An additional level of disaggregation, the branches, could contain relevant information to better explain developments at the sectoral level. Moreover, a larger number of time series allows more precise estimation of the factors. However, since disaggregate time series could present a larger idiosyncratic component or be unrelated with the target, it is important to accurately preselect them.

(d) More than one factor is used to summarize the data. This could be particularly relevant to decrease the idiosyncratic component of the series at the branch level or for pooled datasets of all sectors or countries.

(e) Alternative evaluation criteria are used. The most common criteria employed to evaluate a CCI is its correlation with a reference series, such as Industrial Production or GDP growth, which usually become available with a substantial time delay. However, two other measures provide useful information from an economic point of view: whether the CCI and the target increase/decrease contemporaneously and whether their peak/trough structure is similar. The former can signal in advance whether the economic situation is improving or deteriorating, the latter whether a boom or a recession are starting.

We can anticipate that the additional information, either on the percentage of equal answers or at the branch level, is in general rather useful for the construction of sectoral CCIs, in particular when combined with variable preselection.

After this detailed analysis of sectoral indicators, in Section 5 we address the construction of global indexes at the country or euro area/EU level. Alternative approaches are available. For example, a global national index can be obtained by aggregating the national sectoral indexes with GDP weights, or by summarizing them within a proper factor model, or by extracting the information from a pooled dataset with answer level data on all the sectors for that country. After a more detailed analysis of the advantages and disadvantages of the alternative procedures, we apply them and compare their empirical performance using a set of alternative evaluation criteria. The results are used to propose a method of construction of global national and euro area / EU CCIs.

More disaggregate information appears to be useful also in this context, when summarized into a CCI using a factor based approach. The cost is a substantial reduction of the evaluation sample, since the collection of branch level data started later. However, this negative feature is more than compensated by the fact that the CCIs based on disaggregate information perform well for a vast majority of the rather heterogenous countries under analysis.

In Section 6 we summarize the main findings we have obtained in this study and the resulting suggestions for the construction of CCIs for Europe. In Section 7 we list the main relevant references to the related literature on CCIs. A Statistical Annex provides detailed Tables with the results of the analysis. Finally, the study is completed by a commented MATLAB program for the computation of the CCIs discussed in the Report.

2 Methodological approach

A CCI can be constructed in a non-model-based or in a model based framework. In the former, CCIs are simple unweighted or weighted averages of selected single indicators. Examples are provided, respectively, by the European Commission DG ECFIN's Economic Sentiment Indicator, and by the Conference Board and ECRI CCIs for the US.

Within the model based approach, two main methodologies have emerged: dynamic factor models and Markov switching models. In both cases there is a single unobservable force underlying the current status of the economy, but in the former approach this is a continuous variable, while in the latter it is a discrete variable that evolves according to a Markov chain. Factor models provide a formalization of Burns and Mitchell's (1946) notion of business cycles as comovements in several variables. Leading references in the context of CCIs are Stock and Watson (1989, 1991, 1992), Forni, Lippi, Hallin, Reichlin (2001), Altissimo et al. (2001).

Markov switching (MS) models formalize Burns and Mitchell's (1946) notion that expansions and recessions are different. After the pioneering article by Hamilton (1989), a vast literature followed, extending the basic model into several dimensions, e.g. Krolzig, Marcellino and Mizon (2002) consider multivariate MS error correction models, Diebold, Lee and Weinbach (1994) and Filardo (1994) allow the transition probabilities to depend on exogenous variables.

Diebold and Rudebusch (1996), Kim and Nelson (1998), Filardo and Gordon (1999) combine the characteristics of factor models and MS models by allowing MS features in the evolution of the factors.

Unfortunately, due to the high nonlinearity of the Markov switching specifications, estimation of the models becomes virtually unfeasible already for 6-8 variables. Moreover, typically long time series are required for the results to be reliable and stable. Therefore, this methodology is not suited for the analysis of the large survey based dataset underlying DG-ECFIN coincident indicators, and we focus on the use of the dynamic factor based approach.

A dynamic factor model was used to extract a coincident indicator by Stock and Watson (1989, SW), with subsequent refinements of the methodology in Stock and Watson (1991, 1992). The rationale of the approach is that all the coincident indicators are driven by a common force, the CCI, and by idiosyncratic components that are either uncorrelated across the variables under analysis or in any case common to only a limited subset of them. Hence, this approach formalizes Burns and Mitchell's (1946) notion that business cycles represent comovements in a set of series

The particular model that SW adopted is the following,

$$\Delta x_t = \beta + \gamma(L)\Delta C_t + u_t \tag{1}$$

$$D(L)u_t = e_t \tag{2}$$

$$\phi(L)\Delta C_t = \delta + v_t \tag{3}$$

where x_t includes the components of the CCI, C_t is the single factor driving all variables (CCI_{SW}), while u_t is the idiosyncratic component; Δ indicates the first difference operator,

L is the lag operator and $\gamma(L)$, $D(L)$, $\phi(L)$ are, respectively, vector, matrix and scalar lag polynomials. SW used first differenced variables since unit root tests indicated that the coincident indexes were integrated, but not cointegrated. The model is identified by assuming that $D(L)$ is diagonal and e_t and v_t are mutually and serially uncorrelated at all leads and lags, which ensures that the common and the idiosyncratic components are uncorrelated. Moreover, ΔC_t should affect contemporaneously at least one coincident variable. Notice that the hypothesis of one factor, ΔC_t, does not mean that there is a unique source of aggregate fluctuations, but rather that different shocks have proportional dynamic effects on the variables.

For estimation, the model in (1)-(3) is augmented by the identity

$$C_{t-1} = \Delta C_{t-1} + C_{t-2}, \tag{4}$$

and cast into state-space form. The Kalman filter can then be used to write down the likelihood function, which is in turn maximized to obtain parameter and factor estimates, all the details are presented in Stock and Watson (1991).

From an empirical point of view, the computation of the CCI_{SW} indexes in our context poses two problems. First, as in the case of the Markov switching models, there are often numerical convergence problems when the number of series under analysis is larger than 5-6, which is often the case for our application. Second, the model should be carefully specified for the specific series under analysis. Such a task is too demanding in our context, since we have to consider many countries and several sectors. Moreover, the analysis of Gayer and Genet (2006) indicates that the CCI_{SW} has typically minor advantages with respect to simple non model based confidence indicators.

An additional possible drawback of SW's procedure is that it requires an ex-ante classification of variables into coincident and leading or lagging, even though this is common practice in this literature, and it cannot be directly extended to analyze large datasets because of computational problems. Forni, Hallin, Lippi and Reichlin (2000, 2001 FHLR henceforth) proposed an alternative factor based methodology that addresses both issues, and applied it to the derivation of a composite coincident indicator for the Euro area. They analyzed a large set of macroeconomic time series for each country of the Euro area using a dynamic factor model, and decomposed each time series into a common and an idiosyncratic component, where the former is the part of the variable explained by common Euro area shocks, the latter by variable specific shocks. The CCI_{FHLR} is obtained as a weighted average of the common components of the interpolated monthly GDP series for each country, where the weights are proportional to GDP, and takes into account both within and across-countries cross correlations.

More specifically, the model FHLR adopted is

$$x_{it} = b_i^{'}(L)v_t + \xi_{it}, \quad i = 1, ..., N, \quad t = 1, ..., T, \tag{5}$$

where x_{it} is a stationary univariate random variable, v_t is a $q \times 1$ vector of common shocks, $\chi_{it} = x_{it} - \xi_{it}$ is the common component of x_{it}, and ξ_{it} is its idiosyncratic component. The shock v_t is an orthonormal white noise process, so that $var(v_{jt}) = 1$, $cov(v_t, v_{t-k}) = 0$, and

$cov(v_{jt}, v_{st-k}) = 0$ for any $j \neq s$, t and k. $\xi_N = \{\xi_{1t}, ..., \xi_{Nt}\}'$ is a wide sense stationary process, and $cov(\xi_{jt}, v_{st-k}) = 0$ for any j, s, t and k. $b_i(L)$ is a $q \times 1$ vector of square summable, bilateral filters, for any i. Notice that SW's factor model (1) is obtained as a particular case of (5) when there is one common shock ($q = 1$), $b_i(L) = \gamma_i(L)/\phi(L)$, and the idiosyncratic components are assumed to be orthogonal.

Grouping the variables into $x_{Nt} = \{x_{1t}, ..., x_{Nt}\}'$, FHLR also required x_{Nt} (and χ_{Nt}, ξ_{Nt} that are similarly defined) to have rational spectral density matrices, Σ_N^x, Σ_N^χ, and Σ_N^ξ, respectively. To achieve identification, they assumed that the first (largest) idiosyncratic dynamic eigenvalue, λ_{N1}^ξ, is uniformly bounded, and that the first (largest) q common dynamic eigenvalues, $\lambda_{N1}^\chi, ..., \lambda_{Nq}^\chi$, diverge, where dynamic eigenvalues are the eigenvalues of the spectral density matrix, see e.g. Brillinger (1981, Chap. 9). In words, the former condition limits the effects of ξ_{it} on other cross-sectional units. The latter, instead, requires v_t to affect infinitely many units.

Let us assume for the moment that the number of common shocks is known. Then, FHLR suggested to estimate the common component of χ_{it} with the following step-wise procedure.

(i) Estimate the spectral density matrix of x_{Nt} as

$$\Sigma_N^T(\theta_h) = \sum_{k=-M}^{M} \Gamma_{Nk}^T \omega_k e^{-ik\theta_h}, \quad \theta_h = 2\pi h/(2M+1), \quad h = 0, ..., 2M, \tag{6}$$

where Γ_{Nk}^T is the sample covariance matrix of x_{Nt} and x_{Nt-k}, ω_k is the Bartlett lag window of size M ($\omega_k = 1 - k/(M+1)$), and M diverges but M/T tends to zero.

(ii) Calculate the first q eigenvectors of $\Sigma_N^T(\theta_h)$, $p_{Nj}^T(\theta_h)$, and the associated eigenvalues $\lambda_{j\theta}^x$, $j = 1, ..., q$, for $h = 0, ..., 2M$.

(iii) Define $p_{Nj}^T(L)$ as

$$p_{Nj}^T(L) = \sum_{k=-M}^{M} p_{Nj,k}^T L^k, \quad p_{Nj,k}^T = \frac{1}{2M+1} \sum_{h=0}^{2M} p_{Nj}^T(\theta_h) e^{ik\theta_h}, \quad k = -M, ..., M. \tag{7}$$

$p_{Nj}^T(L)x_{Nt}$, $j = 1, .., q$, are the first q estimated dynamic principal components of x_{Nt}.

(iv) The estimated common component of x_{it}, $\widehat{\chi}_{it}$, is the projection of x_{it} on present, past, and future dynamic principal components. FHLR proved that, under mild conditions, $\widehat{\chi}_{it}$ is a consistent estimator of χ_{it} when N and T diverge. Once the common component is estimated, the idiosyncratic one is obtained simply as a residual, namely, $\widehat{\xi}_{it} = x_{it} - \widehat{\chi}_{it}$. Therefore, each variable can be decomposed into

$$x_{it} = \widehat{\chi}_{it} + \widehat{\xi}_{it}. \tag{8}$$

A competing procedure for the analysis of dynamic factor models with a large number of variables was developed by Stock and Watson (2002a, 2002b, SW2 henceforth), and applied to Europe by, e.g., Marcellino, Stock and Watson (2003). The model by SW2, in its time invariant formulation, can be written as

$$x_{nt} = \Lambda f_t + \xi_{nt}, \tag{9}$$

where f_t is an $r \times 1$ vector of common factors. Contrary to the specification by FHLR, the factors are not required to be uncorrelated in time, and they can be also correlated with the idiosyncratic component, only $var(f_t) = I$ is imposed for identification. Precise moment conditions on f_t and ξ_{nt}, and requirements on the loadings, are given in SW2.

The specification in (9) is related to the one by FHLR in (5). When $b_i(L)$ is unilateral and of finite order b, say $b_i(L) = b_{0i} - b_{1i}L - b_{bi}L^b$, the model in (5) can be written as in (9), where $f_t = (v_t, v_{t-1}, ..., v_{t-b})$ and the i^{th} row of Λ has elements b_{0i}, b_{1i}, b_{bi}. Hence, $r = q(b+1)$, and the factors f_t are dynamically singular, i.e., the spectral density matrix of f_t has rank q.

To estimate the factors, SW2 define the estimators $\widehat{f_t}$ as the minimizers of the objective function

$$V_{nT}(f, \Lambda) = \frac{1}{nT} \sum_{i=1}^{n} \sum_{t=1}^{T} (x_{it} - \Lambda_i f_t)^2. \tag{10}$$

Under the hypothesis of k common factors, it turns out that the optimal estimators of the factors are ($\sqrt{T}$ times) the k eigenvectors corresponding to the k largest eigenvalues of the $T \times T$ matrix $n^{-1} \sum_{i=1}^{n} \underline{x}_i \underline{x}_i'$, where $\underline{x}_i = (x_{i1}, ..., x_{iT})$. These coincide with the principal components of the variables. Moreover, the optimal estimators of the loadings Λ are the OLS estimators of the coefficients in a regression of x_{it} on the k estimated factors $\widehat{f}_t$, $i = 1, ..., n$. Hence, a consistent estimator of the i^{th} common component can be obtained as $\widehat{\chi}_{it} = \widehat{\Lambda}_i \widehat{f}_t$, and a natural choice for the estimator of the idiosyncratic component is $\widehat{\xi}_{it} = x_{it} - \widehat{\chi}_{it}$.

A convenient feature of the SW2 approach is that no future information is used for factor estimation, contrary to FHLR, and therefore the method can be applied in real time. The CCI_{SW2} can be defined either as the single factor extracted from a set of coincident indicators or as an average of the common components of each single indicator. We will report results for the latter approach, since it facilitates the comparison with the FHLR procedure and the computation of a CCI when more than one factor is chosen.

Then, formally, the CCI_{SW2} is defined as

$$CCI_{SW2} = \frac{1}{n} \sum_{i=1}^{n} \widehat{\Lambda}_i \widehat{f}, \tag{11}$$

where the factors are estimated as the (first) principal components of the variables, and the loadings as the coefficients in OLS regressions of each variable on the estimated factors. Notice that in the case of a single factor the expression for CCI_{SW2} simplifies into

$$CCI_{SW2} = \left(\frac{1}{n} \sum_{i=1}^{n} \widehat{\Lambda}_i \right) \widehat{f},$$

so that the index is perfectly collinear with the estimated factor (i.e., the correlation is equal to one).

The current Business Climate Indicator for the euro area published by the European Commission is based on a (single) factor model estimated by Maximum Likelihood (ML), using the industry survey data, and assuming i.i.d. factors and idiosyncratic components

(orthogonal to each other and among themselves). The ML-iid factor estimator coincides, under mild conditions, with the principal components of the variables and empirically the two estimators yield very similar results (see Gayer and Genet (2006) for an application in the CCI context). However, Stock and Watson (2002a) have shown that the principal components provide reliable estimators for the factors also when the latter (and possibly the idiosyncratic components) are correlated over time. Therefore, the ML-iid based indicator is dominated by the CCI_{SW2}, and by CCI_{SW} in a parametric context.

With respect to the methodology by FHLR, SW2 is suited for real time implementation but could be less efficient in modelling the dynamics. Altissimo et al. (2001) refined the approach in FHLR to make it suitable for real time implementation, and used the modified technique to build the CEPR's composite coincident indicator for the euro area, Eurocoin (see www.cepr.org). In particular, they exploited the large cross-sectional dimension of the dataset for forecasting indicators available with delay and for filtering out high frequency dynamics. However, the main innovation is the use of an alternative estimator for the common components of the variables which does not require future information. The theory for the latter is presented in Forni, Lippi, Hallin, Reichlin (2003, FHLR2 henceforth).

While the analytical derivation of the method in FHLR2 is fairly complicated, its practical implementation is relatively easy. Let us reconsider the decomposition in (8), namely,

$$x_{it} = \widehat{\chi}_{it} + \widehat{\xi}_{it}, \tag{12}$$

and indicate the variance covariance matrix of $\widehat{\xi}_t$ by V_ζ.

Using, for example, the standard Choleski decomposition, it is possible to find a matrix P_ζ such that $P_\zeta V_\zeta P_\zeta' = I$. Multiplying both sides of (8) by P_ζ yields

$$P_\zeta x_{it} = P_\zeta \widehat{\chi}_{it} + P_\zeta \widehat{\xi}_{it} = \widehat{\alpha}_{it} + \widehat{\beta}_{it}, \tag{13}$$

where now the variance covariance of $\widehat{\beta}_t$ coincides with the identity matrix.

The principal components of $P_\zeta x_t$ are called generalized principal components of x_t by FHLR2, and the one-sided estimator of the common component is obtained by projecting the variables on the generalized principal components.

Altissimo et al. (2001) construct Eurocoin as the weighted average of common components of interpolated monthly GDP of euro area countries. Following their suggestion, and for comparability with the CCI_{SW2}, we construct the CCI_{FHLR2} as the average of the common components over variables.

3 Overview of the data

The data used in this report are extracted from the general Business and Consumer Survey dataset. We consider the five sectors for which survey data are available, namely, Industry (INDU), Consumers (CONS), Services (SERV), Building (BUIL) and Retail (RETA). We focus on the euro area and the European Union as a whole, plus the 12 countries within the

euro area, the three old member states outside the euro, i.e., Denmark, Sweden and UK, and the three largest new member states, i.e. the Czech Republic, Hungary and Poland. The general sample period is 1985:1-2005:12, with some differences across countries.

For each sector, several questions are asked in the survey, but the answers to some of them are not included into the Confidence Indicators constructed by the European Commission. We make the same choice of questions for each sector as in Gayer and Genet (2006, Table A1), to whom we refer for additional details on the data. In particular, we consider 5 questions for INDU, 9 for CONS, 5 for SERV, 5 for RETA, and 4 for BUILD. For example, the 5 survey questions for INDU refer to "Production trends over the past 3 months", "Order books", "Export order books", "Current stock of finished products", and "Production expectations over the next 12 months".[1]

Typically, each question admits three or five answers. The answers are classified into positive, negative and equal (i.e., unchanged), and the "balance answers" are constructed as the difference of the percentage of positive and negative answers across all respondents, see European Commission (1997) for details.

The Indicators constructed by the European Commission rely on the balance answers, see e.g. Gayer and Genet (2006). However, the use of only the balance answers could miss relevant information since the latter cannot fully summarize the content of the series of (percentages of) positive, negative and equal answers. In fact, the sum of these three series is equal to 100, so that at least two series are needed to fully summarize their content. Therefore we have also included in the dataset the series of equal answers.

Another dimension which is not explicitly taken into account by the European Commission in the construction of the current Indicators is the disaggregation of each Sector into branches or subsectors. This additional level of disaggregation could contain relevant information to better explain developments at the sectoral level. Moreover, a larger number of time series allows more precise estimation of the factors, when the idiosyncratic component of each of them remains limited. Therefore, we have also included branch level information in the dataset, as summarized in the Table below. The cost of the additional disaggregation is a reduction in the number of temporal observations, since branch level data are only avaible after 1997 or later.

Finally, it might be interesting to analyze the answers of the individual respondents without any aggregation, but these data were not available to us.

[1]Some additional questions are dropped in the construction of the Confidence Indicators, based mostly on their past performance, see the User's Guide available at http://ec.europa.eu/economy_finance/ indicators/business_consumer_surveys/ userguide_en.pdf.

INDU	CONS	SERV	BUILD	RETA
Cons. dur.	Income, 1^{st} quart.	Hotels and rest.	residential	food
Cons. non dur.	Income, 2^{nd} quart.	Transport	& non resid.	textile
Cons. tot	Income, 3^{rd} quart.	Tourism	public work	household goods tot
Food and bev.	Income, 4^{th} quart.	Post and telecom		household electr.
Intermediate		Real estate		household other
Investment		Renting of machinery		motor vehicles
		Computer		large multiple shops
		Sewage and sanitation		other
		Other		

Note: Disaggregation of sectoral survey answers.

4 Results on sectoral indexes

In this Section we present results on the performance of alternative CCIs for the five sectors under analysis, namely, Industry (INDU), Consumers (CONS), Services (SERV), Building (BUIL) and Retail (RETA), reporting findings for the euro area and the European Union as a whole, the 12 countries within the euro area, the three old member states outside the euro, i.e., Denmark, Sweden and UK, and the three largest new member states, i.e. the Czech Republic, Hungary and Poland.

We compare the DG-ECFIN's non model based Confidence Indicators with those obtained using the SW2 and FHLR2 methodologies. We do not apply the parametric SW method since it is not suited to analyze medium/large datasets and preliminary results indicate that, in those cases where only 4/5 variables are considered, a different parametric specification of the model underlying SW would be required for each country/sector. Moreover, as mentioned, the results are typically similar to those obtained with the other factor based approaches (Gayer and Genet (2006)).

Different sectoral survey datasets are used to estimate the factors that underlie CCI_{SW2} and CCI_{FHLR2}. First, only the series of balance answers are considered, as in Gayer and Genet (2006). Second, the equal (percentage of no change) series are added. Third, the (balance) answers are disaggregated at the branch level for each sector (subsector). In all the three cases, either the answers to all questions are retained, or only those with a correlation higher than .40 in absolute terms with the target series (Selection 1), or only those that are contemporaneous or leading with respect to the reference series (correlation with the reference series is highest at zero or positive lag, Selection 2). For each dataset we compute the SW2 and FHLR2 CCIs using one factor. For the different versions of the dataset at the aggregate level (balance, balance plus equal, Selections 1 and 2) we also compute the indexes using two factors. The sample period is in general 1985-2005 at the monthly frequency, shorter for the subsector data whose collection began around 1997, and we use the longest time period available for each country/sector, in order to exploit all the available information.

Overall, we have 22 different factor based CCIs for each of the five sectors (for the euro area, EU, and the member countries), since the equal series are not available at the disaggregate branch level. We compare them and the corresponding Confidence Indicators with a sector specific reference series. The latter is the same as in Gayer and Genet (2006), namely, for INDU the (annual growth rate of the) Industrial Production index; for CONS the (annual growth rate of the) private consumption; for SERV the (annual growth rate of the) Value Added in services; for RETA the (annual growth rate of the) private consumption, as for CONS; finally, for BUILD, the (annual growth rate of the) smooth trend-cycle component of the production volume index in construction. Whenever monthly values are not available (i.e. for private consumption and value added), linearly interpolated values from quarterly time series are used.

We adopt three different evaluation criteria. First, we consider the simple correlation of the alternative CCIs with the proper reference series, which is typically available with substantial delay with respect to the survey-based CCI. This measure provides an indication of the overall similarity of the two series.

Second, we evaluate whether the direction of movement of the CCIs and of the reference series is similar. Specifically, we compute the fraction of cases where the CCIs and the reference series increase or decrease contemporaneously. We will refer to this measure as "coherence". We can anticipate that empirically the coherence is not close to one, since the reference series is typically more volatile than the indicators.

Third, we consider whether the peak/trough structure of the CCI and of the reference series are similar. We would like the CCI and the reference series to be coincident, and if this is not the case a leading CCI is better than a lagging CCI. Therefore, our loss function is asymmetric and, to provide a summary measure, we adopt the following scoring system. We assign 6 points when a turning point occurs at the same time in the CCI and in the reference series; 6-x points when the CCI anticipates the reference series of by months (x=1,...,6), e.g., 5 five points when the CCI leads the reference series by one month; and -x points when there is a delay of x months in the CCI (x=1,...,6), e.g., -1 when the reference series leads the CCI by one month. The scores across the different turning points are then summed, and the resulting figure is divided by six times the number of turning points. Therefore, the highest possible value for the turning point score is 1 (the CCI and the reference series are coincident in each turning point), the lowest value is -1 (the CCI is systematically lagging with a delay of 6 months), and positive values indicate that the CCI is leading. Notice that both a lead and a lag longer than 6 months get a zero weight, but empirically there are very few occurrences of this type.

The turning points in the CCIs and in the reference series are identified using the Bry-Boschan dating algorithm. This complicates the interpretation of the turning point score, since the algorithm is quite sensitive to short run movements in the series, so that even series which are highly correlated can present different dates of peaks and troughs. More complicated dating methods and filtering of the series could be adopted, see e.g. Artis, Marcellino and Proietti (2004), but the score would remain sensitive to the particular choice made.

The results are presented in the first subsection for the euro area and the European Union, in the second subsection for the European countries on average, and in the third subsection for each European country in detail. A summary of the main findings is provided in the fourth subsection.

4.1 Results for the euro area and the EU

4.1.1 Industry

The results for Industry are reported in the first and second columns of Tables 1A-1C using, respectively, correlation, coherence and scoring as the evaluation criteria. From Table 1A, the values of the correlation between the Confidence Indicator and the reference series are quite high, 0.91 both for the euro area and for the EU.

For the euro area, the use of the factor based techniques with the balance series generates a minor improvement in these already high values, to about 0.92, in line with the findings of Gayer and Genet (2006).

Adding the series of "equal" answers to the dataset lowers the correlation, and preselecting the series on the basis of either their correlation with the reference series or the property of being contemporaneous or leading is also ineffective, even though the correlation of the resulting CCIs with the reference series remains above 0.85. Extending the dataset is effective only when the added series contain additional marginal information, the "equal" answers for Industry do not seem to have this property. Reducing the dataset by means of dropping some series is instead helpful when the dropped series have a larger idiosyncratic component than the included ones, which does not seem to be the case in our context.

Using two factors rather than one in the construction of the CCIs is also not useful, independently on the data that are used for their estimation (balance, balance plus equal, Selections 1 or 2), see the second panel of Table 1A. Additional factors are useful to summarize heterogenous series. Otherwise, using more factors adds estimation uncertainty to the CCIs, and can capture an unwanted idiosyncratic component of some series. The latter seems to take place in our context, where a single factor can already explain over 90% of the variance of all the series, see Gayer and Genet (2006).

Another potential source of information is represented by branch specific surveys. Disaggregation is positive when the more disaggregate series remain driven by the same factors with an equal or larger intensity, since in this case the factors are more precisely estimated. Otherwise, if the average idiosyncratic component of the series increases, this feature can outweigh the larger dimension of the dataset and deteriorate the quality of the estimated factors. The figures in the third panel of Table 1A indicate that the branch specific data contain some minor additional information for the euro area, once only contemporaneous or leading series are retained. The correlation with the reference series increases to 0.93 for FHLR2 and to 0.91 for SW2, with a similar increase for the EU.

If we change the loss function and consider the coherence in the changes in the CCI and the reference series, measured as the percentage of cases where the two series move in the same direction, the value for the Confidence Indicator is 0.55 for the euro area and 0.59 for the

EU, see the first line of Table 1B. These figures are substantially lower than the correlation. Basically, while the series share the same trending behaviour, they can present different very short run deviations from it.

The values for the CCI_{SW2} and CCI_{FHLR2} based on the balance dataset are very similar, 0.56 and 0.55 for the euro area and 0.60 and 0.62 for the EU, respectively. When the equal answers are added to the dataset, the values increase to 0.60 and 0.58 for the euro area but decrease to 0.57 and 0.59 for the EU. Preselection based on the leading/lagging characteristics yields another minor improvement only for CCI_{SW2} for the euro area, the coherence increases to 0.60.

Using a second factor in the computation of the indexes or basing them on the more disaggregated branch specific dataset does not improve the figures. However, the CCI_{FHLR2} based on the subsector euro area data with preselection, which had a correlation of 0.93 with the reference series (against 0.91 of the benchmark), has a coherence of 0.58, which is also higher than the benchmark (0.55). For the EU, the CCI_{FHLR2} obtained from the balance data had the same correlation with the reference series, but a slightly higher coherence, 0.62 versus 0.59.

In the first two columns of Table 1C we assess the CCIs for the euro area and the EU on the basis of their turning point structure compared with that of the reference series, using the scoring system described above. The Confidence Indicator obtains a score of 0.13 for the euro area and of 0.20 for the EU, indicating that on average it has leading characteristics.

The CCI_{SW2} and CCI_{FHLR2} maintain the leading feature, but obtain lower values than the Confidence Indicator both for the euro area and for the EU. Adding the equal answers makes things worse, the score becomes negative, while with the preselection based on the leading/lagging characteristics non negative values are obtained for FHLR2, see the second panel of Table 1C.

Using two factors to construct the CCIs is in general not helpful, while the subsector information can have a positive role in a few cases. In particular, the CCI_{FHLR2} based on the subsector euro area data with preselection, which had a good performance in terms of correlation and coherence, has a score of 0.15 (against 0.13 of the benchmark). For the EU, the CCI_{FHLR2} based on the subsector data has a score of 0.37 (against 0.20 of the benchmark). However, the latter was slightly worse than the benchmark in terms of correlation and coherence. However, the CCI_{FHLR2} obtained from the balance data, which performed well in terms of correlation and coherence, has a score of 0.19, so that it is also leading and only slightly worse than the benchmark. These results should be interpreted with care, due to the problems with the Bry Boschan dating of the series mentioned before.

In summary, for the euro area Industry it is possible to find a Composite Coincident Index that has (minor but systematic across evaluation criteria) gains with respect to the Confidence Indicator: it is the CCI_{FHLR2} based on the subsector data with "leading" preselection. The CCI_{FHLR2} obtained from the balance aggregate data performs well for the EU, it has only a minor disadvantage in terms of turning points. However, it should be stressed that the differences across methods, datasets and number of factors are in general minor.

4.1.2 Consumers

The results for Consumers are reported in the first and second columns of Tables 2A-2C. The values of the correlation between the Confidence Indicator and the reference series are substantial, 0.77 for the euro area and 0.67 for the EU, though lower than for Industry.

The factor based techniques applied to the balance series generate only a minor improvement in the correlations, to 0.78 for the euro area, in line with the findings of Gayer and Genet (2006), and to 0.68-0.69 for the EU.

Adding the series of "equal" answers to the dataset, without or with preselection of the variables, is not useful in the case of the euro area, the figures are slightly lower than for the base case, while there are some gains for the EU with preselection based on the non lagging requirement. The figures become 0.73 for CCI_{FHLR2} and CCI_{SW2}.

Using two factors rather than one in the construction of the CCIs is not helpful, while extending the dataset by disaggregating the answers at the branch level yields some minor, but systematic across methods, improvements. In particular, the highest correlation for euro area is achieved by CCI_{SW2} with preselection based on the non lagging requirement, 0.80, three points higher than the Confidence Indicator. This model delivers the highest value also for the EU, 0.74, which is seven points higher than the Confidence Indicator.

When the loss function is the coherence with the reference series, the value for the Confidence Indicator is 0.51 for the euro area and 0.48 for the EU, see the first line of Table 2B. These values are comparable with those obtained for Industry.

The values for the CCI_{SW2} and CCI_{FHLR2} based on the balance dataset are similar for the euro area but smaller for the EU, 0.43 and 0.41, respectively. When the equal answers are added to the dataset and the variables preselected based on their leading characteristics, these values increase to 0.48 and 0.50.

The positive effects of preselection are also evident for the other types of CCIs. The highest coherence for the euro area is achieved by the CCI_{FHLR2} with the subsector dataset, 0.53. For the EU, by CCI_{SW2} with two factors, 0.50. But these models do not perform particularly well in terms of correlation. However, the CCI_{SW2} applied to the disaggregate data with correlation or "leading" preselection is comparable to the Confidence Indicator for coherence and better for correlation.

With the third loss function, the scoring method based on the turning point structure of the CCIs and of the reference series, it turns out that the Confidence Indicator is leading on average for the euro area, and lagging for the EU. However, we repeat the warning on the reliability of the peak-trough dates. These should be carefully checked one by one, but unfortunately this is not feasible in our context with many sectors, countries and indicators.

For the euro area, the CCI_{SW2} and CCI_{FHLR2} maintain the leading feature in all cases. Leading based preselection turns out to be again useful. The highest values are obtained with two factors and the aggregate dataset, 0.21 and 0.24 for CCI_{SW2} and CCI_{FHLR2}, but the score for the CCI_{SW2} applied to the disaggregate data with "leading" preselection is 0.06, which is only slightly smaller than the benchmark.

For the EU, the use of disaggregate information typically produces CCIs which are contemporaneous with respect to the reference series rather than lagging. However, even the

factor based CCIs applied to the standard aggregate balance dataset have a higher score than the benchmark.

In summary, for Consumers, it appears that in general disaggregate information matters, in particular when combined with variable preselection. The gains are small for the euro area, but it is possible to find a CCI which is better than the Confidence Indicator, the CCI_{SW2} applied to the disaggregate data with correlation or "leading" preselection. The same procedure when applied to disaggregate data works well also for the EU. In this case the gains are larger, seven points in terms of higher correlation with the reference series.

4.1.3 Services

The results for Services are reported in the first and second columns of Tables 3A-3C. The values of the correlation between the Confidence Indicator and the reference series are rather large, 0.85 for the euro area and 0.90 for the EU, which makes it harder to outperform the benchmark Confidence Indicator.

However, the SW2 or FHLR2 factor based techniques applied to the balance series do generate an improvement, though minor: to about 0.89 for the euro area, in line with the findings of Gayer and Genet (2006), and to 0.92 for the EU.

Adding the series of "equal" answers to the dataset, possibly combined with variable preselection, does not yield any additional gains. Similarly, when two factors are used in the construction of CCI_{SW2} and CCI_{FHLR2}, the correlations do not increase, they even decrease in the case of the equal plus balance dataset.

The branch specific dataset is also not particularly informative in this context, the correlation values are systematically smaller than those obtained from the aggregate dataset.

Using the coherence in the CCI and the reference series as the evaluation criterion, produces a value for the Confidence Indicator of 0.64 for the euro area and 0.69 for the EU, see the first line of Table 3B.

It turns out that it is difficult to improve upon the benchmark both for the euro area and for the EU, see Table 3C. The highest value achievable for the euro area is 0.65, SW2 applied to the equal and balance dataset, 0.69 for the EU, FHLR2 applied to the aggregate balance dataset and based on two factors. These models beat the benchmark also in terms of correlation (0.88 versus 0.85 for the euro area and 0.92 versus 0.90 for the EU).

The third evaluation criterion, the scoring system to compare the turning point structure of the CCIs and of the references series, suggests that the Confidence Indicator is leading for the euro area and on average lagging for the EU. The performance of the CCI_{SW2} and CCI_{FHLR2} is in general better, with a maximum score of 0.17 achieved by several CCIs. In particular, SW2 applied to the equal and balance dataset for the euro area and FHLR2 applied to the aggregate balance dataset for the EU have a score of 0.17.

In summary, it is hard to outperform the Confidence Indicator for Services, since it already has a high correlation and coherence with the reference series. However, also in this case it is possible to find some factor based CCIs that are systematically not worse and often better than the Confidence Indicator. Specifically, the CCI_{SW2} applied to the equal and balance

dataset for the euro area and the CCI_{SW2} applied to the aggregate balance dataset for the EU have a slightly higher correlation, similar coherence and better leading features.

4.1.4 Building

The results for Building are reported in the first and second columns of Tables 4A-4C. The values of the correlation between the Confidence Indicator and the reference series are rather low in this case, 0.34 for the euro area and 0.24 for the EU, see Table 4A.

The use of the factor based techniques with the balance series generates an improvement of about four-five points for the euro area, in line with the findings of Gayer and Genet (2006), and of ten points for the EU.

Adding the series of "equal" answers to the dataset further increases the correlation for the euro area, to 0.42-0.45, and selecting the series based on their correlation with the reference variable yields additional gains, the correlation becomes 0.49-0.52. For the EU, the SW2 method applied to the balance plus equal dataset generates a correlation of 0.38, while virtually all series are discarded by the selection criteria, which makes the CCIs not computable in these cases.

For the euro area, additional gains in terms of correlation with the target variable can be obtained by using the subsector dataset combined with correlation based variable preselection. The highest value is 0.57 (FHLR2, subsector data, correlation preselection), about 23 points higher than the benchmark. For the EU, the highest correlation is 0.40 (SW2, 2 factors, equal plus balance), about 16 points higher than the benchmark.

If we change the loss function and consider the coherence between the CCI and the reference series, the values for the Confidence Indicator are 0.56 for the euro area and 0.53 for the EU, see the first line of Table 4B. These figures are higher than the correlation, which suggests that the Confidence Indicator is more similar to the reference series in the short run than in the long run.

The values for the CCI_{SW2} and CCI_{FHLR2} based on the balance dataset are higher, 0.60 and 0.61 for both the euro area and the EU. It is possible to do slightly better with the SW2 approach, based on two factors, applied to the balance plus equal dataset. The resulting figures are 0.64 for the euro area and 0.63 for the EU.

The model that generated the highest correlation for the euro area has a similar coherence to that of the benchmark, 0.56, while the best model in terms of coherence has a correlation of 0.43 with the benchmark, substantially lower than the first best (0.57). In this case there is a clear trade-off between the two CCIs, the choice depends on the preferred loss function. Instead, for the EU, the CCIs with the higher correlation and coherence coincide (SW2, 2 factors, equal plus balance).

In the first two columns of Table 4C we assess the CCIs for the euro area and the EU on the basis of their turning point structure compared with that of the reference series, using the scoring system described above. The Confidence Indicator obtains a score of -0.02 for the euro area and -0.03 for the EU, basically indicating coincidence in both cases.

The CCI_{SW2} and CCI_{FHLR2} computed with the equal plus balance datasets have higher scores, the maximum values are 0.29 for the euro area and 0.18 for the EU, obtained with

the SW2 method based on one factor. The preferred FHLR2 methods for the euro area on the basis of correlation or coherence have a score of 0.05-0.06, similar to that of the preferred (SW2) CCI for the EU, 0.06.

In summary, for the euro area and EU Building there are substantial gains from the use of factor based methods to construct CCIs, in the range of 15-20 points in terms of correlation, 5-10 points for coherence, and 0.20-0.30 points for scoring. The best CCIs depend on the loss function, but it is possible to find solutions that work reasonably well and better than the benchmark for each evaluation criterion, such as FHLR2 with balance plus equal dataset, variable preselection and 2 factors for the euro area, and SW2, equal plus balance dataset and 2 factors for the EU.

4.1.5 Retail

The results for the sector Retail are reported in the first and second columns of Tables 5A-5C. The values of the correlation between the Confidence Indicator and the reference series are intermediate for the euro area, 0.60, and rather limited for the EU, 0.35.

With the factor based techniques applied to the aggregate balance dataset, the gains are 4-5 points for the euro area, in line with the results of Gayer and Genet (2006), but much larger for the EU, about 20 points.

Adding the series of "equal" answers to the dataset lowers the correlation, likely the equal series either have a larger idiosyncratic component than the balance ones or are partly driven by a second factor. Preselecting the variables on the basis of either their correlation with the reference series or the property of being contemporaneous or leading, the values go back to those for the balance only dataset, slightly higher for the EU.

Using two factors rather than one in the construction of the CCIs is also not particularly useful with respect to the benchmark factor case, there are some additional gains of 2-3 points in a few cases. Interestingly, the results with two factors for the balance plus equal dataset are much better than those with one factor, suggesting that the equal answers included in the extended dataset are indeed driven at least in part by a different factor.

The branch specific information turns out to be quite useful. When combined with variable preselection, it yields the CCIs with the highest correlation with the reference series. Specifically, SW2 applied to the subsector euro area data with correlation based preselection generates a correlation of 0.77 with the target series, 17 points higher than the benchmark, and of 0.70 for the EU, 35 points higher than the benchmark.

If we change the loss function and consider the coherence of the CCI and the reference series, the values for the Confidence Indicator are 0.48 for the euro area and 0.50 for the EU, see the first line of Table 5B.

The gains from the factor based procedures are now more limited. The best values are often achieved by the use of the subsector information set, generally combined with variable preselection, and are in the range of 2-3 points for the euro area and up to 7 points for the EU. The best models in terms of correlation have virtually the same coherence as the benchmark.

Using the turning point based scoring system, the first two columns of Table 5C indicate that the Confidence Indicator has a leading feature both for the euro area (score of 0.46) and for the EU (score of 0.25). However, dating these series is even more complicated than in the other cases, because of their erratic behaviour.

The factor based CCIs perform in general worse based on this criterion. The best scores are 0.25 for the euro area and 0.22 for the EU, while the best models in terms of correlation have a score of 0.11 and 0.08, respectively.

In summary, for the euro area Retail it is possible to achieve large gains in terms of the correlation with the reference series, in the order of 15 points for the euro area and 30 for the EU. The best models are SW2 applied to the subsector data with correlation based variable preselection. However, the gains are much more limited in terms of scores, while the simple Confidence Indicator appears to have the strongest leading features for the reference series.

4.1.6 Summary

The results we have obtained suggest that it is difficult to propose a single factor based CCI for the euro area or the EU sectors that systematically outperforms the Confidence Indicator. Typically, each sector and choice of loss function suggest the choice of a different (SW2 or FHLR2) method, dataset (balance, equal plus balance, subsector), number of factors (one or two) and variable preselection (none, correlation based or contemporaneous/leading based).

A summary of the suggested procedures, based on their average performance on the three evaluation criteria is reported in the Table below, together with the associated gains/losses with respect to the Confidence Indicator.

While the search for a proper CCI is complicated, the gains in terms of a better tracking of the reference series can be substantial, in particular for the Building and Retail sectors. Also, it is often possible to select a CCI for each sector that is consistently better than the benchmark across loss functions, even though not the best on each single evaluation criterion.

Since the results are not fully conclusive, we will reconsider the choice of sectoral euro area / EU CCIs in Section 5.3 below.

Preferred CCIs for Euro area and EU sectors (gains/losses wrt C.I.)

	Euro area		EU	
INDU	FHLR2 subsector 1 factor cont/lead	0.02 0.03 0.32	FHLR2 balance 1 factor none	0 0.03 -0.01
CONS	SW2 subsector 1 factor cont/lead	0.03 0.02 -0.11	SW2 subsector 1 factor cont/lead	0.07 -0.04 0.25
SERV	SW2 eq. + bal 1 factor none	0.03 0.01 0.14	SW2 balance 1 factor none	0.02 -0.03 0.44
BUILD	FHLR2 eq. + bal 2 factors correl.	0.23 0 0.08	SW2 eq. + bal 2 factors none	0.16 0.10 0.09
RETA	SW2 subsector 1 factor cont/lead	0.17 0 -0.21	SW2 subsector 1 factor correl.	0.33 0.07 -0.14

Note: For each sector the first panel reports the preferred method (SW2 or FHLR2), type of data (balance, balance plus equal or subsector), number of factors (1 or 2), and type of variable preselection (none, correlation based, contemporaneous/leading based). The second panel reports the gains/losses wrt the Confidence Indicators for the three loss functions (correlation, coherence, turning point score).

4.2 Results for the European countries - average performance

In this subsection we evaluate the performance of the alternative CCIs based on their average correlation, coherence and scoring for the 12 members of the euro area, for the 4 largest countries in the euro area, and for the 15 "old" members of the European Union plus the three largest new members. In the next subsection we provide detailed results for each country.

4.2.1 Industry

The results for Industry are reported in columns 3, 4 and 5 of Tables 1A-1C for the different loss functions and for, respectively, the average euro area, the average EU, and the 4 largest countries in the euro area. Specifically, the values are the simple average of those of the countries in each group.

A first interesting finding is that for each group the correlation of the Confidence Indicator with the reference series is substantially lower than for the euro area or the EU as a whole, and the same is true for the other CCIs. We will see in the next subsection that this result also holds for each country and sector. A possible rationale underlying it is that the averaging over all countries of the answers to the questions to obtain the euro area or EU series is quite effective in eliminating idiosyncratic components, so that the resulting euro or EU balance series for each sector are more informative than their counterparts at the national level. An additional element is that the reference series is often smoother and easier to be tracked at the aggregate level than at the national level. It is also worth noting that the differences with respect to the euro area and EU figures shrink substantially when the coherence is the evaluation criterion, and often disappear for the scoring loss function.

A second feature is that the average performance of the Confidence Indicator and the factor based CCIs is better for the four largest countries in the euro area. A possible rationale for this outcome is the larger number of respondents to the survey in these countries.

About the alternative factor based CCIs, using the aggregate balance series with no preselection of the variables and one factor is slightly better than the benchmark in terms of correlation for both the average euro area and EU, but the gains are limited to 1-2 points, in line with the findings in Gayer and Genet (2006). Adding the equal answers to the dataset, combined with correlation based variable preselection, further slightly improves the results. The gains are similar to those obtained from the disaggregate branch level dataset and variable preselection, while the use of two factors is not relevant. Overall, we prefer the CCI based on the SW2 method applied to the subsector dataset with correlation based variable preselection (SW2d). It improves the average correlation of 4 points for the euro area and 5 for the EU, with similar gains in terms of coherence. However, if the Confidence Indicator is only compared for those countries for which SW2d is available, the gains of the latter basically disappear (since the countries for which SW2d cannot be computed are also those where the Confidence Indicator has the lowest correlation with the reference series). The scoring system to evaluate the turning points characteristics suggests that the Confidence Indicator is slightly leading (the average score is about 0.11 for the euro area and 0.10 for the EU), as well as the preferred CCI (the scores are about 0.10 for the euro area and the EU).

For the four largest euro area countries, the preferred CCI on the basis of its average correlation with the reference series relied on the FHLR2 factor estimation method applied to the aggregate balance dataset. However, the gains with respect to the benchmark area again limited, 3 points for correlation and even less for coherence and scoring. The SW2 with correlation preselection of the subsector variables also performs well, with similar correlation and better directional coherence that the Confidence Indicator.

Overall, the factor based methods seem to work rather well for Industry also for the average of the countries, in particular when branch level information is used combined with variable preselection, but, as for the euro area and EU as a whole, the marginal gains for the sector Industry are rather limited. The preferred methods of construction of CCIs for the Industry sector are summarized in the Table at the end of this subsection.

4.2.2 Consumers

The results for Consumers are reported in columns 3, 4 and 5 of Tables 2A-2C for the different loss functions and for, respectively, the average euro area, the average EU, and the 4 largest countries in the euro area.

As for Industry, for each group the correlation of the Confidence Indicator with the reference series is substantially lower than for the euro area or the EU as a whole, and the results are better for the four largest euro area countries. The same is true for the other CCIs, even though the differences are reduced, in particular for the four largest countries.

Using the aggregate balance series with no preselection of the variables and one factor, as in Gayer and Genet (2006), increases the correlation of about 8-9 points for the euro area, in line with their results, of 7 points for the EU, and of 10 for the four largest members of the euro area. There are virtually no gains or losses in terms of coherence or scoring.

Adding the percentage of equal answers for each question to the dataset further improves the correlation with the reference series when the variables are preselected based on the correlation with the latter, while adding a second factor in the computation of the CCIs has only minor effects, even though it produces the highest average correlation both for the EU and the euro area.

Disaggregation of the survey answers by income quartile is helpful, in particular for the EU, again when combined with variable preselection based on correlation, the resulting figures are comparable with those obtained with two factors and the balance and equal dataset. The average gains in terms of correlation become of 15 points for the euro area and 18 for the EU. Lower values are instead obtained for the four largest euro area countries.

In summary, the factor based methods seem to work rather well for the Consumers sector for the average of the euro area and EU countries, in particular when information classified by income quartiles is used in combination with variable preselection. The gains in terms of higher correlation with the reference series can be noticeable, 15-20 points, while the average coherence and turning points scoring are basically unaffected. The preferred methods of construction of CCIs for the Consumers sector are summarized in the Table at the end of this subsection.

4.2.3 Services

The results for Services are reported in columns 3, 4 and 5 of Tables 3A-3C for the different loss functions and for, respectively, the average euro area, the average EU, and the 4 largest countries in the euro area.

The average values of correlation and coherence of the Confidence Indicator are substantially lower than the corresponding figures for the euro area and the EU as a whole, while the results for scoring are very similar. A similar finding holds for the factor based CCIs too.

Using the aggregate balance series with no preselection of the variables and one factor is slightly better than the Confidence Indicator in terms of correlation with the reference series for both the average euro area and EU, but the gains are limited to about 3 points for the former, slightly less than the figure in Gayer and Genet (2006), and 6 for the latter.

Adding the equal answers to the dataset, combined with correlation based variable preselection, further improves the correlation results (of about 5-6 points), without decreasing the coherence or the scoring for the turning points.

Using two factors to summarize the aggregate datasets does not yield additional marginal gains, while using the branch level dataset does so. In particular, for both the euro area and the EU, the highest average correlation with the references series is achieved by the SW2 method applied to the subsector dataset with correlation based variable preselection. The resulting figures are 0.80 for both the euro area and the EU with gains with respect to the Confidence Indicator of, respectively, 16 and 19 points. These CCIs perform better also in terms of coherence, the percentage increase of about 6 points, and of the scoring, with limited gains.

For the four largest euro area countries, the previous CCI also performs quite well, and it remains our preferred choice.

Overall, the factor based methods applied to derive CCIs for the Services sector work rather well also for the average of the countries, in particular when branch level information is used combined with variable preselection. The gains are in the range of 15-19 points in terms of higher correlation with the reference series, smaller but still existent for coherence and scoring.

The preferred methods of construction of CCIs for the Services sector are summarized in the Table at the end of this subsection.

4.2.4 Building

The results for Building are reported in columns 3, 4 and 5 of Tables 4A-4C for the different loss functions and for, respectively, the average euro area, the average EU, and the 4 largest countries in the euro area.

Contrary to the other sectors, for Building the average correlation between the Confidence Indicator and the reference series is higher than that for the euro area or EU.

About the alternative factor based CCIs, using the aggregate balance series with no preselection of the variables and one factor is slightly better than the benchmark in terms of correlation for both the average euro area and EU, but the gains are limited to 1-2 points, in line with the findings in Gayer and Genet (2006).

Adding the equal answers to the dataset, combined with variable preselection, improves considerably the results, and the gains are similar to those obtained from the disaggregate branch level dataset with variable preselection. In both cases, the gains in terms of correlation are of about 20 points.

However, the previous result should be interpreted with care. In fact, when the variable preselection is applied, often all the series are dropped for those countries where the correlation between the Confidence Indicator and the reference series are small (in particular, Austria, Belgium, Ireland, Italy, Denmark, UK and Hungary, see Table 4A). The CCIs with variable preselection are not computed for these countries and the average values are calculated without them, which biases the comparison against the Confidence Indicator. If the average value of correlation for the Confidence Indicator are also computed excluding

these countries, the resulting figures are 0.65 for the euro area and 0.71 for the EU, so that gains from the more sophisticated CCIs shrink to 2-3 points, as in the basic factor case with aggregate balance series and no variable preselection. A similar finding also holds for the 4 largest euro area countries.

The preferred methods of construction of CCIs for the Building sector are summarized in the Table at the end of this subsection. They are based on the non corrected average values, but they remain the preferred methods even after correction, only the gains are smaller. Moreover, the country by country analysis in the next subsection will show that for most countries rather large gains can be obtained from the disaggregate branch level dataset combined with variable preselection.

4.2.5 Retail

The results for the Retail sector are reported in columns 3, 4 and 5 of Tables 5A-5C for the different loss functions and for, respectively, the average euro area, the average EU, and the 4 largest countries in the euro area.

Using the aggregate balance series with no preselection of the variables and one factor increases the correlation between the CCI and the benchmark for both the average euro area and EU, but the gains are limited to 2-3 points, in line with the figures in Gayer and Genet (2006).

Adding the equal answers to the dataset, combined with correlation based variable preselection, further improves the results. Instead, no major improvements can be obtained with a second factor. The best results are again achieved by the SW2 factor estimation method applied to the disaggregate branch level dataset with correlation based variable preselection. The gains are of 15 points for the euro area, 16 for the EU, and 13 for the four largest euro area members.

The preferred methods of construction of CCIs for the Services sector are summarized in the Table at the end of this subsection.

4.2.6 Summary

The results in this subsection are interesting to provide an overview of the performance of the more sophisticated CCIs at the national level. They indicate that there are systematic gains with respect to the Confidence Indicator, for virtually all sectors and choice of loss function. In some cases, such as Industry and Building, the gains are limited. But for other sectors, such as Consumers, Services and Retail, the average correlation can increase of 15-20 points, without any major loss in coherence or scoring.

These gains require a careful selection of the method of estimation, dataset and variable selection procedure. A summary of the best CCIs, based on their average performance on the three evaluation criteria is reported in the Table below, together with the associated gains/losses with respect to the Confidence Indicator. However, it is interesting to point out the systematically good performance on average of CCIs based on the branch level dataset combined with correlation based variable preselection, with SW2 and FHLR2 yielding similar

results in this case.[2] The comparable performance of the SW2 and FHLR2 approaches favors the former, since it is substantially simpler.

Preferred CCIs for European countries based on average performance (gains/losses wrt C.I.)

	mean Euro area		mean EU		mean Euro area 4	
INDU	SW2 subsector 1 factor correl.	0.04 0.05 -0.01	SW2 subsector 1 factor correl.	0.05 0.05 0.00	FHLR2 balance 1 factor none	0.03 0.02 0.01
CONS	SW2 subsector 1 factor correl.	0.14 0.00 -0.04	SW2 subsector 1 factor correl.	0.16 0.00 -0.05	FHLR2 balance 1 factor none	0.10 0.01 -0.02
SERV	SW2 subsector 1 factor correl.	0.16 0.06 0.15	SW2 subsector 1 factor correl.	0.19 0.06 0.08	SW2 subsector 1 factor correl.	0.15 0.08 -0.18
BUILD	SW2 subsector 1 factor correl.	0.21 0.05 0.07	SW2 subsector 1 factor correl.	0.20 0.05 0.10	SW2 eq. +bal. 1 factor correl.	0.09 0.05 -0.07
RETA	SW2 subsector 1 factor correl.	0.19 -0.01 -0.13	SW2 subsector 1 factor correl.	0.20 0.00 -0.04	SW2 subsector 1 factor correl.	0.13 0.02 -0.07

Note: For each sector the first panel reports the preferred method (SW2 or FHLR2), type of data (balance, balance plus equal or subsector), number of factors (1 or 2), and type of variable preselection (none, correlation based, contemporaneous/leading based). The second panel reports the gains/losses wrt the Confidence Indicators for the three loss functions (correlation, coherence, turning point score). For Industry and Building, if the Confidence Indicator is computed on the same set of countries as the factor method with preselection, the correlation gains of the latter basically disappear for INDU and are substantially reduced to about 6-8 points for BUILD.

[2] As mentioned, the results for the branch level data are based on shorter samples, with a later starting date due to the data availability. Over the more recent periods the correlation of the Confidence Indicators with the references series typically decrease for all sectors, see the more detailed results in Section 5.2. Therefore, the relative gains from the use of branch level data are likely even larger than those resulting from Tables 1-5.

4.3 Results for the European countries - details

4.3.1 Industry

The country by country results for Industry are reported in the final columns of Tables 1A-1C for the different loss functions, i.e. respectively, for correlation, coherence and scoring.

Focusing first on the members of the euro area, the correlation between the Confidence Indicator and the reference series is highest for the four largest countries, it ranges from 0.67 for Italy to 0.81 for Germany. This explains the better average values for these four countries than for the euro area as whole reported in the previous subsection. It is also worth noting that even these values are lower than the correlation for the euro area series, which is 0.91.

For all the four largest countries, the correlation with the reference series increases using the SW2 method applied to the aggregate balance series with one factor. However, the gains are limited, about 3-4 points. Some additional minor gains, 1-2 points, can be reached by a more careful tailoring of the method for each country.

The SW2 CCIs perform reasonably well also in terms of coherence and scoring. For the former, they yield equal or larger values than the Confidence Indicator, except for France where the loss is however minimal, one point. For the latter, the are some minor losses for Germany and Spain and gains for France. The results for scoring indicate that the Confidence Indicator, and the CCISW2, are lagging for Spain and Italy, leading for Germany. In the case of Spain, France and Italy it is possible to achieve a much better scoring using disaggregate branch level information combined with leading/contemporaneous selection of the variables. However, these CCIs are in general substantially outperformed by the Confidence Indicator in terms of correlation and coherence.

Using coherence as the loss function, the performance of the Confidence Indicator becomes more stable across the euro area members, the values range from 0.49 for Spain and Ireland to 0.57 for France. These values are also closer to the figure for the euro area as a whole, 0.55.

In terms of scoring, the Confidence Indicator is leading for the other six euro area countries for which data are available (the series are missing for Finland and The Netherlands). It is often difficult to outperform it with a more sophisticated construction method for the CCI, while the latter can generally provide some gains in terms of correlation, the range is from zero (Greece) to 13 points (Portugal).

For the "old" EU member states outside the euro, the Confidence Indicator has the highest correlation with the reference series for both Denmark and the UK (data for Sweden are missing). However, in the case of the UK it is possible to achieve a higher coherence by applying the FHLR2 method with contemporaneous/leading preselection of the disaggregate branch level data, the gains are of 6 points. The same method has a score of 0.23 versus -0.10 of the Confidence Indicator.

Data on the reference series for the three largest new member states are not available.

4.3.2 Consumers

The country by country results for Consumers are reported in the final columns of Tables 2A-2C for the different loss functions, i.e. respectively, for correlation, coherence and scoring.

Focusing first on the four largest members of the euro area, the correlation between the Confidence Indicator and the reference series ranges from 0.46 for Germany to 0.66 for Spain. All these figures, as well as those for the other countries, are lower than the value for the euro area, 0.77.

Interestingly, for all the four countries it is possible to obtain substantial gains in terms of correlation, without any major losses of coherence or scoring, by using a more sophisticated method of construction for the CCI. In the case of Spain and France the use of branch level data combined with variable preselection produces a correlation with the reference series of, respectively, 0.79 and 0.75, versus 0.66 and 0.65 of the Confidence Indicator. For Germany and Italy it is advisable to use the equal plus balance dataset with two factors and variable preselection (correlation of 0.64 and 0.65 versus 0.46 and 0.55 of the benchmark). In all the four cases, SW2 should be used to estimate the factors.

A similar finding holds for the other countries within the euro area. The gains in terms of correlation from the adoption of a more sophisticated CCI range from 11 points for Belgium to 61 for Finland. Again, the models that produce these correlation gains do not generate any sizeable losses in terms of coherence or scoring.

The gains for the three "old" EU members outside the euro area are also substantial. In particular, for the UK the use of the SW2 method with branch level data and correlation based selection of the variables produces a correlation with the reference series of 0.78 versus 0.45 for the benchmark Confidence Indicator. The gains for Denmark and Sweden are, respectively, of 17 and 11 points. Again, often there are gains rather than losses also for the other two evaluation criteria from the use of the more sophisticated CCIs.

Finally, about the three largest new EU member states, the use of branch level data seems to be particularly useful for the Czech Republic and Poland, where the correlation with the reference series increases of up to 26 and 18 points with respect to the benchmark. The gains are more limited for Hungary, 9 points, and derive, for example, from the use of the FHLR2 method applied to the aggregate balance dataset with one factor. Again, several factor based CCIs yield very similar results.

4.3.3 Services

The country by country results for Services are reported in the final columns of Tables 3A-3C for the different loss functions, i.e. respectively, for correlation, coherence and scoring.

Focusing again first on the four largest members of the euro area, the correlation between the Confidence Indicator and the reference series are on average large, they range from 0.55 for Italy to 0.74 for Germany, though still lower than the value for the euro area, 0.85.

For all the four countries it is possible to obtain gains in terms of correlation, without any major losses of coherence or scoring, by using the SW2 method with the disaggregate branch level dataset and correlation based preselection of the variables. The gains are small

in the case of Germany, about 3 points, but arrive up to 20 points for Italy and 18 for France and Spain.

This model works well also for Belgium and Finland (with gains of 6 and 27 points, respectively), while for the other euro area countries other methods work better. In particular, for The Netherlands and Portugal it is preferable to use the FHLR2 approach with the equal plus balance dataset and correlation based preselection of the variables, which yields gains of 22 and 9 points with respect to the benchmark Confidence Indicators for these two countries.

The SW2 method applied to the branch level data works also for Denmark and, in particular, for the UK, where the gains with respect to the benchmark are of 42 points and the achieved correlation with the target is 0.95. For Sweden there are instead only minor gains (2 points) from the use of two factors for the aggregate balance only dataset.

Finally, the same SW2 method applied to the branch level data is the best also for the Czech Republic and Hungary (with huge gains of 76 points for the former and of 6 points for the latter), while data for Poland are not available.

4.3.4 Building

The country by country results for Building are reported in the final columns of Tables 4A-4C for the different loss functions, i.e. respectively, for correlation, coherence and scoring.

The results on the correlation of the Confidence Indicator with the target reference series are very different across the four largest euro countries: 0.85 for Germany, 0.73 for Spain, 0.48 for France and 0.37 for Italy. The values for Germany and Spain are much higher than those for the whole EU, 0.34. This finding could be due to the reference series used at the aggregate level or just to the different characteristics of this sector across countries.

Concerning the performance of the alternative more complicated CCIs, it is hard to beat the benchmark for Germany while for the other three countries there are some gains from the use of the subsector dataset combined with either FHLR2 or SW2 and correlation based variable preselection. The gains amount to only 4 points for Spain, but increase to 9 and 12 points for, respectively, France and Italy. However, sometimes the gains are associated with a worse performance on the scoring criterion.

The varied performance of the Confidence Indicator for the Building sector in terms of correlation with the reference series is confirmed for the other euro area countries, the correlation values range from 0.07 for Austria to 0.91 for Portugal. In all cases it is possible to improve upon these values by adopting a different CCI, and in most cases the disaggregate information from the branch level data is useful. The resulting gains are in general of the order of 5-6 points.

About the three "old" EU members outside the euro area, subsector information is again helpful for Denmark and Sweden, while for the UK the correlation of the Confidence Indicator cannot be improved upon.

To conclude, about the three largest new EU member states, subsector information is quite useful in the case of Hungary (gains of 31 points) while for Poland and the Czech Republic it is difficult to outperform the Confidence Indicator in terms of correlation. However, some

of the factor based CCIs can still produce some minor gains, also in terms of coherence and scoring.

4.3.5 Retail

The country by country results for the sector Retail are reported in the final columns of Tables 5A-5C for the different loss functions, i.e. respectively, for correlation, coherence and scoring.

Focusing first on the four largest members of the euro area, the correlation between the Confidence Indicator and the reference series ranges from 0.45 for Germany to 0.79 for Spain, overall comparable with the value for the euro area as a whole, 0.60.

For all the four countries it is again possible to obtain gains in terms of correlation, without any major losses of coherence or scoring, by using a more sophisticated method of construction for the CCI. In the case of Spain the gains are minor, about 2 points, but for the other three countries the improvements are substantial: up to 26 points for Germany, 31 for France and 10 for Italy. For Germany and Italy the information in the disaggregate branch level data is important, that in the equal plus balance data for France.

For the other euro area countries, subsector information is also quite important and yields in general/ sizeable gains in terms of increased correlation between the CCI and the reference series. In the case of Austria there is a deterioration in the scoring, which can be avoided by the use of the aggregate balance plus equal dataset with two factors. CCIs based on the same dataset for Portugal generate some additional minor gains of about two points. The largest gains are for Finland, 68 points and Austria, up to 33 points.

The disaggregate branch level data contain useful information also for two of the three "old" EU members outside the euro area: Denmark and Sweden. For the former, the gains are of about 10 points, 20 for the latter, in both cases with variable preselection based on correlation. Instead, for the UK the SW2 method applied to the aggregate equal plus balance dataset with two factors and correlation preselection produces the highest correlation, 0.77 versus 0.71 of the benchmark Confidence Indicator, and also gains in terms of coherence and score.

Finally, about the three largest new EU member states, subsector information is particularly important for the Czech Republic and Poland. It generates gains also for Hungary, but larger advantages are produced by the equal plus balance aggregate dataset.

4.3.6 Summary

The country by country results are very interesting since they indicate that some of the new and more sophisticated techniques for the construction of sectoral CCIs produce gains with respect to the Confidence Indicator for virtually all countries and sectors, and choice of loss function. Often the gains in terms of increased correlation exceed 20 points, and sometimes 40 points. However, as in the aggregate euro area and EU case, a careful selection of the method, dataset and variable selection procedure is required.

4.4 Summary

The Table below reports a summary of the correlations between the reference series and the Confidence Indicator (Conf), the CCI based on the SW2 method applied to the sector balance data (SW2), and that based on the SW2 method with the subsector data and correlation based preselection of the series (SW2d). The latter has been chosen for its good performance in most of the cases we have analyzed so far.

A few comments are worth mentionging. First, for the sectors Consumption, Services and Retail, SW2d has larger correlation with the reference series than the corresponding Confidence Indicator in most cases. Specifically the correlation is higher for SW2d in 17 out of 20 cases (EA, EU and the 18 countries) for CONS and RETA, in 14 out of 20 cases for SERV; the correlation is instead higher for Conf only in 2 cases for CONS and SERV and 1 for RETA. SW2 also performs well for these three sectors, but in general worse than SW2d.

Second, for Industry, the gains from SW2d are reduced, it is better than Conf in only 4 cases, while Conf is better than SW2d in 8 cases, including the euro area, the EU and Germany. However, the differences are small, only two points for the euro area and Germnany, one for the EU. SW2 appears to be preferable for Industry, it is better than Conf in 10 cases and worse only in 3, with gains of 3-4 points for the four largest euro are countries and substantial equivalence for the euro area and the EU.

Third, for BUIL the ranking is less clear cut. SW2d is better than Conf in 7 cases, the opposite holds in 2 cases. In the remaining cases the SW2d cannot be computed because all the series are dropped by the selection criterion since their correlation with the target is low. If in these cases SW2 is used, the modified SW2d procedure beats Conf in 13 cases, and it is beaten in only 5 cases.

Finally, because of the larger number of variables contained in the branch level dataset, more factors could be needed to summarize the information contained therein. Therefore, we have repeated the analysis using two factors, but the figures are systematically similar to those obtained with one factor.[3]

In conclusion, if a single method of construction of sectoral CCIs has to be chosen and applied for each country, the analysis in this subsection supports the use of the SW2 approach, applied to subsector data, with correlation based preselection (SW2d). When this procedure cannot be implemented either because of lack of subsector data or because all the branch level series are dropped by the selection criterion, SW2d can be substituted by SW2 applied to the sector balance data. The resulting correlations with the reference series are higher than for the Confidence Indicator in 66 cases and lower in only 17 cases, generally with minor losses in the latter. Even better results can be achieved with a careful selection of the method, dataset and variable selection procedure for each sector and country, but a real time implementation of such an approach can be rather time consuming.

[3] Details available upon request.

Correlation of Confidence Indicator and selected factor based CCIs with reference series

INDUSTRY	EA	EU	mean EA	mean EU	Mean4
Conf	0,91	0,91	0,59	0,58	0,73
SW2	0,92	0,91	0,61	0,60	0,76
SW2d	0,89	0,90	0,63	0,63	0,72
CONSUMER	EA	EU	mean EA	mean EU	Mean4
Conf	0,77	0,67	0,53	0,52	0,58
SW2	0,78	0,69	0,61	0,58	0,67
SW2d	0,79	0,73	0,67	0,68	0,65
SERVICES	EA	EU	mean EA	mean EU	Mean4
Conf	0,85	0,90	0,64	0,61	0,67
SW2	0,89	0,92	0,67	0,67	0,62
SW2d	0,86	0,84	0,80	0,80	0,82
BUILDING	EA	EU	mean EA	mean EU	Mean4
Conf	0,34	0,24	0,48	0,49	0,61
SW2	0,38	0,33	0,50	0,50	0,59
SW2d	0,56	na	0,69	0,69	0,64
RETAIL	EA	EU	mean EA	mean EU	Mean4
Conf	0,60	0,35	0,53	0,53	0,57
SW2	0,64	0,55	0,55	0,55	0,63
SW2d	0,77	0,70	0,72	0,73	0,70

INDUSTRY	AT	BE	DE	EL	ES	FI	FR	IE	IT
Conf	0,63	0,59	0,81	0,45	0,68	na	0,77	0,47	0,67
SW2	0,65	0,62	0,85	0,43	0,71	na	0,80	0,48	0,70
SW2d	0,70	0,59	0,79	na	0,63	na	0,79	0,48	0,67
CONSUMER	AT	BE	DE	EL	ES	FI	FR	IE	IT
Conf	0,33	0,56	0,46	0,41	0,66	0,17	0,65	0,57	0,55
SW2	0,56	0,48	0,58	0,47	0,77	0,32	0,67	0,68	0,67
SW2d	0,63	0,65	0,59	0,60	0,79	0,78	0,75	0,58	0,48
SERVICES	AT	BE	DE	EL	ES	FI	FR	IE	IT
Conf	0,74	0,55	0,74	na	0,68	0,40	0,72	na	0,55
SW2	0,80	0,55	0,50	na	0,66	0,39	0,72	na	0,60
SW2d	0,82	0,61	0,77	na	0,86	0,77	0,90	na	0,75
BUILDING	AT	BE	DE	EL	ES	FI	FR	IE	IT
Conf	0,07	0,17	0,85	na	0,73	0,47	0,48	0,16	0,37
SW2	0,08	0,25	0,79	na	0,72	0,60	0,54	0,21	0,32
SW2d	na	na	0,75	na	0,76	0,73	0,56	na	0,49
RETAIL	AT	BE	DE	EL	ES	FI	FR	IE	IT
Conf	0,34	0,60	0,45	0,36	0,79	0,09	0,46	0,68	0,57
SW2	0,26	0,61	0,49	0,31	0,81	0,15	0,73	0,68	0,50
SW2d	0,67	0,72	0,70	0,55	0,68	0,77	0,73	0,77	0,70

INDUSTRY	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Conf	0,44	na	0,36	0,43	na	0,71	na	na	na
SW2	0,46	na	0,40	0,38	na	0,69	na	na	na
SW2d	na	na	0,42	na	na	0,63	na	na	na
CONSUMER	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Conf	na	0,74	0,75	0,41	0,66	0,45	0,52	0,78	0,24
SW2	na	0,80	0,75	0,44	0,57	0,54	0,56	0,85	0,16
SW2d	na	0,79	0,77	0,58	0,77	0,78	0,78	0,77	0,42
SERVICES	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Conf	na	0,59	0,82	0,55	0,68	0,53	0,20	0,78	na
SW2	na	0,90	0,90	0,61	0,69	0,55	0,78	0,79	na
SW2d	na	0,83	0,89	0,76	0,54	0,95	0,96	0,84	na
BUILDING	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Conf	0,47	0,63	0,91	0,28	0,72	0,16	0,69	0,33	0,88
SW2	0,48	0,65	0,91	0,42	0,74	0,13	0,66	0,16	0,88
SW2d	na	0,64	0,89	na	0,79	na	na	0,64	na
RETAIL	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Conf	na	0,69	0,82	0,68	0,66	0,71	0,38	0,01	0,68
SW2	na	0,69	0,84	0,65	0,74	0,68	0,33	0,36	0,50
SW2d	na	0,75	0,84	0,79	0,86	0,68	0,76	0,70	0,74

Note: The table reports the correlation with the reference series of the Confidence Indicator, the CCI based on the SW2 method with sector balance data (SW2), and the CCI based on the SW2 method applied to the subsector data with correlation based preselection (SW2d). The mean EA and mean EU results for industry and building are biased in favour of SW2d, since the averages are computed without those countries where all series were dropped due to low correlation in the preselection step, see section 4.2.

5 Global national and euro area / EU indexes

In the first subsection we add a few methodological comments on the construction of aggregate indexes. Then, we construct and comment upon global national indexes, subsection two; sectoral indexes for the euro area / EU, subsection three; and global euro area / EU indexes, subsection four. The final subsection provides a summary of the main results we have obtained on global indexes.

5.1 Methodological issues in the construction of aggregate indexes

To construct an aggregate (Global) Composite Coincident Index (GCCI) two main approaches are available.

The first method, labelled "Direct", is based on the use of disaggregate sectoral and/or national information, e.g. all questions for each sector (possibly of each country). As in the previous Section, this approach will generate 22 Global CCIs (for each nation, or euro area/EU sector, or euro area/EU as a whole). Specifically, we have Global CCIs based on sector data, summarized with one or two factors, or on subsector (branch level) data. For each of the three types we can use all the balance series, all the balance plus equal series (not available at the subsector level) and selected series (based on correlation or leading/lagging characteristics). Finally, for each option we can use SW2 or FHLR2.

As a second approach to the construction of a GCCI, we can adopt a two-step procedure. In particular, the disaggregate sectoral and/or national indexes can be grouped into a GCCI by using them as input series for the SW2 or FHLR2 procedures. As an alternative, we consider a simple weighted average of the (non-standardized) subsector indexes (MEAN), using sectoral or national (GDP based) weights.[4]

Notice that the $GCCI$ based on the MEAN of the Confidence Indicators requires to combine the (input) variables using fixed and equal weights, possibly after standardizing them, and the input variables, in turn, are not based on factor techniques but on fixed weights. Notwithstanding its simplicity, in several cases this approach yields comparable indexes to those obtained with more sophisticated methods, see e.g. Marcellino (2005) for the US and Carriero and Marcellino (2005) for Europe, likely since it is similar in principle to a pooled forecast, which is also known to perform well, see e.g. Clemen (1989). This approach underlies the Economic Sentiment Indicator, published by the European Commission. A further advantage of this procedure is that the weights are fixed over time so that earlier values of the estimated index do not need revision. Instead with the factor based methods the weights change over time, which requires to continuously revise the indexes.

Due to the large number of CCIs available at the sectoral/national level (23 for each sector, as we have seen in Section 4), we suggest to focus on the aggregation of a few of them only in the first step of the two-step approach. In particular, we have selected the

[4]The sectoral weights are assigned as in Gayer and Genet (2006), i.e., 0.40 for INDU, 0.30 for SERV, 0.20 for CONS, and 0.05 for BUIL and RETA. In case of missing data for a sector, the weight of the largest available sector is increased. Notice also that the use of non standardized data can create differences between the MEAN of the sectoral Confidence Indicators and the ESI.

Confidence Indicator (the benchmark in the sectoral analysis of Section 4), the CCI_{SW2} and CCI_{FHLR2} based on the aggregate balance dataset (which were considered by Gayer and Genet (2006) at the sectoral level), and the SW2 CCI based on subsector information and correlation preselection of the variables, CCI_{SW2d}, which performed well for most countries and sectors in Section 4.

Overall, there are 12 GCCIs of the "two-step" type (for each nation, or euro area/EU sector, or euro area/EU as a whole).

In summary, in general we will have 34 alternative GCCIs for each aggregate of interest, 22 from the Direct approach and 12 from the Two-step method of construction. A few more are possible at the euro area / EU level, as we will detail below. As in the previous Section, the comparison of the alternative GCCIs will be based on the correlations, directional accuracy and timing of turning points with respect to a proper reference series. As a result of this analysis, we will suggest the use of one approach for the construction of GCCIs for European countries and Europe / euro area as a whole.

5.2 Construction and evaluation of global national indexes

In this subsection we present results on the performance of alternative GCCIs for the 12 countries within the euro area, the three old member states outside the euro, i.e., Denmark, Sweden and UK, the three largest new member states, i.e. the Czech Republic, Hungary and Poland, and average results for the euro area and the EU countries.

The benchmark for each country is the DG-ECFIN's non model based Economic Sentiment Indicator, while the reference series is (linearly) interpolated monthly GDP growth.

As for the sectoral analsysis in Section 4, we adopt three different evaluation criteria. First, the simple correlation of the alternative GCCIs with the reference series, which is typically available with substantial delay with respect to the survey-based CCI. Second, the directional coherence of the GCCIs and the reference series, computed as the fraction of cases where the GCCIs and the reference series increase or decrease contemporaneously. Third, the scoring system that measures whether the peak/trough structure of the GCCI and of the reference series are similar. The latter measure has the same problems mentioned before, mostly due to the unreliability of an automatic implementation of the Bry-Boschan dating algorithm. Also, since correlation is the most often adopted evaluation criterion, we will mainly focus on it.

It is also worth mentioning that we use a common sample for the computation and evaluation of the indexes based on the sector and subsector (branch level) information sets. Typically the sample coincides with that for the subsector information, and can be rather short. However, since the sample corresponds to the most recent period, and we will see that the results are rather clear-cut, this choice is justified. The results are reported in Tables 6A, 6B and 6C for the three evaluation criteria.

As a robustness check, we have also recomputed all the results using either the longest available sample for the construction of the indexes based on sector information but with a common evaluation sample, or even a different construction and evaluation sample for

indexes based on sector and subsector information. The latter comparison is justifiable with an assumption of stability over time of the correlation with the reference series. Since there are no qualitative changes in the ranking of the GCCIs with respect to the base case, we will focus on the figures in Table 6.

Starting with the values for the average of the euro area and EU countries, which provide an overall picture, five main comments can be made.

First, among the two-step methods, pooling (MEAN) works almost as well as the more sophisticated factor methods. This is more evident when a weighted average of the countries is considered, where the weights are based on the GDP shares. Second, the direct approach in general works better than the two-step approach, possibly with the interesting exception of the four largest euro area countries. A justification for this finding is the use of a much larger dataset in the direct approach, which provides more precisely estimated factors and allows to better capture the interaction across the different sectors. Third, within the direct approach, the preferred method of construction of a GCCI requires the use of subsector information combined with the Stock and Watson factor estimation method and preselection of the variables based on their correlation with the reference series. This is the same method we suggested at the sectoral level. The gains with respect to the benchmark ESI in terms of correlation with GDP growth are small for the weighted euro area average, about 4 points, larger for the weighted EU average, about 10 points, and even larger for the unweighted averages, 13 points for the euro area and 23 points for the EU. The rationale of this pattern is that the ESI works fairly well for the four largest euro area countries, the average correlation is the same as for the SW method with subsector information, but it is systematically outperformed for the other countries, which though have a smaller GDP weight. Fourth, SW2 applied to contemporaneous / leading subsector data (Selection 2) also performs well for the largest four euro area countries and, as a consequence, for the weighted euro area / EU average. We will see that this is indeed the preferred approach at the euro area / EU level. Finally, a similar ranking of the methods emerges when assessing the directional accuracy or scoring the turning points, but the gains shrink, in particular for the former measure.

About the country by country results, the SW method applied to selected subsector variables produces the largest correlation for 7 out of the 17 countries under investigation: Austria, Greece, Spain, Finland, Sweden, the Czech Republic, and Poland. Moreover, it produces better results than the ESI for other 6 countries: Belgium, France, the Netherlands, Denmark, UK, and Hungary. The ESI is preferred to this method for only 4 out 17 countries: Germany, Ireland, Italy and Portugal, the largest gains are 15 points for Ireland, with less than 5 points of difference for the other three countries. Interestingly, for both Germany and Italy it is possible to beat the ESI by taking a simple average of the sectoral indexes constructed with the SW method applied to the subsector information with variable preselection. A similar ranking of methods emerges with the two other evaluation criteria, directional coherence and turning point scoring.

In summary, even though the construction and evaluation sample of the alternative GCCIs is fairly short, the findings in this subsection clearly point to the adoption of a direct approach for the construction of Global national coincident indexes, where the Stock and Watson

method is applied to extract information from branch-level variables, selected on the basis of their correlation with the target series.[5] The fact that this approach works well for many rather heterogeneous countries indicates that its performance should be also rather stable over time for a given country. Moreover, the use of branch level information is also supported by its good performance at the sectoral level for most countries, where a longer evaluation period is also often available.

5.3 Construction and evaluation of sectoral euro area and EU indexes

In this subsection we reconsider the issue of the construction of sectoral indexes for the euro area and the EU. In Section 4 we have used euro area or EU data at the sectoral level. Instead, here we use either a larger dataset with sectoral data for all the euro area or EU countries (direct approach), or combine the sectoral indexes for each country obtained in Section 4 (two-step approach). We also recompute the results based on the euro area or EU data using the same sample as for the direct and two-step methods. This sample typically starts after the new millennium, which is interesting to provide an evaluation over the most recent period and to assess the stability of the results computed in Section 4. Therefore, overall we compare three approaches to the construction of aggregate sectoral indexes, for a total of 56 indexes:

1. SW2 and FHLR2 applied to country level sectoral data, direct approach (-> 22 indexes)
2. SW2, FHLR2, MEAN applied to a few types of the national sectoral indexes, two-step approach (-> 12 indexes)
3. SW2 and FHLR2 applied to euro area / EU sectoral data, direct approach (-> 22 indexes)

As in Section 4, the benchmark for each EU / euro area sector is the corresponding DG-ECFIN's non model based Confidence Indicator, and the reference series are for INDU the (annual growth rate of the) Industrial Production index; for CONS the (annual growth rate of the) private consumption; for SERV the (annual growth rate of the) Value Added in services; for RETA the (annual growth rate of the) private consumption, as for CONS; finally, for BUILD, the (annual growth rate of the) smooth trend-cycle component of the production volume index in construction. Linearly interpolated values are used whenever monthly data are not available.

The results for the three different evaluation criteria (correlation, directional coherence and turning point synchronization with the reference series) are reported in Table 7 A,B,C.

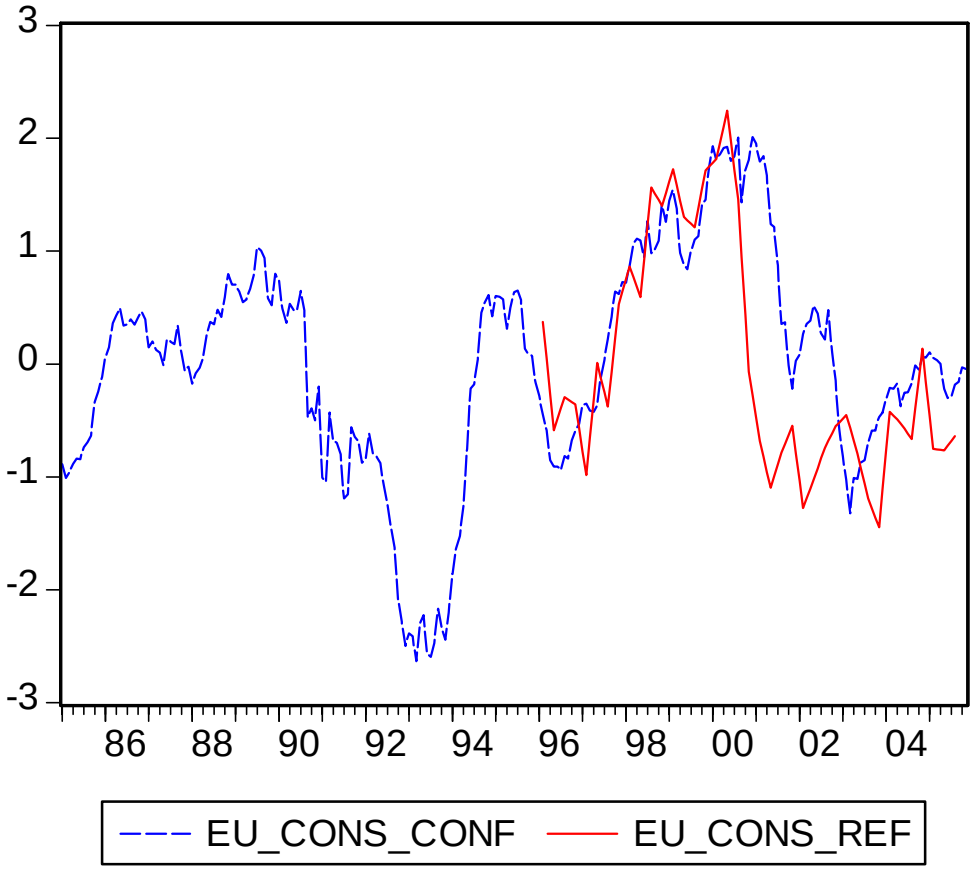
[5] For Italy and Germany even better results can be obtained with a two-step approach where the SW method is applied to correlation selected branch level variables in the first step, and MEAN is used in the second step.

Starting with Industry, the correlations emerging from the use of the country level data are overall comparable to those for the EU data, while the former are systematically better for the euro area. The results from the direct approach are also better than those for the two-step method. It is worth mentioning that the correlations with the reference series are much smaller than for the longer sample analysed in Table 1, in particular for the Confidence Indicator. While, the ranking of the factor based methods is similar, it is now possible to achieve substantial gains in terms of higher correlation with the reference series. The preferred method remains Stock and Watson applied to disaggregate branch-level information, and the selection based on the leading/contemporaneous characteristics of the variables produces the best results (selection 2), with correlation based selection also producing good results (better than the Confidence Indicator). The gains in terms of correlation using the best method are of about 16 points for the EU and of 23 points for the euro area.

For the Consumption sector, the first striking result is the very low correlation between the Confidence Indicator and the reference series for the euro area. As the Figure below illustrates, the problem is that the Confidence indicator tracks very well the reference series at the beginning of the sample, then it becomes lagging, and finally the reference series presents a very erratic behaviour in the final period, the one we are considering now. There is a corresponding deterioration also for the factor based methods, but the best procedure is rather stable over time. It is again based on the use of the SW method on the subsector country level data, combined with selection 2. The results for other evaluation criteria are more stable. About the relative overall performance of the three approaches, country level data are better than the EU ones, while the ranking is less clear cut for the euro area and for the direct versus two-step case.

For Services, the Confidence Indicator has a high correlation with the reference series for the euro area, 0.75, lower for the EU, 0.52. However, the best factor based index, which overall is again the SW method applied to selected subsector country level data, produces values of 0.90 for the euro area, and 0.93 for the EU. The ranking of the three approaches is not so clear cut, with country level data better for the euro area but not for the EU, and the two-step method working reasonably well but outperformed by the best direct indexes.

For the Building sector, the use of country level data is in general better than that of aggregate euro area or EU series, and the direct approach is better than the two-step procedure. The former also produces the best index, which is again SW on subsector data with Selection 2. The gains are substantial in terms of correlation, even though for this sector the performance of the Confidence Indicator is rather stable over time, while they are smaller when measured with the directional coherence or on the basis of turning point synchronization.



Confidence Indicator for Consumption and reference series, euro area

Finally, for the Retail sector, the direct use of country level data is better than the application of the two-step procedure or the analysis based on euro area / EU series. The correlation of the Confidence Indicator is very low, as in the case of Consumption and basically for the same reason. Also in this case the SW method applied to leading/contemporaneous based selected subsector variables is best, and it produces sizeable gains with respect to the Confidence Indicator.

In Summary, a set of interesting and clear results emerge from this subsection on the construction of euro area or EU sectoral CCIs, even though they are based on a rather short sample. First, country level information is in general better than euro area / EU series. This is likely due to the use of a larger dataset with more interaction across variables, both positive aspects for the application of factor based methods. Second, often the direct approach is better than the two-step method. This is the same finding as in the previous subsection and it is again likely due to the adoption of a larger dataset. Third, disaggregate branch level information is quite useful, which confirms the finding in Section 4. Fourth, pre-selection of the subsector variables based on their leading/lagging features is better than correlation based selection, systematically across sectors and with large gains. However, correlation based selection still outperforms the Confidence Indicators in 9 out of 10 cases,

the only exception being CONS for the EU. Fifth, in general the SW method works better than the FHLR approach, in the sense of producing indexes with a higher correlation with the reference series. Finally, in general the results are more stable over time for the best factor based methods than for the Confidence Indicator. This is an important finding for the use of these indexes in a policy making context.

5.4 Construction and evaluation of global euro area and EU indexes

In this subsection we focus on the construction of global indexes for the euro area and the EU. We compare four alternative approaches:

1. SW2 and FHLR2 applied to pooled datasets of sectoral "question level" variables at the euro area / EU level, direct approach (-> 26 indexes, we also consider the use of two factors for the branch level data with the two types of preselection)

2. SW2 and FHLR2 applied to pooled datasets of sectoral "question level" variables at the national level, direct approach, (-> 24 indexes. We do not compute the indexes on the branch level data without preselection since in this case there are more than 2500 series and this creates computational problems, but we also consider the use of two factors for the branch level data with the two types of preselection)

3. SW2, FHLR2 and MEAN applied to a few types of sectoral euro area / EU indexes, two-step approach (-> 12 indexes)

4. SW2, FHLR2 and MEAN applied to a few types of national global indexes, two-step approach (-> 12 indexes)

Overall, we have 74 alternative euro area and EU global indexes. The benchmark is the DG-ECFIN's non model based Economic Sentiment Indicator, while the reference series is interpolated monthly GDP growth. We assess the alternative GCCIs on the basis of their correlation, directional accuracy and timing of turning points with respect to the reference series. All the results are summarized in the three panels of Table 8, based on the sample 2002:9-2005:8. While the sample is rather short, due to the heterogeneity in the starting dates of the different types of data across sectors and countries, it still contains 36 observations for the most recent period, which makes the exercise perhaps even more interesting, even though the quantitative ranking of the methods can be inaccurate when the differences across them are not large.

Six main comments can be made based on the figures in Table 8. First, the Economic Sentiment Indicator performs fairly well also in this short recent sample, the correlation with monthly GDP growth is 0.77 for the euro area, increasing to 0.85 for the EU.

Second, within the direct approach, the use of the larger sectoral national dataset yields higher correlation across the GCCIs and the reference series than with the euro area / EU data.

Third, the ranking of the SW and FHLR factor methods is not clear cut, but the former appears to produce slightly better results in the majority of cases.

Fourth, the additional contribution of the branch level data is minor. Likely, the idiosyncratic component in the large dataset increases with respect to the national level, even after variable preselection and with the addition of a second factor.

Fifth, among the two-step methods, pooling (MEAN) works often as well as the more sophisticated factor methods, while aggregating the national global CCIs is systematically better than aggregating the sectoral euro area or EU indexes. The latter result confirms that there is some remaining useful information at the national level.

Sixth, the best method for the EU is the SW (or FHLR) applied to the branch level sectoral national data with Selection 2, the correlation of the resulting GCCI with monthly GDP is 0.90, five points higher than the EU ESI. The same method performs very well for the euro area, with gains of 10 points with respect to the ESI (0.87 vs 0.77). The use of Selection 1 (correlation based selection, as at the national level) is only slightly worse, the correlation of the GCCIs are 0.85 for the EU and 0.86 for the euro area, with virtually no gains with respect to the ESI for the EU, but still of 9 points for the euro area.[6]

In summary, for the construction of a Global euro area or EU CCI we suggest the adoption of the SW method applied to the branch level sectoral national data, with correlation contemporaneous/leading based preselection as at the sectoral level; correlation based preselection, as at the national level, produces only slightly worse results.

5.5 Summary

The findings about the construction of Global composite coincident indexes for the European countries and the EU/ euro area can be summarized as follows.

First, a direct approach for the construction of GCCIs, where question level national/sectoral data are used, is typically better than a two step procedure, where the inputs are national sectoral CCIs obtained in a first step.

Second, the performance of the Stock and Watson method is comparable to that by Forni et al., but we prefer the former for its simplicity.

Third, subsector data in general contain useful information, in particular for the single countries and when combined with a selection procedure to eliminate series with a large idiosyncratic component. Correlation based selection works particularly well at the country level, contemporaenous/leading selection at the euro area / EU level

Fourth, even though the construction and evaluation sample of the alternative GCCIs is fairly short, the fact that the proposed approach works well for many rather heterogeneous countries indicates that its performance should be also rather stable over time for a given country.[7]

[6] This method becomes slightly better than the ESI also for the EU when the sample starts in 2001:7, results are available upon request.

[7] If the evaluation of the global national CCIs is conducted on a longer sample at the cost of dismissing the branch level data, it is still possible to improve upon the ESI for the majority of the European countries under analysis (12 out of 17, with minor losses for the remaining 5 countries) by applying the Stock and

Correlation of Economic Sentiment Indicator and selected factor-based GCCIs with reference series

		EA	EU	EA	EU	Mean EA	WMEA	Mean EU	WMEU	Mean4
		Sectoral EU/EA		Sectoral Country						
	Sentiment	0,77	0,85	0,77	0,85	0,68	0,77	0,58	0,68	0,79
Direct	SW2	0,77	0,82	0,81	0,70	0,68	0,75	0,64	0,67	0,72
	SW2d	0,81	0,87	0,87	0,90	0,81	0,81	0,81	0,78	0,81
2-step	SW2 SW2d	0,70	0,67	0,82	0,82	0,71	0,79	0,62	0,70	0,81
		AT	BE	DE	EL	ES	FI	FR	IE	IT
	Sentiment	0,75	0,81	0,79	0,29	0,63	0,23	0,90	0,81	0,84
Direct	SW2	0,83	0,81	0,75	0,01	0,50	0,53	0,90	0,77	0,75
	SW2d	0,88	0,87	0,74	0,77	0,75	0,79	0,92	0,66	0,81
2-step	SW2 SW2d	0,70	0,80	0,77	0,15	0,70	0,69	0,91	0,70	0,86
		NL	PT	DK	SE	UK	CZ	HU	PL	
	Sentiment	0,50	0,88	0,29	0,69	0,54	0,04	0,31	0,62	
Direct	SW2	0,82	0,83	0,87	0,59	0,53	0,35	0,45	0,61	
	SW2d	0,83	0,85	0,70	0,73	0,90	0,94	0,73	0,89	
2-step	SW2 SW2d	0,71	0,84	0,30	0,54	0,56	0,14	0,54	0,56	

Note: The table reports the correlation with the reference series of: 1) The Economic Sentiment Indicator, 2) the CCI based on the SW2 method with sector balance data (SW2), 3) the CCI based on the SW2 method applied to the subsector data with preselection based on correlation for individual countries and on leading/lagging carachteristics for EU and EA (SW2d), 4) the CCI based on the two-step method using SW2 on the SW2d CCIs derived in the first

The Table above summarizes the performance in terms of correlation with interpolated monthly GDP of our preferred method for the construction of GCCIs, SW2 applied to selected subsector data (SW2d); of the ESI; of SW2 applied to the sectoral balance data; and of one of the best procedures within the two-step approach, SW2 applied to summarize the information in sectoral SW2 based CCIs with subsector information (SW2 SW2d).

6 Conclusions

In this Report we have conducted an exhaustive analysis of the usefulness of factor based methods for the construction of survey based Composite Coincident Indexes (CCIs) for European countries, either at the sectoral level or at the global national or area wide level.

With a few caveats, mostly related to the short sample size under analysis, the results we have obtained provide a clear indication that factor based CCIs can produce in almost all cases better results than either the Confidence Indicator or the Economic Sentiment Indicator.

Our main findings and reccomendations can be summarized as follows.

1. For sectoral national indexes, the average results across countries indicate that there are systematic gains with respect to the Confidence Indicator, for virtually all sectors and choice of loss function. In some cases, such as Industry, the gains are limited. But

Watson method to the sample of Equal and Balance series, again with correlation based variable preselection.

for other sectors, such as Consumers, Services and Retail, the average correlation with the reference series can increase of 15-20 points, without any major loss in directional coherence or turning point scoring. These gains require a careful selection of the method of factor estimation, dataset and variable selection procedure. However, CCIs based on the branch level dataset combined with correlation based variable preselection perform systematically well, with the Stock and Watson (2002a,b, labelled SW2) and the Forni et al. (2003, labelled FHLR2) factor estimation methods yielding similar results. The comparable performance of the SW2 and FHLR2 approaches favors the former, since it is substantially simpler.

2. The country by country results indicate that the new and more sophisticated techniques for the construction of sectoral CCIs produce gains with respect to the Confidence Indicator for virtually all countries and sectors (and choice of loss function). Therefore, the good results for the average of the countries reported in point 1 reflect a systematic good performance across countries and sectors. Often the gains in terms of increased correlation exceed 20 points, and sometimes 40 points. The SW2 approach, applied to subsector data, with correlation based preselection performs well in the majority of the cases. When this procedure cannot be implemented either because of lack of subsector data or because all the branch level series are dropped by the selection criterion, it can be substituted by SW2 applied to the sector balance data. The resulting correlations with the reference series are higher than for the Confidence Indicator in 66 cases and lower in only 17 cases, generally with minor losses in the latter.

3. Based on the results in points 1 and 2, if a single method of construction of sectoral CCIs has to be chosen and applied for each country, we support the use of the SW2 approach, applied to subsector (branch level) data, with correlation based preselection. Even better results can be achieved with a careful selection of the method, dataset and variable selection procedure for each sector and country, but a real time implementation of such an approach can be rather time consuming.

4. For the global national CCIs, the findings clearly point to the adoption of the SW2 method applied to extract information from a dataset of branch-level variables for all sectors of each country, with the variables selected on the basis of their correlation with the target series. This "direct" method works better than a "two-step" approach where the sectoral indexes are aggregated into a global one either by simple averaging or again using factor methods. The evaluation of the suggested method is conducted over a rather short sample, but the fact that it works well for many rather heterogeneous countries indicates that its performance should be also rather stable over time for a given country. Moreover, we have seen that this method works well also at the sectoral level for most countries, where a longer evaluation period is often available.

5. For the construction of euro area / EU global and sectoral factor based CCIs, the suggestion is again to use the SW2 approach for factor estimation, since it is simpler than FHLR2 and the results are similar; to apply it to a large dataset of subsector country

data; and to preselect the subsector variables on the basis of their leading characteristics (even though correlation based selection also performs well). The resulting CCIs are again better than either the ESI or the Confidence Indicator in most cases, but the differences are in general smaller than at the national level.

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8 Statistical Annex

Table 1A: Performance of alternative CCIs for the sector INDUSTRY – Correlation with reference series

Industry																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,91	0,91	0,59	0,58	0,73	0,63	0,59	0,81	0,45	0,68	na	0,77	0,47	0,67	0,44	na	0,36	0,43	na	0,71	na	na	na
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,92	0,91	0,61	0,60	0,76	0,67	0,62	0,84	0,43	0,69	na	0,80	0,49	0,69	0,46	na	0,42	0,37	na	0,70	na	na	na
	SW2	0,92	0,91	0,61	0,60	0,76	0,65	0,62	0,85	0,43	0,71	na	0,80	0,48	0,70	0,46	na	0,40	0,38	na	0,69	na	na	na
Equal and Balance	FHLR2	0,87	0,87	0,57	0,56	0,71	0,53	0,60	0,83	0,39	0,57	na	0,77	0,50	0,65	0,48	na	0,42	0,34	na	0,69	na	na	na
	SW2	0,86	0,85	0,56	0,55	0,69	0,48	0,60	0,83	0,37	0,58	na	0,71	0,50	0,62	0,47	na	0,41	0,34	na	0,68	na	na	na
Selection1	FHLR2	0,87	0,87	0,63	0,64	0,74	0,70	0,59	0,83	na	0,67	na	0,80	0,49	0,66	0,45	na	0,49	na	na	0,70	na	na	na
	SW2	0,86	0,85	0,63	0,64	0,74	0,69	0,59	0,83	na	0,67	na	0,80	0,49	0,66	0,45	na	0,49	na	na	0,70	na	na	na
Selection2	FHLR2	0,92	0,90	0,51	0,49	0,57	na	0,62	0,83	0,35	0,39	na	na	0,50	0,49	0,48	na	0,42	0,20	na	0,58	na	na	na
	SW2	0,90	0,88	0,50	0,48	0,57	na	0,61	0,82	0,30	0,39	na	na	0,50	0,49	0,48	na	0,42	0,25	na	0,57	na	na	na
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,89	0,91	0,60	0,59	0,75	0,70	0,59	0,85	0,41	0,71	na	0,80	0,46	0,65	0,46	na	0,42	0,36	na	0,67	na	na	na
	SW2	0,89	0,91	0,60	0,59	0,76	0,70	0,58	0,85	0,38	0,72	na	0,80	0,46	0,66	0,46	na	0,44	0,34	na	0,65	na	na	na
Equal and Balance	FHLR2	0,85	0,86	0,54	0,53	0,67	0,46	0,59	0,83	0,37	0,56	na	0,72	0,41	0,58	0,47	na	0,39	0,28	na	0,70	na	na	na
	SW2	0,85	0,85	0,54	0,53	0,67	0,44	0,58	0,83	0,37	0,57	na	0,71	0,41	0,59	0,47	na	0,40	0,29	na	0,68	na	na	na
Selection1	FHLR2	0,85	0,86	0,62	0,63	0,73	0,68	0,58	0,83	na	0,69	na	0,80	0,49	0,59	0,45	na	0,49	na	na	0,71	na	na	na
	SW2	0,85	0,85	0,62	0,63	0,73	0,69	0,59	0,83	na	0,69	na	0,80	0,49	0,59	0,45	na	0,49	na	na	0,71	na	na	na
Selection2	FHLR2	0,90	0,88	0,47	0,45	0,55	na	0,62	0,83	0,07	0,39	na	na	0,53	0,42	0,47	na	0,41	0,18	na	0,57	na	na	na
	SW2	0,90	0,87	0,45	0,43	0,52	na	0,63	0,83	0,02	0,39	na	na	0,53	0,35	0,47	na	0,41	0,16	na	0,57	na	na	na
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,89	0,90	0,55	0,54	0,68	0,63	0,53	0,75	0,37	0,53	na	0,78	0,46	0,67	0,44	na	0,37	0,31	na	0,60	na	na	na
	SW2	0,89	0,89	0,55	0,53	0,68	0,59	0,53	0,75	0,35	0,55	na	0,78	0,45	0,66	0,44	na	0,37	0,32	na	0,57	na	na	na
Selection1	FHLR2	0,89	0,90	0,63	0,63	0,71	0,70	0,59	0,79	na	0,61	na	0,79	0,47	0,67	na	na	0,42	na	na	0,63	na	na	na
	SW2	0,89	0,90	0,63	0,63	0,72	0,70	0,59	0,79	na	0,63	na	0,79	0,48	0,67	na	na	0,42	na	na	0,63	na	na	na
Selection2	FHLR2	0,93	0,91	0,50	0,49	0,71	0,02	0,54	0,79	0,26	0,64	na	0,74	0,51	0,66	0,43	na	0,38	0,40	na	0,56	na	na	na
	SW2	0,91	0,90	0,50	0,50	0,71	0,08	0,53	0,79	0,28	0,66	na	0,73	0,51	0,64	0,42	na	0,38	0,41	na	0,55	na	na	na

1) The three panels “Sector data, 1 fac”, “Sector data, 2 fac”, “Subsector data, 1 fac” refer, respectively, to the dataset of survey answers at the aggregate sector level summarized by one factor, to the same dataset summarized by two factors, and to the dataset of disaggregated survey answers at the branch level.
2) Within each panel “Balance” refers to the dataset of balance answers/difference of percentage of positive and negative answers; “Equal and Balance” to the same dataset with the percentage of “Equal” (unchanged) answers to each question added; “Selection 1” to the Equal and Balance dataset without variables whose correlation with the reference series is lower than 0.40. ; “Selection 2” to the Equal and Balance dataset without variables whose correlation with the reference series is highest using lags of the variables (i.e. lagging variables are discarded).
3) The reference series is the annual growth rate of the Industrial Production Index.
4) Na indicates that either the survey answer or the reference series are not available.
5) The reported figures are correlations with reference series.

Table 1B: Performance of alternative CCIs for the sector INDUSTRY – Directional coherence with reference series

Industry																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,55	0,59	0,53	0,53	0,53	0,50	0,56	0,54	0,54	0,49	na	0,57	0,49	0,52	0,53	na	0,55	0,53	na	0,56	na	na	na
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,55	0,62	0,53	0,53	0,55	0,52	0,57	0,58	0,44	0,49	na	0,55	0,49	0,57	0,54	na	0,56	0,51	na	0,53	na	na	na
	SW2	0,56	0,60	0,52	0,52	0,54	0,52	0,54	0,58	0,46	0,49	na	0,56	0,47	0,53	0,50	na	0,58	0,50	na	0,54	na	na	na
Equal and	FHLR2	0,58	0,59	0,55	0,55	0,57	0,55	0,56	0,59	0,50	0,52	na	0,55	0,51	0,61	0,54	na	0,55	0,55	na	0,54	na	na	na
Balance	SW2	0,60	0,57	0,53	0,53	0,55	0,53	0,55	0,59	0,50	0,51	na	0,50	0,52	0,57	0,52	na	0,52	0,54	na	0,54	na	na	na
Selection1	FHLR2	0,58	0,59	0,54	0,54	0,56	0,53	0,56	0,59	na	0,47	na	0,55	0,50	0,60	0,54	na	0,54	na	na	0,56	na	na	na
	SW2	0,60	0,57	0,54	0,54	0,56	0,48	0,56	0,59	na	0,49	na	0,56	0,49	0,58	0,54	na	0,55	na	na	0,56	na	na	na
Selection2	FHLR2	0,57	0,56	0,56	0,55	0,57	na	0,55	0,61	0,59	0,54	na	na	0,54	0,55	0,51	na	0,56	0,53	na	0,56	na	na	na
	SW2	0,60	0,58	0,56	0,56	0,59	na	0,54	0,63	0,56	0,57	na	na	0,54	0,56	0,54	na	0,53	0,54	na	0,56	na	na	na
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,55	0,61	0,53	0,53	0,54	0,53	0,61	0,59	0,39	0,50	na	0,54	0,51	0,55	0,54	na	0,53	0,53	na	0,56	na	na	na
	SW2	0,55	0,60	0,52	0,52	0,53	0,52	0,58	0,58	0,40	0,48	na	0,51	0,50	0,53	0,56	na	0,51	0,52	na	0,55	na	na	na
Equal and	FHLR2	0,58	0,57	0,54	0,54	0,55	0,51	0,54	0,60	0,49	0,47	na	0,51	0,53	0,62	0,55	na	0,53	0,56	na	0,51	na	na	na
Balance	SW2	0,60	0,59	0,53	0,53	0,55	0,45	0,57	0,59	0,50	0,50	na	0,50	0,50	0,61	0,56	na	0,52	0,57	na	0,50	na	na	na
Selection1	FHLR2	0,58	0,57	0,55	0,54	0,57	0,48	0,57	0,60	na	0,52	na	0,54	0,49	0,63	0,54	na	0,55	na	na	0,52	na	na	na
	SW2	0,60	0,59	0,54	0,54	0,56	0,48	0,56	0,59	na	0,50	na	0,51	0,49	0,64	0,54	na	0,55	na	na	0,55	na	na	na
Selection2	FHLR2	0,58	0,56	0,55	0,55	0,59	na	0,55	0,61	0,46	0,57	na	na	0,51	0,58	0,58	na	0,53	0,53	na	0,56	na	na	na
	SW2	0,60	0,56	0,55	0,55	0,60	na	0,55	0,61	0,46	0,57	na	na	0,52	0,61	0,57	na	0,52	0,54	na	0,56	na	na	na
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,55	0,56	0,51	0,52	0,53	0,49	0,56	0,57	0,44	0,46	na	0,55	0,45	0,56	0,48	na	0,58	0,55	na	0,53	na	na	na
	SW2	0,55	0,56	0,51	0,52	0,53	0,49	0,54	0,57	0,42	0,46	na	0,55	0,44	0,54	0,50	na	0,58	0,58	na	0,53	na	na	na
Selection1	FHLR2	0,55	0,58	0,58	0,57	0,60	0,53	0,62	0,62	na	0,66	na	0,56	0,52	0,57	na	na	0,54	na	na	0,54	na	na	na
	SW2	0,55	0,55	0,58	0,58	0,59	0,57	0,62	0,59	na	0,67	na	0,55	0,52	0,57	na	na	0,54	na	na	0,55	na	na	na
Selection2	FHLR2	0,58	0,56	0,55	0,56	0,58	0,49	0,56	0,56	0,50	0,66	na	0,55	0,55	0,54	0,53	na	0,59	0,54	na	0,62	na	na	na
	SW2	0,56	0,54	0,55	0,56	0,57	0,57	0,55	0,55	0,50	0,67	na	0,55	0,52	0,52	0,53	na	0,59	0,56	na	0,62	na	na	na

1) See notes 1-4 to Table 1A
2) The reported figures are the percentage of observations when the CCI and the reference series move in the same direction (i.e. both decrease or increase).

Table 1C: Performance of alternative CCIs for the sector INDUSTRY – Turning point coherence with reference series

Industry																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,13	0,20	0,11	0,10	-0,05	0,17	0,24	0,21	0,19	-0,26	na	-0,15	0,28	-0,03	0,11	na	0,37	0,23	na	-0,10	na	na	na
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,03	0,19	0,13	0,12	-0,04	0,19	0,20	0,13	0,46	-0,12	na	-0,24	0,22	0,08	0,03	na	0,37	0,02	na	0,09	na	na	na
	SW2	0,14	0,15	0,14	0,13	-0,03	0,28	0,16	0,18	0,46	-0,29	na	0,00	0,20	-0,03	0,04	na	0,40	0,08	na	0,09	na	na	na
Equal and	FHLR2	-0,15	-0,30	0,06	0,04	-0,05	0,06	0,12	0,05	0,23	-0,12	na	-0,19	0,23	0,06	-0,04	na	0,17	0,01	na	-0,07	na	na	na
Balance	SW2	-0,08	-0,30	0,02	0,02	-0,12	0,06	0,16	-0,02	0,13	-0,08	na	-0,30	0,22	-0,09	-0,05	na	0,15	0,02	na	0,04	na	na	na
Selection1	FHLR2	-0,15	-0,30	0,01	0,00	-0,12	-0,03	0,11	0,05	na	-0,31	na	-0,24	0,28	0,03	-0,04	na	0,27	na	na	-0,09	na	na	na
	SW2	-0,08	-0,30	0,05	0,04	-0,08	0,14	0,09	-0,02	na	-0,35	na	0,00	0,33	0,05	-0,04	na	0,27	na	na	-0,04	na	na	na
Selection2	FHLR2	0,25	0,37	0,16	0,15	0,01	na	0,23	0,12	0,38	-0,05	na	na	0,34	-0,04	-0,01	na	0,30	0,12	na	0,07	na	na	na
	SW2	0,07	0,06	0,10	0,09	-0,03	na	0,22	-0,05	0,15	-0,04	na	na	0,22	0,00	-0,04	na	0,30	0,01	na	0,07	na	na	na
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	-0,15	0,15	0,07	0,05	-0,13	0,17	0,09	0,04	0,33	-0,27	na	-0,26	0,23	-0,04	0,00	na	0,37	-0,04	na	-0,02	na	na	na
	SW2	-0,14	0,19	0,08	0,06	-0,11	0,08	0,10	0,18	0,33	-0,32	na	-0,26	0,23	-0,05	0,09	na	0,37	-0,02	na	-0,02	na	na	na
Equal and	FHLR2	-0,08	-0,28	-0,02	-0,05	-0,07	0,00	0,02	-0,04	0,02	-0,10	na	-0,17	0,16	0,00	-0,09	na	0,02	-0,06	na	-0,33	na	na	na
Balance	SW2	-0,08	-0,30	-0,01	-0,02	-0,12	0,17	0,11	-0,02	0,13	-0,08	na	-0,30	0,13	-0,08	-0,18	na	0,07	0,02	na	-0,22	na	na	na
Selection1	FHLR2	-0,08	-0,28	0,00	-0,02	-0,18	0,17	0,02	-0,04	na	-0,42	na	-0,26	0,33	0,00	-0,04	na	0,27	na	na	-0,26	na	na	na
	SW2	-0,08	-0,30	0,02	-0,01	-0,16	0,14	0,09	-0,02	na	-0,32	na	-0,26	0,33	-0,03	-0,04	na	0,27	na	na	-0,26	na	na	na
Selection2	FHLR2	0,11	0,04	0,05	0,05	-0,02	na	0,17	-0,06	-0,04	-0,04	na	na	0,24	0,03	-0,05	na	0,17	0,00	na	0,07	na	na	na
	SW2	0,07	0,00	0,05	0,04	0,00	na	0,17	0,04	-0,02	-0,04	na	na	0,24	0,01	-0,05	na	0,02	0,00	na	0,07	na	na	na
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	-0,18	0,37	0,03	0,03	0,00	0,03	0,15	0,12	-0,17	-0,04	na	0,00	0,19	-0,08	-0,02	na	0,13	-0,03	na	0,10	na	na	na
	SW2	0,11	0,27	0,05	0,04	0,00	0,03	0,22	0,12	-0,06	-0,04	na	0,00	0,19	-0,08	-0,02	na	0,15	-0,08	na	0,10	na	na	na
Selection1	FHLR2	-0,18	0,37	0,05	0,05	0,00	0,19	0,05	0,08	na	0,21	na	-0,19	-0,10	-0,08	na	na	0,27	na	na	-0,02	na	na	na
	SW2	0,11	0,33	0,10	0,10	0,09	0,11	0,19	0,12	na	0,33	na	-0,02	-0,10	-0,08	na	na	0,27	na	na	0,08	na	na	na
Selection2	FHLR2	0,45	0,20	0,11	0,13	0,09	-0,17	0,20	-0,11	0,15	0,04	na	0,28	0,12	0,15	0,29	na	0,13	0,25	na	0,23	na	na	na
	SW2	0,52	0,30	0,18	0,18	0,11	0,08	0,32	0,00	0,08	0,21	na	0,28	0,36	-0,03	0,35	na	0,13	0,22	na	0,19	na	na	na

1) See notes 1-4 to Table 1A
2) The reported figures are the scores of each CCI using the evaluation method described in the text to compare its turning points with those of the reference series. The turning points are identified using Bry Boschan algorithm.

Table 2A: Performance of alternative CCIs for the sector CONSUMERS – Correlation with reference series

Consumer																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,77	0,67	0,53	0,52	0,58	0,33	0,56	0,46	0,41	0,66	0,17	0,65	0,57	0,55	na	0,74	0,75	0,41	0,66	0,45	0,52	0,78	0,24
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,78	0,68	0,62	0,59	0,68	0,58	0,47	0,58	0,45	0,79	0,33	0,69	0,72	0,65	na	0,79	0,80	0,43	0,57	0,53	0,58	0,87	0,16
	SW2	0,78	0,69	0,61	0,58	0,67	0,56	0,48	0,58	0,47	0,77	0,32	0,67	0,68	0,67	na	0,80	0,75	0,44	0,57	0,54	0,56	0,85	0,16
Equal and Balance	FHLR2	0,76	0,66	0,58	0,55	0,62	0,40	0,53	0,57	0,41	0,72	0,30	0,66	0,68	0,53	na	0,82	0,80	0,34	0,52	0,44	0,59	0,87	0,20
	SW2	0,74	0,64	0,55	0,53	0,60	0,34	0,51	0,54	0,36	0,70	0,29	0,61	0,57	0,53	na	0,82	0,78	0,35	0,51	0,45	0,57	0,87	0,20
Selection1	FHLR2	0,77	0,68	0,68	0,67	0,68	0,61	0,65	0,64	0,47	0,75	na	0,70	0,69	0,63	na	0,82	0,81	0,54	0,76	0,67	0,61	0,86	0,50
	SW2	0,76	0,68	0,67	0,67	0,68	0,63	0,65	0,64	0,50	0,74	na	0,70	0,62	0,64	na	0,83	0,80	0,54	0,78	0,66	0,62	0,86	0,50
Selection2	FHLR2	0,66	0,73	0,55	0,54	0,52	0,47	na	0,52	0,42	0,68	0,33	0,62	0,63	0,25	na	0,78	0,81	0,55	0,22	0,44	0,61	0,86	0,43
	SW2	0,65	0,69	0,54	0,53	0,53	0,46	na	0,53	0,39	0,69	0,34	0,62	0,54	0,28	na	0,77	0,80	0,55	0,20	0,44	0,61	0,86	0,43
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,76	0,68	0,58	0,55	0,63	0,55	0,42	0,55	0,46	0,74	0,14	0,52	0,74	0,69	na	0,74	0,78	0,38	0,53	0,54	0,52	0,83	0,15
	SW2	0,76	0,68	0,56	0,54	0,62	0,53	0,40	0,56	0,48	0,70	0,11	0,52	0,71	0,68	na	0,75	0,76	0,38	0,54	0,54	0,52	0,83	0,16
Equal and Balance	FHLR2	0,76	0,66	0,52	0,52	0,61	0,43	0,44	0,58	0,42	0,73	0,02	0,52	0,60	0,60	na	0,62	0,80	0,30	0,67	0,43	0,57	0,85	0,22
	SW2	0,74	0,66	0,50	0,50	0,60	0,41	0,43	0,56	0,41	0,72	0,01	0,52	0,52	0,61	na	0,58	0,78	0,27	0,65	0,45	0,57	0,85	0,20
Selection1	FHLR2	0,76	0,68	0,63	0,64	0,66	0,54	0,66	0,62	0,49	0,73	na	0,61	0,67	0,66	na	0,50	0,84	0,53	0,75	0,67	0,62	0,87	0,50
	SW2	0,76	0,68	0,62	0,63	0,66	0,53	0,65	0,64	0,50	0,73	na	0,60	0,63	0,65	na	0,46	0,81	0,52	0,77	0,66	0,63	0,86	0,50
Selection2	FHLR2	0,65	0,64	0,50	0,53	0,55	0,41	na	0,51	0,39	0,73	0,25	0,52	0,53	0,43	na	0,45	0,83	0,56	0,61	0,41	0,62	0,85	0,40
	SW2	0,64	0,65	0,49	0,53	0,55	0,40	na	0,51	0,32	0,73	0,25	0,52	0,47	0,43	na	0,45	0,82	0,56	0,65	0,43	0,62	0,86	0,41
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,79	0,72	0,59	0,58	0,56	0,57	0,60	0,49	0,56	0,78	0,31	0,71	0,60	0,27	na	0,80	0,80	0,50	0,66	0,70	0,69	0,73	0,16
	SW2	0,79	0,73	0,57	0,56	0,54	0,53	0,55	0,47	0,56	0,77	0,32	0,68	0,57	0,26	na	0,79	0,75	0,49	0,64	0,68	0,70	0,71	0,15
Selection1	FHLR2	0,79	0,72	0,68	0,68	0,66	0,60	0,67	0,60	0,59	0,79	0,78	0,74	0,60	0,52	na	0,80	0,81	0,56	0,74	0,78	0,75	0,78	0,42
	SW2	0,79	0,73	0,67	0,68	0,65	0,63	0,65	0,59	0,60	0,79	0,78	0,75	0,58	0,48	na	0,79	0,77	0,58	0,77	0,78	0,78	0,77	0,42
Selection2	FHLR2	0,79	0,73	0,61	0,62	0,64	0,47	0,63	0,52	0,53	0,78	0,34	0,72	0,60	0,53	na	0,76	0,83	0,41	0,70	0,69	0,88	0,79	0,36
	SW2	0,80	0,74	0,61	0,62	0,64	0,46	0,62	0,50	0,55	0,78	0,36	0,74	0,57	0,54	na	0,74	0,80	0,43	0,76	0,67	0,88	0,78	0,35

1) The three panels “Sector data, 1 fac”, “Sector data, 2 fac”, “Subsector data, 1 fac” refer, respectively, to the dataset of survey answers at the aggregate sector level summarized by one factor, to the same dataset summarized by two factors, and to the dataset of survey answers disaggregated by income quartiles.
2) Within each panel “Balance” refers to the dataset of balance answers/difference of percentage of positive and negative answers; “Equal and Balance” to the same dataset with the percentage of “Equal” (unchanged) answers to each question added; “Selection 1” to the Equal and Balance dataset without variables whose correlation with the reference series is lower than 0.40. ; “Selection 2” to the Equal and Balance dataset without variables whose correlation with the reference series is highest using lags of the variables (i.e. lagging variables are discarded).
3) The reference series is the annual growth rate of the private consumption.
4) Na indicates that either the survey answer or the reference series are not available.
5) The reported figures are correlations with reference series.

Table 2B: Performance of alternative CCIs for the sector CONSUMERS – Directional coherence with reference series

consumer																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,51	0,48	0,52	0,52	0,50	0,55	0,55	0,48	0,53	0,52	0,47	0,51	0,48	0,49	na	0,54	0,57	0,51	0,61	0,48	0,54	0,49	0,47
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,48	0,41	0,53	0,52	0,51	0,50	0,58	0,52	0,47	0,53	0,57	0,53	0,49	0,47	na	0,57	0,57	0,47	0,56	0,47	0,50	0,52	0,47
	SW2	0,51	0,43	0,51	0,51	0,49	0,47	0,57	0,50	0,45	0,51	0,55	0,48	0,54	0,48	na	0,54	0,54	0,48	0,61	0,48	0,53	0,55	0,45
Equal and	FHLR2	0,48	0,43	0,52	0,52	0,51	0,53	0,56	0,51	0,45	0,53	0,53	0,49	0,53	0,50	na	0,52	0,61	0,46	0,65	0,53	0,49	0,49	0,47
Balance	SW2	0,48	0,44	0,53	0,52	0,51	0,50	0,55	0,50	0,44	0,53	0,56	0,50	0,55	0,51	na	0,53	0,60	0,45	0,65	0,52	0,48	0,50	0,47
Selection1	FHLR2	0,48	0,45	0,52	0,52	0,51	0,50	0,59	0,50	0,47	0,55	na	0,52	0,49	0,45	na	0,53	0,61	0,49	0,61	0,51	0,51	0,50	0,57
	SW2	0,47	0,42	0,51	0,52	0,50	0,49	0,57	0,48	0,46	0,54	na	0,50	0,52	0,47	na	0,53	0,57	0,49	0,64	0,54	0,48	0,48	0,57
Selection2	FHLR2	0,50	0,45	0,51	0,51	0,52	0,53	na	0,51	0,45	0,54	0,48	0,50	0,47	0,53	na	0,47	0,59	0,47	0,53	0,51	0,51	0,46	0,55
	SW2	0,50	0,48	0,51	0,51	0,52	0,48	na	0,53	0,41	0,52	0,50	0,51	0,51	0,53	na	0,51	0,57	0,50	0,51	0,52	0,48	0,48	0,55
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,49	0,43	0,52	0,52	0,50	0,50	0,57	0,52	0,45	0,55	0,57	0,48	0,53	0,47	na	0,52	0,56	0,47	0,57	0,47	0,53	0,54	0,49
	SW2	0,52	0,47	0,51	0,51	0,50	0,50	0,56	0,50	0,45	0,56	0,54	0,47	0,51	0,47	na	0,49	0,57	0,48	0,61	0,48	0,54	0,55	0,47
Equal and	FHLR2	0,48	0,44	0,52	0,51	0,51	0,51	0,57	0,52	0,46	0,54	0,53	0,49	0,47	0,50	na	0,54	0,57	0,46	0,59	0,54	0,50	0,47	0,47
Balance	SW2	0,47	0,44	0,51	0,51	0,51	0,50	0,57	0,50	0,45	0,53	0,46	0,50	0,47	0,51	na	0,53	0,55	0,46	0,64	0,51	0,48	0,49	0,47
Selection1	FHLR2	0,47	0,45	0,51	0,51	0,49	0,50	0,56	0,47	0,48	0,53	na	0,51	0,51	0,46	na	0,53	0,58	0,49	0,60	0,49	0,46	0,47	0,57
	SW2	0,45	0,43	0,51	0,51	0,49	0,50	0,58	0,48	0,46	0,53	na	0,50	0,52	0,46	na	0,50	0,59	0,49	0,56	0,49	0,48	0,49	0,57
Selection2	FHLR2	0,48	0,50	0,50	0,51	0,51	0,45	na	0,52	0,45	0,51	0,54	0,49	0,47	0,51	na	0,49	0,58	0,50	0,53	0,51	0,51	0,48	0,53
	SW2	0,50	0,50	0,51	0,51	0,51	0,51	na	0,52	0,46	0,53	0,50	0,50	0,48	0,50	na	0,51	0,59	0,50	0,55	0,51	0,49	0,47	0,51
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,52	0,46	0,51	0,51	0,48	0,50	0,55	0,50	0,48	0,55	0,53	0,52	0,48	0,38	na	0,53	0,55	0,48	0,62	0,54	0,40	0,60	0,43
	SW2	0,50	0,50	0,51	0,51	0,49	0,49	0,55	0,47	0,46	0,56	0,53	0,52	0,52	0,39	na	0,53	0,58	0,50	0,63	0,52	0,46	0,60	0,43
Selection1	FHLR2	0,52	0,46	0,51	0,52	0,51	0,50	0,58	0,50	0,46	0,55	0,53	0,51	0,45	0,47	na	0,52	0,57	0,47	0,60	0,51	0,38	0,60	0,55
	SW2	0,50	0,50	0,52	0,52	0,50	0,52	0,57	0,52	0,47	0,56	0,51	0,50	0,49	0,44	na	0,53	0,58	0,44	0,60	0,49	0,42	0,62	0,51
Selection2	FHLR2	0,50	0,47	0,52	0,52	0,53	0,53	0,56	0,50	0,43	0,54	0,52	0,52	0,45	0,56	na	0,56	0,57	0,51	0,59	0,52	0,46	0,57	0,51
	SW2	0,53	0,44	0,51	0,51	0,52	0,50	0,54	0,48	0,44	0,54	0,46	0,52	0,47	0,56	na	0,54	0,57	0,52	0,59	0,54	0,38	0,58	0,51

1) See notes 1-4 to Table 2A
2) The reported figures are the percentage of observations when the CCI and the reference series move in the same direction (i.e. both decrease or increase).

Table 2C: Performance of alternative CCIs for the sector CONSUMERS – Turning point coherence with reference series

consumer																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,17	-0,25	0,08	0,11	0,08	0,00	0,10	0,10	0,24	0,08	0,10	0,08	-0,12	0,08	na	0,26	0,00	0,00	0,31	0,07	0,11	0,23	0,17
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,08	0,00	0,04	0,08	0,06	0,00	0,24	0,19	-0,21	0,06	-0,07	0,07	0,00	-0,09	na	0,23	0,00	0,15	0,24	-0,10	0,33	0,30	0,00
	SW2	0,08	-0,11	0,03	0,07	0,05	0,00	-0,01	0,08	-0,21	0,06	0,13	-0,02	-0,07	0,08	na	0,13	0,17	0,14	0,10	-0,01	0,31	0,30	0,00
Equal and	FHLR2	0,08	0,00	0,03	0,07	0,05	0,00	0,35	0,11	-0,17	0,03	-0,03	0,06	0,00	0,00	na	0,00	0,00	0,08	0,14	0,00	0,33	0,30	0,00
Balance	SW2	0,08	-0,03	0,05	0,08	0,04	0,00	0,36	0,11	-0,05	0,03	0,20	0,01	-0,12	0,02	na	-0,03	0,03	0,05	0,14	-0,04	0,33	0,30	0,00
Selection1	FHLR2	0,08	0,00	0,02	0,07	0,01	0,00	0,20	0,06	-0,12	0,05	na	-0,04	0,00	-0,02	na	0,09	0,00	-0,04	0,24	0,02	0,33	0,30	0,00
	SW2	0,10	0,00	0,06	0,09	0,08	0,00	0,30	0,06	-0,10	0,05	na	0,10	0,00	0,10	na	0,09	0,03	0,08	0,24	-0,10	0,33	0,30	0,00
Selection2	FHLR2	0,10	-0,06	-0,01	0,04	0,10	0,00	na	0,11	-0,21	0,01	-0,10	0,07	-0,12	0,19	na	-0,03	0,00	0,06	0,02	0,02	0,33	0,27	0,00
	SW2	0,24	-0,08	-0,01	0,05	0,06	-0,07	na	0,11	-0,10	0,01	0,00	0,07	-0,07	0,04	na	-0,10	0,00	0,23	0,05	-0,01	0,33	0,23	0,00
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,07	0,00	0,04	0,09	0,10	0,00	0,10	0,19	-0,21	0,08	0,17	0,06	-0,02	0,08	na	0,04	0,00	0,19	0,24	-0,10	0,36	0,30	0,00
	SW2	0,07	0,06	0,02	0,06	0,09	0,00	0,10	0,14	-0,19	0,08	0,17	0,06	-0,19	0,08	na	-0,01	0,00	0,15	0,10	-0,07	0,31	0,37	0,00
Equal and	FHLR2	0,08	0,00	0,02	0,06	0,04	0,00	0,25	0,11	-0,24	0,04	0,17	0,05	-0,07	-0,03	na	0,04	-0,14	0,11	0,19	-0,04	0,36	0,30	0,00
Balance	SW2	0,08	-0,03	0,03	0,06	0,02	0,00	0,30	0,11	-0,21	0,03	0,27	0,00	-0,07	-0,03	na	0,06	-0,14	0,06	0,05	-0,04	0,33	0,30	0,00
Selection1	FHLR2	0,10	0,06	0,04	0,06	0,04	0,00	0,21	0,05	-0,10	0,04	na	0,04	0,00	0,03	na	0,21	-0,11	-0,10	0,24	-0,10	0,31	0,30	0,00
	SW2	0,08	-0,03	0,06	0,08	0,06	0,00	0,36	0,06	-0,10	0,05	na	0,04	0,00	0,10	na	0,22	-0,11	-0,11	0,19	-0,07	0,28	0,30	0,00
Selection2	FHLR2	0,21	-0,08	0,03	0,08	0,08	0,07	na	0,11	-0,10	0,01	0,10	0,05	-0,05	0,13	na	0,00	0,00	0,23	0,10	-0,05	0,33	0,27	0,00
	SW2	0,24	-0,08	0,01	0,06	0,05	0,07	na	0,11	-0,24	0,01	0,10	-0,05	-0,07	0,12	na	0,00	0,00	0,23	0,10	-0,02	0,33	0,27	0,00
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,04	0,00	0,01	0,02	0,05	0,00	0,00	0,20	-0,21	0,01	-0,10	-0,01	0,14	-0,02	na	0,05	0,00	-0,21	0,19	0,03	0,00	0,25	0,00
	SW2	0,04	0,03	0,00	0,03	0,04	0,00	0,07	0,13	-0,21	0,01	0,13	-0,02	-0,12	0,06	na	-0,02	0,00	-0,14	0,29	0,11	0,00	0,25	0,00
Selection1	FHLR2	0,04	0,00	0,04	0,06	0,03	-0,05	0,08	0,20	-0,21	0,01	0,37	0,00	0,14	-0,11	na	0,05	0,00	-0,01	0,19	0,04	0,00	0,25	0,00
	SW2	0,06	0,03	0,04	0,06	0,01	0,00	0,06	0,13	-0,10	0,01	0,37	0,00	0,14	-0,11	na	-0,02	0,00	-0,04	0,07	0,17	0,00	0,25	0,00
Selection2	FHLR2	0,06	0,00	0,05	0,06	0,08	0,00	-0,08	0,20	-0,24	0,05	0,17	-0,06	0,14	0,13	na	0,05	0,14	0,13	0,07	0,01	0,00	0,25	0,00
	SW2	0,06	0,00	0,04	0,06	0,07	0,00	0,05	0,13	-0,24	0,05	0,17	-0,02	0,14	0,13	na	0,05	0,03	0,17	0,17	-0,08	0,00	0,25	0,00

1) See notes 1-4 to Table 2A
2) The reported figures are the scores of each CCI using the evaluation method described in the text to compare its turning points with those of the reference series. The turning points are identified using Bry Boschan algorithm.

Table 3A: Performance of alternative CCIs for the sector SERVICES – Correlation with reference series

Services																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,85	0,90	0,64	0,61	0,67	0,74	0,55	0,74	na	0,68	0,40	0,72	na	0,55	na	0,59	0,82	0,55	0,68	0,53	0,20	0,78	na
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,89	0,92	0,67	0,67	0,61	0,80	0,55	0,46	na	0,65	0,44	0,72	na	0,63	na	0,90	0,90	0,59	0,69	0,54	0,81	0,77	na
	SW2	0,89	0,92	0,67	0,67	0,62	0,80	0,55	0,50	na	0,66	0,39	0,72	na	0,60	na	0,90	0,90	0,61	0,69	0,55	0,78	0,79	na
Equal and Balance	FHLR2	0,87	0,90	0,66	0,65	0,57	0,79	0,54	0,17	na	0,64	0,51	0,74	na	0,73	na	0,90	0,89	0,59	0,67	0,52	0,60	0,84	na
	SW2	0,88	0,90	0,64	0,64	0,55	0,76	0,53	0,13	na	0,62	0,48	0,75	na	0,71	na	0,91	0,86	0,59	0,65	0,53	0,66	0,84	na
Selection1	FHLR2	0,87	0,90	0,73	0,72	0,71	0,80	0,57	0,78	na	0,62	0,57	0,72	na	0,73	na	0,90	0,91	0,71	0,68	0,59	0,70	0,82	na
	SW2	0,88	0,90	0,74	0,73	0,73	0,80	0,56	0,80	na	0,64	0,60	0,72	na	0,76	na	0,91	0,90	0,73	0,68	0,59	0,77	0,84	na
Selection2	FHLR2	0,87	0,90	0,61	0,61	0,49	0,71	0,56	0,24	na	0,63	0,48	0,38	na	0,69	na	0,90	0,91	0,59	0,63	0,55	0,50	0,80	na
	SW2	0,88	0,90	0,61	0,61	0,48	0,70	0,54	0,26	na	0,62	0,54	0,35	na	0,67	na	0,91	0,90	0,59	0,48	0,55	0,57	0,83	na
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,89	0,92	0,66	0,66	0,63	0,80	0,56	0,54	na	0,66	0,34	0,72	na	0,59	na	0,86	0,89	0,58	0,70	0,55	0,69	0,81	na
	SW2	0,89	0,92	0,66	0,66	0,62	0,80	0,55	0,51	na	0,66	0,35	0,72	na	0,60	na	0,85	0,89	0,60	0,69	0,55	0,69	0,78	na
Equal and Balance	FHLR2	0,27	0,41	0,48	0,47	0,39	0,74	0,55	0,40	na	0,59	0,34	0,46	na	0,10	na	0,26	0,84	0,07	0,55	0,58	0,29	0,84	na
	SW2	0,30	0,40	0,45	0,45	0,33	0,71	0,53	0,38	na	0,53	0,40	0,43	na	0,01	na	0,27	0,84	0,06	0,55	0,53	0,18	0,84	na
Selection1	FHLR2	0,27	0,41	0,70	0,65	0,63	0,80	0,55	0,56	na	0,68	0,58	0,72	na	0,58	na	0,91	0,90	0,38	0,66	0,58	0,40	0,85	na
	SW2	0,30	0,40	0,64	0,60	0,66	0,80	0,56	0,55	na	0,68	0,46	0,72	na	0,68	na	0,40	0,89	0,34	0,65	0,58	0,29	0,85	na
Selection2	FHLR2	0,27	0,41	0,45	0,44	0,44	0,67	0,24	0,23	na	0,63	0,20	0,35	na	0,56	na	0,26	0,89	0,07	0,58	0,54	0,09	0,85	na
	SW2	0,30	0,40	0,43	0,42	0,42	0,68	0,23	0,23	na	0,65	0,17	0,36	na	0,43	na	0,27	0,89	0,06	0,42	0,55	0,12	0,83	na
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,83	0,84	0,59	0,59	0,79	0,37	0,18	0,71	na	0,86	0,08	0,90	na	0,68	na	0,77	0,79	0,55	0,19	0,94	0,78	0,42	na
	SW2	0,84	0,83	0,58	0,60	0,77	0,34	0,21	0,69	na	0,85	0,05	0,91	na	0,66	na	0,72	0,82	0,54	0,22	0,93	0,85	0,69	na
Selection1	FHLR2	0,84	0,84	0,79	0,79	0,82	0,82	0,60	0,77	na	0,87	0,72	0,90	na	0,74	na	0,80	0,86	0,77	0,55	0,96	0,95	0,81	na
	SW2	0,86	0,84	0,80	0,80	0,82	0,82	0,61	0,77	na	0,86	0,77	0,90	na	0,75	na	0,83	0,89	0,76	0,54	0,95	0,96	0,84	na
Selection2	FHLR2	0,84	0,84	0,66	0,66	0,80	0,48	0,27	0,71	na	0,86	0,42	0,90	na	0,73	na	0,75	0,81	0,67	0,04	0,95	0,88	0,73	na
	SW2	0,85	0,83	0,67	0,66	0,79	0,53	0,33	0,69	na	0,85	0,44	0,91	na	0,72	na	0,76	0,84	0,66	0,05	0,93	0,83	0,77	na

1) The three panels “Sector data, 1 fac”, “Sector data, 2 fac”, “Subsector data, 1 fac” refer, respectively, to the dataset of survey answers at the aggregate sector level summarized by one factor, to the same dataset summarized by two factors, and to the dataset of disaggregated survey answers at the branch level.
2) Within each panel “Balance” refers to the dataset of balance answers/difference of percentage of positive and negative answers; “Equal and Balance” to the same dataset with the percentage of “Equal” (unchanged) answers to each question added; “Selection 1” to the Equal and Balance dataset without variables whose correlation with the reference series is lower than 0.40. ; “Selection 2” to the Equal and Balance dataset without variables whose correlation with the reference series is highest using lags of the variables (i.e. lagging variables are discarded).
3) The reference series is the annual growth rate of the Value Added in services.
4) Na indicates that either the survey answer or the reference series are not available.
5) The reported figures are correlations with reference series.

Table 3B: Performance of alternative CCIs for the sector SERVICES – Directional coherence with reference series

Services																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,64	0,69	0,53	0,53	0,52	0,55	0,54	0,46	na	0,56	0,52	0,55	na	0,53	na	0,45	0,60	0,61	0,52	0,51	0,55	0,50	na
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,59	0,65	0,54	0,54	0,52	0,52	0,51	0,46	na	0,56	0,55	0,54	na	0,51	na	0,63	0,59	0,61	0,49	0,46	0,58	0,50	na
	SW2	0,64	0,66	0,53	0,53	0,52	0,54	0,50	0,43	na	0,56	0,50	0,57	na	0,51	na	0,60	0,60	0,55	0,51	0,47	0,52	0,53	na
Equal and	FHLR2	0,63	0,63	0,51	0,51	0,52	0,55	0,52	0,43	na	0,52	0,47	0,57	na	0,54	na	0,43	0,59	0,57	0,52	0,42	0,48	0,53	na
Balance	SW2	0,65	0,67	0,52	0,52	0,52	0,59	0,56	0,46	na	0,48	0,48	0,59	na	0,54	na	0,41	0,57	0,55	0,53	0,46	0,45	0,56	na
Selection1	FHLR2	0,63	0,63	0,50	0,51	0,48	0,52	0,48	0,43	na	0,50	0,54	0,54	na	0,46	na	0,43	0,59	0,55	0,50	0,52	0,48	0,53	na
	SW2	0,65	0,67	0,50	0,50	0,48	0,54	0,49	0,41	na	0,51	0,53	0,57	na	0,43	na	0,42	0,61	0,50	0,52	0,47	0,48	0,56	na
Selection2	FHLR2	0,63	0,63	0,50	0,51	0,50	0,56	0,47	0,41	na	0,51	0,51	0,55	na	0,53	na	0,43	0,54	0,57	0,63	0,45	0,48	0,50	na
	SW2	0,65	0,67	0,50	0,51	0,51	0,60	0,45	0,46	na	0,52	0,51	0,53	na	0,53	na	0,41	0,52	0,55	0,54	0,48	0,48	0,59	na
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,64	0,69	0,54	0,53	0,52	0,52	0,53	0,41	na	0,54	0,52	0,57	na	0,54	na	0,63	0,60	0,59	0,52	0,46	0,52	0,50	na
	SW2	0,64	0,66	0,54	0,53	0,53	0,53	0,51	0,43	na	0,55	0,52	0,57	na	0,55	na	0,62	0,60	0,55	0,51	0,47	0,52	0,53	na
Equal and	FHLR2	0,49	0,49	0,51	0,53	0,51	0,53	0,45	0,41	na	0,51	0,51	0,59	na	0,54	na	0,49	0,58	0,63	0,55	0,53	0,48	0,56	na
Balance	SW2	0,52	0,48	0,51	0,52	0,52	0,52	0,47	0,43	na	0,51	0,49	0,59	na	0,54	na	0,49	0,56	0,66	0,55	0,47	0,48	0,56	na
Selection1	FHLR2	0,49	0,49	0,51	0,52	0,50	0,52	0,51	0,48	na	0,52	0,51	0,57	na	0,43	na	0,40	0,62	0,59	0,60	0,46	0,52	0,53	na
	SW2	0,52	0,48	0,52	0,53	0,53	0,53	0,49	0,52	na	0,55	0,50	0,57	na	0,47	na	0,41	0,60	0,61	0,61	0,48	0,52	0,62	na
Selection2	FHLR2	0,49	0,49	0,52	0,53	0,50	0,64	0,47	0,50	na	0,51	0,54	0,52	na	0,47	na	0,49	0,54	0,63	0,58	0,45	0,52	0,59	na
	SW2	0,52	0,48	0,52	0,53	0,50	0,62	0,46	0,48	na	0,51	0,54	0,53	na	0,49	na	0,49	0,52	0,66	0,52	0,48	0,48	0,68	na
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,56	0,63	0,58	0,58	0,60	0,56	0,48	0,66	na	0,65	0,51	0,64	na	0,46	na	0,68	0,59	0,63	0,63	0,54	0,58	0,55	na
	SW2	0,63	0,61	0,58	0,58	0,61	0,47	0,48	0,66	na	0,69	0,55	0,64	na	0,47	na	0,68	0,57	0,60	0,66	0,64	0,45	0,58	na
Selection1	FHLR2	0,56	0,66	0,59	0,58	0,58	0,56	0,63	0,59	na	0,63	0,53	0,66	na	0,45	na	0,68	0,57	0,67	0,59	0,54	0,48	0,55	na
	SW2	0,56	0,63	0,59	0,59	0,60	0,56	0,63	0,66	na	0,65	0,53	0,66	na	0,43	na	0,64	0,55	0,73	0,66	0,57	0,35	0,61	na
Selection2	FHLR2	0,59	0,63	0,59	0,58	0,60	0,53	0,59	0,66	na	0,65	0,57	0,64	na	0,45	na	0,64	0,57	0,67	0,63	0,57	0,39	0,61	na
	SW2	0,59	0,61	0,60	0,59	0,60	0,56	0,63	0,66	na	0,63	0,62	0,64	na	0,47	na	0,64	0,55	0,67	0,56	0,54	0,42	0,61	na

1) See notes 1-4 to Table 4A
2) The reported figures are the percentage of observations when the CCI and the reference series move in the same direction (i.e. both decrease or increase).

Table 3C: Performance of alternative CCIs for the sector SERVICES – Turning point coherence with reference series

Services																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,03	-0,27	0,01	0,07	-0,03	0,14	-0,17	0,00	na	-0,10	-0,20	-0,12	na	0,11	na	0,00	0,40	0,63	0,00	-0,03	0,00	0,33	na
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,07	0,17	-0,08	0,01	-0,10	0,24	-0,28	0,00	na	-0,37	-0,20	-0,14	na	0,11	na	-0,20	0,17	0,57	-0,07	-0,07	0,00	0,33	na
	SW2	0,17	0,17	0,03	0,08	-0,02	0,24	-0,17	0,00	na	0,00	-0,20	-0,18	na	0,11	na	0,13	0,37	0,60	-0,07	-0,03	0,00	0,33	na
Equal and	FHLR2	0,17	0,17	0,00	0,04	0,01	-0,02	-0,20	0,25	na	-0,20	0,00	-0,19	na	0,19	na	0,00	0,20	0,33	0,00	-0,07	0,00	0,33	na
Balance	SW2	0,17	0,13	-0,04	0,04	-0,14	0,02	-0,13	-0,33	na	-0,23	0,00	-0,19	na	0,19	na	0,10	0,20	0,33	0,00	0,07	0,00	0,56	na
Selection1	FHLR2	0,17	0,17	-0,03	0,01	-0,16	0,24	-0,22	-0,42	na	0,00	0,20	-0,14	na	-0,08	na	0,00	0,17	0,00	0,00	0,07	0,00	0,33	na
	SW2	0,17	0,13	-0,05	0,00	-0,22	0,24	-0,30	-0,42	na	-0,20	0,23	-0,18	na	-0,08	na	0,10	0,17	0,00	0,00	0,07	0,00	0,33	na
Selection2	FHLR2	0,17	0,17	0,06	0,09	-0,03	0,33	-0,02	0,00	na	-0,20	0,20	0,04	na	0,06	na	0,00	0,17	0,33	0,00	0,07	0,00	0,33	na
	SW2	0,17	0,13	0,07	0,11	-0,05	0,36	0,02	-0,17	na	-0,20	0,20	-0,01	na	0,19	na	0,10	0,17	0,33	0,13	0,03	0,00	0,33	na
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,17	0,17	-0,04	0,03	-0,08	0,07	-0,10	0,00	na	-0,23	-0,20	-0,18	na	0,11	na	-0,20	0,37	0,60	-0,07	-0,03	0,00	0,33	na
	SW2	0,17	0,17	0,02	0,11	-0,02	0,24	-0,38	0,00	na	0,00	-0,20	-0,18	na	0,11	na	0,20	0,37	0,60	-0,07	-0,03	0,50	0,33	na
Equal and	FHLR2	-0,13	0,03	-0,02	0,03	-0,01	0,10	0,00	0,00	na	0,00	-0,07	-0,05	na	0,00	na	-0,03	-0,13	0,40	-0,17	0,07	0,00	0,33	na
Balance	SW2	-0,13	0,03	0,02	0,09	0,00	0,17	0,18	0,00	na	-0,03	0,10	0,03	na	0,00	na	-0,13	-0,13	0,37	-0,17	0,27	0,00	0,56	na
Selection1	FHLR2	-0,13	0,03	-0,11	-0,04	-0,21	0,07	-0,30	-0,50	na	-0,20	0,20	-0,18	na	0,03	na	0,07	-0,13	0,10	-0,03	-0,03	0,00	0,33	na
	SW2	-0,13	0,03	-0,12	-0,03	-0,19	0,24	-0,30	-0,50	na	-0,10	0,23	-0,18	na	0,03	na	-0,37	-0,13	0,23	-0,03	0,07	0,00	0,33	na
Selection2	FHLR2	-0,13	0,03	0,09	0,13	-0,02	0,55	0,05	-0,17	na	-0,03	0,13	-0,01	na	0,14	na	-0,03	0,17	0,40	0,07	0,07	0,00	0,56	na
	SW2	-0,13	0,03	0,06	0,11	-0,07	0,38	0,08	-0,17	na	-0,10	0,33	-0,01	na	0,00	na	-0,13	0,17	0,37	0,27	0,03	0,00	0,33	na
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	-0,08	-0,08	0,18	0,17	-0,10	0,39	-0,17	-0,50	na	0,25	0,00	-0,13	na	-0,03	na	0,83	1,00	0,75	0,00	-0,08	0,00	0,00	na
	SW2	-0,08	-0,08	0,14	0,14	-0,04	0,33	-0,17	-0,50	na	0,50	0,00	-0,13	na	-0,03	na	0,25	1,00	0,75	0,00	-0,08	0,00	0,00	na
Selection1	FHLR2	0,00	-0,08	0,15	0,15	-0,16	0,44	-0,28	-0,50	na	-0,08	0,17	-0,13	na	0,08	na	0,83	0,83	0,83	0,00	-0,08	0,00	0,00	na
	SW2	0,00	-0,08	0,16	0,15	-0,21	0,44	-0,28	-0,50	na	-0,08	0,42	-0,08	na	-0,17	na	0,83	0,83	0,83	0,00	-0,08	0,00	0,00	na
Selection2	FHLR2	0,00	-0,08	0,03	0,07	-0,18	0,17	0,17	-0,50	na	-0,08	0,00	-0,13	na	-0,03	na	0,83	-0,17	0,83	0,00	-0,08	0,00	0,00	na
	SW2	0,00	-0,08	0,19	0,17	-0,14	0,33	0,17	-0,50	na	-0,08	0,00	-0,13	na	0,14	na	0,83	0,92	0,83	0,00	-0,08	0,00	0,00	na

1) See notes 1-4 to Table 4A
2) The reported figures are the scores of each CCI using the evaluation method described in the text to compare its turning points with those of the reference series. The turning points are identified using Bry Boschan algorithm.

Table 4A: Performance of alternative CCIs for the sector BUILDING – Correlation with reference series

Building																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,34	0,24	0,48	0,49	0,61	0,07	0,17	0,85	na	0,73	0,47	0,48	0,16	0,37	0,47	0,63	0,91	0,28	0,72	0,16	0,69	0,33	0,88
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,39	0,34	0,51	0,50	0,59	0,08	0,26	0,79	na	0,72	0,60	0,53	0,25	0,31	0,45	0,67	0,89	0,40	0,71	0,12	0,69	0,20	0,88
	SW2	0,38	0,33	0,50	0,50	0,59	0,08	0,25	0,79	na	0,72	0,60	0,54	0,21	0,32	0,48	0,65	0,91	0,42	0,74	0,13	0,66	0,16	0,88
Equal and Balance	FHLR2	0,42	0,34	0,48	0,49	0,58	0,07	0,20	0,85	na	0,73	0,37	0,47	0,23	0,29	0,52	0,60	0,93	0,35	0,77	0,14	0,66	0,25	0,89
	SW2	0,45	0,38	0,47	0,48	0,57	0,07	0,25	0,83	na	0,72	0,28	0,45	0,24	0,28	0,55	0,58	0,93	0,30	0,78	0,10	0,63	0,22	0,89
Selection1	FHLR2	0,49	na	0,70	0,72	0,70	na	na	0,85	na	0,72	0,60	0,53	na	na	0,57	0,67	0,93	na	0,77	na	0,69	na	0,89
	SW2	0,52	na	0,69	0,72	0,70	na	na	0,84	na	0,72	0,53	0,54	na	na	0,60	0,65	0,93	na	0,79	na	0,68	na	0,89
Selection2	FHLR2	0,16	na	0,55	0,57	0,67	na	0,21	0,85	na	0,49	na	na	na	na	0,53	0,31	0,93	0,40	0,76	na	0,34	na	0,88
	SW2	0,46	na	0,60	0,60	0,68	na	0,24	0,84	na	0,52	na	na	na	na	0,56	0,54	0,93	0,33	0,78	na	0,36	na	0,88
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,39	0,34	0,51	0,51	0,59	0,09	0,28	0,78	na	0,71	0,62	0,54	0,25	0,32	0,48	0,66	0,91	0,43	0,75	0,13	0,69	0,18	0,88
	SW2	0,38	0,33	0,51	0,51	0,59	0,08	0,27	0,78	na	0,72	0,62	0,54	0,21	0,32	0,48	0,67	0,91	0,42	0,75	0,13	0,69	0,17	0,88
Equal and Balance	FHLR2	0,40	0,36	0,46	0,48	0,56	0,05	0,22	0,82	na	0,70	0,20	0,45	0,29	0,26	0,51	0,68	0,93	0,28	0,78	0,09	0,69	0,29	0,89
	SW2	0,43	0,40	0,45	0,47	0,53	0,07	0,25	0,80	na	0,69	0,07	0,44	0,32	0,20	0,54	0,63	0,93	0,28	0,78	0,08	0,68	0,28	0,89
Selection1	FHLR2	0,53	na	0,63	0,68	0,69	na	na	0,83	na	0,71	0,16	0,54	na	na	0,60	0,66	0,93	na	0,78	na	0,68	na	0,90
	SW2	0,52	na	0,61	0,67	0,70	na	na	0,83	na	0,72	0,02	0,54	na	na	0,60	0,67	0,93	na	0,79	na	0,68	na	0,89
Selection2	FHLR2	0,46	na	0,60	0,57	0,72	na	0,26	0,83	na	0,60	na	na	na	na	0,55	0,41	0,93	0,20	0,77	na	0,32	na	0,78
	SW2	0,46	na	0,60	0,58	0,71	na	0,26	0,83	na	0,59	na	na	na	na	0,56	0,41	0,93	0,30	0,78	na	0,32	na	0,79
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,36	0,30	0,50	0,45	0,60	0,12	0,22	0,69	na	0,77	0,62	0,57	na	0,35	0,12	0,64	0,88	0,40	0,78	0,08	0,38	0,12	na
	SW2	0,38	0,32	0,50	0,46	0,60	0,13	0,24	0,72	na	0,76	0,56	0,56	na	0,35	0,11	0,64	0,89	0,41	0,79	0,05	0,43	0,22	na
Selection1	FHLR2	0,57	na	0,69	0,69	0,64	na	na	0,74	na	0,77	0,73	0,57	na	0,49	na	0,64	0,88	na	0,78	na	na	0,63	na
	SW2	0,56	na	0,69	0,69	0,64	na	na	0,75	na	0,76	0,73	0,56	na	0,49	na	0,64	0,89	na	0,79	na	na	0,64	na
Selection2	FHLR2	0,34	na	0,48	0,46	0,68	0,03	0,31	0,69	na	0,67	na	na	na	na	0,10	0,69	0,85	0,44	0,76	na	0,46	0,10	na
	SW2	0,35	na	0,47	0,45	0,69	0,02	0,28	0,72	na	0,67	na	na	na	na	0,04	0,70	0,86	0,45	0,76	na	0,40	0,07	na

1) The three panels “Sector data, 1 fac”, “Sector data, 2 fac”, “Subsector data, 1 fac” refer, respectively, to the dataset of survey answers at the aggregate sector level summarized by one factor, to the same dataset summarized by two factors, and to the dataset of disaggregated survey answers at the branch level.
2) Within each panel “Balance” refers to the dataset of balance answers/difference of percentage of positive and negative answers; “Equal and Balance” to the same dataset with the percentage of “Equal” (unchanged) answers to each question added; “Selection 1” to the Equal and Balance dataset without variables whose correlation with the reference series is lower than 0.40. ; “Selection 2” to the Equal and Balance dataset without variables whose correlation with the reference series is highest using lags of the variables (i.e. lagging variables are discarded).
3) The reference series is the annual growth rate of the smooth trend-cycle component of the production volume index in construction.
4) Na indicates that either the survey answer or the reference series are not available.
5) The reported figures are correlations with reference series.

Table 4B: Performance of alternative CCIs for the sector BUILDING – Directional coherence with reference series

building																								
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,56	0,53	0,54	0,53	0,55	0,45	0,55	0,61	na	0,52	0,49	0,65	0,51	0,43	0,59	0,56	0,58	0,57	0,52	0,50	0,52	0,53	0,52
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,61	0,61	0,54	0,54	0,57	0,45	0,55	0,59	na	0,50	0,51	0,70	0,55	0,50	0,48	0,59	0,56	0,53	0,56	0,51	0,56	0,49	0,50
	SW2	0,60	0,60	0,55	0,54	0,57	0,47	0,57	0,60	na	0,51	0,51	0,70	0,53	0,48	0,48	0,62	0,58	0,57	0,54	0,45	0,55	0,47	0,52
Equal and	FHLR2	0,61	0,57	0,56	0,55	0,56	0,46	0,57	0,63	na	0,48	0,58	0,64	0,55	0,49	0,50	0,65	0,58	0,55	0,59	0,51	0,47	0,56	0,51
Balance	SW2	0,62	0,62	0,55	0,54	0,56	0,48	0,54	0,62	na	0,51	0,57	0,63	0,55	0,49	0,48	0,67	0,54	0,54	0,60	0,46	0,47	0,56	0,50
Selection1	FHLR2	0,58	na	0,59	0,58	0,61	na	na	0,63	na	0,50	0,57	0,70	na	na	0,57	0,59	0,58	na	0,63	na	0,48	na	0,53
	SW2	0,59	na	0,59	0,57	0,61	na	na	0,62	na	0,51	0,56	0,70	na	na	0,57	0,62	0,54	na	0,60	na	0,51	na	0,49
Selection2	FHLR2	0,56	na	0,52	0,54	0,56	na	0,52	0,63	na	0,48	na	na	na	na	0,48	0,44	0,58	0,55	0,60	na	0,56	na	0,50
	SW2	0,57	na	0,52	0,53	0,56	na	0,53	0,62	na	0,50	na	na	na	na	0,48	0,42	0,54	0,52	0,60	na	0,54	na	0,53
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,60	0,62	0,54	0,53	0,57	0,45	0,56	0,63	na	0,50	0,54	0,69	0,51	0,45	0,47	0,59	0,58	0,53	0,54	0,49	0,51	0,49	0,50
	SW2	0,60	0,60	0,55	0,53	0,57	0,46	0,56	0,61	na	0,50	0,52	0,70	0,53	0,48	0,47	0,61	0,58	0,55	0,54	0,45	0,53	0,46	0,52
Equal and	FHLR2	0,63	0,62	0,55	0,54	0,56	0,45	0,56	0,60	na	0,54	0,53	0,64	0,55	0,49	0,48	0,60	0,56	0,53	0,56	0,51	0,52	0,54	0,52
Balance	SW2	0,64	0,63	0,55	0,54	0,56	0,50	0,54	0,58	na	0,53	0,56	0,63	0,55	0,50	0,52	0,58	0,54	0,53	0,60	0,47	0,51	0,56	0,50
Selection1	FHLR2	0,63	na	0,59	0,56	0,60	na	na	0,62	na	0,50	0,56	0,69	na	na	0,59	0,59	0,56	na	0,57	na	0,49	na	0,48
	SW2	0,59	na	0,58	0,57	0,60	na	na	0,61	na	0,50	0,56	0,70	na	na	0,57	0,61	0,54	na	0,59	na	0,51	na	0,49
Selection2	FHLR2	0,57	na	0,55	0,55	0,59	na	0,54	0,62	na	0,55	na	na	na	na	0,48	0,56	0,56	0,53	0,58	na	0,55	na	0,51
	SW2	0,57	na	0,54	0,54	0,57	na	0,52	0,61	na	0,53	na	na	na	na	0,48	0,56	0,54	0,51	0,59	na	0,55	na	0,47
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,58	0,57	0,56	0,55	0,57	0,57	0,54	0,59	na	0,51	0,57	0,69	na	0,50	0,43	0,62	0,54	0,52	0,57	0,48	0,65	0,44	na
	SW2	0,58	0,60	0,56	0,55	0,57	0,55	0,53	0,60	na	0,51	0,54	0,69	na	0,48	0,44	0,63	0,60	0,55	0,56	0,50	0,67	0,39	na
Selection1	FHLR2	0,56	na	0,58	0,57	0,58	na	na	0,62	na	0,51	0,58	0,69	na	0,48	na	0,62	0,54	na	0,57	na	na	0,54	na
	SW2	0,56	na	0,59	0,58	0,57	na	na	0,62	na	0,51	0,57	0,69	na	0,48	na	0,63	0,60	na	0,56	na	na	0,53	na
Selection2	FHLR2	0,58	na	0,54	0,53	0,55	0,47	0,56	0,59	na	0,51	na	na	na	na	0,51	0,58	0,56	0,59	0,57	na	0,44	0,42	na
	SW2	0,56	na	0,55	0,53	0,56	0,47	0,57	0,60	na	0,52	na	na	na	na	0,50	0,57	0,58	0,54	0,54	na	0,47	0,42	na

1) See notes 1-4 to Table 3A
2) The reported figures are the percentage of observations when the CCI and the reference series move in the same direction (i.e. both decrease or increase).

Table 4C: Performance of alternative CCIs for the sector BUILDING – Turning point coherence with reference series

building																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		-0,02	-0,03	0,07	0,03	0,13	0,13	0,26	0,22	na	0,11	0,03	0,13	-0,28	0,04	0,20	-0,17	0,13	-0,08	0,37	0,07	-0,06	-0,20	-0,33
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,21	-0,03	0,09	0,06	0,09	-0,10	0,22	0,02	na	0,00	0,28	0,28	-0,22	0,06	0,13	0,03	0,23	-0,13	0,44	-0,07	0,03	-0,13	0,00
	SW2	0,21	-0,03	0,06	0,03	0,07	-0,23	0,24	0,02	na	-0,07	0,22	0,27	-0,22	0,06	0,13	0,03	0,23	-0,13	0,13	-0,08	-0,17	0,03	0,00
Equal and Balance	FHLR2	0,27	0,17	0,15	0,09	0,06	-0,03	0,11	-0,03	na	0,00	0,44	0,20	-0,22	0,08	0,40	0,17	0,50	-0,27	0,24	0,17	0,03	-0,13	-0,06
	SW2	0,29	0,18	0,09	0,06	0,02	-0,10	0,08	0,03	na	-0,03	0,03	-0,05	-0,22	0,15	0,40	0,17	0,50	-0,27	0,22	0,15	0,03	0,03	-0,06
Selection1	FHLR2	0,14	na	0,22	0,17	0,10	na	na	0,01	na	0,00	0,19	0,28	na	na	0,50	0,03	0,50	na	0,24	na	0,03	na	-0,06
	SW2	0,06	na	0,22	0,18	0,07	na	na	0,02	na	-0,07	0,31	0,27	na	na	0,50	0,03	0,50	na	0,26	na	0,03	na	-0,06
Selection2	FHLR2	0,03	na	0,19	0,10	-0,02	na	0,28	0,01	na	-0,04	na	na	na	na	0,40	-0,03	0,50	-0,30	0,43	na	-0,03	na	-0,22
	SW2	0,03	na	0,23	0,10	0,00	na	0,36	0,02	na	-0,01	na	na	na	na	0,50	0,02	0,50	-0,30	0,24	na	-0,07	na	-0,28
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,06	-0,03	0,07	0,03	0,07	-0,10	0,22	0,02	na	-0,07	0,14	0,25	-0,22	0,06	0,13	0,08	0,23	-0,13	0,13	-0,08	-0,10	0,03	0,00
	SW2	0,21	-0,03	0,06	0,04	0,07	-0,23	0,22	0,02	na	-0,08	0,19	0,27	-0,22	0,06	0,13	0,08	0,23	-0,13	0,13	-0,08	0,03	0,03	0,00
Equal and Balance	FHLR2	0,27	0,17	0,11	0,06	0,03	-0,10	0,04	0,09	na	0,08	0,28	0,17	-0,17	-0,23	0,40	0,17	0,50	-0,27	0,22	0,07	0,03	-0,27	-0,06
	SW2	0,29	0,06	0,05	0,01	-0,07	-0,10	0,08	-0,07	na	0,06	0,03	-0,05	-0,28	-0,23	0,40	0,17	0,50	-0,27	0,22	-0,03	0,03	-0,27	-0,06
Selection1	FHLR2	0,06	na	0,22	0,16	0,07	na	na	0,02	na	-0,07	0,28	0,25	na	na	0,50	0,08	0,50	na	0,22	na	0,03	na	-0,22
	SW2	0,06	na	0,18	0,15	0,06	na	na	0,01	na	-0,08	-0,03	0,27	na	na	0,50	0,08	0,50	na	0,26	na	0,03	na	-0,06
Selection2	FHLR2	0,03	na	0,19	0,07	-0,03	na	0,29	0,02	na	-0,07	na	na	na	na	0,40	0,00	0,50	-0,30	0,11	na	0,00	na	-0,22
	SW2	0,03	na	0,18	0,08	-0,05	na	0,21	0,01	na	-0,11	na	na	na	na	0,50	0,00	0,50	-0,30	0,24	na	0,00	na	-0,22
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,08	0,03	0,10	0,07	0,08	-0,13	0,15	0,00	na	-0,07	0,13	0,33	na	0,04	0,22	0,03	0,33	-0,13	0,25	0,03	0,25	-0,40	na
	SW2	0,17	-0,12	0,08	0,07	0,08	-0,13	0,22	0,00	na	-0,07	-0,07	0,33	na	0,04	0,11	0,08	0,33	-0,13	0,22	0,15	0,25	-0,30	na
Selection1	FHLR2	0,05	na	0,10	0,11	0,03	na	na	0,01	na	-0,07	0,20	0,33	na	-0,15	na	0,03	0,33	na	0,25	na	na	0,03	na
	SW2	0,14	na	0,14	0,13	0,05	na	na	0,01	na	-0,07	0,33	0,33	na	-0,06	na	0,08	0,33	na	0,22	na	na	0,03	na
Selection2	FHLR2	0,15	na	0,11	0,07	-0,02	0,03	0,29	0,00	na	-0,04	na	na	na	na	0,13	0,03	0,33	-0,13	0,53	na	0,00	-0,37	na
	SW2	0,15	na	0,07	0,04	-0,02	-0,13	0,26	0,00	na	-0,04	na	na	na	na	0,18	0,03	0,17	-0,13	0,53	na	0,00	-0,37	na

1) See notes 1-4 to Table 3A
2) The reported figures are the scores of each CCI using the evaluation method described in the text to compare its turning points with those of the reference series. The turning points are identified using Bry Boschan algorithm.

Table 5A: Performance of alternative CCIs for the sector RETAIL – Correlation with reference series

Retail																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,60	0,35	0,53	0,53	0,57	0,34	0,60	0,45	0,36	0,79	0,09	0,46	0,68	0,57	na	0,69	0,82	0,68	0,66	0,71	0,38	0,01	0,68
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,64	0,55	0,56	0,55	0,63	0,27	0,62	0,49	0,35	0,81	0,16	0,72	0,69	0,49	na	0,70	0,84	0,67	0,77	0,68	0,32	0,24	0,51
	SW2	0,64	0,55	0,55	0,55	0,63	0,26	0,61	0,49	0,31	0,81	0,15	0,73	0,68	0,50	na	0,69	0,84	0,65	0,74	0,68	0,33	0,36	0,50
Equal and Balance	FHLR2	0,04	0,35	0,44	0,49	0,49	0,30	0,39	0,53	0,34	0,25	0,20	0,75	0,81	0,42	na	0,19	0,64	0,70	0,74	0,72	0,36	0,27	0,63
	SW2	0,54	0,52	0,44	0,49	0,51	0,33	0,42	0,53	0,32	0,29	0,17	0,75	0,80	0,45	na	0,33	0,44	0,68	0,68	0,72	0,38	0,40	0,64
Selection1	FHLR2	0,65	0,61	0,63	0,67	0,71	0,55	0,68	0,57	0,31	0,81	na	0,76	0,80	na	na	0,70	0,53	0,70	0,77	0,76	na	0,82	0,69
	SW2	0,67	0,62	0,61	0,66	0,72	0,55	0,67	0,58	0,07	0,81	na	0,77	0,80	na	na	0,69	0,52	0,70	0,76	0,76	na	0,82	0,70
Selection2	FHLR2	0,57	0,59	0,50	0,51	0,44	na	0,53	0,51	0,30	0,40	0,20	0,76	0,81	0,07	na	0,71	0,69	0,64	na	0,67	0,27	0,46	0,62
	SW2	0,55	0,60	0,52	0,54	0,50	na	0,52	0,52	0,36	0,57	0,19	0,77	0,80	0,13	na	0,66	0,68	0,65	na	0,65	0,27	0,68	0,64
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,67	0,53	0,54	0,55	0,63	0,35	0,66	0,54	0,05	0,78	0,18	0,75	0,73	0,45	na	0,64	0,81	0,62	0,77	0,72	0,35	0,45	0,45
	SW2	0,68	0,56	0,53	0,54	0,64	0,28	0,66	0,56	0,04	0,77	0,17	0,75	0,75	0,48	na	0,61	0,79	0,59	0,77	0,72	0,36	0,48	0,47
Equal and Balance	FHLR2	0,64	0,54	0,38	0,44	0,40	0,39	0,37	0,55	0,24	0,22	0,15	0,75	0,06	0,10	na	0,45	0,85	0,26	0,75	0,72	0,36	0,66	0,65
	SW2	0,60	0,51	0,36	0,44	0,40	0,32	0,36	0,55	0,21	0,23	0,15	0,74	0,04	0,09	na	0,45	0,86	0,25	0,74	0,72	0,38	0,69	0,65
Selection1	FHLR2	0,66	0,62	0,56	0,60	0,71	0,55	0,66	0,57	0,07	0,81	na	0,76	0,12	na	na	0,64	0,86	0,38	0,75	0,76	na	0,82	0,71
	SW2	0,67	0,62	0,56	0,60	0,72	0,55	0,67	0,58	0,07	0,81	na	0,77	0,12	na	na	0,61	0,86	0,33	0,73	0,77	na	0,81	0,70
Selection2	FHLR2	0,61	0,60	0,46	0,48	0,45	na	0,54	0,49	0,35	0,24	0,24	0,73	0,02	0,34	na	0,76	0,86	0,56	na	0,70	0,04	0,70	0,65
	SW2	0,61	0,60	0,47	0,50	0,48	na	0,54	0,51	0,35	0,26	0,25	0,76	0,04	0,41	na	0,73	0,86	0,59	na	0,71	0,11	0,71	0,64
A		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,74	0,58	0,59	0,59	0,63	0,53	0,65	0,67	0,25	0,58	0,30	0,67	0,75	0,60	na	0,72	0,79	0,75	0,85	0,58	0,55	0,34	0,51
	SW2	0,75	0,58	0,59	0,59	0,63	0,48	0,66	0,65	0,28	0,58	0,26	0,70	0,74	0,61	na	0,73	0,78	0,75	0,83	0,55	0,50	0,34	0,57
Selection1	FHLR2	0,75	0,67	0,70	0,72	0,69	0,64	0,71	0,69	0,54	0,68	0,76	0,71	0,77	0,67	na	0,74	0,84	0,77	0,87	0,67	0,74	0,71	0,74
	SW2	0,77	0,70	0,72	0,73	0,70	0,67	0,72	0,70	0,55	0,68	0,77	0,73	0,77	0,70	na	0,75	0,84	0,79	0,86	0,68	0,76	0,70	0,74
Selection2	FHLR2	0,76	0,67	0,63	0,63	0,64	0,63	0,62	0,70	0,29	0,53	0,49	0,67	0,75	0,65	na	0,79	0,84	0,74	0,80	0,64	0,69	0,37	0,55
	SW2	0,77	0,68	0,64	0,64	0,65	0,63	0,63	0,71	0,31	0,53	0,47	0,70	0,74	0,67	na	0,81	0,83	0,76	0,80	0,63	0,69	0,37	0,60

1) The three panels “Sector data, 1 fac”, “Sector data, 2 fac”, “Subsector data, 1 fac” refer, respectively, to the dataset of survey answers at the aggregate sector level summarized by one factor, to the same dataset summarized by two factors, and to the dataset of disaggregated survey answers at the branch level.
2) Within each panel “Balance” refers to the dataset of balance answers/difference of percentage of positive and negative answers; “Equal and Balance” to the same dataset with the percentage of “Equal” (unchanged) answers to each question added; “Selection 1” to the Equal and Balance dataset without variables whose correlation with the reference series is lower than 0.40. ; “Selection 2” to the Equal and Balance dataset without variables whose correlation with the reference series is highest using lags of the variables (i.e. lagging variables are discarded).
3) The reference series is the annual growth rate of the private consumption.
4) Na indicates that either the survey answer or the reference series are not available.
5) The reported figures are correlations with reference series.

Table 5B: Performance of alternative CCIs for the sector RETAIL – Directional coherence with reference series

Retail																								
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,48	0,50	0,53	0,53	0,52	0,54	0,53	0,52	0,49	0,54	0,53	0,49	0,56	0,54	na	0,53	0,55	0,51	0,54	0,53	0,53	0,51	0,54
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,49	0,51	0,53	0,53	0,52	0,53	0,58	0,48	0,54	0,55	0,51	0,53	0,47	0,52	na	0,51	0,61	0,51	0,60	0,56	0,54	0,48	0,49
	SW2	0,48	0,52	0,53	0,53	0,53	0,53	0,59	0,50	0,51	0,55	0,48	0,53	0,49	0,54	na	0,52	0,59	0,51	0,56	0,55	0,57	0,48	0,54
Equal and Balance	FHLR2	0,53	0,50	0,51	0,51	0,51	0,53	0,52	0,50	0,54	0,42	0,51	0,53	0,48	0,57	na	0,49	0,49	0,53	0,55	0,53	0,50	0,46	0,54
	SW2	0,55	0,52	0,49	0,51	0,49	0,53	0,53	0,52	0,52	0,47	0,49	0,53	0,47	0,43	na	0,46	0,48	0,53	0,55	0,57	0,50	0,46	0,55
Selection1	FHLR2	0,48	0,48	0,50	0,52	0,51	0,52	0,52	0,45	0,43	0,52	na	0,55	0,52	na	na	0,51	0,46	0,52	0,60	0,60	na	0,54	0,55
	SW2	0,48	0,48	0,51	0,53	0,51	0,52	0,52	0,47	0,48	0,53	na	0,52	0,52	na	na	0,52	0,47	0,52	0,59	0,59	na	0,56	0,60
Selection2	FHLR2	0,48	0,50	0,51	0,51	0,50	na	0,58	0,50	0,52	0,48	0,48	0,52	0,47	0,52	na	0,51	0,50	0,48	na	0,56	0,49	0,50	0,57
	SW2	0,49	0,50	0,51	0,52	0,51	na	0,57	0,50	0,46	0,47	0,52	0,54	0,47	0,53	na	0,54	0,51	0,49	na	0,55	0,50	0,54	0,55
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,42	0,43	0,52	0,53	0,52	0,55	0,52	0,48	0,47	0,49	0,49	0,56	0,48	0,53	na	0,54	0,60	0,54	0,60	0,54	0,53	0,49	0,54
	SW2	0,42	0,44	0,52	0,53	0,52	0,48	0,52	0,49	0,47	0,48	0,50	0,57	0,51	0,53	na	0,52	0,60	0,57	0,62	0,53	0,56	0,49	0,55
Equal and Balance	FHLR2	0,50	0,50	0,53	0,53	0,52	0,53	0,52	0,52	0,48	0,51	0,48	0,53	0,56	0,54	na	0,54	0,57	0,54	0,56	0,55	0,50	0,48	0,54
	SW2	0,50	0,50	0,53	0,53	0,53	0,53	0,52	0,53	0,50	0,51	0,51	0,53	0,56	0,54	na	0,54	0,56	0,51	0,58	0,57	0,50	0,51	0,57
Selection1	FHLR2	0,47	0,48	0,52	0,54	0,52	0,52	0,52	0,47	0,48	0,52	na	0,56	0,55	na	na	0,54	0,57	0,50	0,58	0,58	na	0,55	0,61
	SW2	0,48	0,48	0,52	0,53	0,51	0,52	0,52	0,48	0,48	0,51	na	0,52	0,54	na	na	0,52	0,56	0,51	0,53	0,58	na	0,52	0,62
Selection2	FHLR2	0,45	0,50	0,54	0,53	0,53	na	0,58	0,47	0,53	0,54	0,50	0,53	0,56	0,57	na	0,52	0,57	0,48	na	0,56	0,50	0,53	0,54
	SW2	0,45	0,50	0,53	0,53	0,52	na	0,59	0,50	0,53	0,52	0,48	0,52	0,56	0,55	na	0,51	0,56	0,51	na	0,54	0,50	0,55	0,57
B		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,52	0,50	0,51	0,52	0,51	0,51	0,53	0,50	0,47	0,51	0,49	0,52	0,47	0,52	na	0,52	0,58	0,55	0,61	0,56	0,48	0,54	0,51
	SW2	0,50	0,50	0,52	0,52	0,52	0,52	0,55	0,51	0,48	0,51	0,52	0,53	0,48	0,52	na	0,53	0,56	0,54	0,60	0,58	0,43	0,52	0,55
Selection1	FHLR2	0,50	0,53	0,51	0,52	0,53	0,47	0,55	0,52	0,46	0,58	0,50	0,52	0,42	0,52	na	0,55	0,52	0,59	0,61	0,63	0,40	0,52	0,53
	SW2	0,48	0,51	0,52	0,53	0,54	0,49	0,53	0,53	0,49	0,57	0,53	0,54	0,47	0,53	na	0,55	0,50	0,55	0,62	0,64	0,38	0,52	0,56
Selection2	FHLR2	0,51	0,56	0,52	0,53	0,54	0,53	0,52	0,55	0,46	0,56	0,51	0,47	0,47	0,56	na	0,49	0,60	0,58	0,55	0,59	0,48	0,54	0,53
	SW2	0,48	0,57	0,53	0,53	0,54	0,55	0,55	0,53	0,49	0,56	0,51	0,51	0,48	0,55	na	0,53	0,62	0,59	0,56	0,55	0,43	0,52	0,57

1) See notes 1-4 to Table 5A
2) The reported figures are the percentage of observations when the CCI and the reference series move in the same direction (i.e. both decrease or increase).

Table 5C: Performance of alternative CCIs for the sector RETAIL – Turning point coherence with reference series

Retail																							
		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0,46	0,25	0,13	0,11	0,09	0,15	0,26	0,17	-0,06	-0,30	0,17	0,10	0,25	0,38	na	0,22	0,08	0,00	0,25	-0,10	0,00	0,12	0,10
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																								
Balance	FHLR2	0,17	-0,03	-0,02	0,02	0,01	-0,17	0,26	0,06	0,00	0,06	-0,20	-0,08	0,17	0,01	na	-0,22	-0,14	0,06	0,36	0,00	0,11	0,00	0,00
	SW2	0,14	-0,03	0,00	0,03	0,00	-0,17	0,26	0,00	0,00	0,06	-0,20	-0,08	0,19	0,04	na	0,04	-0,14	-0,02	0,31	0,05	0,08	0,00	0,00
Equal and	FHLR2	0,06	0,11	0,01	0,05	0,02	-0,14	0,35	-0,02	-0,17	0,17	0,00	-0,04	-0,14	-0,01	na	0,03	0,14	0,04	0,31	0,08	0,31	0,00	0,00
Balance	SW2	0,08	0,03	0,02	0,05	0,08	-0,14	0,32	0,18	-0,17	0,14	0,00	-0,04	-0,14	0,05	na	-0,06	0,08	-0,02	0,31	0,10	0,22	0,06	0,00
Selection1	FHLR2	0,14	-0,08	0,03	0,09	0,06	0,00	0,11	0,11	-0,02	0,15	na	-0,07	0,14	na	na	-0,22	0,11	0,15	0,31	0,12	na	0,33	0,00
	SW2	0,24	-0,08	0,09	0,15	0,08	0,00	0,36	0,15	-0,10	0,17	na	-0,08	0,14	na	na	0,04	0,11	0,04	0,38	0,15	na	0,33	0,33
Selection2	FHLR2	0,14	0,06	-0,04	0,00	-0,06	na	0,28	-0,06	0,26	-0,05	-0,20	-0,18	-0,14	0,04	na	-0,22	-0,11	0,00	na	0,00	0,17	0,22	0,00
	SW2	0,14	0,06	-0,01	0,04	0,01	na	0,28	-0,06	-0,05	0,17	0,00	-0,18	-0,14	0,10	na	-0,04	-0,14	0,04	na	0,15	0,17	0,28	0,00
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																								
Balance	FHLR2	0,15	-0,03	0,03	0,05	0,01	-0,05	0,22	0,06	0,17	0,14	-0,03	-0,06	0,19	-0,08	na	-0,08	-0,17	-0,24	0,29	0,08	0,28	0,22	0,00
	SW2	0,22	-0,03	0,02	0,07	0,03	-0,21	0,22	0,08	0,14	0,11	-0,03	0,01	0,19	-0,08	na	-0,08	-0,08	-0,02	0,36	0,05	0,28	0,22	0,00
Equal and	FHLR2	0,07	0,14	0,02	0,10	0,00	0,12	0,40	-0,10	-0,17	0,09	0,00	-0,01	0,07	0,04	na	-0,07	-0,11	0,26	0,31	0,08	0,31	0,39	0,08
Balance	SW2	0,08	0,22	0,05	0,11	0,03	-0,14	0,40	0,10	-0,14	0,09	0,13	-0,04	0,21	-0,01	na	0,03	-0,06	0,06	0,38	0,10	0,22	0,39	0,08
Selection1	FHLR2	0,24	-0,08	0,02	0,11	0,00	0,00	0,39	-0,01	-0,10	0,15	na	-0,13	-0,02	na	na	-0,08	0,00	-0,04	0,38	0,20	na	0,50	0,33
	SW2	0,24	-0,08	0,04	0,10	0,09	0,00	0,36	0,19	-0,10	0,17	na	-0,08	-0,02	na	na	-0,08	-0,11	-0,04	0,40	0,20	na	0,17	0,33
Selection2	FHLR2	0,14	0,06	0,01	0,05	-0,03	na	0,33	-0,06	-0,12	0,06	0,00	-0,13	0,12	0,00	na	0,03	-0,11	0,00	na	0,17	-0,06	0,28	0,25
	SW2	0,14	0,06	0,02	0,04	-0,03	na	0,31	-0,01	-0,12	0,06	0,00	-0,18	0,19	0,00	na	0,08	-0,11	0,02	na	0,20	-0,06	0,28	0,00
C		EA	EU	mean EA	mean EU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																								
Balance	FHLR2	0,19	-0,19	-0,01	0,03	0,04	0,10	0,21	-0,02	-0,07	0,06	0,00	0,03	0,00	0,08	na	-0,15	-0,36	0,17	0,38	-0,21	0,00	0,33	0,00
	SW2	0,25	0,00	0,01	0,03	0,06	0,10	0,21	0,04	-0,07	0,06	0,00	0,03	0,00	0,11	na	-0,15	-0,19	0,28	0,24	-0,21	0,00	0,06	0,00
Selection1	FHLR2	0,06	0,08	-0,01	0,02	0,09	-0,10	0,05	0,04	-0,05	0,17	-0,17	0,03	0,00	0,14	na	-0,15	-0,11	0,61	0,38	-0,33	0,00	-0,11	-0,13
	SW2	0,11	0,08	0,00	0,07	0,02	-0,07	0,03	-0,12	-0,05	0,17	0,07	0,04	0,00	0,00	na	-0,10	0,08	0,61	0,38	-0,33	0,00	0,56	-0,13
Selection2	FHLR2	0,25	0,06	-0,04	0,03	-0,05	-0,07	-0,06	0,01	0,10	-0,06	-0,40	-0,11	0,00	-0,03	na	-0,02	0,22	0,56	0,19	-0,13	0,00	0,33	0,00
	SW2	0,25	0,11	0,00	0,05	0,00	-0,07	0,05	-0,05	0,14	-0,06	-0,20	0,03	0,00	0,06	na	-0,08	0,19	0,61	0,31	-0,13	0,00	0,06	0,00

1) See notes 1-4 to Table 5A
2) The reported figures are the scores of each CCI using the evaluation method described in the text to compare its turning points with those of the reference series. The turning points are identified using Bry Boschan algorithm.

Table 6A: Performance of alternative Global CCIs for European Countries– Correlation with reference series

A																							
Sentiment		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
		0,68	0,77	0,58	0,68	0,79	0,75	0,81	0,79	0,29	0,63	0,23	0,90	0,81	0,84	0,50	0,88	0,29	0,69	0,54	0,04	0,31	0,62
Direct																							
Sector data, 1 fac		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
Balance	**FHLR2**	0,68	0,73	0,63	0,65	0,70	0,82	0,83	0,71	0,02	0,50	0,59	0,91	0,75	0,70	0,82	0,83	0,88	0,62	0,47	0,22	0,48	0,64
	SW2	0,68	0,75	0,64	0,67	0,72	0,83	0,81	0,75	0,01	0,50	0,53	0,90	0,77	0,75	0,82	0,83	0,87	0,59	0,53	0,35	0,45	0,61
Equal and	**FHLR2**	0,61	0,59	0,60	0,53	0,55	0,75	0,77	0,67	0,08	0,49	0,55	0,37	0,75	0,66	0,85	0,80	0,87	0,60	0,39	0,48	0,53	0,64
Balance	**SW2**	0,65	0,67	0,61	0,60	0,65	0,76	0,74	0,71	0,10	0,52	0,51	0,63	0,76	0,73	0,85	0,80	0,88	0,58	0,43	0,23	0,51	0,61
Selection1	**FHLR2**	0,73	0,77	0,75	0,73	0,77	0,79	0,89	0,68	0,00	0,66	0,75	0,91	0,76	0,83	0,88	0,81	0,88	0,68	0,84	0,93	0,63	0,73
	SW2	0,75	0,79	0,76	0,75	0,80	0,83	0,88	0,73	0,00	0,73	0,78	0,91	0,78	0,84	0,89	0,84	0,88	0,69	0,84	0,93	0,64	0,74
Selection2	**FHLR2**	0,71	0,66	0,68	0,64	0,69	0,83	0,90	0,33	0,15	0,62	0,72	0,92	0,75	0,88	0,89	0,80	0,85	0,73	0,89	0,38	0,63	0,33
	SW2	0,71	0,67	0,69	0,66	0,71	0,83	0,89	0,37	0,14	0,68	0,70	0,92	0,77	0,86	0,89	0,80	0,84	0,74	0,87	0,43	0,64	0,42
Sector data, 2 fac		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
Balance	**FHLR2**	0,68	0,75	0,64	0,68	0,74	0,78	0,81	0,74	0,02	0,54	0,54	0,90	0,76	0,77	0,82	0,85	0,87	0,58	0,57	0,24	0,41	0,64
	SW2	0,67	0,75	0,65	0,69	0,75	0,77	0,77	0,73	0,08	0,59	0,38	0,89	0,76	0,78	0,82	0,81	0,86	0,50	0,72	0,62	0,42	0,57
Equal and	**FHLR2**	0,64	0,70	0,58	0,59	0,67	0,76	0,80	0,69	0,05	0,47	0,34	0,84	0,75	0,69	0,86	0,79	0,88	0,45	0,24	0,20	0,51	0,64
Balance	**SW2**	0,58	0,69	0,56	0,65	0,67	0,71	0,79	0,74	0,09	0,41	0,15	0,90	0,53	0,61	0,66	0,75	0,87	0,31	0,71	0,13	0,50	0,60
Selection1	**FHLR2**	0,68	0,76	0,70	0,72	0,76	0,83	0,89	0,72	0,00	0,58	0,21	0,92	0,78	0,83	0,88	0,82	0,88	0,65	0,81	0,72	0,63	0,72
	SW2	0,63	0,72	0,64	0,70	0,69	0,86	0,88	0,72	0,00	0,29	0,05	0,91	0,79	0,82	0,72	0,83	0,89	0,54	0,89	0,23	0,64	0,73
Selection2	**FHLR2**	0,61	0,61	0,62	0,61	0,68	0,78	0,89	0,33	0,23	0,60	0,08	0,91	0,75	0,86	0,42	0,80	0,85	0,62	0,89	0,37	0,63	0,44
	SW2	0,55	0,63	0,54	0,61	0,67	0,70	0,86	0,57	0,24	0,41	0,12	0,92	0,60	0,78	0,07	0,82	0,85	0,57	0,87	0,22	0,64	0,00
Subsector data, 1 fac		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
Balance	**FHLR2**	0,65	0,75	0,64	0,67	0,77	0,80	0,78	0,75	0,09	0,72	0,51	0,91	0,35	0,68	0,71	0,83	0,43	0,65	0,46	0,87	0,52	0,75
	SW2	0,63	0,75	0,63	0,69	0,78	0,81	0,74	0,76	0,03	0,72	0,43	0,91	0,34	0,72	0,66	0,83	0,43	0,64	0,67	0,79	0,54	0,75
Selection1	**FHLR2**	0,79	0,79	0,79	0,76	0,79	0,88	0,87	0,70	0,71	0,73	0,78	0,92	0,61	0,80	0,80	0,84	0,68	0,71	0,90	0,94	0,68	0,85
	SW2	0,81	0,81	0,81	0,78	0,81	0,88	0,87	0,74	0,77	0,75	0,79	0,92	0,66	0,81	0,83	0,85	0,70	0,73	0,90	0,94	0,73	0,89
Selection2	**FHLR2**	0,75	0,81	0,75	0,78	0,82	0,83	0,86	0,77	0,60	0,72	0,62	0,92	0,42	0,88	0,83	0,85	0,53	0,73	0,90	0,72	0,72	0,86
	SW2	0,77	0,82	0,76	0,78	0,83	0,83	0,86	0,79	0,64	0,73	0,61	0,92	0,47	0,87	0,84	0,86	0,54	0,72	0,91	0,72	0,77	0,85
Two-step		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
2nd	**1st**																						
MEAN	**con**	0,63	0,74	0,53	0,66	0,79	0,75	0,82	0,77	0,40	0,65	0,09	0,93	0,74	0,81	0,11	0,89	0,31	0,00	0,55	0,42	0,35	0,45
	fhlr2	0,66	0,76	0,59	0,66	0,79	0,87	0,79	0,77	0,32	0,63	0,16	0,92	0,73	0,85	0,30	0,88	0,33	0,45	0,45	0,74	0,27	0,52
	sw2	0,64	0,75	0,58	0,66	0,79	0,85	0,78	0,77	0,28	0,62	0,16	0,92	0,72	0,85	0,25	0,88	0,33	0,46	0,46	0,74	0,18	0,52
	sw2d	0,69	0,79	0,57	0,69	0,80	0,71	0,76	0,80	0,33	0,62	0,46	0,94	0,63	0,86	0,64	0,81	0,02	0,71	0,53	0,14	0,45	0,35
SW2	**con**	0,66	0,74	0,60	0,68	0,79	0,75	0,85	0,76	0,49	0,67	0,34	0,92	0,72	0,80	0,03	0,90	0,41	0,51	0,71	0,50	0,35	0,52
	fhlr2	0,69	0,75	0,64	0,71	0,79	0,81	0,84	0,77	0,46	0,68	0,43	0,91	0,71	0,81	0,22	0,90	0,44	0,58	0,78	0,70	0,37	0,50
	sw2	0,69	0,75	0,64	0,70	0,79	0,82	0,83	0,76	0,43	0,68	0,50	0,91	0,70	0,81	0,21	0,90	0,42	0,57	0,76	0,75	0,32	0,49
	sw2d	0,71	0,79	0,62	0,70	0,81	0,70	0,80	0,77	0,15	0,70	0,69	0,91	0,70	0,86	0,71	0,84	0,30	0,54	0,56	0,14	0,54	0,56
FHLR2	**con**	0,68	0,74	0,59	0,67	0,79	0,74	0,86	0,73	0,50	0,70	0,41	0,93	0,72	0,80	0,21	0,90	0,42	0,60	0,64	0,11	0,31	0,50
	fhlr2	0,68	0,75	0,63	0,68	0,79	0,79	0,85	0,74	0,42	0,69	0,44	0,92	0,72	0,80	0,25	0,89	0,44	0,61	0,65	0,74	0,34	0,51
	sw2	0,69	0,75	0,64	0,69	0,79	0,79	0,83	0,73	0,36	0,69	0,59	0,92	0,71	0,80	0,26	0,89	0,41	0,61	0,66	0,77	0,28	0,49
	sw2d	0,72	0,79	0,63	0,70	0,81	0,68	0,88	0,75	0,18	0,72	0,69	0,92	0,68	0,86	0,71	0,84	0,27	0,59	0,53	0,24	0,50	0,62
DISAGGR First obs							02:2	02:6	90:1	93:4	00:6	01:1	00:7	98:3	98:1	02:5	01:4	98:1	02:4	02:8	02:5	02:5	01:5

1) The three panels “Sector data, 1 fac”, “Sector data, 2 fac”, “Subsector data, 1 fac” refer, respectively, to the dataset of survey answers at the aggregate sector level summarized by one factor, to the same dataset summarized by two factors, and to the dataset of disaggregated survey answers at the branch level.
2) Within each panel “Balance” refers to the dataset of balance answers/difference of percentage of positive and negative answers; “Equal and Balance” to the same dataset with the percentage of “Equal” (unchanged) answers to each question added; “Selection 1” to the Equal and Balance dataset without variables whose correlation with the reference series is lower than 0.40. ; “Selection 2” to the Equal and Balance dataset without variables whose correlation with the reference series is highest using lags of the variables (i.e. lagging variables are discarded).
3) The reference series is interpolated monthly GDP.
4) Mean reports the simple average of the results over countries, WM the weighted average using GDP based weights, Mean4 is the average for the four largest euro area countries.
5) Two-step reports the results for the indexes obtained with the two-step procedure described in the text, where 1^{st} relates to the indexes computed in the first step, and 2^{nd} to the aggregation method used in the second step.
6) The last row reports the first observation in the sample, the final observation is 2005:8 for all countries.
7) The reported figures are correlations with the reference series

Table 6B: Performance of alternative Global CCIs for European Countries – Directional coherence with reference series

B																							
Sentiment		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
		0,56	0,58	0,54	0,54	0,57	0,60	0,62	0,58	0,50	0,56	0,52	0,66	0,56	0,50	0,58	0,53	0,55	0,51	0,57	0,45	0,44	0,44
Direct																							
Aggregated		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
Balance	**FHLR2**	0,60	0,59	0,57	0,55	0,58	0,69	0,71	0,55	0,53	0,58	0,56	0,67	0,51	0,52	0,57	0,72	0,62	0,55	0,58	0,44	0,52	0,40
	SW2	0,59	0,58	0,57	0,54	0,57	0,67	0,68	0,59	0,52	0,58	0,58	0,62	0,52	0,51	0,54	0,69	0,65	0,63	0,53	0,49	0,52	0,42
Equal and Balance	**FHLR2**	0,58	0,56	0,56	0,53	0,55	0,67	0,66	0,59	0,50	0,56	0,56	0,52	0,52	0,51	0,54	0,72	0,58	0,53	0,61	0,54	0,52	0,46
	SW2	0,59	0,58	0,57	0,55	0,57	0,67	0,66	0,59	0,50	0,56	0,58	0,59	0,51	0,54	0,58	0,72	0,58	0,55	0,58	0,54	0,52	0,46
Selection1	**FHLR2**	0,55	0,58	0,56	0,56	0,58	0,67	0,74	0,58	0,00	0,56	0,40	0,67	0,56	0,52	0,56	0,77	0,60	0,60	0,67	0,59	0,55	0,54
	SW2	0,52	0,56	0,55	0,54	0,57	0,67	0,68	0,56	0,00	0,53	0,36	0,64	0,52	0,54	0,51	0,74	0,60	0,63	0,64	0,62	0,50	0,54
Selection2	**FHLR2**	0,58	0,59	0,58	0,56	0,58	0,62	0,63	0,59	0,55	0,53	0,62	0,66	0,55	0,56	0,50	0,59	0,67	0,60	0,64	0,46	0,55	0,56
	SW2	0,57	0,59	0,57	0,55	0,58	0,62	0,63	0,59	0,53	0,55	0,56	0,67	0,51	0,52	0,49	0,59	0,62	0,63	0,61	0,49	0,52	0,54
2 Factors		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
Balance	**FHLR2**	0,58	0,58	0,57	0,55	0,56	0,55	0,68	0,57	0,51	0,51	0,58	0,67	0,54	0,51	0,57	0,69	0,63	0,53	0,64	0,46	0,52	0,44
	SW2	0,59	0,59	0,57	0,56	0,58	0,57	0,68	0,59	0,49	0,58	0,64	0,62	0,54	0,54	0,54	0,67	0,67	0,50	0,64	0,38	0,55	0,42
Equal and Balance	**FHLR2**	0,59	0,59	0,58	0,56	0,58	0,50	0,66	0,59	0,53	0,56	0,65	0,66	0,53	0,52	0,57	0,72	0,65	0,53	0,67	0,51	0,50	0,48
	SW2	0,58	0,58	0,56	0,54	0,56	0,48	0,68	0,60	0,54	0,55	0,56	0,62	0,55	0,48	0,60	0,67	0,58	0,53	0,58	0,51	0,50	0,44
Selection1	**FHLR2**	0,56	0,60	0,56	0,56	0,59	0,62	0,74	0,60	0,00	0,56	0,56	0,67	0,57	0,53	0,57	0,77	0,60	0,58	0,61	0,54	0,48	0,52
	SW2	0,53	0,57	0,53	0,54	0,55	0,62	0,68	0,58	0,00	0,47	0,53	0,64	0,52	0,53	0,53	0,74	0,62	0,50	0,64	0,44	0,50	0,54
Selection2	**FHLR2**	0,57	0,58	0,57	0,55	0,58	0,48	0,66	0,59	0,57	0,55	0,60	0,66	0,55	0,53	0,51	0,62	0,67	0,55	0,64	0,49	0,57	0,44
	SW2	0,58	0,61	0,57	0,57	0,60	0,50	0,68	0,64	0,47	0,56	0,62	0,67	0,54	0,54	0,50	0,64	0,63	0,55	0,64	0,51	0,52	0,44
Disaggregated		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
Balance	**FHLR2**	0,60	0,59	0,59	0,57	0,58	0,60	0,64	0,58	0,61	0,56	0,73	0,68	0,50	0,50	0,63	0,62	0,59	0,63	0,65	0,33	0,50	0,63
	SW2	0,59	0,59	0,58	0,57	0,55	0,65	0,62	0,60	0,57	0,51	0,73	0,63	0,42	0,48	0,70	0,60	0,59	0,63	0,70	0,35	0,53	0,59
Selection1	**FHLR2**	0,58	0,58	0,58	0,56	0,57	0,65	0,67	0,52	0,50	0,54	0,70	0,69	0,33	0,52	0,65	0,66	0,59	0,63	0,68	0,35	0,45	0,71
	SW2	0,58	0,58	0,58	0,56	0,55	0,63	0,67	0,57	0,52	0,52	0,70	0,65	0,36	0,48	0,68	0,64	0,63	0,68	0,65	0,40	0,45	0,71
Selection2	**FHLR2**	0,61	0,60	0,57	0,57	0,59	0,67	0,67	0,58	0,57	0,54	0,73	0,68	0,44	0,55	0,60	0,62	0,59	0,66	0,68	0,40	0,43	0,37
	SW2	0,61	0,61	0,57	0,57	0,59	0,67	0,67	0,57	0,61	0,54	0,71	0,71	0,42	0,55	0,63	0,60	0,60	0,71	0,65	0,38	0,40	0,32
Two-step		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
2nd	**1st**																						
MEAN	**con**	0,58	0,59	0,55	0,55	0,59	0,63	0,62	0,58	0,52	0,57	0,54	0,66	0,58	0,57	0,53	0,62	0,55	0,37	0,59	0,48	0,58	0,37
	fhlr2	0,60	0,60	0,58	0,56	0,58	0,72	0,64	0,60	0,53	0,48	0,59	0,69	0,58	0,54	0,58	0,62	0,55	0,56	0,62	0,53	0,60	0,44
	sw2	0,59	0,59	0,57	0,56	0,57	0,65	0,67	0,56	0,56	0,51	0,55	0,69	0,57	0,52	0,60	0,60	0,52	0,49	0,62	0,48	0,60	0,48
	sw2d	0,56	0,58	0,54	0,55	0,55	0,52	0,71	0,63	0,52	0,42	0,56	0,64	0,54	0,53	0,59	0,52	0,59	0,55	0,58	0,49	0,41	0,42
SW2	**con**	0,57	0,58	0,56	0,56	0,56	0,56	0,64	0,60	0,53	0,52	0,61	0,60	0,56	0,54	0,60	0,57	0,50	0,56	0,70	0,55	0,53	0,42
	fhlr2	0,58	0,59	0,55	0,55	0,57	0,63	0,62	0,57	0,53	0,49	0,55	0,66	0,57	0,58	0,58	0,62	0,52	0,46	0,62	0,33	0,56	0,50
	sw2	0,57	0,56	0,55	0,54	0,55	0,65	0,62	0,56	0,53	0,51	0,55	0,61	0,54	0,50	0,55	0,64	0,54	0,54	0,65	0,40	0,51	0,48
	sw2d	0,55	0,57	0,55	0,54	0,55	0,50	0,63	0,58	0,44	0,47	0,62	0,62	0,50	0,54	0,62	0,58	0,58	0,50	0,58	0,51	0,49	0,54
FHLR2	**con**	0,59	0,58	0,57	0,55	0,58	0,58	0,62	0,60	0,51	0,56	0,75	0,60	0,56	0,57	0,53	0,62	0,50	0,59	0,65	0,50	0,58	0,42
	fhlr2	0,59	0,59	0,57	0,55	0,57	0,60	0,62	0,56	0,52	0,49	0,68	0,68	0,57	0,55	0,63	0,62	0,52	0,49	0,62	0,40	0,58	0,48
	sw2	0,59	0,58	0,56	0,54	0,56	0,63	0,64	0,56	0,53	0,52	0,64	0,65	0,54	0,53	0,58	0,64	0,50	0,51	0,57	0,38	0,60	0,44
	sw2d	0,55	0,59	0,55	0,55	0,59	0,45	0,63	0,58	0,46	0,53	0,56	0,67	0,49	0,56	0,59	0,56	0,60	0,50	0,61	0,49	0,46	0,56
DISAGGR First obs							02:2	02:6	90:1	93:4	00:6	01:1	00:7	98:3	98:1	02:5	01:4	98:1	02:4	02:8	02:5	02:5	01:5

1) See notes 1-6 to table 6A
2) The reported figures are the percentage of observations when the CCI and the reference series move in the same direction (i.e. both decrease or increase).

Table 6C: Performance of alternative Global CCIs for European Countries – Turning point coherence with reference series

C																							
Sentiment		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
		-0,03	-0,09	-0,03	0,06	-0,16	-0,33	0,50	-0,20	0,00	-0,33	0,17	0,25	0,29	-0,36	-0,17	-0,08	-0,75	-0,42	1,00	0,00	0,00	0,00
Direct																							
Sector data, 1 fac		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
Balance	**FHLR2**	-0,02	-0,11	-0,03	-0,18	-0,18	-0,17	0,00	-0,15	-0,22	-0,22	0,25	0,00	0,42	-0,36	0,07	0,17	0,06	0,33	-0,67	0,00	0,00	0,00
	SW2	-0,02	-0,05	-0,03	-0,13	-0,13	-0,17	0,00	0,06	-0,25	-0,22	0,25	0,00	0,28	-0,36	0,07	0,17	0,06	0,17	-0,67	0,00	0,08	0,00
Equal and	**FHLR2**	0,01	-0,06	-0,01	-0,13	-0,08	-0,17	0,25	-0,15	-0,22	-0,11	0,04	0,00	0,42	-0,06	0,03	0,08	0,06	0,33	-0,67	0,00	0,00	0,00
Balance	**SW2**	-0,01	-0,13	-0,02	-0,19	-0,14	-0,33	0,25	-0,33	-0,22	-0,11	0,25	0,00	0,42	-0,11	-0,07	0,17	0,06	0,33	-0,67	0,00	0,00	0,00
Selection1	**FHLR2**	0,01	-0,10	-0,02	-0,10	-0,16	-0,17	0,33	-0,13	0,00	-0,11	-0,04	-0,04	0,42	-0,36	0,03	0,17	0,06	0,33	-0,17	-0,67	0,00	0,00
	SW2	-0,01	-0,05	-0,03	-0,06	-0,10	-0,33	0,33	0,06	0,00	-0,11	-0,04	0,00	0,42	-0,36	-0,27	0,17	0,06	0,33	-0,17	-0,67	0,00	0,00
Selection2	**FHLR2**	0,06	0,06	0,02	0,01	0,00	-0,33	0,00	0,29	0,19	-0,11	0,13	-0,04	0,42	-0,14	-0,10	0,33	0,00	0,33	-0,17	0,00	0,08	-0,50
	SW2	0,05	0,12	0,09	0,16	0,06	-0,33	0,33	0,40	-0,08	-0,22	0,13	0,00	0,42	0,06	-0,13	0,00	0,00	0,33	0,50	0,00	0,00	0,17
Sector data, 2 fac		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
Balance	**FHLR2**	-0,01	-0,11	-0,03	-0,15	-0,15	-0,33	0,00	-0,15	-0,19	-0,11	0,50	0,00	0,36	-0,36	-0,03	0,17	0,06	0,33	-0,50	-0,33	0,08	0,00
	SW2	0,10	-0,01	0,08	-0,03	-0,11	1,00	0,08	0,02	-0,22	-0,11	0,00	0,00	0,42	-0,36	0,07	0,17	0,06	0,33	-0,17	0,00	0,08	0,00
Equal and	**FHLR2**	0,00	-0,08	0,02	-0,06	-0,10	-0,33	0,25	-0,15	-0,08	-0,11	0,17	-0,04	0,42	-0,11	-0,07	0,08	0,06	0,33	0,00	0,00	0,00	0,00
Balance	**SW2**	-0,01	-0,04	-0,01	-0,10	-0,11	-0,33	0,25	0,08	-0,11	-0,11	0,33	-0,04	0,08	-0,36	-0,03	0,17	0,06	0,42	-0,50	0,00	0,00	0,00
Selection1	**FHLR2**	0,00	-0,10	-0,02	-0,10	-0,16	-0,17	0,33	-0,13	0,00	-0,11	-0,08	-0,04	0,42	-0,36	-0,07	0,17	0,06	0,33	-0,17	-0,50	0,00	0,00
	SW2	-0,03	-0,05	-0,01	-0,06	-0,07	-0,33	0,33	0,06	0,00	0,00	0,00	0,00	0,06	-0,36	-0,33	0,25	-0,06	0,42	-0,17	0,00	0,00	0,00
Selection2	**FHLR2**	0,04	0,08	0,05	0,05	0,03	-0,17	0,33	0,29	-0,17	-0,11	-0,17	-0,04	0,42	-0,03	0,07	0,00	-0,28	0,33	-0,17	0,00	0,00	0,50
	SW2	0,01	0,04	0,01	0,10	-0,03	-0,17	0,33	0,29	0,06	-0,11	-0,17	0,00	0,19	-0,31	-0,17	0,17	-0,28	0,33	0,50	-0,50	0,00	0,00
Subsector data, 1 fac		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
Balance	**FHLR2**	0,05	0,00	-0,01	-0,09	-0,11	0,50	0,00	0,13	-0,17	-0,33	0,50	0,00	0,08	-0,25	-0,08	0,17	-0,28	0,42	-0,67	0,00	-0,17	0,00
	SW2	0,06	0,01	0,04	-0,01	-0,09	0,50	0,00	0,13	-0,17	-0,33	0,54	0,00	0,08	-0,17	-0,08	0,17	-0,28	0,42	-0,17	0,00	0,00	0,00
Selection1	**FHLR2**	0,01	-0,07	-0,03	-0,09	-0,18	-0,17	0,00	-0,03	-0,17	-0,33	0,67	0,00	0,00	-0,36	0,33	0,17	-0,06	0,33	-0,17	0,00	0,00	-0,67
	SW2	0,18	0,01	0,11	-0,02	-0,16	1,00	0,00	0,05	0,42	-0,33	0,67	0,00	0,00	-0,36	0,33	0,17	-0,06	0,42	-0,17	0,00	0,00	-0,33
Selection2	**FHLR2**	0,18	0,08	0,20	0,20	-0,09	-0,17	0,00	0,22	0,67	-0,33	0,42	0,00	0,42	-0,25	0,83	0,17	0,00	0,42	1,00	0,00	0,00	0,00
	SW2	0,15	0,10	0,18	0,21	-0,07	-0,17	0,00	0,30	0,75	-0,33	0,38	0,00	0,00	-0,25	0,83	0,17	0,00	0,42	1,00	0,00	0,00	0,00
Two-step		Mean EA	WMEA	Mean EU	WMEU	Mean4	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	DK	SE	UK	CZ	HU	PL
2nd	**1st**																						
MEAN	**con**	0,05	0,01	0,01	-0,10	0,07	-0,33	0,50	-0,19	0,05	0,50	-0,04	0,25	0,29	-0,28	-0,08	-0,08	-0,42	-0,08	-0,83	0,50	0,50	0,00
	fhlr2	0,27	0,08	0,15	-0,05	0,04	1,00	0,75	-0,24	0,13	0,50	0,00	0,25	0,17	-0,36	0,50	0,25	-0,42	0,33	-0,83	0,00	0,50	0,00
	sw2	0,28	0,08	0,15	-0,05	0,04	1,00	0,83	-0,24	0,02	0,50	0,25	0,25	0,17	-0,33	0,33	0,25	-0,50	0,33	-0,83	0,00	0,50	0,00
	sw2d	0,06	0,26	-0,02	0,24	0,20	0,04	0,00	0,83	0,07	0,18	-0,33	0,00	-0,38	-0,21	-0,03	0,50	0,33	-0,92	0,33	-0,67	0,00	-0,17
SW2	**con**	-0,10	-0,11	-0,10	-0,11	-0,16	-0,33	0,00	-0,20	-0,08	-0,33	0,04	0,25	0,19	-0,33	-0,08	-0,17	-0,50	0,00	-0,17	0,00	0,00	0,00
	fhlr2	0,03	-0,07	-0,01	-0,12	0,01	-0,17	-0,08	-0,28	-0,13	0,50	0,42	0,00	0,07	-0,19	0,00	0,25	-0,42	0,33	-0,50	0,00	0,00	0,00
	sw2	-0,01	-0,09	-0,02	-0,10	-0,17	-0,17	0,25	-0,15	-0,13	-0,33	0,42	0,00	-0,05	-0,19	0,00	0,25	-0,42	0,33	-0,17	0,00	0,00	0,00
	sw2d	0,03	0,09	-0,04	0,00	-0,03	0,00	0,00	0,33	-0,17	-0,33	0,17	0,04	-0,19	-0,17	0,33	0,33	-0,42	-0,17	-0,50	0,00	0,00	0,00
FHLR2	**con**	-0,01	-0,07	-0,02	0,08	-0,14	-0,67	0,50	-0,17	-0,08	-0,33	0,29	0,21	0,31	-0,28	0,00	0,08	-0,83	-0,42	1,00	0,00	0,00	0,00
	fhlr2	-0,04	-0,13	-0,06	-0,17	-0,22	-0,17	-0,08	-0,15	-0,13	-0,33	0,42	0,00	0,17	-0,39	0,00	0,25	-0,75	0,33	-0,50	0,00	0,33	0,00
	sw2	-0,02	-0,12	-0,04	-0,16	-0,22	-0,17	-0,08	-0,15	0,00	-0,33	0,38	0,00	0,07	-0,39	0,25	0,25	-0,75	0,33	-0,50	0,00	0,33	0,00
	sw2d	0,10	0,05	0,03	-0,05	-0,10	0,00	0,83	0,20	-0,17	-0,33	0,17	-0,13	0,05	-0,14	0,33	0,33	-0,42	0,42	-0,67	0,00	0,00	0,00
DISAGGR First obs							02:2	02:6	90:1	93:4	00:6	01:1	00:7	98:3	98:1	02:5	01:4	98:1	02:4	02:8	02:5	02:5	01:5

1) See notes 1-6 to Table 6A
2) The reported figures are the scores of each CCI using the evaluation method described in the text to compare its turning points with those of the reference series. The turning points are identified using Bry Boschan algorithm.

Table 7A: Performance of alternative Sectoral CCIs for Euro Area and the EU – Correlation with reference series

		EUROPE					EURO AREA				
A											
Confidence		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
		0,598	0,306	0,519	0,230	0,043	0,645	0,030	0,749	0,337	0,003
National data											
Sector data, 1 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	0,665	0,286	0,408	0,456	0,274	0,772	0,056	0,848	0,066	0,206
	SW2	0,672	0,001	0,420	0,430	0,276	0,774	0,347	0,853	0,016	0,255
Equal and	**FHLR2**	0,608	0,324	0,380	0,529	0,242	0,754	0,237	0,829	0,746	0,176
Balance	**SW2**	0,599	0,367	0,377	0,520	0,247	0,760	0,356	0,832	0,089	0,224
Selection1	**FHLR2**	0,685	0,606	0,658	0,650	0,715	0,786	0,696	0,864	0,868	0,719
	SW2	0,696	0,645	0,689	0,677	0,733	0,795	0,717	0,877	0,890	0,732
Selection2	**FHLR2**	0,550	0,395	0,459	0,552	0,606	0,780	0,299	0,883	0,566	0,569
	SW2	0,578	0,418	0,493	0,555	0,624	0,793	0,326	0,887	0,584	0,584
Sector data, 2 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	0,686	0,048	0,410	0,456	0,401	0,772	0,288	0,842	0,035	0,282
	SW2	0,682	0,011	0,416	0,390	0,438	0,605	0,352	0,840	0,189	0,321
Equal and	**FHLR2**	0,631	0,059	0,379	0,499	0,362	0,763	0,259	0,827	0,243	0,247
Balance	**SW2**	0,647	0,014	0,371	0,409	0,260	0,695	0,300	0,831	0,255	0,281
Selection1	**FHLR2**	0,677	0,634	0,641	0,649	0,007	0,778	0,700	0,861	0,714	0,539
	SW2	0,712	0,613	0,644	0,649	0,089	0,748	0,721	0,870	0,435	0,408
Selection2	**FHLR2**	0,433	0,392	0,465	0,545	0,408	0,787	0,290	0,858	0,502	0,330
	SW2	0,626	0,391	0,498	0,501	0,326	0,637	0,249	0,867	0,380	0,190
Subsector data, 1 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	0,672	0,240	0,935	0,436	0,301	0,851	0,198	0,892	0,452	0,819
	SW2	0,678	0,250	0,925	0,299	0,274	0,847	0,152	0,877	0,474	0,828
Selection1	**FHLR2**	0,670	0,252	0,927	0,267	0,360	0,852	0,183	0,876	0,440	0,805
	SW2	0,672	0,252	0,915	0,317	0,324	0,847	0,128	0,865	0,461	0,816
Selection2	**FHLR2**	0,740	0,586	0,933	0,640	0,702	0,879	0,654	0,899	0,670	0,831
	SW2	0,760	0,633	0,934	0,681	0,740	0,881	0,677	0,902	0,708	0,854
Two-step		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
2nd	**1st**										
MEAN	**con**	0,586	0,288	0,639	0,081	0,019	0,576	0,350	0,514	0,208	0,168
	fhlr2	0,625	0,475	0,714	0,130	0,091	0,625	0,475	0,714	0,130	0,091
	sw2	0,530	0,435	0,704	0,285	0,038	0,530	0,435	0,704	0,285	0,038
	sw2d	0,017	0,339	0,473	0,141	0,419	0,015	0,442	0,546	0,120	0,427
SW2	**con**	0,579	0,228	0,743	0,027	0,237	0,571	0,317	0,756	0,206	0,131
	fhlr2	0,608	0,474	0,826	0,075	0,295	0,608	0,474	0,826	0,075	0,295
	sw2	0,622	0,453	0,834	0,100	0,258	0,622	0,453	0,834	0,100	0,258
	sw2d	0,008	0,542	0,179	0,150	0,503	0,006	0,557	0,432	0,139	0,517
FHLR2	**con**	0,583	0,188	0,775	0,048	0,202	0,573	0,301	0,784	0,290	0,092
	fhlr2	0,614	0,496	0,846	0,140	0,241	0,614	0,496	0,846	0,140	0,241
	sw2	0,630	0,479	0,854	0,153	0,194	0,630	0,479	0,854	0,153	0,194
	sw2d	0,028	0,520	0,144	0,133	0,532	0,023	0,527	0,420	0,108	0,555
EU/euro area data											
Sector data, 1 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	0,661	0,152	0,812	0,309	0,021	0,636	0,459	0,613	0,200	0,163
	SW2	0,676	0,179	0,814	0,310	0,094	0,645	0,475	0,644	0,193	0,206
Equal and	**FHLR2**	0,614	0,081	0,806	0,333	0,211	0,607	0,397	0,626	0,247	0,303
Balance	**SW2**	0,632	0,108	0,823	0,365	0,242	0,622	0,418	0,661	0,267	0,349
Selection1	**FHLR2**	0,638	0,520	0,801	na	na	0,618	0,633	0,627	na	0,551
	SW2	0,657	0,517	0,819	na	na	0,632	0,669	0,655	na	0,576
Selection2	**FHLR2**	na	0,208	0,807	0,331	0,481	0,070	na	0,680	na	na
	SW2	na	0,163	0,828	0,371	0,474	0,149	na	0,695	na	na
Sector data, 2 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	0,613	0,251	0,812	0,315	0,018	0,593	0,519	0,658	0,192	0,041
	SW2	0,606	0,251	0,815	0,309	0,022	0,585	0,518	0,649	0,194	0,020
Equal and	**FHLR2**	0,595	0,136	0,813	0,194	0,179	0,590	0,411	0,672	0,186	0,143
Balance	**SW2**	0,612	0,156	0,831	0,171	0,149	0,607	0,420	0,677	0,160	0,108
Selection1	**FHLR2**	0,608	0,517	0,814	na	na	0,585	0,604	0,668	na	0,576
	SW2	0,588	0,517	0,817	na	na	0,579	0,627	0,661	na	0,576
Selection2	**FHLR2**	na	0,267	0,819	0,088	0,059	0,518	na	0,683	na	na
	SW2	na	0,267	0,826	0,054	0,059	0,518	na	0,693	na	na
Subsector data, 1 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	0,630	0,024	0,861	0,281	0,197	0,578	0,314	0,748	0,231	0,210
	SW2	0,621	0,001	0,861	0,279	0,176	0,562	0,356	0,785	0,197	0,210
Selection1	**FHLR2**	0,673	na	0,867	na	0,512	0,638	0,633	0,752	na	0,556
	SW2	0,684	na	0,870	na	0,516	0,646	0,630	0,788	na	0,587
Selection2	**FHLR2**	0,684	0,408	0,869	0,241	0,366	0,576	na	0,793	na	0,317
	SW2	0,663	0,402	0,867	0,246	0,340	0,564	na	0,804	na	0,303
First obs		2002:4	2002:1	2002:9	2001:1	2002:5	2002:4	2002:1	2002:9	2001:1	2002:5

1) The table reports the results for three alternative methods of construction of sectoral CCIs for Euro area/EU. In the first panel (National data) country level sectoral data are used to compute 22 indexes. In the second panel (two-step) sectoral country level CCIs are aggregated. In the third panel (EU/euro area data), sectoral Euro area/EU data are used to compute 22 indexes.
2) See the notes to Table 6 for a description of the methods
3) The reference series are the annual growth rate of the Industrial Production Index for IND, the annual growth rate of the private consumption for CON and RET, the annual growth rate of the Value Added in services for SER, the annual growth rate of the smooth trend-cycle component of the production volume index in construction for BUI.
4) The reported figures are correlations with reference series

Table 7B: Performance of alternative Sectoral CCIs for Euro Area and the EU – Directional coherence with reference series

		EUROPE					EURO AREA				
B											
Confidence		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
		0,442	0,605	0,615	0,520	0,447	0,512	0,488	0,692	0,560	0,579
National data											
Sector data, 1 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	0,619	0,326	0,658	0,500	0,385	0,556	0,326	0,500	0,518	0,462
	SW2	0,595	0,326	0,579	0,536	0,410	0,519	0,326	0,577	0,500	0,462
Equal and	**FHLR2**	0,619	0,442	0,553	0,482	0,410	0,611	0,419	0,538	0,554	0,410
Balance	**SW2**	0,619	0,581	0,632	0,446	0,410	0,593	0,349	0,538	0,518	0,410
Selection1	**FHLR2**	0,595	0,442	0,605	0,393	0,538	0,574	0,419	0,538	0,411	0,692
	SW2	0,619	0,419	0,684	0,375	0,564	0,556	0,372	0,615	0,411	0,692
Selection2	**FHLR2**	0,595	0,465	0,605	0,500	0,538	0,556	0,419	0,538	0,536	0,590
	SW2	0,667	0,395	0,605	0,500	0,462	0,574	0,442	0,615	0,554	0,538
Sector data, 2 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	0,619	0,326	0,605	0,500	0,436	0,556	0,326	0,500	0,536	0,487
	SW2	0,595	0,326	0,579	0,518	0,410	0,574	0,326	0,577	0,518	0,513
Equal and	**FHLR2**	0,643	0,326	0,553	0,500	0,462	0,593	0,349	0,538	0,500	0,385
Balance	**SW2**	0,619	0,349	0,658	0,500	0,410	0,537	0,349	0,538	0,518	0,436
Selection1	**FHLR2**	0,571	0,442	0,579	0,393	0,410	0,556	0,395	0,538	0,446	0,564
	SW2	0,619	0,372	0,605	0,375	0,462	0,519	0,372	0,577	0,429	0,538
Selection2	**FHLR2**	0,595	0,419	0,605	0,518	0,513	0,519	0,419	0,538	0,518	0,538
	SW2	0,690	0,395	0,605	0,464	0,513	0,556	0,419	0,615	0,554	0,538
Subsector data, 1 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	0,585	0,455	0,741	0,518	0,425	0,507	0,386	0,630	0,491	0,511
	SW2	0,512	0,409	0,704	0,518	0,425	0,463	0,341	0,593	0,509	0,544
Selection1	**FHLR2**	0,512	0,477	0,741	0,482	0,450	0,522	0,386	0,630	0,518	0,533
	SW2	0,561	0,364	0,667	0,518	0,500	0,522	0,341	0,630	0,526	0,522
Selection2	**FHLR2**	0,585	0,500	0,778	0,464	0,700	0,582	0,295	0,630	0,579	0,489
	SW2	0,610	0,386	0,778	0,429	0,725	0,537	0,295	0,593	0,588	0,533
Two-step		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
2nd	**1st**										
MEAN	**con**	0,395	0,614	0,593	0,474	0,600	0,372	0,614	0,630	0,561	0,500
	fhlr2	0,465	0,659	0,593	0,509	0,425	0,465	0,659	0,593	0,509	0,425
	sw2	0,419	0,705	0,519	0,667	0,425	0,419	0,705	0,519	0,667	0,425
	sw2d	0,560	0,589	0,847	0,587	0,646	0,577	0,589	0,840	0,581	0,650
SW2	**con**	0,372	0,568	0,481	0,561	0,500	0,419	0,682	0,519	0,509	0,500
	fhlr2	0,442	0,636	0,593	0,561	0,525	0,442	0,636	0,593	0,561	0,525
	sw2	0,465	0,659	0,593	0,526	0,550	0,465	0,659	0,593	0,526	0,550
	sw2d	0,590	0,603	0,851	0,611	0,677	0,597	0,566	0,851	0,611	0,694
FHLR2	**con**	0,395	0,591	0,556	0,579	0,475	0,419	0,636	0,519	0,526	0,450
	fhlr2	0,442	0,614	0,630	0,579	0,450	0,442	0,614	0,630	0,579	0,450
	sw2	0,442	0,614	0,593	0,596	0,500	0,442	0,614	0,593	0,596	0,500
	sw2d	0,600	0,596	0,851	0,611	0,690	0,603	0,586	0,858	0,614	0,687
EU/euro area data											
Sector data, 1 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	0,455	0,455	0,630	0,549	0,425	0,500	0,295	0,593	0,490	0,450
	SW2	0,432	0,432	0,593	0,510	0,425	0,477	0,318	0,593	0,510	0,475
Equal and	**FHLR2**	0,568	0,364	0,630	0,510	0,550	0,545	0,341	0,667	0,529	0,475
Balance	**SW2**	0,500	0,409	0,519	0,431	0,525	0,545	0,295	0,556	0,569	0,525
Selection1	**FHLR2**	0,523	0,455	0,630	na	na	0,500	0,318	0,667	na	0,550
	SW2	0,568	0,455	0,630	na	na	0,523	0,364	0,630	na	0,525
Selection2	**FHLR2**	na	0,455	0,667	0,471	0,450	0,523	na	0,667	na	na
	SW2	na	0,455	0,556	0,431	0,550	0,432	na	0,667	na	na
Sector data, 2 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	0,500	0,500	0,593	0,510	0,475	0,545	0,295	0,593	0,510	0,350
	SW2	0,523	0,500	0,593	0,510	0,425	0,568	0,341	0,630	0,510	0,400
Equal and	**FHLR2**	0,477	0,364	0,519	0,569	0,500	0,636	0,318	0,407	0,647	0,450
Balance	**SW2**	0,523	0,364	0,593	0,608	0,475	0,591	0,295	0,444	0,647	0,450
Selection1	**FHLR2**	0,523	0,455	0,630	na	na	0,568	0,318	0,630	na	0,525
	SW2	0,545	0,455	0,593	na	na	0,568	0,364	0,630	na	0,525
Selection2	**FHLR2**	na	0,636	0,519	0,569	0,475	0,432	na	0,630	na	na
	SW2	na	0,636	0,519	0,549	0,475	0,432	na	0,630	na	na
Subsector data, 1 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	0,488	0,419	0,538	0,600	0,436	0,488	0,302	0,615	0,480	0,385
	SW2	0,442	0,372	0,577	0,600	0,436	0,465	0,326	0,577	0,520	0,410
Selection1	**FHLR2**	0,512	na	0,615	na	0,462	0,535	0,442	0,577	na	0,436
	SW2	0,512	na	0,577	na	0,487	0,512	0,395	0,577	na	0,462
Selection2	**FHLR2**	0,535	0,488	0,615	0,500	0,487	0,558	na	0,654	na	0,564
	SW2	0,535	0,488	0,577	0,500	0,436	0,558	na	0,769	na	0,564
First obs		2002:4	2002:1	2002:9	2001:1	2002:5	2002:4	2002:1	2002:9	2001:1	2002:5

1) See notes 1-3 to table 7A
2) The reported figures are the percentage of observations when the CCI and the reference series move in the same direction (i.e. both decrease or increase).

Table 7C: Performance of alternative Sectoral CCIs for Euro Area and the EU – Turning point coherence with reference series

		EUROPE					EURO AREA				
C											
Confidence		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
		-0,208	-0,056	0,083	0,000	0,667	-0,333	0,000	-0,417	-0,208	0,500
National data											
Sector data, 1 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	-0,167	-0,222	-0,111	0,000	-0,222	0,000	-0,222	0,083	0,125	0,000
	SW2	-0,167	-0,222	0,111	0,167	0,000	0,000	0,278	0,250	0,125	0,000
Equal and	**FHLR2**	-0,667	-0,222	-0,222	0,000	-0,222	-0,125	-0,222	-0,250	0,083	0,000
Balance	**SW2**	-0,667	0,000	-0,222	0,125	0,000	-0,125	-0,222	-0,250	0,125	0,000
Selection1	**FHLR2**	-0,167	0,000	0,167	0,000	0,444	-0,125	0,000	0,167	0,000	0,444
	SW2	-0,500	0,000	0,167	0,000	0,444	0,042	0,000	0,167	0,000	0,444
Selection2	**FHLR2**	0,833	-0,222	0,333	0,000	0,444	-0,125	-0,222	0,167	0,250	0,444
	SW2	0,833	-0,222	0,556	0,000	0,444	-0,125	-0,222	0,167	0,250	0,444
Sector data, 2 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	-0,167	-0,222	0,278	0,000	-0,222	0,000	-0,222	-0,417	0,125	0,000
	SW2	-0,167	-0,222	0,333	0,167	0,000	0,375	0,278	-0,250	0,000	0,278
Equal and	**FHLR2**	-0,667	-0,222	-0,222	0,125	-0,222	-0,125	-0,222	-0,250	0,125	0,000
Balance	**SW2**	-0,167	-0,222	-0,111	0,125	0,000	-0,125	-0,222	-0,250	0,125	0,000
Selection1	**FHLR2**	-0,167	0,000	0,111	0,000	0,000	-0,125	0,000	0,167	0,000	0,111
	SW2	-0,167	0,000	0,056	-0,083	0,000	-0,125	0,000	0,167	0,000	0,000
Selection2	**FHLR2**	0,833	-0,167	0,333	0,125	0,278	0,208	-0,222	-0,083	0,125	0,000
	SW2	0,833	-0,167	0,556	0,125	0,000	0,208	-0,167	0,167	0,125	0,000
Subsector data, 1 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	-0,167	-0,278	0,000	-0,208	-0,056	0,167	0,333	0,167	-0,104	0,033
	SW2	-0,167	-0,222	0,000	-0,208	0,000	0,333	0,278	0,167	-0,104	0,033
Selection1	**FHLR2**	-0,167	-0,278	0,000	-0,208	-0,222	0,333	0,333	0,000	0,083	0,133
	SW2	-0,167	-0,222	-0,417	-0,208	0,000	0,250	0,278	0,000	-0,042	-0,033
Selection2	**FHLR2**	-0,167	0,000	0,000	-0,083	0,556	0,333	0,000	0,083	0,229	0,367
	SW2	-0,167	0,000	0,000	-0,083	0,556	0,333	0,000	0,083	0,146	0,367
Two-step		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
2nd	**1st**										
MEAN	**con**	-0,208	-0,056	-0,417	0,125	-0,333	-0,208	-0,056	0,083	0,125	-0,111
	fhlr2	-0,208	-0,056	-0,083	0,125	0,000	-0,208	-0,056	-0,083	0,125	0,000
	sw2	0,042	-0,056	-0,417	0,000	0,000	0,042	-0,056	-0,417	0,000	0,000
	sw2d	-0,333	0,000	-0,500	0,000	0,208	-0,333	0,000	-0,500	0,000	-0,042
SW2	**con**	-0,208	-0,056	-0,417	-0,250	-0,056	-0,208	-0,056	-0,417	0,000	0,000
	fhlr2	-0,083	-0,056	-0,083	-0,250	-0,111	-0,083	-0,056	-0,083	-0,250	-0,111
	sw2	-0,083	-0,056	-0,083	-0,250	-0,111	-0,083	-0,056	-0,083	-0,250	-0,111
	sw2d	-0,222	0,000	-0,500	0,167	0,000	-0,278	0,000	-0,500	0,000	0,000
FHLR2	**con**	-0,208	-0,056	-0,417	-0,250	-0,056	-0,208	-0,056	-0,417	0,125	0,000
	fhlr2	-0,083	-0,056	-0,083	-0,250	-0,111	-0,083	-0,056	-0,083	-0,250	-0,111
	sw2	-0,083	-0,056	-0,083	-0,250	-0,111	-0,083	-0,056	-0,083	-0,250	-0,111
	sw2d	-0,278	0,000	-0,500	0,000	0,000	-0,278	0,000	-0,500	0,000	0,000
EU/euro area data											
Sector data, 1 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	-0,167	-0,111	-0,083	0,000	0,000	-0,167	-0,167	-0,500	0,125	-0,111
	SW2	-0,667	-0,167	-0,083	0,000	0,000	-0,333	-0,111	-0,167	0,125	-0,111
Equal and	**FHLR2**	-0,500	-0,167	-0,417	0,125	0,167	-0,444	-0,111	-0,500	0,125	0,000
Balance	**SW2**	-1,000	-0,222	-0,333	-0,125	0,167	-0,556	-0,111	-0,500	0,125	0,000
Selection1	**FHLR2**	-0,500	-0,500	-0,417	na	na	-0,444	-0,111	-0,500	na	0,000
	SW2	-0,500	-0,500	-0,417	na	na	-0,444	-0,222	-0,500	na	0,000
Selection2	**FHLR2**	na	-0,111	-0,417	-0,500	0,000	-0,611	na	0,000	na	na
	SW2	na	-0,056	-0,333	-0,500	0,056	0,056	na	0,000	na	na
Sector data, 2 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	-0,167	-0,111	-0,083	0,000	0,000	0,167	-0,111	-0,167	0,125	0,000
	SW2	-0,167	-0,111	-0,083	0,000	0,000	0,167	-0,111	-0,167	0,125	0,000
Equal and	**FHLR2**	-1,000	-0,167	-0,250	0,083	0,000	-0,222	-0,111	-0,500	0,333	0,000
Balance	**SW2**	-1,000	-0,222	-0,167	0,083	0,000	-0,556	-0,111	0,167	0,333	0,000
Selection1	**FHLR2**	-0,500	-0,500	-0,500	na	na	0,167	-0,111	-0,500	na	0,000
	SW2	-0,500	-0,500	-0,500	na	na	0,167	-0,111	-0,500	na	0,000
Selection2	**FHLR2**	na	0,500	-0,250	0,208	0,000	0,389	na	0,000	na	na
	SW2	na	0,500	-0,250	0,208	0,000	0,389	na	0,000	na	na
Subsector data, 1 fac		IND	CON	SER	BUI	RET	IND	CON	SER	BUI	RET
Balance	**FHLR2**	-0,083	-0,111	-0,417	0,000	0,000	0,000	-0,111	-0,417	0,000	0,278
	SW2	0,333	-0,111	-0,417	0,000	0,000	-0,042	-0,111	-0,417	0,000	-0,111
Selection1	**FHLR2**	-0,083	na	-0,417	na	-0,111	0,208	-0,111	-0,417	na	0,000
	SW2	-0,083	na	-0,417	na	-0,111	0,208	-0,111	-0,417	na	0,000
Selection2	**FHLR2**	0,083	0,000	-0,417	-0,250	0,167	0,375	na	-0,417	na	0,278
	SW2	0,167	-0,278	-0,417	-0,250	0,000	0,375	na	-0,500	na	0,278
First obs		2002:4	2002:1	2002:9	2001:1	2002:5	2002:4	2002:1	2002:9	2001:1	2002:5

1) See notes 1-3 to table 7A
2) The reported figures are the scores of each CCI using the evaluation method described in the text to compare its turning points with those of the reference series. The turning points are identified using Bry Boschan algorithm.

Table 8: Performance of alternative Global CCIs for the euro area and the EU

A						B						C				
Sentiment		EA	EU	EA	EU	**Sentiment**		EA	EU	EA	EU	**Sentiment**		EA	EU	EA	EU
		0,77	0,85	0,77	0,85			0,63	0,63	0,63	0,63			-0,08	-0,08	-0,08	-0,08
		Sectoral EU/EA Data		**Sectoral Country Data**				**Sectoral EU/EA Data**		**Sectoral Country Data**				**Sectoral EU/EA Data**		**Sectoral Country Data**	
Aggregated		EA	EU	EA	EU	**Aggregated**		EA	EU	EA	EU	**Aggregated**		EA	EU	EA	EU
Balance	**FHLR2**	0,70	0,83	0,82	0,71	**Balance**	**FHLR2**	0,55	0,59	0,64	0,64	**Balance**	**FHLR2**	-0,46	-0,04	-0,08	-0,08
	SW2	0,77	0,82	0,81	0,70		**SW2**	0,57	0,57	0,67	0,61		**SW2**	-0,04	-0,04	-0,08	-0,08
Equal and	**FHLR2**	0,46	0,79	0,77	0,67	**Equal and**	**FHLR2**	0,67	0,65	0,61	0,58	**Equal and**	**FHLR2**	-0,08	-0,13	0,33	0,33
Balance	**SW2**	0,43	0,76	0,76	0,66	**Balance**	**SW2**	0,67	0,63	0,64	0,64	**Balance**	**SW2**	-0,21	-0,13	0,33	0,00
Selection1	**FHLR2**	0,76	0,83	0,83	0,78	**Selection1**	**FHLR2**	0,71	0,63	0,64	0,61	**Selection1**	**FHLR2**	-0,46	-0,42	-0,08	-0,08
	SW2	0,78	0,84	0,84	0,81		**SW2**	0,67	0,63	0,56	0,64		**SW2**	-0,04	-0,38	-0,08	0,00
Selection2	**FHLR2**	0,76	0,80	0,87	0,86	**Selection2**	**FHLR2**	0,61	0,59	0,64	0,69	**Selection2**	**FHLR2**	-0,25	-0,04	-0,08	0,75
	SW2	0,79	0,80	0,88	0,87		**SW2**	0,59	0,63	0,72	0,75		**SW2**	0,17	0,17	-0,08	0,75
2 Factors		EA	EU	EA	EU	**2 Factors**		EA	EU	EA	EU	**2 Factors**		EA	EU	EA	EU
Balance	**FHLR2**	0,69	0,71	0,82	0,71	**Balance**	**FHLR2**	0,59	0,57	0,64	0,64	**Balance**	**FHLR2**	0,17	-0,04	-0,08	-0,08
	SW2	0,61	0,52	0,82	0,79		**SW2**	0,57	0,61	0,67	0,67		**SW2**	0,17	-0,04	-0,08	-0,08
Equal and	**FHLR2**	0,64	0,67	0,77	0,65	**Equal and**	**FHLR2**	0,63	0,63	0,61	0,58	**Equal and**	**FHLR2**	0,17	-0,04	0,33	0,33
Balance	**SW2**	0,64	0,51	0,76	0,68	**Balance**	**SW2**	0,63	0,61	0,64	0,64	**Balance**	**SW2**	0,17	0,17	0,33	0,00
Selection1	**FHLR2**	0,78	0,82	0,83	0,78	**Selection1**	**FHLR2**	0,69	0,65	0,64	0,61	**Selection1**	**FHLR2**	-0,04	0,00	-0,08	-0,08
	SW2	0,79	0,78	0,87	0,83		**SW2**	0,67	0,63	0,58	0,72		**SW2**	-0,04	0,04	-0,08	0,00
Selection2	**FHLR2**	0,77	0,77	0,87	0,85	**Selection2**	**FHLR2**	0,59	0,59	0,64	0,69	**Selection2**	**FHLR2**	0,17	-0,04	-0,08	0,08
	SW2	0,75	0,71	0,88	0,89		**SW2**	0,61	0,59	0,72	0,75		**SW2**	0,17	0,17	-0,08	0,75
Disaggregated		EA	EU	EA	EU	**Disaggregated**		EA	EU	EA	EU	**Disaggregated**		EA	EU	EA	EU
Balance	**FHLR2**	0,78	0,81	na	na	**Balance**	**FHLR2**	0,68	0,64	na	na	**Balance**	**FHLR2**	0,25	0,04	na	na
	SW2	0,75	0,77	na	na		**SW2**	0,64	0,64	na	na		**SW2**	0,25	0,04	na	na
Selection1	**FHLR2**	0,77	0,80	0,85	0,83	**Selection1**	**FHLR2**	0,62	0,66	0,72	0,61	**Selection1**	**FHLR2**	-0,04	-0,04	0,08	-0,08
	SW2	0,71	0,69	0,86	0,85		**SW2**	0,62	0,64	0,67	0,67		**SW2**	0,17	-0,04	0,08	0,00
Selection2	**FHLR2**	0,79	0,86	0,87	0,90	**Selection2**	**FHLR2**	0,60	0,62	0,67	0,75	**Selection2**	**FHLR2**	0,25	-0,04	-0,08	0,75
	SW2	0,81	0,87	0,87	0,90		**SW2**	0,58	0,66	0,69	0,75		**SW2**	0,25	-0,04	-0,08	0,75
Disaggregated 2f		EA	EU	EA	EU	**Disaggregated 2f**		EA	EU	EA	EU	**Disaggregated 2f**		EA	EU	EA	EU
Selection1	**FHLR2**	0,80	0,86	0,85	0,83	**Selection1**	**FHLR2**	0,56	0,60	0,67	0,61	**Selection1**	**FHLR2**	0,25	-0,04	-0,08	-0,08
	SW2	0,80	0,83	0,88	0,87		**SW2**	0,60	0,60	0,78	0,69		**SW2**	0,25	-0,04	0,00	0,00
Selection2	**FHLR2**	0,76	0,82	0,87	0,89	**Selection2**	**FHLR2**	0,58	0,64	0,67	0,75	**Selection2**	**FHLR2**	-0,04	-0,04	-0,08	0,75
	SW2	0,72	0,79	0,87	0,90		**SW2**	0,62	0,62	0,69	0,75		**SW2**	-0,04	-0,04	0,75	0,75
		Sectoral EU/EA Indexes		**Global Country indexes**				**Sectoral EU/EA Indexes**		**Global Country indexes**				**Sectoral EU/EA Indexes**		**Global Country indexes**	
Two-step		EA	EU	EA	EU	**Two-step**		EA	EU	EA	EU	**Two-step**		EA	EU	EA	EU
2nd	**1st**					**2nd**	**1st**					**2nd**	**1st**				
MEAN	**con**	0,71	0,79	0,83	0,85	**MEAN**	**con**	0,56	0,62	0,67	0,67	**MEAN**	**con**	-0,04	-0,04	-0,08	-0,08
	fhlr2	0,75	0,76	0,84	0,83		**fhlr2**	0,56	0,58	0,56	0,58		**fhlr2**	-0,04	-0,04	0,33	-0,08
	sw2	0,75	0,76	0,83	0,83		**sw2**	0,60	0,62	0,64	0,67		**sw2**	-0,04	-0,04	0,33	0,33
	sw2d	0,72	0,53	0,76	0,83		**sw2d**	0,51	0,61	0,61	0,61		**sw2d**	-0,04	-0,04	0,50	0,50
SW2	**con**	0,73	0,78	0,84	0,84	**SW2**	**con**	0,56	0,60	0,64	0,64	**SW2**	**con**	0,08	-0,04	-0,08	-0,08
	fhlr2	0,73	0,75	0,81	0,81		**fhlr2**	0,54	0,58	0,58	0,58		**fhlr2**	-0,04	-0,04	-0,08	-0,08
	sw2	0,74	0,76	0,81	0,81		**sw2**	0,60	0,62	0,67	0,67		**sw2**	0,17	-0,04	0,33	0,33
	sw2d	0,70	0,67	0,82	0,82		**sw2d**	0,61	0,63	0,64	0,64		**sw2d**	0,25	-0,04	0,50	0,50
FHLR2	**con**	0,68	0,75	0,86	0,86	**FHLR2**	**con**	0,58	0,60	0,67	0,67	**FHLR2**	**con**	0,17	-0,04	-0,08	-0,08
	fhlr2	0,70	0,72	0,82	0,82		**fhlr2**	0,56	0,58	0,69	0,69		**fhlr2**	-0,21	-0,04	-0,08	-0,08
	sw2	0,71	0,72	0,82	0,82		**sw2**	0,58	0,62	0,72	0,72		**sw2**	-0,13	-0,04	-0,08	-0,08
	sw2d	0,68	0,66	0,83	0,83		**sw2d**	0,55	0,59	0,69	0,69		**sw2d**	0,25	-0,04	0,50	0,50

1) The table reports the results for four alternative methods of construction of a Global CCI for the euro erea or the EU. First, sectoral EU/euro erea data are used to compute 22 indexes. Second, sectoral country level data are used to compute 22 indexes. Third, selected sectoral EU/euro area are aggregated with the two-step method. Finally, selected global national indexes are aggregated with the two-step method.
2) See the notes to table 6A for a description of the methods
3) The reference series is monthly euro area/EU GDP
4) The reported figures are correlation with reference series in panel A, directional coherence with reference series in panel B, turning point coherence with reference series in panel C.