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Sectoral Survey-based Confidence Indicators for Europe*

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Abstract

In this paper we analyze a novel dataset of Business and Consumer Surveys, using dynamic factor techniques, to produce composite coincident indices (CCIs) at the sectoral level for the European countries and for Europe as a whole. Few CCIs are available for Europe compared to the US, and most of them use macroeconomic variables and focus on aggregate activity. However, there are often delays in the release of macroeconomic data, later revisions, and differences in the definition of the variables across countries, while the surveys are timely available, not subject to revision, and fully comparable across countries. Moreover, there are substantial discrepancies in activity at the sectoral level, which justifies the interest in a sectoral disaggregation. Compared to the Confidence Indicators produced by the European Commission, which are based on a simple average of the aggregate survey answers, we show that factor based CCIs, using survey answers at a more disaggregate level, produce higher correlation with the reference series for the majority of sectors and countries.

Keywords: Coincident Indicators, Business and Consumer Surveys, Sectors, Dynamic Factor Models
J.E.L. Classification: E32, E37, C53

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1 Introduction

Composite coincident indexes (CCIs) are a useful tool for monitoring the current status of the economy, which is relevant for policy making but also for the decisions of private agents, consumers and firms. A characteristic of the econometric 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.

A sectoral analysis is interesting for a better 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, see Carriero and Marcellino (2006a). Furthermore, the temporal dimension of the sample at the sectoral level is often larger than at the 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. The need for sectoral disaggregation is confirmed by Figures 1 and 2 that graph, for the euro area and the European Union as a whole, the year on year growth rate in GDP, Private Consumption, Industrial Production, Valued Added in Services, and Production Volume in Construction, using linearly interpolated monthly values when only quarterly data are available. As expected, both the size and the timing of the fluctuations are fairly different. While additional sectoral disaggregation could be helpful, the survey data that we will use in this study are only classified into Consumers, Industry, Services, Building, and Retail.

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 survey 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, see e.g. Stock and Watson (2002a,b) and Forni et al. (2000), 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.

In this paper, as a starting point, we repeat the comparison of factor based sectoral CCIs and Confidence indicators reported in Gayer and Genet (2006) on a slightly different sample and for a larger set of countries, finding similar results. Then, we evaluate whether the results change when:

(a) The equal percentage of answers to the survey is added to the dataset. 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.

(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.

The main findings of our comprehensive evaluation of factor based confidence indicators using survey data are that, on average across countries, there are systematic gains with respect to the Confidence Indicators produced by the European Commission, for virtually all sectors and choices of loss function. In some cases, such as Industry, the gains are limited. But for other sectors, such as Consumers, Services and Retail, the 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 SW) and the Forni et al. (2003, labelled FHLR) factor estimation methods yielding similar results. The comparable performance of the SW and FHLR approaches in this context favors the former, since it is substantially simpler.

The paper is organized as follows. In Section 2 we provide details on the econometric methodology for the construction of factor based CCIs. In Section 3 we describe the survey data. In Section 4 we present the results for the alternative sectoral CCIs. In Section 5 we summarize the main findings we have obtained in the study, and their implications for the construction of CCIs for Europe.

2 Econometric methodology for the construction of sectoral CCIs

A detailed overview of methods for the construction of Composite Coincident Indeces (CCIs) can be found in Marcellino (2005). Here we summarize the main relevant procedures for our empirical application.

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.

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.[1] Unfortunately, due to the high nonlinearity of the Markov switching specifications, estimation of the models becomes virtually unfeasible already for 6-8 variables. Moreover,

[1] 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.

typically long time series are required for the results to be reliable and stable. Therefore, this methodology is not suited for the analysis of our large dataset of surveys, and we focus on the use of the dynamic factor based approach.

The rationale of the dynamic factor based 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 large set of series. Leading references in the context of CCIs are Stock and Watson (1989, 1991, 1992), Forni, Lippi, Hallin, Reichlin (2001), Altissimo et al. (2001).

In particular, the model that Stock and Watson (1989) 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, 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. 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).

In our context, the computation of a CCI based on this methodology poses at least three problems. First, as in the case of the Markov switching models, in practice 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. Third, the procedure requires an ex-ante classification of variables into coincident and leading or lagging, even though this is common practice in this literature. Moreover, the analysis of Gayer and Genet (2006) indicates that CCIs based on the Stock and Watson's (1989) methodology have typically minor advantages with respect to simple non model based confidence indicators.

Forni, Hallin, Lippi and Reichlin (2000, 2001 FHLR henceforth) proposed an alternative factor based methodology that addresses most of the issues raised in the previous paragraph,

and they 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 within 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 proposed by Forni et al. (2001) is 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, SW henceforth), and applied to Europe by, e.g., Marcellino, Stock and Watson (2003). The model by SW, in its time invariant formulation, can be written as

$$x_t = \Lambda f_t + \xi_t, \tag{9}$$

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 (mildly) correlated with the idiosyncratic component, only $var(f_t) = I$ is imposed for identification. Precise moment conditions on f_t and ξ_t, and requirements on the loadings, are given in SW.

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, SW 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 SW 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_{SW} 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, our CCI_{SW} is defined as

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

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_{SW} simplifies into

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

so that the index is perfectly collinear with the estimated factor.[2]

With respect to the methodology by FHLR, SW is suited for real time implementation but could be less efficient in modelling the dynamics. Altissimo et al. (2001, 2005) 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).

While the analytical derivation of the method in Forni et al. (2003) 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 Forni et al. (2003), and the one-sided estimator of the common component is obtained by projecting the variables on the generalized principal components.

As mentioned, Altissimo et al. (2001, 2005) construct Eurocoin as the weighted average of the common components of interpolated monthly GDP of euro area countries. Following their suggestion, and for comparability with the CCI_{SW}, we construct the CCI_{FHLR} as the

[2] 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_{SW}.

average of the common components over variables, i.e.,

$$CCI_{FHLR} = \frac{1}{N}\sum_{i=1}^{N}\widehat{\alpha}_{it}, \tag{14}$$

where $\widehat{\alpha}_{it}$ is defined iu (13).

In summary, the two key formulae for the sectoral CCIs in our paper are (11) and (14), which are based, respectively, on the theory developed by Stock and Watson (2002a,b) and Forni et al. (2003) for the estimation of dynamic factor models for a large set of variables.

3 Overview of the data

The data used in this paper 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 sample usually covers the period 1990:1-2005:12, with some differences across countries and sectors. Exact sample periods for each country/sector are reported in the Tables in the Table Appendix.

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".[3]

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.

[3]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.

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 Table 1 below. The cost of the additional disaggregation is a reduction in the number of temporal observations, since branch level data are only avaible after 1990 or later. We do not analyze the branch level data for those sectors/countries where the sample size would become too short for the results to be statistically reliable (e.g. Services, where typically branch level data are only available after 2001).

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

4 Factor-based Sectoral CCIs for Europe

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). In the first subsection we provide additional details on the alternative CCIs under evaluation. In the second subsection we report the findings for the euro area and the European Union as a whole, on a sector by sector basis. In the third subsection we discuss the results for 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. In the final subsection we evaluate whether it is possible to identify a single factor based method that produces good results for the majority of countries and sectors, and that can therefore be used as a systematic substitute for the Confidence Indicators produced by the European Commission.

4.1 The alternative CCIs under evaluation and the criteria for comparison

We compare the DG-ECFIN's non model based Confidence Indicators with those obtained using the SW and FHLR methodologies. We do not apply the parametric Stock and Watson's (1989) method since it is not suited to analyze medium/large datasets and preliminary results (available upon request) 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_{SW} and CCI_{FHLR} in (11) and (14). 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 SW and FHLR CCIs using either one or two factors. Typically one factor is sufficient to explain more than 50% of the variability in all series (in some cases even 90%, as for Industry), but in a few cases a second factor yields sizeable gains in terms or percentage of explained variance, in particular at the subsector level. As mentioned, we use the longest time period available for each country/sector, in order to exploit all the available information, but the sample period is the same for the different datasets within each country/sector.

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 produced by the European Commission 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, and most important, 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.

4.2 Results for the euro area and the EU

4.2.1 Industry

The detailed results for Industry are reported in the first and second columns of Tables A1A-A1C using, respectively, correlation, coherence and scoring as the evaluation criteria. From Table A1A, 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). For the EU, not considered by Gayer and Genet (2006), the correlation of the factor CCIs with the benchmark remains 0.91, as for the Confidence Indicator.

Adding the series of "equal" answers to the dataset lowers the correlation, and preselecting the series on the basis of their correlation with the reference series 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 series are preselected according to the property of being contemporaneous or leading (correlation goes to 0.92 for both EU and EA when using the FHLR method).

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 A1A. 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 and fourth panels of Table A1A 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 FHLR and to 0.91 for SW.

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 A1B. 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_{SW} and CCI_{FHLR} based on the balance dataset are similar, 0.56 and 0.55 for the euro area and 0.60 and 0.64 for the EU, respectively. When the equal answers are added to the dataset, the values increase to 0.61 and 0.60 for the euro area but decrease to 0.58 for CCI_{FHLR} for the EU. Preselection does not yield any other improvements.

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_{FHLR} 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_{SW} and CCI_{FHLR} obtained from the balance data had the same correlation with the reference series, but a higher coherence, 0.64 and 0.60 versus 0.59.

In the first two columns of Table A1C 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 slightly leading characteristics.

The CCI_{SW} and CCI_{FHLR} in general 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 FHLR, see the second panel of Table A1C.

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_{FHLR} based on the subsector euro area data with preselection, which had a good performance in terms of correlation and coherence, has a score of 0.45 (against 0.13 of the benchmark). For the EU, the CCI_{FHLR} 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. 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_{FHLR} based on the subsector data with "leading" preselection. The CCI_{FHLR} 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 and likely not statistically significant.[4]

4.2.2 Consumers

The results for Consumers are reported in the first and second columns of Tables A2A-A2C. 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. Using two factors rather than one in the construction of the CCIs is also 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_{SW} 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 A2B. These values are comparable with those obtained for Industry.

The values for the CCI_{SW} based on the balance dataset are slightly larger for the euro area but smaller for the EU, 0.53 and 0.43, respectively, with slightly lower values for CCI_{FHLR}. Changing the features of the dataset used for factor estimation, or estimating a second factor, does not yield any additional benefits. However, the CCI that performed best for correlation (CCI_{SW} with preselection based on the non lagging requirement) is better for the euro area (0.53), and only slightly worse for the EU (0.44),

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. For the euro area, the CCI_{SW} and CCI_{FHLR} maintain the leading feature in all cases, and the best CCI in terms of correlation has a loss of 0.06 compared with 0.17 of the benchmark. For the EU, there are instead gains from the use of disaggregate information, which typically produces CCIs that are no longer lagging. 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.

[4]For example, since on average there are about 180 observations in the sample, an approximate standard error for the estimated correlations is $1/\sqrt{180}$, which is about 0.07, making all the differences in correlation non statistically significant at conventional values.

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_{SW} 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.

4.2.3 Services

The results for Services are reported in the first and second columns of Tables A3A-A3C. 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 SW or FHLR 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_{SW} and CCI_{FHLR}, the correlations do not increase, they even decrease in the case of the equal plus balance dataset. The latter result is due to the relevance of a second factor for some of the equal series, which is though basically unrelated with the target reference series.

The branch level dataset is not considered since the available sample is short, typically starting after 2000. Notice that also the sectoral survey data for Services are in general available for a shorter sample than for the other sectors.

Using the directional coherence between the CCIs 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 A3B. It is difficult to improve upon the benchmark using the factor based CCIs, both for the euro area and for the EU. The highest value achievable for the euro area is 0.65, SW applied to the equal and balance dataset, 0.69 for the EU, FHLR 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 slightly leading for the euro area, the value of the criterion is 0.03, and on average lagging for the EU, with a value of -0.27. The performance of the CCI_{SW} and CCI_{FHLR} is in general better, with a maximum score of 0.17 for both the euro area and the EU, achieved by several CCIs. In particular, both SW applied to the equal and balance dataset for the euro area and FHLR applied to the aggregate balance dataset with two factors 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 directional 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_{SW} applied to the equal and balance dataset for the euro area and the CCI_{SW} applied to the aggregate balance dataset with two factors for the EU have a slightly higher correlation, similar coherence and better features in terms of turning points.

4.2.4 Building

The results for Building are reported in the first and second columns of Tables A4A-A4C. 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 A4A.

The use of the factor based techniques with the balance series generates an improvement of about 3-4 points for the euro area, in line with the findings of Gayer and Genet (2006), and of 9 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 SW method applied to the balance plus equal dataset generates a correlation of 0.38, and discarding lagging series produces an additional slight improvement, to 0.41.

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 (FHLR, subsector data, correlation preselection), about 23 points higher than the benchmark. For the EU, the highest correlation is 0.42 (FHLR, 2 factors, equal plus balance, contemponarenous-leading selection), about 18 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 A4B. 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_{SW} and CCI_{FHLR} based on the balance dataset are higher for both the euro area and the EU, in the range 0.59-0.62. For the euro area, it is possible to do slightly better with the FHLR approach, based on two factors, applied to the balance plus equal dataset, the resulting figure is 0.63. The SW method applied to the same dataset produces the highest directional coherence for the EU, 0.64.

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 0.39 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 highest correlation performs well also for coherence, and the best CCI for coherence is also good in terms of correlation.

In the first two columns of Table A4C 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.

The CCI_{SW} computed with the equal plus balance datasets have highest scores, the maximum values are 0.29 for the euro area and 0.22 for the EU. The preferred FHLR methods for the euro area on the basis of correlation or coherence have a score of 0.05-0.11. For the EU, the SW CCI using the equal plus balance dataset with two factors generates a criterion of 0.07, again better than the benchmark.

In summary, for the euro area and EU Building Sector 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 FHLR with balance plus equal dataset, variable preselection and 2 factors for the euro area, and SW, equal plus balance dataset and 2 factors for the EU.

4.2.5 Retail

The results for the sector Retail are reported in the first and second columns of Tables A5A-A5C. 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 3-4 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 are slightly higher than those for the balance only dataset for both the euro area and 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, SW 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. The other type of variable preselection yields comparable results.

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 A5B.

The gains from the factor based procedures are now more limited. The best values are achieved with FHLR and the equal plus balance dataset for the euro area, 0.56, and by SW with branch level data and leading selection, 0.57.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 A5C 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. The best models in terms of correlation have a score of 0.11 and 0.08, respectively, which increases to 0.25 and 0.11 for the models ranked second in terms of correlation.

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 overall best CCIs rely on the SW factor estimation method applied to the subsector data with contemporaneous/leading based variable preselection.

4.2.6 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 (SW or FHLR) estimation 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 Table 2 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.

4.3 Results for the European countries

In this subsection we evaluate the performance of the alternative CCIs for the 12 members of the euro area, for the 3 "old" members of the European Union outside the euro area, and for the three largest new member states. As for Europe, we group the results by sector.

4.3.1 Industry

The country by country results for Industry are reported in the final columns of Tables A1A-A1C 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. It is worth noting that all these values are lower than the correlation for the euro area series, which is 0.91. A possible rationale underlying this finding 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. 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.

For all the four largest countries, the correlation with the reference series increases using the SW method applied to the aggregate balance series with one factor (FHLR produces smaller but still positive gains). 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 SW 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, France and Spain, and gains for Italy. The results for scoring indicate that the Confidence Indicator, and the CCISW, are lagging for Spain and France, leading for Germany. In the case of 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.

For the other six euro area countries for which data are available (the series are missing for Finland and The Netherlands), the Confidence Indicator is leading in terms of scoring. 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 16 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.

Overall, the factor based methods seem to work rather well for Industry also for the single

European countries, but, as for the euro area and EU as a whole, the marginal gains for this sector are rather limited. The preferred methods of construction of CCIs for the Industry sector are summarized in Table 3 at the end of this subsection.

4.3.2 Consumers

The country by country results for Consumers are reported in the final columns of Tables A2A-A2C 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 survey answers disaggregated by income quartile, 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 it is advisable to use the equal plus balance dataset with one factor and variable preselection (correlation of 0.64 versus 0.46 of the benchmark). In all the three cases, SW should be used to estimate the factors. Instead, for Italy the highest correlation with the reference series is obtained with FHLR, two factors, applied to the balance series. The resulting figure is 0.69 versus 0.55 of the benchmark.

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 SW 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 disaggregate 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 largest gains are much more limited for Hungary, just 1 point.

In summary, the factor based methods seem to work rather well for the Consumers sector of 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, on average 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 Table 3 at the end of this subsection.

4.3.3 Services

The country by country results for Services are reported in the final columns of Tables A3A-A3C for the different loss functions, i.e. respectively, for correlation, coherence and scoring. It is worth mentioning that the sample is shorter than for the other sectors, survey data are typically available after 1995-96 for most countries. The sample for the more disaggregated data starts even later, so that we do not consider them.[5]

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 (basically, for the same reasons as discussed for the Industry sector).

For the four countries except Spain it is possible to obtain gains in terms of correlation, without any major losses of coherence or scoring. In particular, for Germany and Italy the preferred CCI relies on the SW method with equal plus balance data and correlation preselection. The gains are of 6 points for Germany, but arrive to 20 points for Italy.

This model works well also for Austria, Belgium, Finland, The Netherlands and Portugal (with gains of, respectively, 8, 1, 20, 32, and 8 points), while data are not available for Greece, Ireland and Luxembourg.

The SW method applied to the equal plus balance data with correlation preselection works also for Denmark and the UK, where the gains with respect to the benchmark are of 18 and 6 points, respectively. 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 method is the best for the Czech Republic (with huge gains of 57 points), and a close second best for Hungary (gains of 6 points against 7 points for the first best). Data for Poland are not available.

Overall, the factor based methods applied to derive CCIs for the Services sector work rather well also for the European countries, in particular when the SW method is applied to the equal and balance data, combined with variable preselection. The gains are usually in the range of 5-20 points in terms of higher correlation with the reference series, smaller but still on average existent for coherence and scoring. The preferred methods of construction of CCIs for the Services sector are summarized in Table 3 at the end of this subsection.

4.3.4 Building

The country by country results for Building are reported in the final columns of Tables A4A-A4C 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

[5]However, it is worth mentioning that on the shorter sample the disaggregated data yield substantial gains, these results are available upon request.

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 FHLR or SW and correlation based variable preselection. The gains amount to only 4 points for Spain, but increase to 10 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, even though it is rather low, 0.16.

For 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.

The preferred methods of construction of CCIs for the Building sector are summarized in the Table 3 at the end of this subsection.

4.3.5 Retail

The country by country results for the sector Retail are reported in the final columns of Tables A5A-A5C 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.

It is again in general 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. The improvements are substantial for Germany, up to 25 points, France, up to 31 points, for Italy, up to 13 points. In all the three cases, the information in the disaggregate branch level data is important.

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. The largest gains are for Finland, 68 points and Austria, up to 33 points. 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.

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 disaggregate data start too late, but the equal plus balance aggregate data combined with variable preselection improve the correlation of 5-6 points, with similar gains for directional coherence and only minor losses for scoring (from 0.71 to 0.60).

The preferred methods of construction of CCIs for the Services sector are summarized in Table 3 at the end of this subsection.

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.

The preferred CCIs for each country/sector, and the associated gains/losses with respect to the Confidence Indicators for the three loss functions, are summarized in Table 3. In 40 cases out of 76 the gains in terms of increased correlation exceed 10 points, in 16 cases exceed 20 points, and in 10 cases exceed 30 points. Figure 5 reports the histogram of the percentage gains in correlations obtained by using the preferred CCIs for each country/sector. As is clear, virtually the whole distribution lies above zero, with an average gain of 13 points and with some cases characterized by very high gains.

4.4 Is there a robust sectoral factor-based CCI?

Table 4 below reports a summary of the correlations between the reference series and the Confidence Indicator (Conf), the CCI based on the SW method applied to the sector balance data (SW), and that based on the SW method with the subsector data and correlation based preselection of the series (SWd). The latter has been chosen for its good performance in most of the cases we have analyzed so far. A few comments are worth mentioning.

First, for the sectors Consumers and Retail SWd has larger correlation with the reference series than the corresponding Confidence Indicator in most cases. Specifically the correlation is always higher for SWd in all the cases for the sector Consumers, and in 14 out of 17 cases for the sector Retail. SW also performs well for these two sectors, but in general worse than SWd.

Second, for the sectors Industry and Services SW does better than the corresponding Confidence Indicator. In particular for the sector Industry the correlation is higher for SW in 10 out of 14 cases while for the sector Services it is higher in 11 out of 16 cases and it

draws in 2 cases. SW2 is not available for the sector services and is in general marginally worse for the sector Industry.

Finally, for the sector Building the ranking is less clear cut. Out of 19 cases, both SW and the Confidence Indicator are the best method in 8 cases (in one case they draw) while SWd is better only in 4 cases.

In conclusion, if a single method of construction of sectoral CCIs has to be chosen and applied for each sector, the analysis in this subsection supports the use of the SWd approach for Consumers and Retail, and of SW for Industry, Services, and Building. If one wants to use a single method, then SW should be preferred, as it also performs well for Consumers and Retail. 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.

5 Conclusions

In this paper 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, at the sectoral level.

The results we have obtained provide a clear indication that factor based CCIs can produce in almost all cases better results than the Confidence Indicators produced by the European Commission in terms of tracking the reference series, retaining the nice features of timeliness and lack of revision related to the use of survey data.

Our main findings and recommendations can be summarized as follows.

1. For euro area / EU national indexes, the average results 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 for other sectors, such as Building and Retail, the average correlation with the reference series can increase of 16-33 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 preselection of the series on the basis of either their correlation with the reference series or the property of being contemporaneous or leading perform systematically well.

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). In 40 cases out of 76 the gains in terms of increased correlation exceed 10 points, in 16 cases exceed 20 points, and in 10 cases exceed 30 points. The Stock and Watson (2002a,b, labelled SW) and the Forni et al. (2003, labelled FHLR) factor estimation methods yield similar results, favoring the former approach since it is substantially simpler than the

latter. The SW 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 SW applied to the sector balance data.

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 SW 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.

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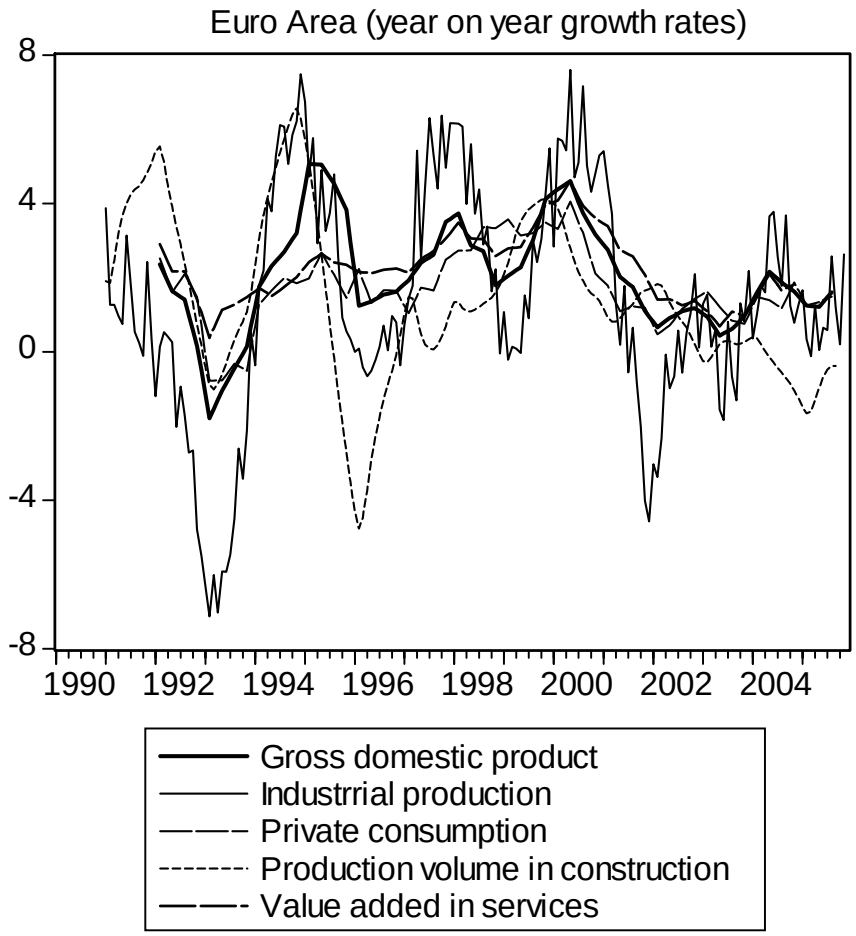

Figure 1: Euro Area year on year growth rate in GDP, Private Consumption, Industrial Production, Valued Added in Services, and Production Volume in Construction.

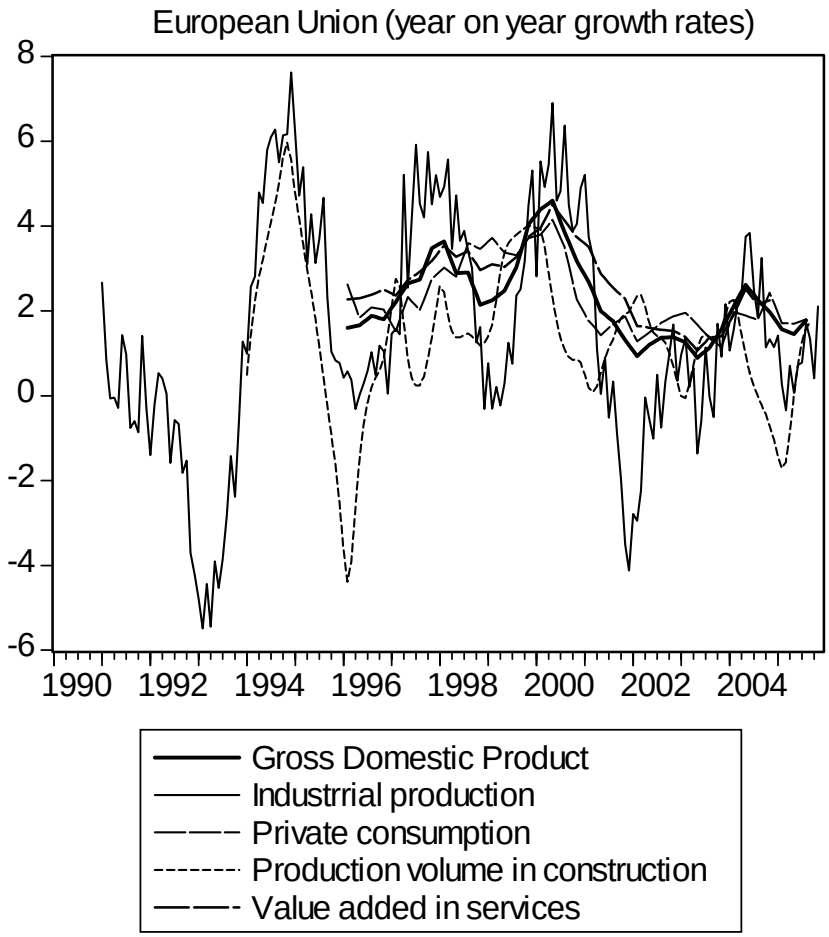

Figure 2: European Union year on year growth rate in GDP, Private Consumption, Industrial Production, Valued Added in Services, and Production Volume in Construction.

Figure 3: Euro Area: Reference series and the Confidence Indicator (Conf), the CCI based on the SW method applied to the sector balance data (SW), and that based on the SW method with the subsector data and correlation based preselection of the series (SWd).

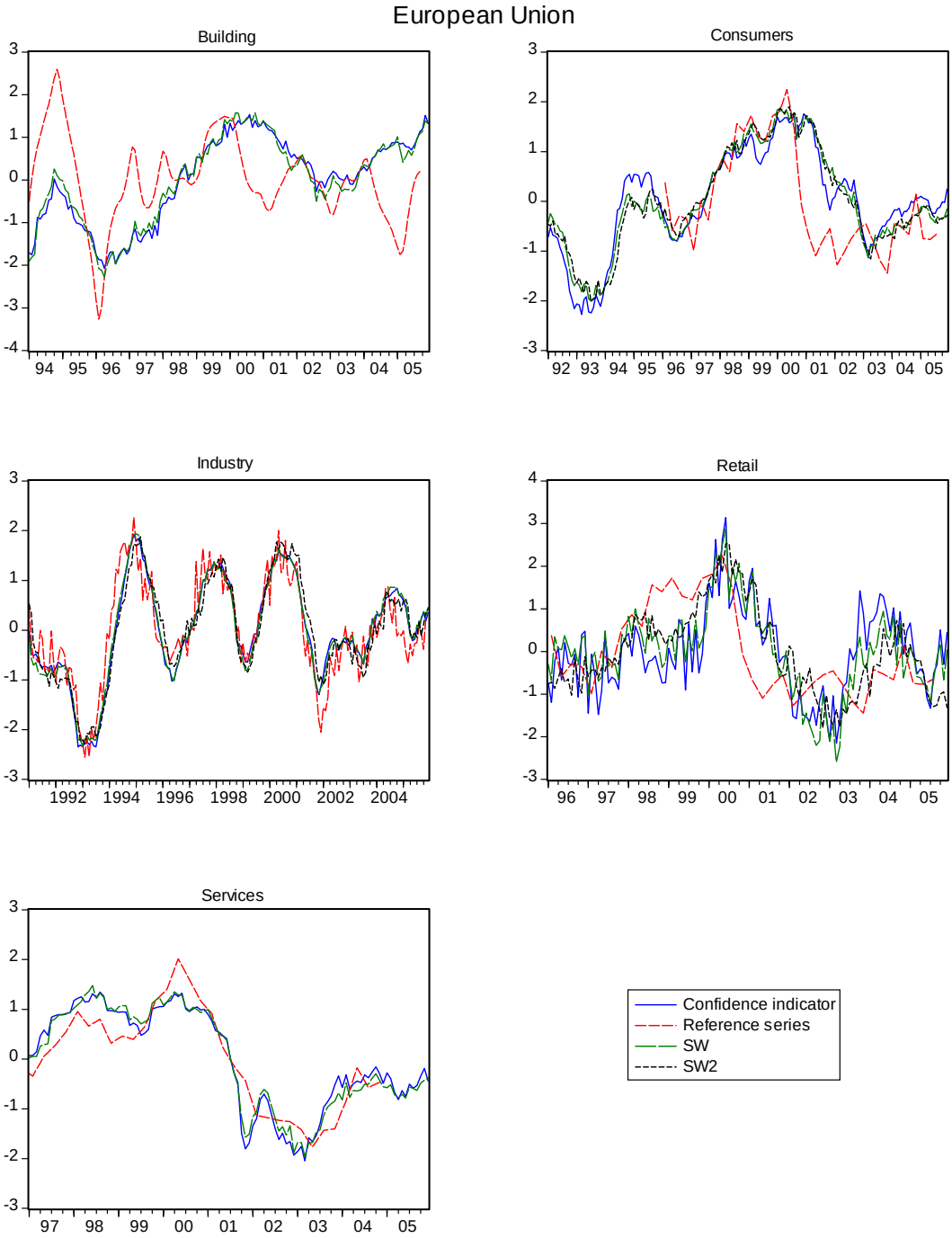

Figure 4: Euro Area: Reference series and the Confidence Indicator (Conf), the CCI based on the SW method applied to the sector balance data (SW), and that based on the SW method with the subsector data and correlation based preselection of the series (SWd).

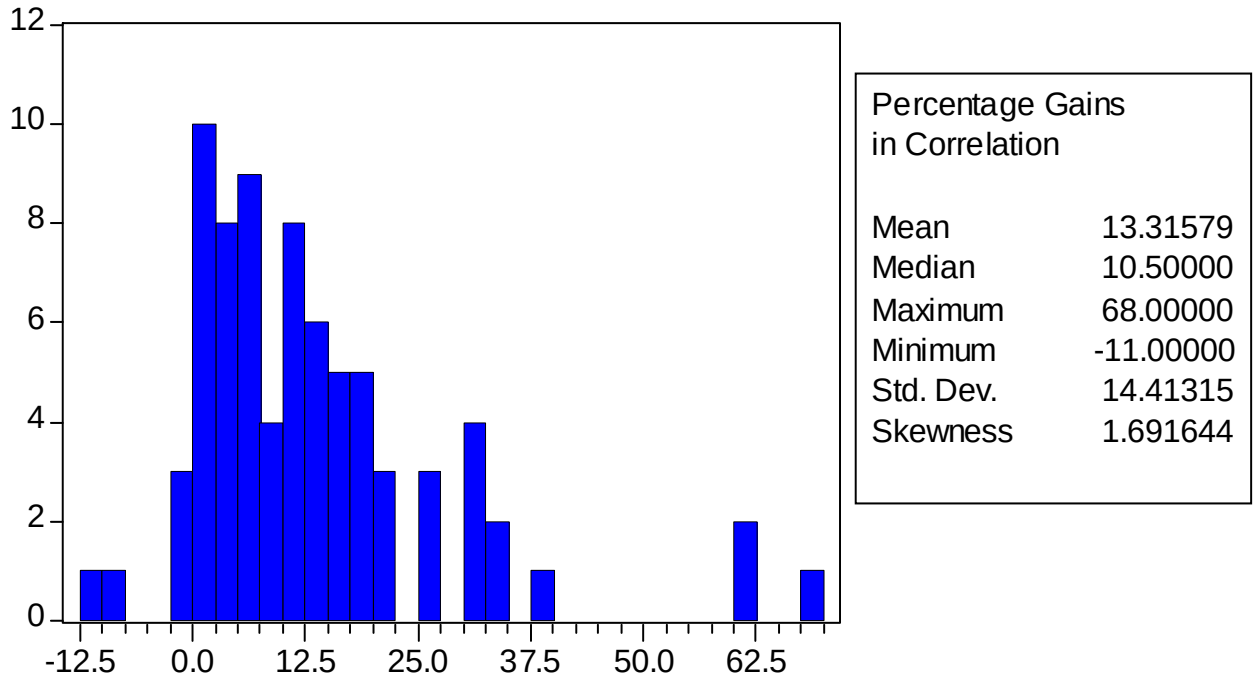

Figure 5: Distribution of the percentage gains in correlation with the reference series obtained when using the preferred CCIs displayed in Table 3.

Table 1. Subsector (or branch) disaggregation of sectoral survey answers.

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		

Disaggregation of sectoral survey answers.

Table 2. Preferred CCIs for Euro area and EU sectors (gains/losses with respect to C.I.)

	Euro area		EU	
	Method	**Gain**	**Method**	**Gain**
Industry	FHLR		FHLR	
	subsector	0.02	sector	0.00
	1 factor	0.03	1 factor	0.05
	balance	0.32	balance	-0.10
	cont/lead		none	
Consumers	SW		SW	
	subsector	0.03	subsector	0.07
	1 factor	0.02	1 factor	-0.04
	balance	-0.11	balance	0.25
	cont/lead		cont/lead	
Services	SW		FHLR	
	sector	0.03	sector	0.02
	1 factor	0.01	2 factors	0.00
	eq. + bal	0.14	balance	0.44
	none		none	
Building	FHLR		SW	
	subsector	0.23	sector	0.16
	1 factor	0.00	2 factors	0.09
	balance	0.07	eq. + bal	0.10
	correl.		none	
Retail	SW		SW	
	subsector	0.17	subsector	0.33
	1 factor	0.00	1 factor	0.07
	balance	-0.21	balance	-0.14
	cont/lead		correl.	

For each sector the first panel reports the preferred method (SW or FHLR), level of disaggregation (sector/subsector), number of factors (1 or 2), type of data (balance or balance plus equal), 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).

Table 3. Preferred CCIs (gains/losses with respect to C.I.)

SECTOR	AT		BE		DE		EL		ES		FI		FR		IE		IT	
	Method	Gain	Method	Gain	Method	Gain	Method	Gain	Method	Gain	Method	Gain	Method	Gain	Method	Gain	Method	Gain
Industry	SW	0.08	SW	0.04	SW	0.04	FHLR	-0.01	SW	0.04	na	na	SW	0.03	SW	0.11	SW	0.03
	Sector	0.03	Sector	-0.01	Sector	0.04	Sector	-0.09	Sector	-0.01	na	na	Sector	-0.06	Sector	0.01	Sector	-0.01
	2Factors	0.00	2Factors	-0.07	1Factor	-0.03	1Factor	0.23	2Factors	-0.06	na	na	2Factors	-0.11	2Factors	0.01	1Factor	0.07
	Balance		Eq.+ bal.		Balance		Balance		Balance		na		Balance		Eq.+ bal.		Balance	
	none		cont/lead		none		none		none		na		none		cont/lead		none	
Consumers	SW	0.30	FHLR	0.11	SW	0.18	SW	0.19	SW	0.13	SW	0.61	SW	0.10	FHLR	0.17	FHLR	0.14
	Sector	-0.06	Sector	0.01	Sector	0.00	Subsector	-0.06	Sector	0.01	Subsector	0.04	Subsector	-0.01	Sector	0.04	Sector	-0.02
	1Factor	0.00	2Factors	0.21	1Factor	-0.04	1Factor	-0.34	1Factor	-0.02	1Factor	0.27	1Factor	-0.08	2Factors	0.10	2Factors	0.00
	Eq.+ bal.		Eq.+ bal.		Eq.+ bal.		Balance		Eq.+ bal.		Balance		Balance		Balance		Balance	
	correl.		correl.		correl.		correl.		none		correl.		correl.		none		none	
Services	FHLR	0.06	FHLR	0.02	SW	0.06	na	na	FHLR	0.00	SW	0.20	SW	0.03	na	na	SW	0.21
	Sector	-0.03	Sector	-0.06	Sector	-0.05	na	na	Sector	-0.04	Sector	0.01	Sector	0.04	na	na	Sector	-0.10
	1Factor	0.10	1Factor	-0.05	1Factor	-0.42	na	na	2Factors	-0.10	1Factor	0.43	1Factor	-0.07	na	na	1Factor	-0.19
	Eq.+ bal.		Eq.+ bal.		Eq.+ bal.		na		Eq.+ bal.		Eq.+ bal.		Eq.+ bal.		na		Eq.+ bal.	
	correl.		correl.		correl.		na		correl.		correl.		none		na		correl.	none
Building	SW	0.06	FHLR	0.14	FHLR	0.00	na	na	FHLR	0.04	FHLR	0.26	FHLR	0.10	SW	0.16	FHLR	0.12
	Subsector	0.10	Subsector	0.01	Sector	0.02	na	na	Subsector	-0.01	Subsector	0.11	Subsector	0.04	Sector	0.04	Subsector	0.05
	2Factors	-0.26	2Factors	0.03	1Factor	-0.21	na	na	2Factors	-0.17	2Factors	0.17	2Factors	0.20	2Factors	0.00	2Factors	-0.19
	Balance		Balance		Eq.+ bal.		na		Balance		Balance		Balance		Eq.+ bal.		Balance	
	none		cont/lead		correl.		na		correl.		correl.		correl.		none		correl.	
Retail	SW	0.33	SW	0.12	SW	0.26	SW	0.19	SW	-0.11	SW	0.68	SW	0.31	FHLR	0.13	SW	0.17
	Subsector	-0.05	Subsector	0.00	Subsector	0.01	Subsector	0.00	Subsector	0.03	Subsector	0.00	Sector	0.05	Sector	-0.09	Subsector	0.00
	1Factor	0.22	1Factor	-0.23	1Factor	-0.23	1Factor	0.01	1Factor	0.47	1Factor	0.10	1Factor	-0.28	1Factor	-0.39	2Factors	-0.56
	Balance		Balance		Balance		Balance		Balance		Balance		Eq.+ bal.		Eq.+ bal.		Balance	
	correl.		correl.		cont/lead		correl.		correl.		correl.		cont/lead		cont/lead		correl.	

SECTOR	LU		NL		PT		DK		SE		UK		CZ		HU		PL	
	Method	Gain	Method	Gain	Method	Gain	Method	Gain	Method	Gain	Method	Gain	Method	Gain	Method	Gain	Method	Gain
Industry	FHLR	0.02	na	na	SW	0.06	SW	-0.02	na	na	FHLR	-0.08	na	na	na	na	na	na
	Sector	-0.04	na	na	Subsector	-0.01	Subsector	0.03	na	na	Subsector	-0.02	na	na	na	na	na	na
	2Factors	-0.07	na	na	1 factor	-0.10	1 factor	-0.01	na	na	1 factor	0.08	na	na	na	na	na	na
	Eq.+ bal.		na		Balance		Balance		na		Balance		na		na		na	
	correl.		na		correl.		cont/lead		na		correl.		na		na		na	
Consumers	na	na	SW	0.09	FHLR	0.09	SW	0.17	SW	0.12	FHLR	0.33	FHLR	0.38	FHLR	0.01	SW	0.26
	na	na	Sector	0.00	Sector	0.01	Subsector	-0.07	Sector	0.03	Subsector	0.03	Sector	-0.19	Subsector	0.06	Sector	0.10
	na	na	1Factor	-0.31	2Factors	-0.11	1Factor	-0.04	1Factor	-0.07	2Factors	-0.06	1Factor	-0.11	2Factors	0.02	1Factor	-0.17
	na		Eq.+ bal.		Eq.+ bal.		Balance		Eq.+ bal.		Balance		Eq.+ bal.		Balance		Eq.+ bal.	
	na		correl.		correl.		correl.		correl.		correl.		cont/lead		cont/lead		correl.	
Services	na	na	SW	0.32	FHLR	0.09	SW	0.18	FHLR	0.02	SW	0.06	FHLR	0.61	FHLR	0.07	na	na
	na	na	Sector	-0.03	Sector	-0.01	Sector	-0.11	Sector	0.00	Sector	-0.04	Sector	0.03	Sector	0.03	na	na
	na	na	1Factor	0.10	1Factor	-0.23	1Factor	-0.63	2Factors	-0.07	1Factor	0.10	1Factor	0.00	2Factors	0.00	na	na
	na		Eq.+ bal.		Eq.+ bal.		Eq.+ bal.		Balance		Eq.+ bal.		Balance		Eq.+ bal.		na	
	na		correl.		correl.		correl.		none		correl.		none		correl.		na	
Building	FHLR	0.19	FHLR	0.07	FHLR	0.02	SW	0.17	SW	0.13	FHLR	-0.02	FHLR	0.00	SW	0.31	FHLR	0.02
	Subsector	0.00	Subsector	0.00	Sector	0.00	Subsector	-0.03	Sector	0.08	Sector	0.01	Sector	-0.04	Subsector	0.00	Sector	-0.04
	2Factors	-0.10	2Factors	0.20	1Factor	0.37	2Factors	-0.05	2Factors	-0.15	1Factor	0.10	1Factor	0.09	1Factor	0.23	2Factors	0.11
	Balance		Balance		Eq.+ bal.		Balance		Eq.+ bal.		Eq.+ bal.		Eq.+ bal.		Balance		Eq.+ bal.	
	correl.		cont/lead		cont/lead		cont/lead		none		none		correl.		correl.		correl.	
Retail	na	na	SW	0.14	FHLR	0.04	SW	0.11	FHLR	0.21	SW	0.06	SW	0.00	FHLR	na	SW	0.06
	na	na	Subsector	-0.03	Sector	0.02	Subsector	0.04	Subsector	0.07	Sector	0.05	Sector	-0.03	Subsector	na	Subsector	0.02
	na	na	2Factors	-0.25	1Factor	-0.19	1Factor	0.61	1Factor	0.13	2Factors	0.30	1Factor	0.22	1Factor	na	1Factor	-0.23
	na		Balance		Eq.+ bal.		Balance		Balance		Eq.+ bal.		Eq.+ bal.		Balance		Balance	
	na		cont/lead		cont/lead		correl.		correl.		correl.		none		correl.		correl.	

For each sector and country the first panel reports the preferred method (SW or FHLR), level of disaggregation (sector/subsector), number of factors (1 or 2), type of data (balance or balance plus equal), 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).

Table 4. Summary of the Preferred CCIs

SECTOR	METHOD	COUNTRY									
		EA	**EU**	**AT**	**BE**	**DE**	**EL**	**ES**	**FI**	**FR**	**IE**
Industry	**SW**	**1.01**	**1.01**	**1.04**	**1.05**	**1.05**	0.97	**1.05**	**na**	**1.03**	**1.06**
	SWd	**1.00**	0.99	0.13	0.94	0.97	0.62	**na**	**na**	0.94	**1.07**
Consumer	**SW**	**1.01**	**1.02**	**1.71**	0.91	**1.25**	**1.16**	**1.18**	**1.90**	**1.07**	**1.21**
	SWd	**1.04**	**1.10**	**1.40**	**1.11**	**1.10**	**1.34**	**1.18**	**2.14**	**1.13**	**1.01**
Services	**SW**	**1.05**	**1.02**	**1.08**	1.00	0.68	**na**	0.97	0.99	1.00	**na**
	SWd	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Building	**SW**	**1.10**	**1.39**	**1.13**	**1.50**	0.93	**na**	1.00	**1.25**	**1.12**	**1.30**
	SWd	**1.02**	**na**	0.27	**1.69**	0.85	**na**	0.83	**na**	**na**	**na**
Retail	**SW**	**1.05**	**1.55**	0.76	0.93	**1.07**	0.86	0.61	**1.59**	**1.60**	**1.01**
	SWd	**1.28**	**1.97**	**1.86**	**1.05**	**1.56**	0.84	0.68	**5.04**	**1.67**	**1.09**
		IT	**LU**	**NL**	**PT**	**DK**	**SE**	**UK**	**CZ**	**HU**	**PL**
Industry	**SW**	**1.04**	**1.05**	**na**	0.73	0.75	**na**	0.84	**na**	**na**	**na**
	SWd	0.95	0.96	**na**	**1.05**	0.94	**na**	0.78	**na**	**na**	**na**
Consumer	**SW**	**1.23**	**na**	**1.08**	**1.01**	**1.16**	0.87	**1.30**	**1.28**	0.95	0.67
	SWd	**na**	**na**	**1.01**	**1.07**	**1.05**	**1.16**	**1.49**	**1.69**	1.00	**1.48**
Services	**SW**	**1.08**	**na**	**1.51**	**1.09**	**1.10**	**1.02**	**1.05**	**3.87**	**1.01**	**na**
	SWd	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Building	**SW**	0.87	**1.03**	**1.03**	0.99	**1.51**	**1.08**	0.83	0.97	0.48	1.00
	SWd	**na**	**1.07**	**1.10**	0.94	**1.62**	**1.05**	**na**	**na**	0.21	**na**
Retail	**SW**	0.80	**na**	**1.08**	**1.03**	0.95	**1.12**	0.95	0.85	**66.36**	0.74
	SWd	**1.19**	**na**	**1.19**	**1.02**	**1.11**	**1.21**	**na**	**na**	**71.04**	0.89

For each sector and country the rows SW and SWd report the correlation between the CCI based on the method SW and SWd and the reference series divided by the correlation between the Confidence Indicator (Conf) and the reference series. The method SW is the Stock and Watson method applied to the sector balance data while SW2 is the Stock and Watson method with the subsector data and correlation based preselection of the series. Values above 1 are in bold.

Table A1A: Performance of alternative CCIs for the sector INDUSTRY – Correlation with reference series

Industry																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.91	0.91	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.92	0.91	0.69	0.62	0.84	**0.44**	0.69	na	0.80	0.51	0.68	0.46	na	0.28	0.32	na	0.60	na	na	na
	SW	0.92	0.91	0.66	0.62	**0.85**	0.43	0.71	na	0.80	0.50	**0.70**	0.46	na	0.26	0.33	na	0.59	na	na	na
Equal and	FHLR	0.87	0.87	0.52	0.60	0.83	0.40	0.57	na	0.75	0.51	0.64	0.45	na	0.25	0.29	na	0.59	na	na	na
Balance	SW	0.86	0.85	0.52	0.60	0.83	0.38	0.58	na	0.71	0.50	0.62	0.44	na	0.24	0.29	na	0.58	na	na	na
Selection1	FHLR	0.87	0.87	0.70	0.59	0.83	na	0.67	na	0.80	0.52	0.66	0.45	na	na	na	na	0.60	na	na	na
	SW	0.86	0.85	0.69	0.59	0.83	na	0.67	na	0.80	0.51	0.66	0.46	na	na	na	na	0.60	na	na	na
Selection2	FHLR	0.92	**0.92**	na	0.62	0.83	0.24	0.39	na	na	0.51	0.44	0.31	na	0.29	0.27	na	0.49	na	na	na
	SW	0.90	0.91	na	0.61	0.82	0.33	0.39	na	na	0.51	0.49	0.35	na	0.29	0.28	na	0.52	na	na	na
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.89	0.89	0.71	0.59	0.85	0.43	0.71	na	0.80	0.50	0.64	0.46	na	0.35	0.32	na	0.57	na	na	na
	SW	0.89	0.89	**0.71**	0.58	0.85	0.43	**0.72**	na	**0.80**	0.48	0.65	0.46	na	0.37	0.35	na	0.55	na	na	na
Equal and	FHLR	0.85	0.87	0.53	0.59	0.83	0.35	0.56	na	0.62	0.42	0.56	0.42	na	0.22	0.26	na	0.61	na	na	na
Balance	SW	0.86	0.85	0.51	0.58	0.83	0.32	0.57	na	0.61	0.44	0.53	0.41	na	0.21	0.27	na	0.60	na	na	na
Selection1	FHLR	0.85	0.87	0.69	0.58	0.83	na	0.69	na	0.80	0.50	0.59	**0.46**	na	na	na	na	0.57	na	na	na
	SW	0.86	0.85	0.69	0.59	0.83	na	0.69	na	0.80	0.51	0.59	0.46	na	na	na	na	0.57	na	na	na
Selection2	FHLR	0.90	0.80	na	0.62	0.83	0.03	0.39	na	na	0.58	0.15	0.36	na	0.24	0.34	na	0.52	na	na	na
	SW	0.90	0.80	na	**0.63**	0.83	0.02	0.39	na	na	**0.58**	0.12	0.37	na	0.25	0.34	na	0.52	na	na	na
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	0.89	0.90	0.63	0.55	0.77	0.37	na	na	0.78	0.46	0.67	0.44	na	0.37	0.31	na	0.60	na	na	na
	SW	0.89	0.89	0.59	0.55	0.78	0.35	na	na	0.78	0.45	0.66	0.44	na	0.37	0.32	na	0.57	na	na	na
Selection1	FHLR	0.89	0.90	0.70	0.61	0.80	na	na	na	0.79	0.47	0.67	na	na	0.42	na	na	**0.63**	na	na	na
	SW	0.89	0.90	0.70	0.61	0.80	na	na	na	0.79	0.48	0.67	na	na	**0.42**	na	na	0.63	na	na	na
Selection2	FHLR	**0.93**	0.91	0.02	0.55	0.78	0.26	na	na	0.74	0.51	0.66	0.43	na	0.38	0.40	na	0.56	na	na	na
	SW	0.91	0.90	0.08	0.55	0.79	0.28	na	na	0.73	0.51	0.64	0.42	na	0.38	**0.41**	na	0.55	na	na	na
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	0.89	0.90	0.57	0.54	0.78	0.37	na	na	0.77	0.47	0.66	0.43	na	0.37	0.32	na	0.60	na	na	na
	SW	0.90	0.89	0.62	0.50	0.81	0.36	na	na	0.72	0.47	0.59	0.45	na	0.38	0.35	na	0.52	na	na	na
Selection1	FHLR	0.89	0.90	0.69	0.61	0.80	na	na	na	0.78	0.48	0.68	na	na	0.42	na	na	0.63	na	na	na
	SW	0.90	0.90	0.70	0.61	0.83	na	na	na	0.76	0.48	0.65	na	na	0.42	na	na	0.63	na	na	na
Selection2	FHLR	0.92	0.91	0.05	0.54	0.78	0.30	na	na	0.77	0.51	0.59	0.17	na	0.39	0.40	na	0.58	na	na	na
	SW	0.82	0.90	0.11	0.40	0.83	0.31	na	na	0.44	0.51	0.41	0.41	na	0.39	0.41	na	0.55	na	na	na
Sample		1991.01	1991.01	1997.01	1987.04	1987.04	1996.01	1987.04	na	1991.01	1995.08	1991.01	1996.03	na	1994.06	1998.01	na	1989.01	na	na	na

1) The four panels "Sector data, 1 fac", "Sector data, 2 fac", "Subsector data, 1 fac", "Subsector data, 2 fac" refer, respectively, to the dataset of survey answers at the aggregate sector level summarized by one/two factors, and to the dataset of survey answers disaggregated at the branch level summarized by one/two factors.
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. Highest values are in bold.

Table A1B: Performance of alternative CCIs for the sector INDUSTRY – Directional coherence with reference series

Industry																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.55	0.59	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.55	0.64	0.54	0.57	0.58	0.45	0.49	na	0.56	0.51	0.56	0.51	na	0.54	0.44	na	0.53	na	na	na
	SW	0.56	0.60	0.51	0.54	0.58	0.47	0.49	na	0.56	0.48	0.51	0.48	na	0.59	0.47	na	0.53	na	na	na
Equal and	FHLR	0.60	0.58	0.58	0.56	0.59	0.45	0.52	na	0.54	0.51	0.59	0.50	na	0.57	0.59	na	0.54	na	na	na
Balance	SW	0.61	0.60	0.54	0.55	0.59	0.44	0.51	na	0.50	0.49	0.56	0.48	na	0.54	0.56	na	0.55	na	na	na
Selection1	FHLR	0.60	0.58	0.52	0.56	0.59	na	0.47	na	0.56	0.46	0.60	0.56	na	na	na	na	0.53	na	na	na
	SW	0.61	0.60	0.50	0.56	0.59	na	0.49	na	0.56	0.47	0.57	0.50	na	na	na	na	0.55	na	na	na
Selection2	FHLR	0.54	0.56	na	0.55	0.61	0.40	0.54	na	na	0.51	0.56	0.56	na	0.54	0.57	na	0.56	na	na	na
	SW	0.57	0.56	na	0.54	0.63	0.37	0.57	na	na	0.48	0.57	0.55	na	0.55	0.55	na	0.56	na	na	na
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.55	0.63	0.52	0.61	0.59	0.42	0.50	na	0.53	0.50	0.57	0.50	na	0.57	0.49	na	0.56	na	na	na
	SW	0.56	0.60	0.53	0.58	0.58	0.40	0.48	na	0.51	0.50	0.51	0.51	na	0.59	0.48	na	0.51	na	na	na
Equal and	FHLR	0.59	0.58	0.56	0.54	0.60	0.49	0.47	na	0.49	0.48	0.65	0.50	na	0.54	0.57	na	0.48	na	na	na
Balance	SW	0.61	0.56	0.54	0.57	0.59	0.46	0.50	na	0.45	0.47	0.61	0.50	na	0.55	0.57	na	0.49	na	na	na
Selection1	FHLR	0.59	0.58	0.47	0.57	0.60	na	0.52	na	0.53	0.44	0.62	0.49	na	na	na	na	0.51	na	na	na
	SW	0.61	0.56	0.50	0.56	0.59	na	0.50	na	0.51	0.47	0.63	0.49	na	na	na	na	0.49	na	na	na
Selection2	FHLR	0.59	0.53	na	0.55	0.61	0.46	0.57	na	na	0.49	0.57	0.52	na	0.53	0.55	na	0.56	na	na	na
	SW	0.60	0.54	na	0.55	0.61	0.46	0.57	na	na	0.50	0.58	0.54	na	0.54	0.57	na	0.56	na	na	na
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	0.55	0.56	0.49	0.55	0.58	0.44	na	na	0.55	0.45	0.56	0.48	na	0.58	0.55	na	0.53	na	na	na
	SW	0.55	0.56	0.49	0.54	0.56	0.42	na	na	0.55	0.44	0.54	0.50	na	0.58	0.58	na	0.53	na	na	na
Selection1	FHLR	0.55	0.58	0.53	0.61	0.58	na	na	na	0.56	0.52	0.57	na	na	0.54	na	na	0.54	na	na	na
	SW	0.55	0.55	0.57	0.60	0.57	na	na	na	0.55	0.52	0.57	na	na	0.54	na	na	0.55	na	na	na
Selection2	FHLR	0.58	0.56	0.49	0.57	0.54	0.50	na	na	0.55	0.55	0.54	0.53	na	0.59	0.54	na	0.62	na	na	na
	SW	0.56	0.54	0.57	0.56	0.54	0.50	na	na	0.55	0.52	0.52	0.53	na	0.59	0.56	na	0.62	na	na	na
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	0.53	0.56	0.45	0.54	0.57	0.43	na	na	0.57	0.46	0.54	0.48	na	0.58	0.55	na	0.52	na	na	na
	SW	0.56	0.56	0.51	0.55	0.54	0.42	na	na	0.56	0.45	0.53	0.48	na	0.57	0.52	na	0.52	na	na	na
Selection1	FHLR	0.53	0.57	0.51	0.57	0.58	na	na	na	0.56	0.52	0.57	na	na	0.54	na	na	0.55	na	na	na
	SW	0.56	0.55	0.58	0.60	0.59	na	na	na	0.54	0.52	0.58	na	na	0.54	na	na	0.53	na	na	na
Selection2	FHLR	0.58	0.56	0.50	0.56	0.52	0.50	na	na	0.56	0.53	0.54	0.50	na	0.61	0.54	na	0.60	na	na	na
	SW	0.55	0.54	0.51	0.57	0.57	0.53	na	na	0.51	0.52	0.56	0.56	na	0.62	0.55	na	0.53	na	na	na
Sample		1991.01	1991.01	1997.01	1987.04	1987.04	1996.01	1987.04	na	1991.01	1995.08	1991.01	1996.03	na	1994.06	1998.01	na	1989.01	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 A1C: Performance of alternative CCIs for the sector INDUSTRY – Turning point coherence with reference series

Industry																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.13	0.20	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	-0.07	0.10	0.19	0.20	0.13	0.42	-0.12	na	-0.24	0.23	0.07	-0.02	na	0.29	0.00	na	0.17	na	na	na
	SW	0.07	0.10	0.28	0.16	0.18	0.44	-0.29	na	-0.19	0.23	0.04	0.00	na	0.29	0.22	na	0.10	na	na	na
Equal and	FHLR	-0.27	-0.44	0.00	0.12	0.05	0.21	-0.12	na	-0.17	0.25	0.07	-0.04	na	0.13	0.14	na	-0.04	na	na	na
Balance	SW	-0.08	-0.44	0.00	0.16	-0.02	0.21	-0.08	na	-0.24	0.13	-0.07	-0.06	na	0.13	0.03	na	0.04	na	na	na
Selection1	FHLR	-0.27	-0.44	0.25	0.11	0.05	na	-0.31	na	-0.24	0.25	0.01	-0.02	na	na	na	na	-0.10	na	na	na
	SW	-0.08	-0.44	0.14	0.09	-0.02	na	-0.35	na	-0.19	0.25	0.06	0.04	na	na	na	na	-0.21	na	na	na
Selection2	FHLR	0.10	0.33	na	0.23	0.12	-0.33	-0.05	na	na	0.23	-0.32	0.08	na	0.29	-0.08	na	0.08	na	na	na
	SW	0.05	0.29	na	0.22	-0.05	0.00	-0.04	na	na	0.23	0.00	-0.04	na	0.29	-0.08	na	0.08	na	na	na
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	-0.23	-0.15	0.03	0.09	0.04	0.44	-0.27	na	-0.26	0.27	-0.01	-0.02	na	0.29	-0.22	na	0.10	na	na	na
	SW	-0.25	-0.15	0.17	0.10	0.18	0.44	-0.32	na	-0.26	0.13	-0.06	-0.02	na	0.29	-0.08	na	-0.10	na	na	na
Equal and	FHLR	-0.20	-0.29	0.11	0.02	-0.04	0.08	-0.10	na	-0.31	-0.04	0.00	-0.19	na	0.13	0.14	na	-0.17	na	na	na
Balance	SW	-0.18	-0.31	0.00	0.11	-0.02	0.04	-0.08	na	-0.19	0.00	0.04	-0.19	na	0.13	0.06	na	-0.17	na	na	na
Selection1	FHLR	-0.20	-0.29	0.17	0.02	-0.04	na	-0.42	na	-0.26	0.25	0.00	0.04	na	na	na	na	-0.19	na	na	na
	SW	-0.18	-0.31	0.14	0.09	-0.02	na	-0.32	na	-0.26	0.25	-0.03	0.04	na	na	na	na	-0.08	na	na	na
Selection2	FHLR	0.15	-0.02	na	0.17	-0.06	-0.06	-0.04	na	na	0.17	0.10	0.02	na	0.25	0.28	na	0.08	na	na	na
	SW	0.15	-0.02	na	0.17	0.04	-0.04	-0.04	na	na	0.29	-0.07	0.02	na	0.29	0.25	na	0.08	na	na	na
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	-0.18	0.37	0.03	0.10	0.11	-0.17	na	na	0.00	0.19	-0.08	-0.02	na	0.13	-0.03	na	0.10	na	na	na
	SW	0.11	0.27	0.03	0.24	0.11	-0.06	na	na	0.00	0.19	-0.08	-0.02	na	0.15	-0.08	na	0.10	na	na	na
Selection1	FHLR	-0.18	0.37	0.19	0.11	0.11	na	na	na	-0.19	-0.10	-0.08	na	na	0.27	na	na	-0.02	na	na	na
	SW	0.11	0.33	0.11	0.17	0.11	na	na	na	-0.02	-0.10	-0.08	na	na	0.27	na	na	0.08	na	na	na
Selection2	FHLR	0.45	0.20	-0.17	0.07	0.02	0.15	na	na	0.28	0.12	0.15	0.29	na	0.13	0.25	na	0.23	na	na	na
	SW	0.52	0.30	0.08	0.28	0.10	0.08	na	na	0.28	0.36	-0.03	0.35	na	0.13	0.22	na	0.19	na	na	na
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	-0.18	0.37	-0.06	0.08	0.11	-0.21	na	na	0.00	0.19	-0.08	-0.23	na	0.13	-0.11	na	-0.08	na	na	na
	SW	0.00	0.27	0.19	0.22	0.11	-0.06	na	na	-0.02	0.19	-0.22	-0.19	na	0.15	0.00	na	-0.08	na	na	na
Selection1	FHLR	-0.18	0.37	0.19	0.11	0.11	na	na	na	-0.19	-0.10	-0.08	na	na	0.27	na	na	0.17	na	na	na
	SW	0.00	0.33	0.11	0.17	0.01	na	na	na	-0.02	-0.10	-0.08	na	na	0.27	na	na	-0.13	na	na	na
Selection2	FHLR	0.45	0.20	-0.36	0.16	0.02	0.04	na	na	-0.13	0.12	-0.07	0.00	na	0.08	0.22	na	0.23	na	na	na
	SW	-0.06	0.30	-0.22	0.06	-0.07	0.04	na	na	-0.19	0.36	-0.19	-0.23	na	0.13	0.22	na	-0.25	na	na	na
Sample		1991.01	1991.01	1997.01	1987.04	1987.04	1996.01	1987.04	na	1991.01	1995.08	1991.01	1996.03	na	1994.06	1998.01	na	1989.01	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 A2A: Performance of alternative CCIs for the sector CONSUMERS – Correlation with reference series

Consumer																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.77	0.67	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.78	0.68	0.58	0.52	0.58	0.45	**0.79**	0.33	0.71	0.72	0.65	na	0.80	0.80	0.47	0.57	0.57	0.65	0.76	0.16
	SW	0.78	0.69	0.56	0.51	0.57	0.47	0.77	0.32	0.70	0.69	0.67	na	0.80	0.75	0.48	0.57	0.58	0.67	0.74	0.16
Equal and	FHLR	0.77	0.66	0.40	0.56	0.57	0.38	0.72	0.30	0.69	0.68	0.53	na	0.82	0.80	0.41	0.52	0.49	0.63	0.73	0.20
Balance	SW	0.74	0.64	0.34	0.54	0.54	0.34	0.70	0.29	0.65	0.58	0.53	na	0.82	0.78	0.41	0.51	0.49	0.64	0.71	0.20
Selection1	FHLR	0.77	0.68	0.61	0.66	0.63	0.47	0.75	na	0.72	0.68	0.63	na	0.82	0.81	0.55	0.76	0.71	0.69	0.77	0.50
	SW	0.76	0.68	**0.63**	0.66	**0.64**	0.50	0.74	na	0.71	0.63	0.64	na	**0.83**	0.80	0.55	**0.78**	0.70	0.75	0.77	**0.50**
Selection2	FHLR	0.77	0.68	0.47	0.04	0.55	0.42	0.68	0.33	0.70	0.63	0.25	na	0.77	0.81	na	0.22	0.48	**0.90**	0.79	0.43
	SW	0.76	0.67	0.46	0.04	0.55	0.37	0.69	0.34	0.72	0.55	0.28	na	0.77	0.80	na	0.20	0.48	0.89	0.76	0.43
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.76	0.68	0.55	0.50	0.56	0.46	0.74	0.14	0.63	**0.74**	**0.69**	na	0.76	0.78	0.42	0.53	0.58	0.46	0.68	0.15
	SW	0.76	0.69	0.53	0.49	0.57	0.47	0.70	0.11	0.58	0.71	0.68	na	0.76	0.76	0.43	0.54	0.58	0.46	0.67	0.16
Equal and	FHLR	0.76	0.66	0.43	0.59	0.57	0.40	0.73	0.02	0.56	0.60	0.60	na	0.57	0.80	0.33	0.67	0.47	0.52	0.72	0.22
Balance	SW	0.74	0.66	0.41	0.45	0.56	0.39	0.72	0.01	0.55	0.54	0.61	na	0.56	0.78	0.35	0.65	0.49	0.52	0.69	0.20
Selection1	FHLR	0.76	0.68	0.54	**0.67**	0.62	0.49	0.73	na	0.61	0.67	0.66	na	0.47	**0.84**	0.56	0.75	0.69	0.53	0.75	0.50
	SW	0.76	0.68	0.53	0.65	0.64	0.50	0.73	na	0.60	0.63	0.65	na	0.45	0.81	0.55	0.77	0.68	0.53	0.75	0.50
Selection2	FHLR	0.76	0.63	0.41	0.06	0.55	0.37	0.73	0.25	0.70	0.53	0.43	na	0.31	0.83	na	0.61	0.45	0.09	0.77	0.40
	SW	0.77	0.65	0.40	0.03	0.55	0.36	0.73	0.25	0.71	0.48	0.43	na	0.33	0.82	na	0.65	0.47	0.15	0.76	0.41
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	0.79	0.72	0.57	0.60	0.49	0.56	0.78	0.31	0.71	0.60	na	na	0.80	0.80	0.50	0.66	0.70	0.69	0.73	0.16
	SW	0.79	0.73	0.53	0.55	0.47	0.56	0.77	0.32	0.68	0.57	na	na	0.79	0.75	0.49	0.64	0.68	0.70	0.71	0.15
Selection1	FHLR	0.79	0.72	0.60	0.67	0.60	0.59	0.79	0.78	0.74	0.60	na	na	0.80	0.81	0.56	0.74	0.78	0.75	0.78	0.42
	SW	0.79	0.73	0.63	0.65	0.59	**0.60**	0.79	**0.78**	**0.75**	0.58	na	na	0.79	0.77	**0.58**	0.77	0.78	0.78	0.77	0.42
Selection2	FHLR	0.79	0.73	0.47	0.63	0.52	0.53	0.78	0.34	0.72	0.60	na	na	0.76	0.83	0.41	0.70	0.69	0.88	0.79	0.36
	SW	**0.80**	**0.74**	0.46	0.62	0.50	0.55	0.78	0.36	0.74	0.57	na	na	0.74	0.80	0.43	0.76	0.67	0.88	0.78	0.35
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	0.79	0.72	0.56	0.57	0.49	0.56	0.78	0.30	0.71	0.62	na	na	0.80	0.78	0.49	0.66	0.68	0.58	0.72	0.15
	SW	0.78	0.73	0.54	0.37	0.45	0.55	0.70	0.09	0.47	0.53	na	na	0.76	0.77	0.44	0.55	0.66	0.48	0.63	0.14
Selection1	FHLR	0.79	0.72	0.61	0.67	0.60	0.59	0.79	0.78	0.74	0.59	na	na	0.80	0.81	0.56	0.75	**0.78**	0.51	0.77	0.42
	SW	0.79	0.73	0.50	0.65	0.57	0.60	0.79	0.78	0.54	0.54	na	na	0.79	0.79	0.57	0.77	0.72	0.18	0.75	0.42
Selection2	FHLR	0.79	0.73	0.45	0.64	0.52	0.54	0.77	0.34	0.72	0.60	na	na	0.75	0.83	0.43	0.75	0.67	0.00	**0.79**	0.36
	SW	0.79	0.74	0.47	0.42	0.54	0.54	0.58	0.26	0.10	0.59	na	na	0.73	0.80	0.44	0.75	0.62	0.14	0.78	0.31
Sample		1992.02	1996.02	1995.10	1986.06	1992.02	1996.02	1986.06	1995.11	1986.06	1998.02	1986.02	na	1986.06	1996.02	1986.06	1995.10	1986.06	2001.05	2000.01	2001.05

1) The four panels "Sector data, 1 fac", "Sector data, 2 fac", "Subsector data, 1 fac", "Subsector data, 2 fac" refer, respectively, to the dataset of survey answers at the aggregate sector level summarized by one/two factors, and to the dataset of survey answers disaggregated by income quartiles summarized by one/two factors.
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. Higest values are in bold.

Table A2B: Performance of alternative CCIs for the sector CONSUMERS – Directional coherence with reference series

Consumer																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.51	0.48	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.48	0.42	0.50	0.59	0.51	0.46	0.53	0.57	0.50	0.51	0.47	na	0.55	0.57	0.47	0.56	0.48	0.50	0.55	0.47
	SW	0.53	0.43	0.47	0.58	0.50	0.44	0.51	0.55	0.48	0.53	0.48	na	0.53	0.54	0.48	0.61	0.48	0.48	0.58	0.45
Equal and	FHLR	0.48	0.43	0.53	0.57	0.50	0.46	0.53	0.53	0.50	0.52	0.50	na	0.54	0.61	0.47	0.65	0.53	0.44	0.51	0.47
Balance	SW	0.48	0.45	0.50	0.58	0.50	0.46	0.53	0.56	0.51	0.54	0.51	na	0.52	0.60	0.45	0.65	0.52	0.44	0.49	0.47
Selection1	FHLR	0.48	0.44	0.50	0.58	0.49	0.47	0.55	na	0.51	0.49	0.45	na	0.53	0.61	0.48	0.61	0.50	0.42	0.51	0.57
	SW	0.47	0.41	0.49	0.58	0.48	0.45	0.54	na	0.52	0.52	0.47	na	0.54	0.57	0.50	0.64	0.52	0.42	0.54	0.57
Selection2	FHLR	0.50	0.48	0.53	0.55	0.51	0.44	0.54	0.48	0.50	0.47	0.53	na	0.45	0.59	na	0.53	0.50	0.35	0.52	0.55
	SW	0.50	0.46	0.48	0.53	0.53	0.43	0.52	0.50	0.50	0.52	0.53	na	0.45	0.57	na	0.51	0.52	0.44	0.52	0.55
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.50	0.47	0.50	0.58	0.52	0.44	0.55	0.57	0.52	0.53	0.47	na	0.52	0.56	0.45	0.57	0.47	0.46	0.55	0.49
	SW	0.52	0.46	0.50	0.57	0.50	0.44	0.56	0.54	0.47	0.51	0.47	na	0.50	0.57	0.46	0.61	0.48	0.48	0.58	0.47
Equal and	FHLR	0.48	0.43	0.51	0.58	0.52	0.44	0.54	0.53	0.51	0.46	0.50	na	0.52	0.57	0.43	0.59	0.55	0.44	0.51	0.47
Balance	SW	0.48	0.44	0.50	0.58	0.50	0.45	0.53	0.46	0.51	0.51	0.51	na	0.54	0.55	0.45	0.64	0.52	0.48	0.52	0.47
Selection1	FHLR	0.48	0.43	0.50	0.56	0.47	0.47	0.53	na	0.50	0.51	0.46	na	0.51	0.58	0.49	0.60	0.51	0.44	0.54	0.57
	SW	0.45	0.43	0.50	0.55	0.48	0.46	0.53	na	0.51	0.54	0.46	na	0.52	0.59	0.50	0.56	0.50	0.44	0.57	0.57
Selection2	FHLR	0.50	0.42	0.45	0.51	0.52	0.43	0.51	0.54	0.51	0.46	0.51	na	0.46	0.58	na	0.53	0.51	0.46	0.49	0.53
	SW	0.51	0.44	0.51	0.52	0.53	0.44	0.53	0.50	0.49	0.47	0.50	na	0.46	0.59	na	0.55	0.51	0.48	0.51	0.51
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	0.52	0.46	0.50	0.55	0.50	0.48	0.55	0.53	0.52	0.48	na	na	0.53	0.55	0.48	0.62	0.54	0.40	0.60	0.43
	SW	0.50	0.50	0.49	0.55	0.47	0.46	0.56	0.53	0.52	0.52	na	na	0.53	0.58	0.50	0.63	0.52	0.46	0.60	0.43
Selection1	FHLR	0.52	0.46	0.50	0.58	0.50	0.46	0.55	0.53	0.51	0.45	na	na	0.52	0.57	0.47	0.60	0.51	0.38	0.60	0.55
	SW	0.50	0.50	0.52	0.57	0.52	0.47	0.56	0.51	0.50	0.49	na	na	0.53	0.58	0.44	0.60	0.49	0.42	0.62	0.51
Selection2	FHLR	0.50	0.47	0.53	0.56	0.50	0.43	0.54	0.52	0.52	0.45	na	na	0.56	0.57	0.51	0.59	0.52	0.46	0.57	0.51
	SW	0.53	0.44	0.50	0.54	0.48	0.44	0.54	0.46	0.52	0.47	na	na	0.54	0.57	0.52	0.59	0.54	0.38	0.58	0.51
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	0.52	0.46	0.50	0.57	0.48	0.47	0.53	0.54	0.52	0.51	na	na	0.52	0.56	0.48	0.62	0.53	0.37	0.62	0.43
	SW	0.48	0.49	0.49	0.58	0.47	0.46	0.54	0.54	0.50	0.51	na	na	0.52	0.55	0.49	0.62	0.53	0.40	0.57	0.45
Selection1	FHLR	0.52	0.46	0.50	0.59	0.52	0.46	0.54	0.53	0.51	0.44	na	na	0.53	0.58	0.46	0.59	0.51	0.42	0.62	0.55
	SW	0.51	0.53	0.49	0.57	0.53	0.47	0.57	0.51	0.47	0.48	na	na	0.55	0.58	0.45	0.59	0.50	0.50	0.60	0.51
Selection2	FHLR	0.50	0.47	0.52	0.56	0.49	0.43	0.55	0.51	0.52	0.44	na	na	0.54	0.57	0.52	0.59	0.53	0.42	0.55	0.51
	SW	0.50	0.49	0.51	0.56	0.52	0.45	0.50	0.58	0.49	0.51	na	na	0.52	0.56	0.50	0.61	0.54	0.44	0.63	0.47
Sample		1992.02	1996.02	1995.10	1986.06	1992.02	1996.02	1986.06	1995.11	1986.06	1998.02	1986.02	na	1986.06	1996.02	1986.06	1995.10	1986.06	2001.05	2000.01	2001.05

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 A2C: Performance of alternative CCIs for the sector CONSUMERS – Turning point coherence with reference series

Consumer																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.17	-0.25	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.08	0.00	0.00	0.24	0.19	-0.21	0.06	-0.07	0.06	0.00	-0.09	na	0.02	0.00	0.11	0.24	-0.10	0.00	0.33	0.00
	SW	0.08	-0.11	0.00	0.17	0.08	-0.21	0.06	0.13	0.04	-0.05	0.08	na	0.12	0.17	0.13	0.10	-0.06	0.00	0.33	0.00
Equal and	FHLR	0.08	0.00	0.00	0.17	0.11	-0.24	0.03	-0.03	-0.02	0.00	0.00	na	-0.05	0.00	0.03	0.14	-0.01	0.00	0.33	0.00
Balance	SW	0.08	-0.03	0.00	0.37	0.11	-0.12	0.03	0.20	-0.01	-0.12	0.02	na	-0.05	0.03	-0.01	0.14	-0.04	0.00	0.33	0.00
Selection1	FHLR	0.08	0.00	0.00	0.13	0.06	-0.12	0.05	na	-0.04	0.00	-0.02	na	-0.05	0.00	-0.06	0.24	0.01	0.00	0.33	0.00
	SW	0.10	0.00	0.00	0.35	0.06	-0.10	0.05	na	0.00	0.00	0.10	na	-0.05	0.03	0.21	0.24	-0.07	0.00	0.33	0.00
Selection2	FHLR	0.08	0.00	0.00	0.23	0.11	-0.10	0.01	-0.10	-0.04	0.00	0.19	na	0.05	0.00	na	0.02	0.00	0.00	0.33	0.00
	SW	0.07	0.03	-0.07	0.15	0.11	-0.10	0.01	0.00	0.06	-0.07	0.04	na	0.05	0.00	na	0.05	-0.03	0.00	0.25	0.00
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.07	0.00	0.00	0.24	0.19	-0.14	0.08	0.17	-0.03	-0.02	0.08	na	0.08	0.00	0.15	0.24	-0.10	0.00	0.33	0.00
	SW	0.07	0.06	0.00	0.05	0.08	-0.19	0.08	0.17	0.04	-0.19	0.08	na	0.03	0.00	0.11	0.10	-0.06	0.00	0.33	0.00
Equal and	FHLR	0.08	0.00	0.00	0.35	0.11	-0.21	0.04	0.17	-0.01	-0.07	-0.03	na	-0.02	-0.14	0.01	0.19	-0.03	0.00	0.33	0.00
Balance	SW	0.08	-0.03	0.00	0.30	0.11	-0.10	0.03	0.27	-0.02	-0.07	-0.03	na	-0.05	-0.14	-0.04	0.05	-0.04	0.00	0.33	0.00
Selection1	FHLR	0.08	0.06	0.00	0.31	0.05	-0.10	0.04	na	-0.02	0.00	0.03	na	0.17	-0.11	0.19	0.24	-0.08	0.00	0.33	0.00
	SW	0.08	-0.03	0.00	0.40	0.06	-0.10	0.05	na	-0.01	0.00	0.10	na	0.15	-0.11	0.21	0.19	0.08	0.00	0.33	0.00
Selection2	FHLR	0.13	0.00	0.07	0.15	0.11	-0.10	0.01	0.10	0.00	-0.07	0.13	na	0.15	0.00	na	0.10	-0.03	0.00	0.25	0.00
	SW	0.07	0.03	0.07	0.15	0.11	-0.10	0.01	0.10	0.06	-0.07	0.12	na	0.15	0.00	na	0.10	-0.03	0.00	0.25	0.00
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	0.04	0.00	0.00	0.00	0.20	-0.21	0.01	-0.10	-0.01	0.14	na	na	0.05	0.00	-0.21	0.19	0.03	0.00	0.25	0.00
	SW	0.04	0.03	0.00	0.07	0.13	-0.21	0.01	0.13	-0.02	-0.12	na	na	-0.02	0.00	-0.14	0.29	0.11	0.00	0.25	0.00
Selection1	FHLR	0.04	0.00	-0.05	0.08	0.20	-0.21	0.01	0.37	0.00	0.14	na	na	0.05	0.00	-0.01	0.19	0.04	0.00	0.25	0.00
	SW	0.06	0.03	0.00	0.06	0.13	-0.10	0.01	0.37	0.00	0.14	na	na	-0.02	0.00	-0.04	0.07	0.17	0.00	0.25	0.00
Selection2	FHLR	0.06	0.00	0.00	-0.08	0.20	-0.24	0.05	0.17	-0.06	0.14	na	na	0.05	0.14	0.13	0.07	0.01	0.00	0.25	0.00
	SW	0.06	0.00	0.00	0.05	0.13	-0.24	0.05	0.17	-0.02	0.14	na	na	0.05	0.03	0.17	0.17	-0.08	0.00	0.25	0.00
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	0.04	0.00	0.00	0.13	0.13	-0.21	0.00	-0.10	-0.01	0.14	na	na	-0.02	0.00	-0.11	0.19	0.04	0.00	0.25	0.00
	SW	0.03	0.03	0.00	0.33	0.13	-0.19	0.01	0.00	0.09	-0.10	na	na	0.08	0.00	0.14	0.24	0.07	0.00	0.25	0.00
Selection1	FHLR	0.04	0.00	0.00	0.10	0.13	-0.21	0.00	0.37	0.00	0.14	na	na	0.05	0.00	-0.01	0.19	0.01	0.00	0.25	0.00
	SW	0.06	0.03	0.00	-0.01	-0.12	-0.10	0.01	0.37	-0.01	0.14	na	na	0.00	0.00	-0.01	0.07	0.18	0.08	0.25	0.00
Selection2	FHLR	0.06	0.00	-0.07	0.04	0.20	-0.24	0.05	0.17	0.00	0.14	na	na	0.05	0.14	0.01	0.17	0.03	0.00	0.25	0.00
	SW	0.11	0.00	0.10	0.18	0.04	-0.24	0.08	0.40	0.12	0.14	na	na	0.05	0.00	0.17	0.17	-0.04	0.00	0.25	0.00
Sample		1992.02	1996.02	1995.10	1986.06	1992.02	1996.02	1986.06	1995.11	1986.06	1998.02	1986.02	na	1986.06	1996.02	1986.06	1995.10	1986.06	2001.05	2000.01	2001.05

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 A3A: Performance of alternative CCIs for the sector SERVICES – Correlation with reference series

Services																					
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.85	0.90	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.89	0.92	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
	SW	**0.89**	0.92	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	FHLR	0.87	0.90	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
	SW	0.88	0.90	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	FHLR	0.87	0.90	**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
	SW	0.88	0.90	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	FHLR	0.87	0.90	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
	SW	0.88	0.90	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.89	**0.92**	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
	SW	0.89	0.92	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	FHLR	0.27	0.41	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
	SW	0.30	0.40	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	FHLR	0.27	0.41	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
	SW	0.30	0.40	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	FHLR	0.27	0.41	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
	SW	0.30	0.40	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selection1	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selection2	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selection1	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selection2	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Sample		1997.01	1997.01	1997.02	1995.01	2001.02	na	1996.10	1996.10	1988.01	na	1998.01	na	1997.01	1997.06	2000.04	1996.04	1997.01	2002.05	2002.02	na

1) The four panels "Sector data, 1 fac", "Sector data, 2 fac", "Subsector data, 1 fac", "Subsector data, 2 fac" refer, respectively, to the dataset of survey answers at the aggregate sector level summarized by one/two factors, and to the dataset of survey answers disaggregated at the branch level summarized by one/two factors.
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. Higest values are in bold.

Table A3B: Performance of alternative CCIs for the sector SERVICES – Directional coherence with reference series

Services																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.64	0.69	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.59	0.65	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
	SW	0.64	0.66	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	FHLR	0.63	0.63	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	SW	0.65	0.67	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	FHLR	0.63	0.63	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
	SW	0.65	0.67	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	FHLR	0.63	0.63	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
	SW	0.65	0.67	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.64	0.69	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
	SW	0.64	0.66	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	FHLR	0.49	0.49	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	SW	0.52	0.48	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	FHLR	0.49	0.49	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
	SW	0.52	0.48	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	FHLR	0.49	0.49	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
	SW	0.52	0.48	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selection1	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selection2	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selection1	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selection2	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Sample		1997.01	1997.01	1997.02	1995.01	2001.02	na	1996.10	1996.10	1988.01	na	1998.01	na	1997.01	1997.06	2000.04	1996.04	1997.01	2002.05	2002.02	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 A3C: Performance of alternative CCIs for the sector SERVICES – Turning point coherence with reference series

Services																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.03	-0.27	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.07	0.17	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
	SW	0.17	0.17	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	FHLR	0.17	0.17	-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	SW	0.17	0.13	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	FHLR	0.17	0.17	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
	SW	0.17	0.13	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	FHLR	0.17	0.17	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
	SW	0.17	0.13	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.17	0.17	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
	SW	0.17	0.17	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	FHLR	-0.13	0.03	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	SW	-0.13	0.03	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	FHLR	-0.13	0.03	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
	SW	-0.13	0.03	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	FHLR	-0.13	0.03	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
	SW	-0.13	0.03	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selection1	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selection2	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selection1	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Selection2	FHLR	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	SW	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Sample		1997.01	1997.01	1997.02	1995.01	2001.02	na	1996.10	1996.10	1988.01	na	1998.01	na	1997.01	1997.06	2000.04	1996.04	1997.01	2002.05	2002.02	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 A4A: Performance of alternative CCIs for the sector BUILDING – Correlation with reference series

Building																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.34	0.24	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.38	0.32	0.08	0.26	0.79	na	0.72	0.63	0.53	0.25	0.31	0.45	0.67	0.89	0.40	0.75	0.12	0.69	0.20	0.88
	SW	0.37	0.33	0.08	0.25	0.79	na	0.72	0.59	0.54	0.21	0.32	0.48	0.65	0.91	0.42	0.78	0.13	0.66	0.16	0.88
Equal and Balance	FHLR	0.42	0.34	0.07	0.20	0.85	na	0.73	0.69	0.47	0.23	0.29	0.52	0.60	0.93	0.35	0.83	**0.14**	0.66	0.25	0.89
	SW	0.45	0.38	0.07	0.25	0.83	na	0.72	0.66	0.45	0.24	0.28	0.55	0.58	0.93	0.30	0.85	0.10	0.63	0.22	0.89
Selection1	FHLR	0.49	na	na	na	**0.85**	na	0.72	0.71	0.53	na	na	0.57	0.67	0.93	na	0.83	na	**0.69**	na	0.89
	SW	0.52	na	na	na	0.84	na	0.72	0.70	0.54	na	na	0.60	0.65	0.93	na	0.85	na	0.68	na	0.89
Selection2	FHLR	0.42	0.41	na	0.21	0.85	na	0.49	na	na	na	na	0.53	0.31	**0.93**	0.40	0.79	na	0.34	na	0.88
	SW	0.45	0.41	na	0.24	0.84	na	0.52	na	na	na	na	0.56	0.54	0.93	0.33	0.82	na	0.36	na	0.88
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.38	0.34	0.09	0.28	0.78	na	0.71	0.57	0.54	0.25	0.32	0.48	0.66	0.91	0.43	0.78	0.13	0.69	0.18	0.88
	SW	0.37	0.33	0.08	0.27	0.78	na	0.72	0.58	0.54	0.21	0.32	0.48	0.67	0.91	0.42	0.79	0.13	0.69	0.17	0.88
Equal and Balance	FHLR	0.39	0.36	0.05	0.22	0.82	na	0.70	0.11	0.45	0.29	0.26	0.51	0.68	0.93	0.28	0.84	0.09	0.69	0.29	0.89
	SW	0.42	0.40	0.07	0.25	0.80	na	0.69	0.06	0.44	**0.32**	0.20	0.54	0.63	0.93	0.28	**0.85**	0.08	0.68	0.28	0.89
Selection1	FHLR	0.53	na	na	na	0.83	na	0.71	0.15	0.54	na	na	0.60	0.66	0.93	na	0.84	na	0.68	na	**0.90**
	SW	0.52	na	na	na	0.83	na	0.72	0.13	0.54	na	na	0.60	0.67	0.93	na	0.85	na	0.68	na	0.89
Selection2	FHLR	0.40	**0.42**	na	0.26	0.83	na	0.60	na	na	na	na	0.55	0.41	0.93	0.20	0.79	na	0.32	na	0.78
	SW	0.42	0.41	na	0.26	0.83	na	0.59	na	na	na	na	0.56	0.41	0.93	0.30	0.82	na	0.32	na	0.79
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	0.36	0.30	0.12	0.21	0.69	na	0.77	0.62	0.57	na	0.35	0.49	0.64	0.88	0.40	0.78	0.08	na	0.12	na
	SW	0.38	0.32	**0.13**	0.24	0.72	na	0.76	0.56	0.56	na	0.35	0.50	0.64	0.89	0.41	0.79	0.05	na	0.22	na
Selection1	FHLR	**0.57**	na	na	na	0.74	na	**0.77**	**0.73**	0.57	na	**0.49**	0.64	0.64	0.88	na	0.78	na	na	0.63	na
	SW	0.56	na	na	na	0.75	na	0.76	0.73	0.56	na	0.49	0.65	0.64	0.89	na	0.79	na	na	**0.64**	na
Selection2	FHLR	0.34	na	0.03	0.31	0.69	na	0.59	na	na	na	na	0.49	0.69	0.85	0.44	0.76	na	na	0.10	na
	SW	0.35	na	0.02	0.28	0.72	na	0.60	na	na	na	na	0.50	0.70	0.86	**0.45**	0.76	na	na	0.07	na
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	0.35	0.32	0.12	0.24	0.69	na	0.76	0.57	0.58	na	0.35	0.48	0.67	0.88	0.41	0.77	0.03	na	0.28	na
	SW	0.38	0.32	0.13	0.24	0.71	na	0.76	0.54	0.57	na	0.35	0.49	0.66	0.89	0.42	0.79	0.05	na	0.37	na
Selection1	FHLR	0.57	na	na	na	0.74	na	0.76	0.72	**0.58**	na	0.49	**0.66**	0.67	0.88	na	0.77	na	na	0.64	na
	SW	0.56	na	na	na	0.76	na	0.76	0.72	0.57	na	0.49	0.65	0.66	0.89	na	0.79	na	na	0.64	na
Selection2	FHLR	0.34	na	0.02	**0.31**	0.69	na	0.61	na	na	na	na	0.48	**0.70**	0.85	0.45	0.75	na	na	0.08	na
	SW	0.35	na	0.02	0.28	0.71	na	0.61	na	na	na	na	0.49	0.70	0.86	0.45	0.76	na	na	0.07	na
Sample		1991.01	1994.01	1997.01	1991.01	1985.01	na	1989.02	1996.03	1991.01	2001.02	1996.02	2001.01	1996.02	2001.01	1998.01	1996.02	1994.02	1998.01	2001.01	1998.02

1) The four panels "Sector data, 1 fac", "Sector data, 2 fac", "Subsector data, 1 fac", "Subsector data, 2 fac" refer, respectively, to the dataset of survey answers at the aggregate sector level summarized by one/two factors, and to the dataset of survey answers disaggregated at the branch level summarized by one/two factors.
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. Higest values are in bold.

Table A4B: Performance of alternative CCIs for the sector BUILDING – Directional coherence with reference series

Building																					
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.56	0.53	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.59	0.62	0.45	0.55	0.59	na	0.50	0.55	0.70	0.55	0.50	0.48	0.59	0.56	0.53	0.52	0.51	0.56	0.49	0.50
	SW	0.59	0.60	0.47	0.57	0.60	na	0.51	0.53	0.70	0.53	0.48	0.48	0.62	0.58	0.57	0.52	0.45	0.55	0.47	0.52
Equal and	FHLR	0.60	0.57	0.46	0.57	0.63	na	0.48	0.55	0.64	0.55	0.49	0.50	0.65	0.58	0.55	0.55	0.51	0.47	0.56	0.51
Balance	SW	0.62	0.60	0.48	0.54	0.62	na	0.51	0.52	0.63	0.55	0.49	0.48	0.67	0.54	0.54	0.54	0.46	0.47	0.56	0.50
Selection1	FHLR	0.58	na	na	na	0.63	na	0.50	0.54	0.70	na	na	0.57	0.59	0.58	na	0.55	na	0.48	na	0.53
	SW	0.59	na	na	na	0.62	na	0.51	0.52	0.70	na	na	0.57	0.62	0.54	na	0.54	na	0.51	na	0.49
Selection2	FHLR	0.62	0.55	na	0.52	0.63	na	0.48	na	na	na	na	0.48	0.44	0.58	0.55	0.53	na	0.56	na	0.50
	SW	0.63	0.55	na	0.53	0.62	na	0.50	na	na	na	na	0.48	0.42	0.54	0.52	0.56	na	0.54	na	0.53
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.61	0.62	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	0.51	0.49	0.51	0.49	0.50
	SW	0.60	0.60	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	0.53	0.45	0.53	0.46	0.52
Equal and	FHLR	0.63	0.60	0.45	0.56	0.60	na	0.54	0.58	0.64	0.55	0.49	0.48	0.60	0.56	0.53	0.54	0.51	0.52	0.54	0.52
Balance	SW	0.62	0.64	0.50	0.54	0.58	na	0.53	0.58	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	FHLR	0.63	na	na	na	0.62	na	0.50	0.55	0.69	na	na	0.59	0.59	0.56	na	0.54	na	0.49	na	0.48
	SW	0.59	na	na	na	0.61	na	0.50	0.54	0.70	na	na	0.57	0.61	0.54	na	0.60	na	0.51	na	0.49
Selection2	FHLR	0.60	0.59	na	0.54	0.62	na	0.55	na	na	na	na	0.48	0.56	0.56	0.53	0.55	na	0.55	na	0.51
	SW	0.61	0.59	na	0.52	0.61	na	0.53	na	na	na	na	0.48	0.56	0.54	0.51	0.55	na	0.55	na	0.47
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	0.58	0.57	0.57	0.55	0.59	na	0.51	0.57	0.69	na	0.50	0.45	0.62	0.56	0.52	0.57	0.48	na	0.44	na
	SW	0.58	0.60	0.55	0.52	0.61	na	0.50	0.54	0.69	na	0.48	0.48	0.63	0.60	0.55	0.56	0.50	na	0.39	na
Selection1	FHLR	0.56	na	na	na	0.62	na	0.51	0.58	0.69	na	0.48	0.53	0.62	0.56	na	0.57	na	na	0.54	na
	SW	0.56	na	na	na	0.63	na	0.50	0.57	0.69	na	0.48	0.55	0.63	0.60	na	0.56	na	na	0.53	na
Selection2	FHLR	0.58	na	0.47	0.56	0.59	na	0.50	na	na	na	na	0.45	0.58	0.56	0.59	0.57	na	na	0.42	na
	SW	0.56	na	0.47	0.57	0.61	na	0.55	na	na	na	na	0.48	0.57	0.58	0.54	0.54	na	na	0.42	na
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	0.57	0.57	0.57	0.55	0.59	na	0.50	0.54	0.69	na	0.50	0.45	0.61	0.56	0.52	0.54	0.46	na	0.44	na
	SW	0.58	0.60	0.54	0.52	0.60	na	0.50	0.53	0.69	na	0.49	0.47	0.63	0.60	0.55	0.55	0.50	na	0.40	na
Selection1	FHLR	0.56	na	na	na	0.60	na	0.50	0.58	0.69	na	0.47	0.59	0.61	0.56	na	0.54	na	na	0.53	na
	SW	0.56	na	na	na	0.62	na	0.50	0.59	0.69	na	0.48	0.55	0.63	0.60	na	0.55	na	na	0.53	na
Selection2	FHLR	0.56	na	0.48	0.56	0.59	na	0.55	na	na	na	na	0.45	0.56	0.58	0.54	0.56	na	na	0.42	na
	SW	0.56	na	0.47	0.57	0.60	na	0.54	na	na	na	na	0.47	0.55	0.58	0.54	0.54	na	na	0.42	na
Sample		1991.01	1994.01	1997.01	1991.01	1985.01	na	1989.02	1996.03	1991.01	2001.02	1996.02	2001.01	1996.02	2001.01	1998.01	1996.02	1994.02	1998.01	2001.01	1998.02

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 A4C: Performance of alternative CCIs for the sector BUILDING – Turning point coherence with reference series

Building																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		-0.02	-0.03	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	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.18	-0.06	-0.10	0.22	0.02	na	0.00	0.30	0.28	-0.22	0.06	0.13	0.03	0.23	-0.13	0.14	-0.07	0.03	-0.13	0.00
	SW	0.06	-0.04	-0.23	0.24	0.02	na	-0.07	0.10	0.27	-0.22	0.06	0.13	0.03	0.23	-0.13	0.19	-0.08	-0.17	0.03	0.00
Equal and	FHLR	0.27	0.20	-0.03	0.11	-0.03	na	0.00	-0.07	0.20	-0.22	0.08	0.40	0.17	0.50	-0.27	0.17	0.17	0.03	-0.13	-0.06
Balance	SW	0.29	0.22	-0.10	0.08	0.03	na	-0.03	0.13	-0.05	-0.22	0.15	0.40	0.17	0.50	-0.27	0.17	0.15	0.03	0.03	-0.06
Selection1	FHLR	0.06	na	na	na	0.01	na	0.00	0.00	0.28	na	na	0.50	0.03	0.50	na	0.17	na	0.03	na	-0.06
	SW	0.06	na	na	na	0.02	na	-0.07	0.00	0.27	na	na	0.50	0.03	0.50	na	0.17	na	0.03	na	-0.06
Selection2	FHLR	0.27	0.20	na	0.28	0.01	na	-0.04	na	na	na	na	0.40	-0.03	0.50	-0.30	0.14	na	-0.03	na	-0.22
	SW	0.29	0.20	na	0.36	0.02	na	-0.01	na	na	na	na	0.50	0.02	0.50	-0.30	0.19	na	-0.07	na	-0.28
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.21	-0.04	-0.10	0.22	0.02	na	-0.07	-0.17	0.25	-0.22	0.06	0.13	0.08	0.23	-0.13	0.14	-0.08	-0.10	0.03	0.00
	SW	0.21	-0.04	-0.23	0.22	0.02	na	-0.08	-0.17	0.27	-0.22	0.06	0.13	0.08	0.23	-0.13	0.19	-0.08	0.03	0.03	0.00
Equal and	FHLR	0.11	0.20	-0.10	0.04	0.09	na	0.08	0.13	0.17	-0.17	-0.23	0.40	0.17	0.50	-0.27	0.22	0.07	0.03	-0.27	-0.06
Balance	SW	0.26	0.07	-0.10	0.08	-0.07	na	0.06	0.13	-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	FHLR	0.15	na	na	na	0.02	na	-0.07	0.10	0.25	na	na	0.50	0.08	0.50	na	0.22	na	0.03	na	-0.22
	SW	0.06	na	na	na	0.01	na	-0.08	0.13	0.27	na	na	0.50	0.08	0.50	na	0.22	na	0.03	na	-0.06
Selection2	FHLR	0.27	-0.15	na	0.29	0.02	na	-0.07	na	na	na	na	0.40	0.00	0.50	-0.30	0.14	na	0.00	na	-0.22
	SW	0.27	0.20	na	0.21	0.01	na	-0.11	na	na	na	na	0.50	0.00	0.50	-0.30	0.14	na	0.00	na	-0.22
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	0.08	0.03	-0.13	0.15	0.00	na	-0.07	0.13	0.33	na	0.04	0.13	0.03	0.33	-0.13	0.25	0.03	na	-0.40	na
	SW	0.17	-0.12	-0.13	0.22	0.00	na	-0.07	-0.07	0.33	na	0.04	0.13	0.08	0.33	-0.13	0.22	0.15	na	-0.30	na
Selection1	FHLR	0.05	na	na	na	0.01	na	-0.07	0.20	0.33	na	-0.15	0.10	0.03	0.33	na	0.25	na	na	0.03	na
	SW	0.14	na	na	na	0.01	na	-0.07	0.33	0.33	na	-0.06	0.10	0.08	0.33	na	0.22	na	na	0.03	na
Selection2	FHLR	0.15	na	0.03	0.29	0.00	na	-0.04	na	na	na	na	0.13	0.03	0.33	-0.13	0.53	na	na	-0.37	na
	SW	0.15	na	-0.13	0.26	0.00	na	-0.04	na	na	na	na	0.13	0.03	0.17	-0.13	0.53	na	na	-0.37	na
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	0.00	-0.05	-0.13	0.15	0.00	na	-0.13	0.13	0.33	na	0.04	0.13	0.08	0.33	-0.13	0.25	0.12	na	-0.30	na
	SW	0.17	-0.12	-0.13	0.22	0.00	na	-0.07	0.13	0.33	na	0.13	0.13	0.08	0.33	-0.23	0.22	0.15	na	-0.47	na
Selection1	FHLR	0.05	na	na	na	0.01	na	-0.13	0.33	0.33	na	-0.15	0.10	0.08	0.33	na	0.25	na	na	0.03	na
	SW	0.14	na	na	na	0.01	na	-0.07	0.23	0.33	na	-0.06	0.10	0.08	0.33	na	0.22	na	na	0.03	na
Selection2	FHLR	0.08	na	-0.13	0.29	0.00	na	-0.04	na	na	na	na	0.13	0.03	0.33	-0.13	0.53	na	na	-0.37	na
	SW	0.15	na	-0.13	0.33	0.00	na	-0.04	na	na	na	na	0.13	0.03	0.17	-0.13	0.53	na	na	-0.37	na
Sample		1991.01	1994.01	1997.01	1991.01	1985.01	na	1989.02	1996.03	1991.01	2001.02	1996.02	2001.01	1996.02	2001.01	1998.01	1996.02	1994.02	1998.01	2001.01	1998.02

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 A5A: Performance of alternative CCIs for the sector RETAIL – Correlation with reference series

Retail																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.60	0.35	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	na	0.68
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.64	0.54	0.27	0.58	0.49	0.35	0.48	0.16	0.72	0.69	0.46	na	0.75	0.84	0.67	0.77	0.68	0.32	na	0.51
	SW	0.63	0.54	0.26	0.56	0.49	0.31	0.48	0.15	0.73	0.68	0.45	na	0.74	0.84	0.65	0.74	0.68	0.33	na	0.50
Equal and Balance	FHLR	0.39	0.45	0.30	0.39	0.53	0.34	0.52	0.20	0.75	0.81	0.35	na	0.74	0.85	0.71	0.74	0.72	0.36	na	0.63
	SW	0.29	0.31	0.33	0.41	0.53	0.32	0.52	0.17	0.75	0.80	0.37	na	0.73	0.85	0.69	0.68	0.72	**0.38**	na	0.64
Selection1	FHLR	0.66	0.61	0.55	0.64	0.57	0.31	0.58	na	0.76	0.80	na	na	0.76	0.85	0.69	0.77	0.76	na	na	0.69
	SW	0.67	0.62	0.55	0.63	0.58	0.07	0.58	na	0.77	0.80	na	na	0.76	0.85	0.69	0.76	0.76	na	na	0.70
Selection2	FHLR	0.66	0.56	na	0.51	0.51	0.30	0.28	0.20	0.76	**0.81**	0.17	na	0.72	**0.86**	0.69	na	0.67	0.27	na	0.62
	SW	0.67	0.59	na	0.52	0.52	0.36	0.29	0.19	**0.77**	0.80	0.25	na	0.60	0.85	0.66	na	0.65	0.27	na	0.64
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.68	0.54	0.35	0.62	0.54	0.05	0.46	0.18	0.75	0.73	0.39	na	0.72	0.80	0.67	0.77	0.72	0.35	na	0.45
	SW	0.68	0.56	0.28	0.62	0.56	0.04	0.49	0.17	0.75	0.75	0.37	na	0.69	0.79	0.64	0.77	0.72	0.36	na	0.47
Equal and Balance	FHLR	0.58	0.48	0.39	0.40	0.55	0.24	0.43	0.15	0.75	0.06	0.15	na	0.62	0.85	0.20	0.75	0.72	0.36	na	0.65
	SW	0.57	0.51	0.32	0.39	0.55	0.21	0.41	0.15	0.74	0.04	0.17	na	0.61	0.85	0.20	0.74	0.72	0.38	na	0.65
Selection1	FHLR	0.67	0.62	0.55	0.63	0.57	0.07	0.36	na	0.76	0.12	na	na	0.78	0.85	0.15	0.75	0.76	na	na	0.71
	SW	0.67	0.62	0.55	0.63	0.58	0.07	0.28	na	0.77	0.12	na	na	0.78	0.85	0.15	0.73	**0.77**	na	na	0.70
Selection2	FHLR	0.67	0.60	na	0.54	0.49	0.35	0.29	0.24	0.73	0.02	0.50	na	0.61	0.84	0.03	na	0.70	0.04	na	0.65
	SW	0.67	0.59	na	0.51	0.51	0.35	0.30	0.25	0.76	0.04	0.49	na	0.62	0.85	0.13	na	0.71	0.11	na	0.64
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	0.74	0.58	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	na	na	na	0.51
	SW	0.75	0.58	0.48	0.66	0.65	0.28	0.58	0.26	0.69	0.74	0.61	na	0.73	0.78	0.75	0.83	na	na	na	0.57
Selection1	FHLR	0.75	0.67	0.64	0.71	0.69	0.54	0.68	0.76	0.72	0.77	0.67	na	0.74	0.84	0.77	**0.87**	na	na	na	0.74
	SW	0.77	**0.70**	**0.67**	**0.72**	0.70	**0.55**	**0.68**	**0.77**	0.74	0.77	0.70	na	0.75	0.84	**0.79**	0.86	na	na	na	**0.74**
Selection2	FHLR	0.76	0.67	0.63	0.62	0.70	0.28	0.53	0.49	0.76	0.75	0.65	na	0.79	0.84	0.74	0.80	na	na	na	0.55
	SW	**0.77**	0.68	0.63	0.63	**0.71**	0.30	0.53	0.47	0.76	0.74	0.67	na	0.81	0.83	0.76	0.80	na	na	na	0.60
A		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	0.74	0.58	0.47	0.68	0.67	0.27	0.56	0.24	0.67	0.75	0.60	na	0.72	0.78	0.75	0.86	na	na	na	0.55
	SW	0.75	0.58	0.47	0.70	0.66	0.07	0.58	0.20	0.72	0.75	0.59	na	0.73	0.78	0.74	0.81	na	na	na	0.60
Selection1	FHLR	0.75	0.67	0.64	0.71	0.68	0.53	0.68	0.74	0.72	0.77	0.68	na	0.75	0.84	0.77	0.87	na	na	na	0.74
	SW	0.77	0.69	0.58	0.72	0.69	0.38	0.68	0.64	0.74	0.77	**0.74**	na	0.77	0.84	0.78	0.86	na	na	na	0.73
Selection2	FHLR	0.76	0.67	0.65	0.65	0.70	0.30	0.53	0.47	0.76	0.75	0.65	na	0.79	0.84	0.74	0.78	na	na	na	0.58
	SW	0.77	0.69	0.63	0.66	0.70	0.45	0.52	0.36	0.76	0.74	0.65	na	**0.83**	0.82	0.77	0.80	na	na	na	0.63
Sample		1992.02	1996.02	1996.01	1991.05	1992.02	1996.02	1996.04	1997.05	1990.11	1998.02	1990.01	na	1990.01	1996.02	1996.11	1996.10	1990.01	1996.02	na	1998.02

1) The four panels "Sector data, 1 fac", "Sector data, 2 fac", "Subsector data, 1 fac", "Subsector data, 2 fac" refer, respectively, to the dataset of survey answers at the aggregate sector level summarized by one/two factors, and to the dataset of survey answers disaggregated at the branch level summarized by one/two factors.
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. Higest values are in bold.

Table A5B: Performance of alternative CCIs for the sector RETAIL – Directional coherence with reference series

Retail																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.48	0.50	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	na	0.54
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.49	0.50	0.53	0.57	0.48	0.54	0.53	0.51	0.53	0.47	0.55	na	0.51	0.62	0.51	0.60	0.56	0.54	na	0.49
	SW	0.45	0.53	0.53	0.58	0.50	0.51	0.54	0.48	0.53	0.49	0.56	na	0.51	0.59	0.51	0.56	0.55	0.57	na	0.54
Equal and	FHLR	0.56	0.47	0.53	0.53	0.50	0.54	0.55	0.51	0.53	0.48	0.54	na	0.51	0.53	0.54	0.55	0.53	0.50	na	0.54
Balance	SW	0.53	0.52	0.53	0.53	0.52	0.52	0.54	0.49	0.53	0.47	0.55	na	0.52	0.53	0.52	0.55	0.57	0.50	na	0.55
Selection1	FHLR	0.47	0.48	0.52	0.52	0.45	0.43	0.57	na	0.55	0.52	na	na	0.51	0.54	0.52	0.60	0.60	na	na	0.55
	SW	0.48	0.48	0.52	0.52	0.47	0.48	0.56	na	0.52	0.52	na	na	0.54	0.52	0.50	0.59	0.59	na	na	0.60
Selection2	FHLR	0.47	0.49	na	0.59	0.50	0.52	0.48	0.48	0.52	0.47	0.55	na	0.51	0.57	0.51	na	0.56	0.49	na	0.57
	SW	0.48	0.51	na	0.58	0.50	0.46	0.48	0.52	0.54	0.47	0.54	na	0.48	0.57	0.50	na	0.55	0.50	na	0.55
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.42	0.44	0.55	0.55	0.48	0.47	0.55	0.49	0.56	0.48	0.54	na	0.54	0.60	0.51	0.60	0.54	0.53	na	0.54
	SW	0.44	0.44	0.48	0.52	0.49	0.47	0.55	0.50	0.57	0.51	0.53	na	0.54	0.61	0.56	0.62	0.53	0.56	na	0.55
Equal and	FHLR	0.50	0.50	0.53	0.53	0.52	0.48	0.53	0.48	0.53	0.56	0.53	na	0.55	0.57	0.50	0.56	0.55	0.50	na	0.54
Balance	SW	0.48	0.48	0.53	0.54	0.53	0.50	0.56	0.51	0.53	0.56	0.54	na	0.57	0.51	0.48	0.58	0.57	0.50	na	0.57
Selection1	FHLR	0.48	0.48	0.52	0.53	0.47	0.48	0.56	na	0.56	0.55	na	na	0.53	0.57	0.48	0.58	0.58	na	na	0.61
	SW	0.48	0.48	0.52	0.52	0.48	0.48	0.55	na	0.52	0.54	na	na	0.55	0.53	0.47	0.53	0.58	na	na	0.62
Selection2	FHLR	0.48	0.50	na	0.58	0.47	0.53	0.52	0.50	0.53	0.56	0.53	na	0.52	0.58	0.53	na	0.56	0.50	na	0.54
	SW	0.48	0.50	na	0.58	0.50	0.53	0.52	0.48	0.52	0.56	0.53	na	0.51	0.57	0.55	na	0.54	0.50	na	0.57
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	0.52	0.50	0.51	0.53	0.50	0.48	0.51	0.49	0.53	0.47	0.52	na	0.52	0.58	0.55	0.61	na	na	na	0.51
	SW	0.50	0.50	0.52	0.55	0.51	0.49	0.51	0.52	0.54	0.48	0.52	na	0.53	0.56	0.54	0.60	na	na	na	0.55
Selection1	FHLR	0.50	0.53	0.47	0.55	0.52	0.46	0.58	0.50	0.54	0.42	0.52	na	0.55	0.52	0.59	0.61	na	na	na	0.53
	SW	0.48	0.51	0.49	0.53	0.53	0.49	0.57	0.53	0.53	0.47	0.53	na	0.55	0.50	0.55	0.62	na	na	na	0.56
Selection2	FHLR	0.51	0.56	0.53	0.52	0.55	0.47	0.56	0.51	0.53	0.47	0.56	na	0.49	0.60	0.58	0.55	na	na	na	0.53
	SW	0.48	0.57	0.55	0.55	0.53	0.47	0.56	0.51	0.53	0.48	0.55	na	0.53	0.62	0.59	0.56	na	na	na	0.57
B		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	0.52	0.50	0.47	0.53	0.49	0.49	0.52	0.50	0.52	0.47	0.51	na	0.52	0.55	0.55	0.64	na	na	na	0.53
	SW	0.49	0.50	0.53	0.56	0.50	0.45	0.52	0.53	0.53	0.47	0.53	na	0.53	0.51	0.54	0.60	na	na	na	0.53
Selection1	FHLR	0.50	0.52	0.47	0.54	0.51	0.44	0.56	0.49	0.53	0.41	0.54	na	0.52	0.54	0.58	0.61	na	na	na	0.55
	SW	0.49	0.52	0.47	0.53	0.53	0.43	0.57	0.54	0.54	0.47	0.54	na	0.54	0.53	0.58	0.63	na	na	na	0.55
Selection2	FHLR	0.52	0.54	0.52	0.54	0.55	0.49	0.57	0.53	0.53	0.44	0.56	na	0.51	0.60	0.58	0.56	na	na	na	0.50
	SW	0.48	0.57	0.57	0.53	0.55	0.59	0.54	0.47	0.56	0.48	0.57	na	0.50	0.60	0.60	0.61	na	na	na	0.56
Sample		1992.02	1996.02	1996.01	1991.05	1992.02	1996.02	1996.04	1997.05	1990.11	1998.02	1990.01	na	1990.01	1996.02	1996.11	1996.10	1990.01	1996.02	na	1998.02

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 A5C: Performance of alternative CCIs for the sector RETAIL – Turning point coherence with reference series

Retail																				
		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Confidence		0.46	0.25	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	na	0.10
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 1 fac																					
Balance	FHLR	0.14	-0.06	-0.17	0.24	0.06	0.00	0.00	-0.20	-0.08	0.17	0.14	na	-0.20	-0.14	0.17	0.36	0.00	0.11	na	0.00
	SW	0.06	-0.06	-0.17	0.24	0.00	0.00	0.00	-0.20	-0.08	0.19	0.14	na	-0.12	-0.08	-0.06	0.31	0.05	0.08	na	0.00
Equal and Balance	FHLR	0.06	0.06	-0.14	0.38	-0.02	-0.17	-0.03	0.00	-0.04	-0.14	0.10	na	-0.20	-0.06	0.06	0.31	0.08	0.31	na	0.00
	SW	-0.10	0.03	-0.14	0.35	0.18	-0.17	-0.03	0.00	-0.04	-0.14	0.10	na	-0.28	-0.11	-0.06	0.31	0.10	0.22	na	0.00
Selection1	FHLR	0.18	-0.08	0.00	0.14	0.11	-0.02	0.14	na	-0.07	0.14	na	na	-0.20	0.00	0.00	0.31	0.12	na	na	0.00
	SW	0.24	-0.08	0.00	0.33	0.15	-0.10	0.14	na	-0.08	0.14	na	na	-0.13	-0.11	0.00	0.38	0.15	na	na	0.33
Selection2	FHLR	0.18	-0.06	na	0.32	-0.06	0.26	0.03	-0.20	-0.18	-0.14	0.06	na	-0.15	-0.11	0.00	na	0.00	0.17	na	0.00
	SW	0.24	0.03	na	0.38	-0.06	-0.05	0.03	0.00	-0.18	-0.14	-0.01	na	0.00	0.17	0.00	na	0.15	0.17	na	0.00
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Sector data, 2 fac																					
Balance	FHLR	0.22	-0.03	-0.05	0.17	0.06	0.17	0.00	-0.03	-0.06	0.19	0.03	na	-0.02	-0.17	0.00	0.29	0.08	0.28	na	0.00
	SW	0.22	-0.03	-0.21	0.17	0.08	0.14	0.00	-0.03	0.01	0.19	-0.07	na	-0.02	-0.08	-0.33	0.36	0.05	0.28	na	0.00
Equal and Balance	FHLR	0.18	0.31	0.12	0.41	-0.10	-0.17	0.03	0.00	-0.01	0.07	0.07	na	0.00	-0.06	0.28	0.31	0.08	0.31	na	0.08
	SW	0.21	0.22	-0.14	0.35	0.10	-0.14	-0.03	0.13	-0.04	0.21	0.07	na	0.00	-0.11	-0.44	0.38	0.10	0.22	na	0.08
Selection1	FHLR	0.24	-0.08	0.00	0.35	-0.01	-0.10	0.11	na	-0.13	-0.02	na	na	0.05	-0.11	0.33	0.38	0.20	na	na	0.33
	SW	0.24	-0.08	0.00	0.32	0.19	-0.10	0.14	na	-0.08	-0.02	na	na	0.00	-0.11	0.67	0.40	0.20	na	na	0.33
Selection2	FHLR	0.24	0.03	na	0.47	-0.06	-0.12	-0.03	0.00	-0.13	0.12	-0.06	na	0.03	-0.11	0.00	na	0.17	-0.06	na	0.25
	SW	0.24	0.03	na	0.38	-0.01	-0.12	-0.03	0.00	-0.18	0.19	-0.06	na	0.03	-0.11	0.00	na	0.20	-0.06	na	0.00
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data, 1 fac																					
Balance	FHLR	0.19	-0.19	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	na	na	na	0.00
	SW	0.25	0.00	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	na	na	na	0.00
Selection1	FHLR	0.06	0.08	-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	na	na	na	-0.13
	SW	0.11	0.08	-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	na	na	na	-0.13
Selection2	FHLR	0.25	0.06	-0.07	-0.06	0.01	0.02	-0.06	-0.40	-0.03	0.00	-0.03	na	-0.02	0.22	0.56	0.19	na	na	na	0.00
	SW	0.25	0.11	-0.07	0.05	-0.05	0.17	-0.06	-0.20	-0.11	0.00	0.06	na	-0.08	0.19	0.61	0.31	na	na	na	0.00
C		EA	EU	AT	BE	DE	EL	ES	FI	FR	IE	IT	LU	NL	PT	DK	SE	UK	CZ	HU	PL
Subector data,2 fac																					
Balance	FHLR	0.19	-0.19	-0.12	0.05	-0.02	-0.07	0.03	0.00	0.03	0.00	0.08	na	-0.15	-0.36	0.28	0.38	na	na	na	0.00
	SW	0.25	0.00	-0.12	0.05	-0.02	-0.12	0.00	0.00	0.03	0.00	0.04	na	-0.15	-0.11	0.28	0.24	na	na	na	0.00
Selection1	FHLR	0.06	0.08	-0.10	0.05	0.05	-0.05	0.17	-0.07	0.04	0.00	-0.10	na	-0.18	-0.11	0.61	0.38	na	na	na	-0.13
	SW	0.11	0.08	-0.24	0.03	-0.12	-0.10	0.17	0.00	0.04	0.00	-0.18	na	-0.10	0.08	0.61	0.38	na	na	na	-0.13
Selection2	FHLR	0.25	0.06	0.00	-0.06	0.01	0.17	-0.06	0.00	-0.03	0.00	-0.03	na	-0.18	0.22	0.50	0.19	na	na	na	0.00
	SW	0.25	0.11	0.05	0.05	-0.07	0.17	-0.06	0.00	-0.10	0.00	-0.08	na	-0.03	0.19	0.44	0.31	na	na	na	0.00
Sample		1992.02	1996.02	1996.01	1991.05	1992.02	1996.02	1996.04	1997.05	1990.11	1998.02	1990.01	na	1990.01	1996.02	1996.11	1996.10	1990.01	1996.02	na	1998.02

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.