A real-time recession indicator for the Euro area

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Abstract :

In this paper, we propose a new coincident monthly indicator to detect in real-time the start and the end of an economic recession phase for the Euro area. In this respect, we use the methodology proposed in Anas and Ferrara (2002, 2004) as regards the recession indicator for the US, based on Markov-Switching processes popularized in economics by Hamilton (1989). By using a set of four monthly time series, we show that this start-end recession indicator (SERI) is able to reproduce all the recession phases experienced by the Euro area since 1970. Concerning the last low phase of the growth cycle in the Euro area, started in 2001, empirical results show that the Euro area experienced a « quasi-recession » phase, located between the end of the 2001 year and the beginning of 2002, without a global recession. This is due to a lack of diffusion of this phenomena among the main Euro-zone countries, though it was synchronized. Since January 2006, this new indicator is released each month on the COE's web site (www.coe.ccip.fr, section "*Indicateurs*").

Keywords :

Recession, real-time, probabilistic indicator, Euro area.

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Introduction

The aim of this study is to propose a new monthly coincident indicator able to detect in real-time the recession phases in the Euro area, that is the peaks and troughs of the business cycle. In this respect, we need first the reference dates for the business cycle in the Euro area. While there is a reference chronology for the US business cycle, maintained by the Dating Committee of the NBER, there is no such chronology as regards the Euro-zone economy. However, several studies have proposed a chronology, for both growth and business cycles, and we refer to the paper of Anas, Billio, Ferrara and LoDuca, 2003, for a detailed review of the literature on this topic. In this latter paper, the authors propose a chronology for the business cycle (see Table 1) that seems to be coherent with most of the empirical works (see for instance, CEPR, 2003, or Mönch and Uhlig, 2005, for a recent analysis on the Euro area business cycle). It seems clear that the Euro-zone has experienced four economic recessions since 1970, namely the first oil shock (Q2 1974 – Q1 1975, 3 quarters), the second oil shock double-dip (Q1 1980 – Q4 1980, 3 quarters, and Q4 1981 – Q4 1982, 4 quarters) and the 1992-93 recession (Q1 1992 – Q1 1993, 4 quarters).

Table 1 : Business cycle chronology for the aggregated Euro-zone GDP (source Anas et *al.*, 2003)

Dates	Peak B	Trough C	Duration in quarters
1974-75	Q2 1974	Q1 1975	3
1980	Q1 1980	Q4 1980	3
1982	Q4 1981	Q4 1982	4
1992-93	Q1 1992	Q1 1993	4

Recently, the question of the occurrence of a recession during the period 2001-2003 in the Euro area arose in the economic debate. Starting from this reference dating chronology, we propose a coincident indicator for the Euro area, based on the methodology developed by Anas and Ferrara (2002, 2004). This indicator is calibrated on the period 1970–2000 and used in pseudo-real-time through a dynamical approach, from January 2001 to December 2005. We call this approach “pseudo-real-time” because we do not use the true vintage data for this experiment, but the data available in December 2005. We refer to Chauvet and Piger (2003) for a discussion on true real-time analysis.

Beyond the quantitative value of the recession indicator, we try to provide a decision rule to help the practitioner to decide between the two alternatives at each date *t* :

"H0 : Recession at date t" *versus* "H1 : no recession at date t"

Therefore, two underlying non-symmetric risks appear, namely:

(i) type I risk of error = risk to wrongly announce a recession,

(ii) type II risk of error = risk to wrongly miss a recession.

Both risks are also non-symmetric in terms of communication. To our opinion, it seems preferable to minimize the type I risk of error with this new start-end recession indicator. Indeed, we are in favor of announcing a recession with a lag rather than to announce a wrong recession in advance. We point out here the classical trade-off between timeliness and reliability of economic indicators, well known by practitioners.

The first part of this working paper presents the methodology and the second part deals with the results on the period 1970 – 2000, then since 2001.

I. Methodology

1) The Markov-Switching model

The Markov-Switching (MS) model has been popularized in economics by Hamilton (1989) in order to take into account a certain type of non-stationarity inherent to some macroeconomic or financial time series, such as frequent shifts in mean, that cannot be caught by classical linear models. The observed time series is assumed to be approximated by an autoregressive process, whose parameters evolve through time. Moreover, their evolution is ruled by an unobservable variable which in turn follows a first order *K*-state Markov chain, independent of past observations on the observed series. A huge amount of empirical papers dealing with applications of MS models have been proposed in the literature, as well as several extensions of the models (for instance with time-varying transition probabilities). We refer to the paper of Clements and Krolzig (2003) for a review. Krolzig (1997) proposes a multivariate extension of this model by developing a MS-VAR process, see also Ferrara (2003) for an application to the US economy.

The process $(Y_t)_t$ is said to be a MS(K)-AR(p) process if it verifies the following equation:

$$Y_t - \mu(S_t) = \sum_{j=1}^{p} \phi_j(S_t)(Y_{t-j} - \mu(S_{t-j})) + \varepsilon_t \qquad (1)$$

where $(\varepsilon_t)_t$ is a Gaussian white noise process with finite variance, where ϕ_j are the AR coefficients, for $j=1,\ldots,p$, and where the unobservable discrete variable $(S_t)_t$ is supposed to represent the current state of the economy (for all t, $S_t \in \{1,\ldots, K\}$, K being the number of regimes). This previous form is known as the mean-adjusted form of the MS(K)-AR(p) model. Moreover, the whole specification of the model needs the specification of $(S_t)_t$ as a K-state first order Markov chain. That is, the value of the time series S_t, for all t, depends only on the last value S_{t-1}, *i.e.,* for $i,j=1,\ldots,K$,:

$$P(S_t=j \mid S_{t-1}=i, S_{t-2}=i, \ldots)=P(S_t=j \mid S_{t-1}=i)=p_{ij}. \qquad (2)$$

The probabilities $(p_{ij})_{i,j=1,\ldots,K}$ are called *transition probabilities* of moving from one state to the other. Obviously, we get :

$$p_{11}+ p_{12}+ \ldots + p_{1K} =1. \qquad (3)$$

For each regime, p_{ii} is a measure of the persistence of the regime i. For further details, we refer to the monography Hamilton (1994).

Regarding the parameter estimation issue from an observed trajectory $(y_1, \ldots, y_T)$, the maximum likelihood method is used in connection with the Expectation-Maximization (EM) algorithm, which has been proved to be more robust to the starting parameters values. As a by-product of the estimation step, we get the estimated conditional probabilities of being in the state i, for $i=1,\ldots,K$, $P(S_t = i \,/\, y_{t-1},\ldots,y_1, \theta)$, referred to as the *filtered probability*, and $P(S_t = i \,/\, y_T,\ldots,y_1, \theta)$, referred to as the *smoothed probability*. Both probabilities may be used, respectively, to detect in real time and to date *ex post* the turning points of the economic cycles.

2) Choice of the series

As our aim is to construct an indicator on a monthly basis, we focus only on monthly time series, which limits strongly our research. Indeed, the number of monthly series available for the Euro area is very weak in comparison with the US. For instance, series of employment or capacity utilization rate are only available on a quarterly basis. Another difficulty inherent to the Euro area, is that most of the potentially interesting data, contained for example in the Eurostat's EuroInd data base, only start in 1991, just after the German reunification. Yet, since 1991, the Euro area experienced only a single recession, which implies that the statistical inference is going to be a hard job. The learning set is thus considerably narrow in comparison with the one for the US. However, it is noteworthy that Eurostat provides a more and more reliable and timeliness information system for the Euro area, tending to its US benchmark

Among the series of interest, two of them seem to be particularly well appropriated: the manufacturing industrial production index (IPI) and the unemployment rate. Indeed, the study carried out by Anas, Billio, Ferrara et LoDuca (2003) proved empirically a full equivalence between industrial and global recessions, for the Euro area on the period 1970-2000. Thus, the information conveyed by the manufacturing IPI appears to be useful to detect recessions in real-time. Moreover, series related to the employment have been proved to be very useful to characterize global recessions. Especially, both series are used by the Dating Committee of the NBER to date the US recessions (see NBER, 2003) and are used in other papers aiming either at dating the business cycle (see for example Anas *et al.*, 2003, or Mönch and Uhlig, 2005) or at detecting it in real-time (see for example Anas and Ferrara, 2002, 2004).
The official Euro area manufacturing IPI starts in 1991, while the unemployment rate begins only in January 1982. Thus, we use a IPI series provided by Eurostat and we back-calculated rigorously the unemployment series since 1971 by using unemployment rates in France, Germany and Italy through a COE internal procedure.

We consider also the monthly series of new passenger car registrations in the Euro area released each middle of month by the association of European automobile manufacturers (ACEA, see the web site www.acea.be for further details). This series is of great interest for short-term economic analysis because it reflects, on a monthly basis, information on manufacturing goods consumption, only available on a quarterly frequency through the official quarterly accounts. Therefore, economists and market analysts follow carefully the evolution of this series to have a first monthly opinion on household consumption in the Euro area. This series is also integrated in large macroeconomic models in order to predict the Euro area growth (see, for instance, the European Commission DG-EcFin model developed by Grassmann and Keereman, 2001). However, it is well known among practitioners that, due to its high volatility, the extraction of a clear economic signal from this series is a not an obvious task.

Lastly, in front of the lack of historical times series for the Euro area, we decide also to consider opinion surveys released by the DG-EcFin of the European Commission. Since 1985, several opinion surveys are harmonized and aggregated at the euro-zone level by the Commission as regards industry, services, consumers, retail sales, construction and investment (see section *Indicators* on the DG-EcFin web site[1]). For instance, Bengoechea and Perez-Quiros (2004) propose to use the information conveyed by the European Commission industrial confidence indicator, computed by averaging three items of the monthly industrial survey, to identify recessions in the Euro area. Otherwise, the French statistical institute, INSEE, provides opinion surveys the for whole Euro area. After a scan of different opinion surveys series, we finally retain the confidence consumers indicator released by the INSEE, starting in 1985 and back-calculated through 1973 with a COE internal procedure using country-specific series.

Remark :

We considered the information conveyed by many series to construct our indicator, specifically opinions surveys in diverse sectors. We also considered the recession indicator for the US developped by the COE (Anas and Ferrara, 2002, 2004), to add into our Euro area indicator. It appears that this indicator is a good leading indicator on the period 1970-2000. Unfortunately, its lead is not stable over time and we do not have enough observations to propose a model for the dynamic of the lead.

Concluding results :

Finally, we retain the four following components for the Euro area start-end recession indicator :

- **Manufacturing IPI,** variations over 12 months, (available since 1990, source : Eurostat, EuroInd, back-calculated by COE through 1971).
- **Unemployment rate** inverted, variations over 3 months (available since January 1982, source Eurostat, EuroInd, back-calculated by COE through1971).
- **Consumers confidence Indicator,** differences over 9 months (available since 1985, source INSEE, back-calculated by COE through 1973).

- **New passenger cars registrations,** variations over 12 months and smoothed by non-centered 6-months moving-average (available since January 1972, source : ACEA, seasonally adjusted at COE with Census X11).

3) Information aggregation

We aggregate the filtered probabilities stemming from the Markov-Switching model by using the methodology developed by COE (see Anas et Ferrara, 2002, 2004). This approach allows to give more or less weight to a component according to the risks of false and missed signals. This aggregation is done since October 1973, the highest starting date of the four components. We note respectively α^k and β^k the number of false recession signals (type I error) and number of missed recessions (type II error) provided by the variable $(X^k_t)_t$, for $k=1,\ldots,N$, N being the number of components (here $N=4$). Thus, if a given component describes perfectly the four Euro area recessions since 1970, the number of signals emitted by the component is four. To estimate empirically both risks, we count the number of false signals and missed signals emitted by the variable, by comparison with the number of referenced recessions. Thus, the weight of each component, $(X^k_t)_t$, for $k=1,\ldots,N$, is given by:

$$\omega_k = \frac{4}{4+\alpha_k+\beta_k}$$

We normalize those weights by taking :

$$\varpi_k = \frac{\omega_k}{\sum_{k=1}^{N}\omega_k}$$

Thus, the start-end recession indicator is given by, for each date t :

$$IESR_t = \sum_{k=1}^{N}\varpi_k P_t^k$$

where P_t^k is the filtered probability of being in recession provided by the MS model applied to the component $(X^k_t)_t$. Empirical weights are estimated in the next section.

[1] http://europa.eu.int/comm/economy_finance/indicator_en.htm

4) Publication delays

The availability in real-time for the data is the following:

- Manufacturing IPI: around 47 days after the end of the reference month
- Unemployment rate: around 34 days after the end of the reference month
- Consumers confidence: last trading day after of the reference month
- New cars registrations: around 13 days after the end of the reference month

Thus, the SERI Euro area for, let's say, September 2004 should have been released the 17th of November 2004. To reduce the diffusion delays, we first calibrate an estimation of the annual variation of the IPI starting from industrial surveys released by the DG EcFin, generally two days after the end of the reference month. This estimation procedure is described in detail in Ferrara (2005). Second, we predict one-step ahead the unemployment rate by using a naive predictor, insofar as this series appears to be very smooth. For example, an exponential smoothing procedure works fine. Consequently, the SERI Euro area can be released around 13 days after the end of the reference month, as soon as the new cars registrations are released by ACEA.

II. Empirical results

First, we calibrate our start-end recession indicator from October 1973 to December 2000. Then, we use the indicator in a dynamical approach in order to identity the signal produced in pseudo-real-time from January 2001 to December 2005.

1) Results on the period 1971 - 2000

Stationarity of the series

All the classical stationarity tests, like the Augmented Dickey-Fuller, point out the non-stationarity of the manufacturing IPI, unemployment rate and new cars registrations, although it is not possible, for a finite sample, to discriminate between a DS-type (*Difference Stationary*) and a TS-type non-stationarity (*Trend Stationary*). Thus, we are going to stationarize the series by taking their growth rate over a given lag. This lag is chosen by minimizing the QPS criteria (*Quadratic Probability Score*), which measures the quadratic distance between the reference dating and the estimated dating stemming from the MS model applied to the series. This criteria is defined by:

$$QPS = \frac{1}{T}\sum_{t=1}^{T}(R_t - P_t)^2 \ , \qquad (4)$$

where, for $t=1,\ldots,T$, $(P_t)_t$ is the filtered probability of recession stemming from the MS model and $(R_t)_t$ equals 1 during recession phases and 0 during expansion phases. Consequently, we choose the growth rate over 12 months for the manufacturing IPI and the new cars registrations and the inverted growth rate over 3 months for the unemployment rate.

As regards the consumer confidence indicator, it is well known that the degree of integration, d, of opinion surveys is generally difficult to estimate in the classical framework of « $d=0$ » vs « $d=1$ ». Classical unit root tests applied to this series point out the presence of a unit root, at the 5% level. Thus, we decide to differentiate this series by taking the growth rate over 9 months, the optimal lag in the QPS sense. It turns out that the differentiation of opinion survey series is often done in macro-economics models (see for instance the OECD model by Sédillot and Pain, 2005).

Remark : Correction on the series

Two of the four components of the indicator have been statistically treated. First a Perron (1997) test on the unemployment rate shows evidence of a break in the series, estimated in July 1984. An intervention analysis (Box and Tiao, 1975) on the differenced series allows to estimate a persistent impact of 0.1704. The definitive stationary series is thus corrected from this impact before this date. Second, the new car registrations series has been corrected from the "catalytic converters" effect, obligatory on new vehicles since January 1993, through an intervention analysis. This law implied a strong increase in the sales at the end of 1992, followed by a significative drop in January 1993, implying thus a break in the series, with a persistent effect. The impact has been estimated at around 100 000 vehicles. We correct thus the series from this effect before this date.

Specification and estimation of the models

The main issue in the MS specification relates to the number of regimes. Unfortunately, as noted by Hamilton, the assumption that the process describing the data presents a given number K of regimes cannot be tested using the usual likelihood ratio tests, because some of the classical regularity conditions are not fulfilled, although some specification tests have been proposed in the literature (see for instance Hansen, 1992, 1996, Hamilton, 1996, or

Garcia, 1998). In business cycle analysis, a second validation stage is needed to test the ability of the model to replicate some business cycle characteristics, for instance by using numeric simulations (Breunig and Pagan, 2001). Indeed, the estimated regimes do not have spontaneously a clear interpretation and, *a priori*, there is no reason that they coincide with the economic cycle phases.

Generally, in business cycle analysis, a 2-state Markov chain is used in applications in order to match with the seminal characterization of the cycle in terms of expansion and contraction given by Burns and Mitchell (1946). However, since the paper of Sichel (1994), some authors found evidence in favor of a three-regime model for the business cycle (Krolzig and Toro, 1999, or Layton and Smith, 2000). Either the expansion phase can be separated into a regular growth phase and a high growth phase, or the contraction phase can also be separated into a slowdown phase and a recession phase. In some empirical studies, the third regime may also be used as a dummy variable to deal with the non-stationarity in mean of the series.

As in Ferrara (2003), instead of a data-driven choice of *K*, we propose here to impose *a priori* a three-regime specification based on an economic approach in terms of cycles:

- low regime (S_t=1): the economy is in recession (low phase of the business cycle)
- intermediate regime (S_t=2): the growth rate of the economy is below its trend growth rate (low phase of the growth cycle without recession)
- high regime (S_t=3): the growth rate of the economy is over its trend growth rate (high phase of the growth cycle)

We apply this 3-regime specification to the manufacturing IPI, unemployment rate and new cars registrations.

As regards opinion surveys, several studies have proposed to analyse those series with a 3-regimes MS model (see Ladiray and Mazzi, 2002). The underlying idea is that the information conveyed by the answers to opinion surveys is coded in order to provide an indication on the evolution of the activty : positive, stable or negative. We can therefore assume the existence of hidden qualitative variable with 3 regimes with summarizes the information.

A posteriori, we observed that the introduction of a third regime allows to describe in a more comprehensive economic sense the stylized facts of the Euro area business cycle.

The 3-regime MS model does not integrate an AR component and we assume, if possible, a constant variance for each regime. Only the new car registrations series does not support the same variance for each regime, in terms of business cycle replication. Thus we assume a different variance for each regime. This specification corresponds to the MSI specification in the MSVAR module developed by H.-M. Krolzig, integrated in the Ox software.

Results related to estimated models for each of the components are presented in Table 2. We observe that averaged durations of the recession regime (around one year) are closed and coherent with benchmark durations in Table 1. Averaged duration of recessions is three times lower that the one of the other two regimes (except for the opinion survey for which the duration is twice lower). We retain as real-time recession probability the filtered probability of being in the low regime. Figures of filtered probabilities are presented in Annex.

Table 2 : Parameter estimation and standard errors for the MS models and averaged duration for the regimes (in months) for each of the 4 components (data until December 2000)

	IPI	Unemployment	Consumers	Registrations
Starting date	Jan 1972	Apr. 1971	Oct. 1973	Jan. 1972
Parameters				
P_{11}	0.9155	0.9612	0.9250	0.9588
P_{22}	0.9353	0.9664	0.9231	0.9419
P_{33}	0.9503	0.9683	0.9050	0.9193
μ_1	-5.0127 (0.3830)	-0.2377 (0.0138)	-96.27 (6.5345)	-4.0549 (0.5166)
μ_2	1.4401 (0.2284)	-0.0056 (0.0116)	2.35 (7.3738)	4.8858 (0.3081)
μ_3	5.8921 (0.2261)	0.2270 (0.0147)	101.38 (9.66)	12.7277 (0.8446)
σ	2.0673	0.1049	41.47	4.7406
σ_2				2.4356
σ_3				3.9110
Averaged mean				
Low regime	12	13	13	24
Intermediate regime	15	8	13	17
High regime	20	24	11	12

Table 3 : Business cycle chronologies for the Euro area stemming from each components

Dates		Reference	IPI	Unemployment	Consumers	Registrations
1974-75	Peak	Q2 1974	M10 1974	M8 1974	NA	M10 1973
	Trough	Q1 1975	M11 1975	M6 1975	M10 1974	M9 1975
1980	Peak	Q1 1980	M8 1980	M11 1980	M6 1979	M11 1979
	Trough	Q4 1980	M4 1981	M12 1981	M9 1981	
1982	Peak	Q4 1981	M5 1982	M4 1982		
	Trough	Q4 1982	M4 1983	M12 1982		M2 1982
1992-93	Peak	Q1 1992	M6 1992	M6 1992	M7 1992	M9 1991
	Trough	Q1 1993	M11 1993	M3 1994	M8 1993	M4 1994

Manufacturing IPI and unemployment rate describe exactly the four recession phases experienced by the Euro area since 1970, which is a strong proof of reliability for both components. The new cars registrations series allows to reproduce only three of the four recessions, the second dip of the double-dip recession in early eighties is not marked. Otherwise, this component provides two false signals of recessions and the averaged duration of the low regime is proportionally higher than the one of the three other components. The consumer confidence survey doesn't not neither allow to reproduce the second dip of the double-dip recession. Moreover, three false signals of recession are emitted by this component.

Computation of the SERI by aggregation of the probabilities

The final step of the indicator computation is done by aggregation of the probabilities by taking the number of false and missed signals into account. In order to transform the quantitative information provided by each component, we have to choose a threshold over which a signal is given. We choose the natural threshold of 0.50 recommended by Hamilton (1989).

The following table presents the lags of each component *viz* the reference cycle at this natural threshold. The dating being in quarters, the lags have been transformed from months into quarters by affecting to each month its reference quarter.

Table 4 : Lags of the four indicator components (in quarters)

Lags	ipi	une	con	reg
1974-75	1	1		-2
	3	1	-1	0
1980	2	3	-2	1
	2	4	3	-1
1982	2	2		
	2	0		
1992-93	1	1	2	4
	3	4	2	4

From Table 4, we note that manufacturing IPI and unemployment rate are the most lagged components (2 quarters on the average), but also the most reliable. Especially, the lag of the IPI possesses the lowest variance. The consumer confidence survey is the less lagged component, but also less reliable. This phenomenon underlines perfectly the classical trade-off between timeliness and reliability of economic indicators.

Now, we can compute the weights of each component in the synthetic recession indicator. We get the following results:

$$\omega_1 = 4/(4+0+0) = 1$$
$$\omega_2 = 4/(4+0+0) = 1$$
$$\omega_3 = 4/(4+3+1) = 0.5$$
$$\omega_4 = 4/(4+2+1) = 0.57$$

thus:

$$\varpi_1 = 0.33$$
$$\varpi_2 = 0.33$$
$$\varpi_3 = 0.16$$
$$\varpi_4 = 0.18$$

As before, in order to transform the quantitative information provided by the indicator into a qualitative signal, we adopt a decision rule, that is we have to choose the threshold over which a signal of peak or trough will is given. Here again, we adopt the natural threshold of 0.50. According to this decision rule, the dates of peaks and troughs are presented in Table 5.

Table 5 : Business cycle chronologies for the Euro area from the SERI indicator

Dates		Reference	SERI Indicator	Lag (in quart.)
1974-75	Peak	Q2 1974	Sep 1974	1
	Trough	Q1 1975	Jun 1975	1
1980	Peak	Q1 1980	Nov 1980	3
	Trough	Q4 1980	Aou 1981	3
1982	Peak	Q4 1981	Jul 1982	2
	Trough	Q4 1982	Dec 1982	0
1992-93	Peak	Q1 1992	Jul 1992	2
	Trough	Q1 1993	Dec 1993	3

The lag of the recession indicator varies between zero and three quarters. The quite long lag in the 1993 trough is due the unemployment rate, which stayed high during a certain time, illustrating an example of what is often called "jobless recovery". Moreover, new cars registrations have lagged of a whole year for this specific recession, the series being disturbed by the catalytic converters effect. The averaged lag of the indicator is of 1.75 quarters, while the median is of 1.50 quarters. We can thus consider that the SERI indicator is a quasi-coincident indicator of the business cycle, knowing that, up to now, none reliable leading indicator of recession has been proposed in the literature (see Stock and Watson, 2003, for a discussion on this topic related to the last US recession in 2001).

2) Dynamical results from January 2001 to December 2005

In this section, we use the MS models specified on the period 1973-2000 and we consider the evolution of the recession indicator in a pseudo-real-time analysis, insofar as we use the data available in December 2005 and not the true vintage data. Results are presented in figure 7 in the annex.

From November 2001 to March 2002, the SERI indicator stayed high, over the value of 0.4 (0.49 for December 2001, January and February 2002), but without crossing the natural threshold of 0.50, then fell slightly the following months. Consequently, it is not possible to conclude to the occurrence of a peak in the business cycle, we can only qualify the second semester 2001 as a *quasi-recession* period.

By examining the behavior of the components, we observe that they all emit a strong signal of recession, by reaching the probability of 1.00 (see figure 8), but not simultaneously. This lack of synchronization among the components lead to a lower signal than expected.

This result is interesting because it would be the first time, since 1970, that an industrial recession occurs in the Euro area without implying a global recession. This may be seen as an effect of the growing desindustrialisation in the Euro area.

Moreover, this result raises the question of the existence of a common Euro area cycle. Recent papers have questioned the existence of such a common cycle (see for example Camacho, Perez-Quiros and Saiz, 2005). By working in a indirect approach on the GDPs of the six main Euro area countries (Germany, France, Italy, Spain, Netherlands and Belgium), we observe that, since 2000, the recession periods, estimated by using the classical Bry and Boschan algorithm, have not been perfectly diffused across the countries (figure 9). This lack of diffusion of the phenomena, though synchronized, implies thus a quasi-recession phase, around the period last quarter 2001 – first quarter 2002, but not a global recession.

The question of the existence of a common business cycle for the Euro area is of great interest and is linked to economic and political issues for the zone, like for instance the absence of a coherent common budgetary policy or the influence of trade and financial linkages between the countries. However, due to the existence of the Euro currency, we assume, for the moment, the existence of a common business cycle that will be monitored by the Start-End Recession Indicator.

Conclusions

The start-end recession indicator (SERI) for the Euro area provides in real-time a monthly reliable signal of the occurrence of the peaks and troughs of the business cycle, that is the dates of the economic recession periods. This signal is slightly lagged *viz* the reference business cycle, but appears to be reliable. Indeed, our aim was to minimize the risk of false signal (type I error) avoiding thus to announce a warning signal of recession, while there isn't. Since 2001, a pseudo-real-time analysis showed a period of quasi-recession (around Q4 2001 and Q1 2002), where the indicator stayed close to its threshold of 0.50 during three months. Since January 2004, the recession indicator remains close to its minimal level of zero.

Since January 2006, this start-end recession indicator is computed each month in true real-time and is released through the COE web site (www.coe.ccip.fr in the section *Indicateurs*) around 13 days after the end of the reference month.

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Annex

Figure 1 : Evolution of the raw components 1970-2000 (top left : manufacturing IPI, bottom left : unemployment rate, top right: consumers confidence, bottom right : new car registrations)

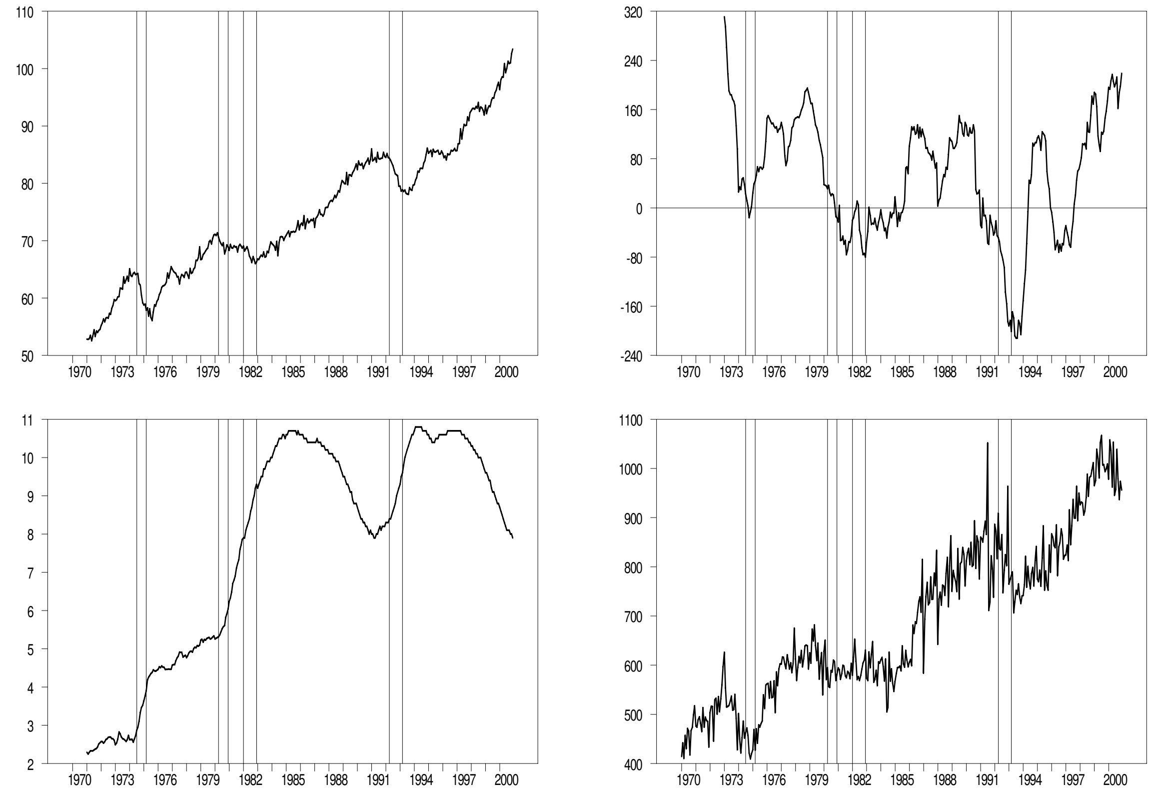

Figure 2 : Manufacturing IPI: filtered probability of low regime, Jan 1972 – Dec 2000

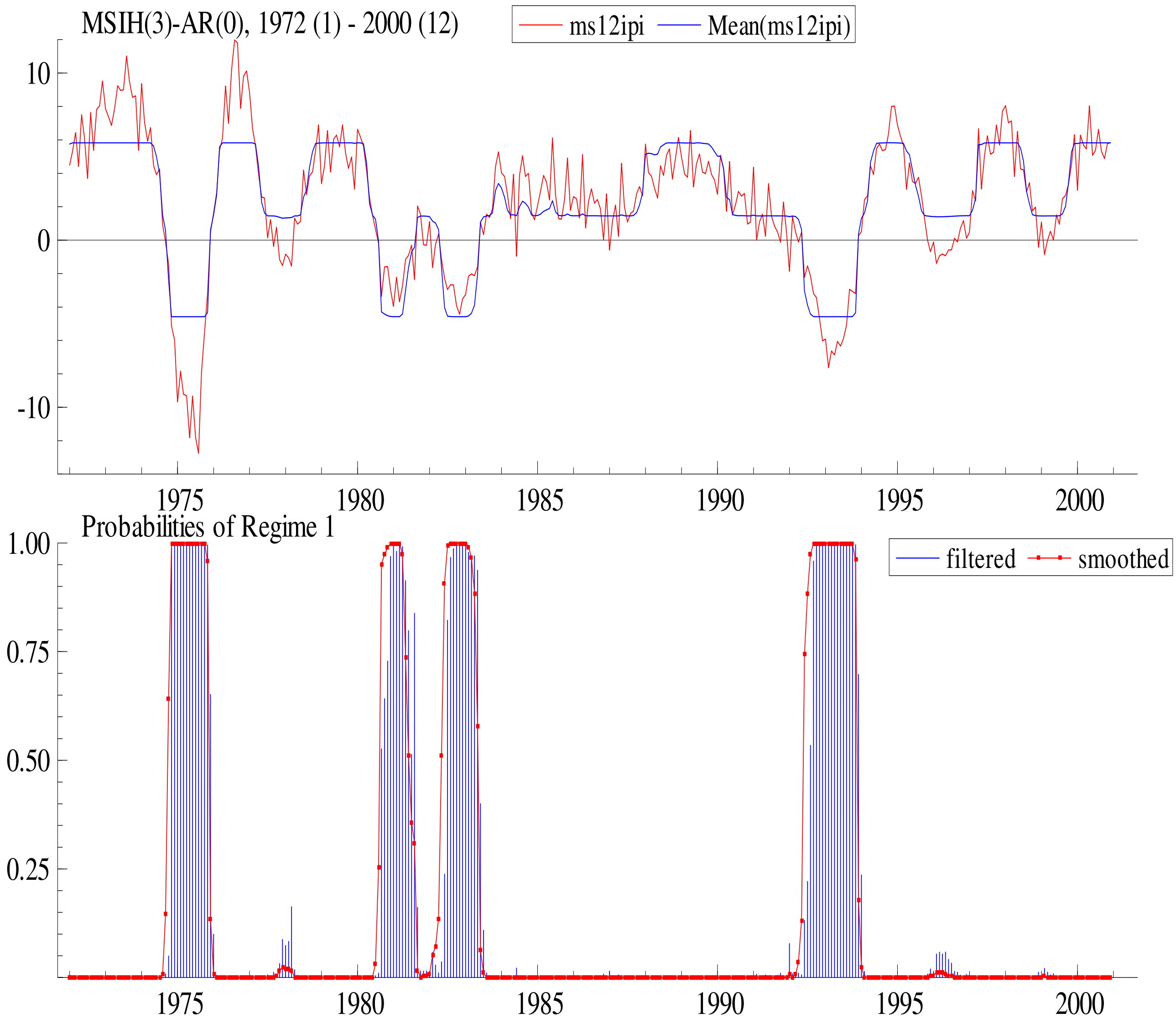

Figure 3 : Unemployment rate: filtered probability of low regime, Apr 1971 – Dec 2000

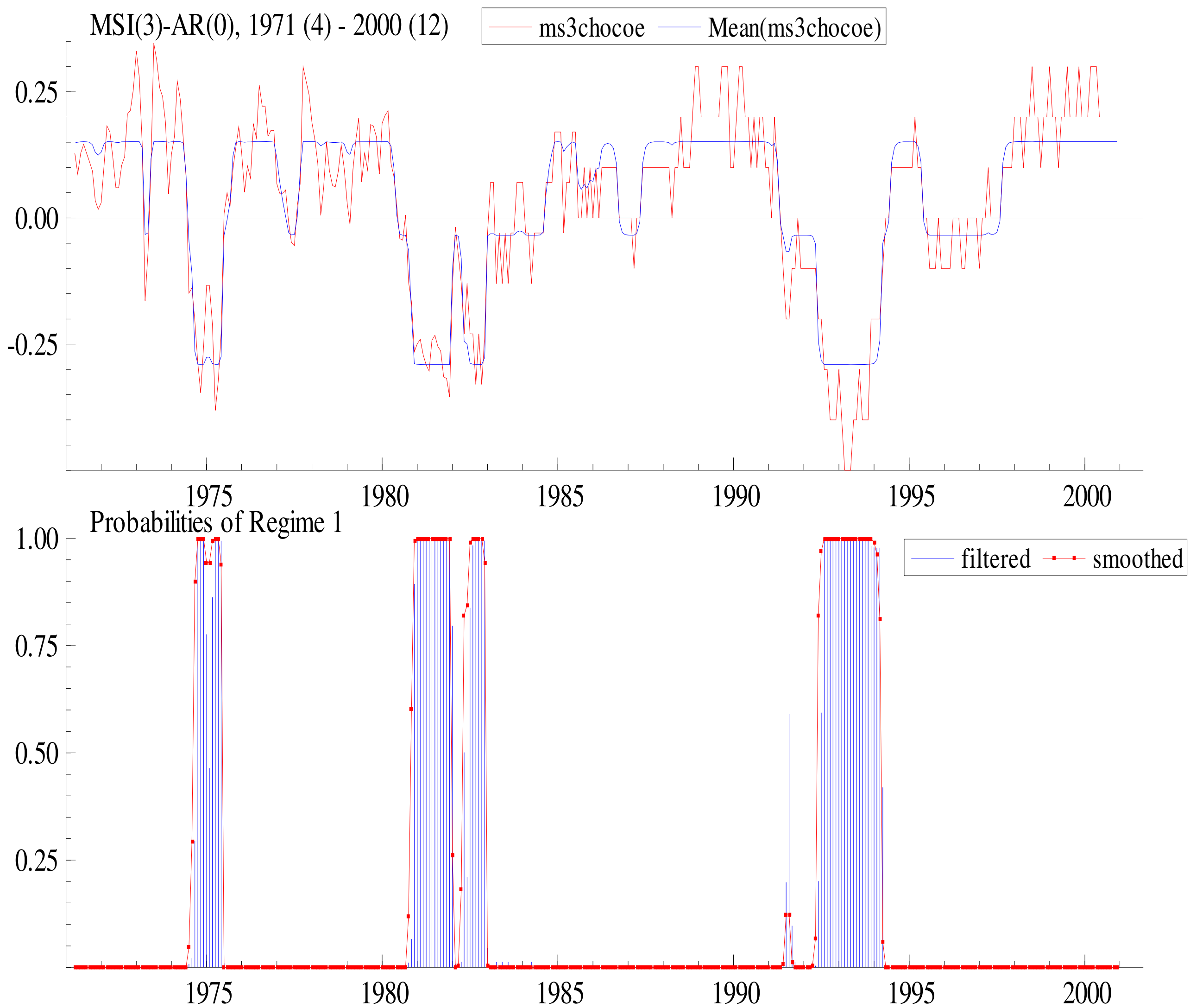

Figure 4 : Consumers confidence survey: filtered probability of low regime, Oct 1973 – Dec 2000

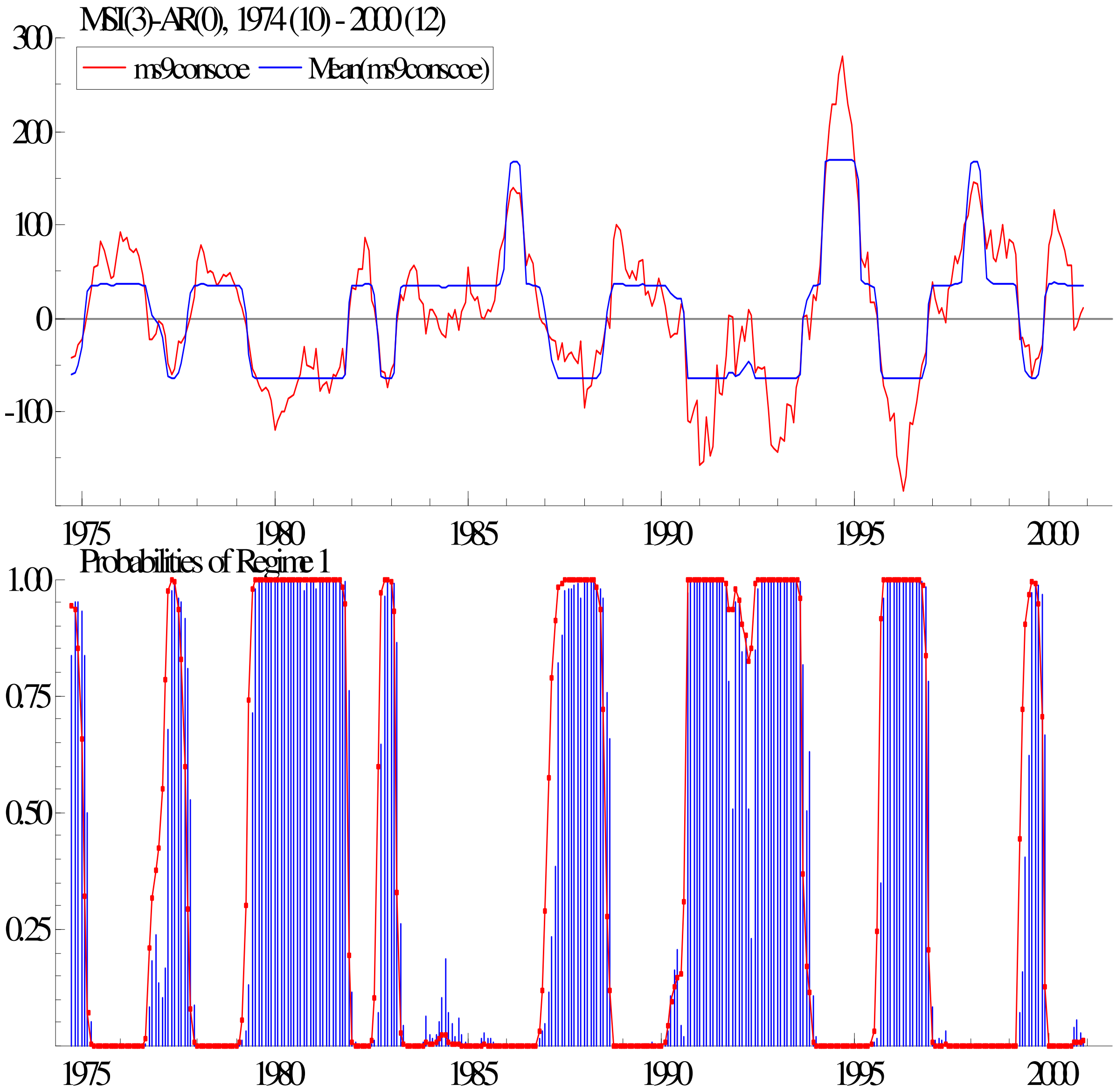

Figure 5 : New car registrations: filtered probability of low regime, Jan 1972 – Dec 2000

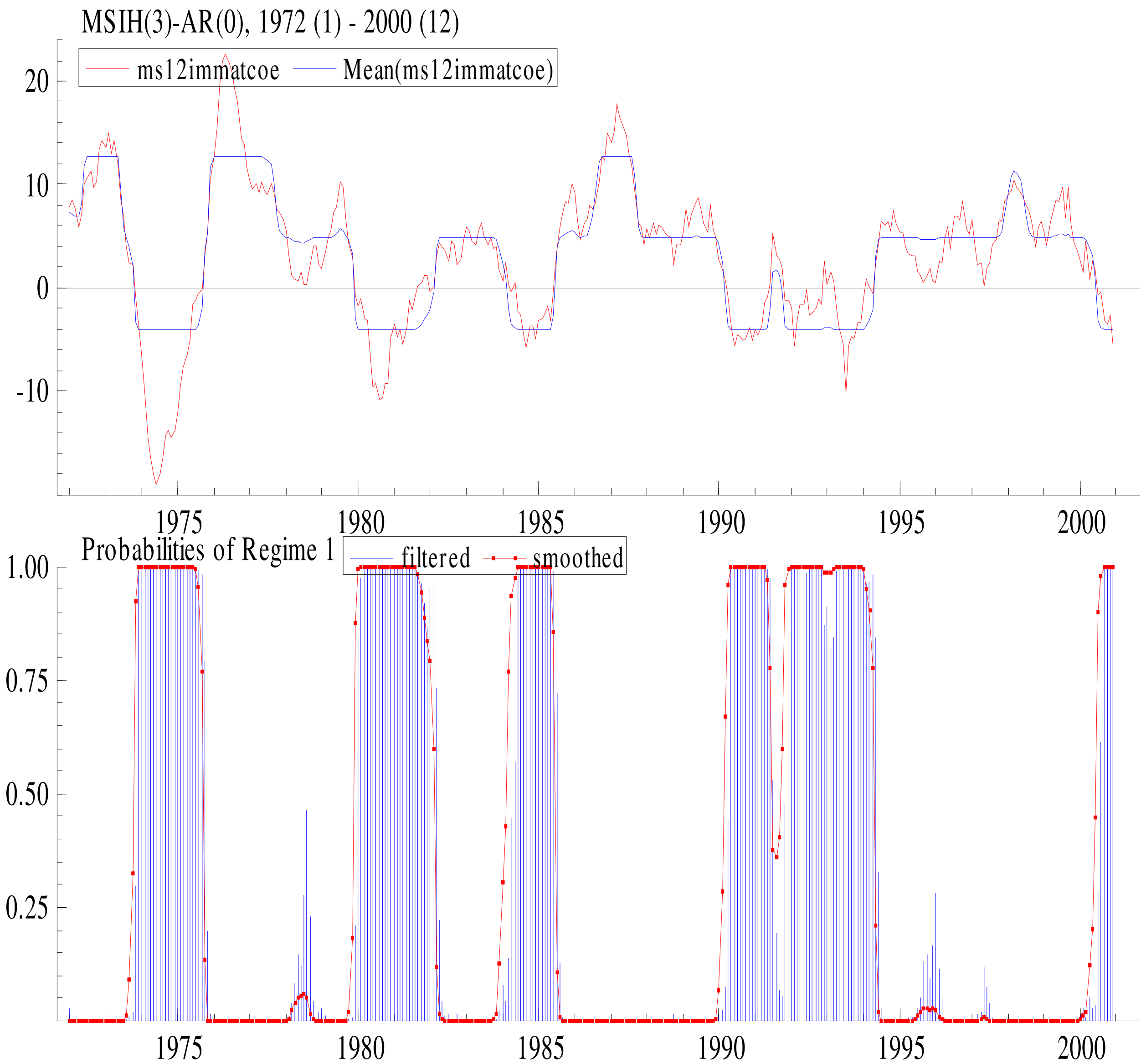

Figure 6 : Evolution of the Start-End Recession Indicator for the Euro area Oct 1973 – Dec 2000

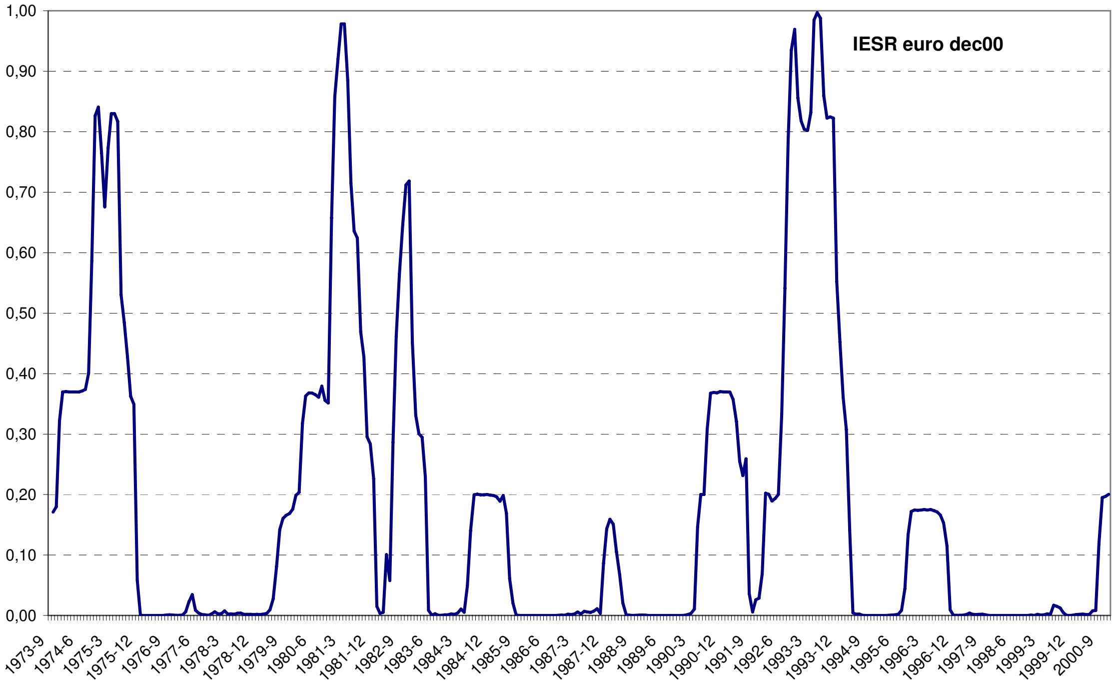

Figure 7: Evolution the Start-End Recession Indicator for the Euro area, Jan. 2001 – Dec. 2005

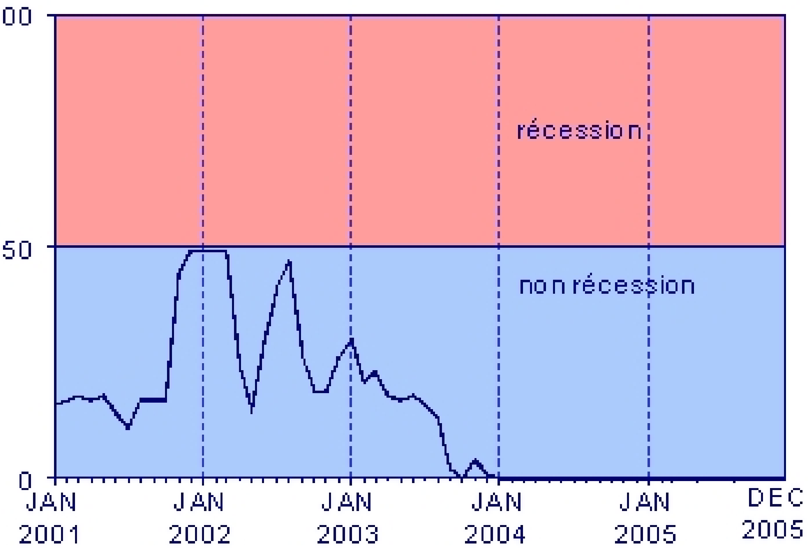

Figure 8 : Evolution of the components, Jan. 2000 – Dec. 2005

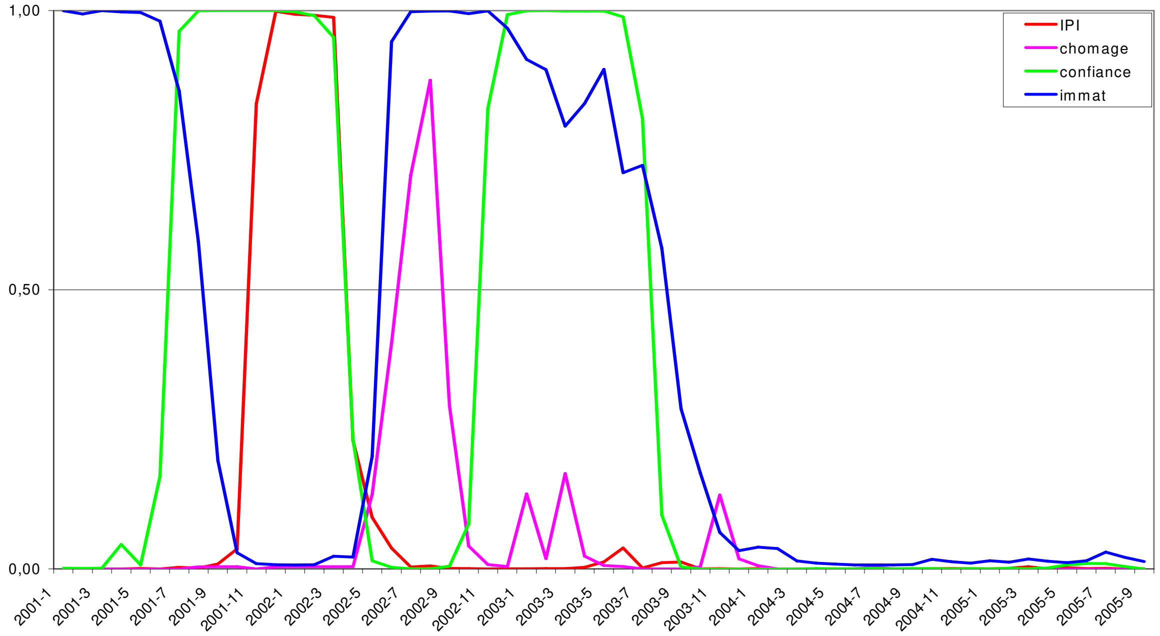

Figure 9: Recessions dates for the main 6 Euro area countries Q1 1980 – Q1 2006 (source: COE)