THE USE OF QUALITATIVE DATA FOR SHORT TERM ANALYSIS*

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1. INTRODUCTION

Opinion surveys have an important bearing on the short-term analysis and forecast of economic activity, since they are made available with some lead time compared with most quantitative indicators and include questions of a prospective nature. In fact, the lagged disclosure of quantitative indicators leads qualitative indicators to play an essential role in the analysis of the economic environment. In addition, it should be noted that these surveys cover activity sectors, such as services, for which quantitative data are generally scarce. Finally, qualitative indicators provide indications on the future behaviour of economic agents for different variables, such as consumption, savings or output.

In general, data collected are shown as balances of respondents, which can be used to proxy rates of change in reference variables, thereby indicating whether they accelerate or decelerate.

Some empirical studies have shown that confidence indicators, in particular, anticipate cyclical developments in major economic aggregates, although they are occasionally coincident or lagging. Even in the latter case, information has an important bearing, given that it permits the validation of the pace of macroeconomic variables. Moreover, qualitative indicators are not revised af-

ter being published. Despite their usefulness, it should be taken into account that they are nevertheless based on surveys, and are therefore of a subjective nature.

This study makes a fairly comprehensive assessment of the use of opinion surveys in the analysis of the economic environment, benefiting from the availability of these series in most cases since January 1987. Section 2 shows a basic statistical analysis of the different survey questions and briefly describes the quantitative series for which the information content of confidence indicators will be tested. Section 3 shows the results of the correlation analysis between these reference variables and the qualitative variables considered. Section 4 presents the calculation of a noise/information measure for opinion data. The principal components are analysed in Section 5. Finally, Section 6 draws the conclusions.

2. DATA

2.1. Qualitative surveys

This study builds on the results of economic surveys to consumers, manufacturing industry (since 1987), retail trade and construction (since 1989), disclosed by the European Commission (EC) on a monthly basis. These series are seasonally adjusted (s.a.). In wholesale trade and total trade, the period of analysis is shorter and series correspond to those published by the *Instituto Nacional de Estatística* (*INE*) from 1994 onwards, and they are not seasonally adjusted. The sample pe-

riod for the purposes of this study ends in June 2003.

The questions included in the opinion surveys are shown in Table 1. Aiming to summarise the information collected, the Commission calculates confidence indicators. These are obtained by a simple arithmetic mean of the balances of respondents[1] from a set of questions deemed more relevant in each survey. Thus, the Consumer Confidence Indicator includes the financial situation over next 12 months, the general economic situation over next 12 months, savings and unemployment expectations over next 12 months (with negative sign); the Manufacturing Industry Confidence Indicator considers production trend observed in recent months, assessment of orderbook levels and of stocks of finished products (with negative sign); the Construction Confidence Indicator aggregates the assessment of order books and employment expectations for the months ahead; Trade Confidence Indicators include questions on business activity over recent months, expected business activity and assessment of stocks (with negative sign). The EC also discloses the Economic Sentiment Indicator, intended to aggregate and summarise the perception of the various economic agents, and hence reflect global activity. This composite indicator is no more than the weighted average of confidence indicators in manufacturing industry (with a weight of 40 per cent), consumption, construction and retail trade (each with 20 per cent)[2].

The calculation of the descriptive statistics shown in Table 1 was based on monthly data, although manufacturing industry and consumer surveys also include questions made with a quarterly frequency. The first set of charts (Charts 1) shows developments in confidence indicators in Portugal for the period mentioned. In general, the share of "below normal" responses is higher than the share of "above normal" responses. This clearly illustrates that the level of balances of respondents does not have an accurate meaning. The analysis must therefore be based on changes in these balances, which are particularly useful in identifying accelerations or decelerations in the associated quantitative variable. Balances obtained in the construction survey show the highest degree of volatility. The series under analysis are also highly resilient[3].

2.2. Reference variables

In order to assess the usefulness of opinion surveys in Portugal for the monitoring of the economic situation, qualitative data were compared with 15 quantitative series: Gross Domestic Product (GDP), total private consumption, of durables and non-durables, nominal and real exports, consumption and GDP deflators, Consumer Price Index (CPI), savings (as a percentage of disposable income), employment and unemployment rate, gross fixed capital formation (GFCF), GVA in manufacturing industry and Industrial Production Index (IPI). Use was made of quarterly data from the INE and the Banco de Portugal, for the 1987-2002 period. Both the IPI and the CPI were calculated on a quarterly basis, although the original series are published on a monthly basis.

3. QUALITATIVE VARIABLES AND REFERENCE AGGREGATES: STATISTICAL ASSOCIATION

Initially, survey responses and EC confidence indicators were compared with the year-on-year rate of change of the quantitative variables mentioned above[4]. Carnazza and Parigi (2001) make a

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(1) It should be noted that surveys usually have three standard responses: "above normal" (+), "normal" (=) and "below normal" (-). The balance of respondents, i.e. the difference between optimistic and pessimistic responses, summarises and quantifies the information collected, although its interpretation is not immediate. In addition, responses indicating a stable situation are ignored, and the weight given to "increase" and "decrease" responses is identical. Occasionally, there are also five possible responses, considering two "increase" and "decrease" levels; in this case the balance of respondents is calculated as follows: $\{[(++) + (+)] - [(- -) + (-)]\}$.

(2) This type of calculation started to be used from September 2001 onwards. Up to this date, the indicator was based on a weighted average of consumer, industrial and construction confidence indicators, and of a measure of developments in stock prices. However, the latter indicator was subject to periodical revisions, eventually reflected in the actual Economic Sentiment Indicator. It was then excluded and replaced by the retail trade series, a rather significant sector in economic activity. See also *Monthly Economic Indicators* (September 2001), Banco de Portugal.

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(3) With the exception of total trade and wholesale trade series, which are not seasonally adjusted.

(4) With the exception of the unemployment rate and savings, which are expressed as a percentage.

Table 1

QUALITATIVE SURVEYS

Questions and descriptive statistics

Period	Freq.	Source	Units		Variable	Average	Standard deviation	Autocorrelation[a]			
								t-3	t-6	t-9	t-12
1987:01/2003:06	m	EC	b.r.	s.a.	**Consumer Confidence Indicator**	-18	11.2	0.92	0.80	0.69	0.57
1987:01/2003:06	m	EC	b.r.	s.a.	Financial situation over last 12 months	-10	7.3	0.92	0.85	0.74	0.60
1987:01/2003:06	m	EC	b.r.	s.a.	Financial situation over next 12 months	-5	7.9	0.89	0.79	0.70	0.59
1987:01/2003:06	m	EC	b.r.	s.a.	General economic situation over last 12 months	-18	17.9	0.95	0.88	0.79	0.69
1987:01/2003:06	m	EC	b.r.	s.a.	General economic situation over next 12 months	-12	14.2	0.90	0.80	0.72	0.62
1987:01/2003:06	m	EC	b.r.	s.a.	Major purchases at present	-27	13.4	0.86	0.72	0.57	0.46
1987:01/2003:06	m	EC	b.r.	s.a.	Major purchases over next 12 months	-5	8.7	0.81	0.74	0.63	0.58
1987:01/2003:06	m	EC	b.r.	s.a.	Unemployment expectations over next 12 months	26	21.2	0.92	0.82	0.69	0.57
1987:01/2003:06	m	EC	b.r.	s.a.	Savings at present	-36	10.3	0.85	0.72	0.61	0.49
1987:01/2003:06	m	EC	b.r.	s.a.	Savings over next 12 months	-31	7.0	0.76	0.58	0.42	0.25
1987:01/2003:06	m	EC	b.r.	s.a.	Statement on financial situation of households	-3	5.4	0.79	0.64	0.56	0.50
1987:01/2003:06	m	EC	b.r.	s.a.	Price trends over last 12 months	37	14.3	0.88	0.76	0.68	0.65
1987:01/2003:06	m	EC	b.r.	s.a.	Price trends over next 12 months	30	11.8	0.78	0.62	0.47	0.40
1990:1/2003:2	q	EC	b.r.	s.a.	Intention to buy a car within the next 12 months	-65	4.5	0.72	0.59	0.43	0.29
1990:1/2003:2	q	EC	b.r.	s.a.	Purchase or build a home within the next 12 months	-76	3.1	0.64	0.39	0.25	0.19
1990:1/2003:2	q	EC	b.r.	s.a.	Home improvements over the next 12 months	-58	23.7	0.55	0.08	-0.06	-0.18
1987:01/2003:06	m	EC	b.r.	s.a.	**Manufacturing Industry Confidence Indicator**	-5	8.5	0.90	0.74	0.52	0.29
1987:01/2003:06	m	EC	b.r.	s.a.	Production trend observed in recent months	1	8.2	0.82	0.66	0.50	0.32
1987:01/2003:06	m	EC	b.r.	s.a.	Production expectations for the months ahead	7	8.0	0.81	0.65	0.48	0.32
1987:01/2003:06	m	EC	b.r.	s.a.	Assessment of order-book levels	-15	13.3	0.91	0.77	0.60	0.39
1987:01/2003:06	m	EC	b.r.	s.a.	Assessment of export order-book levels	-13	15.1	0.86	0.65	0.39	0.15
1987:01/2003:06	m	EC	b.r.	s.a.	Assessment of stocks of finished products	7	6.2	0.79	0.59	0.34	0.05
1987:01/2003:06	m	EC	b.r.	s.a.	Employment expectations for the months ahead	-12	8.6	0.92	0.82	0.65	0.48
1987:01/2003:06	m	EC	b.r.	s.a.	Selling price expectations for the months ahead	12	9.0	0.82	0.71	0.58	0.44
1987:1/2003:2	q	EC	b.r.	s.a.	Current level of capacity utilisation (as a percentage)	80	2.3	0.81	0.75	0.61	0.51
1987:1/2003:2	q	EC	b.r.	s.a.	Assessment of current production capacity	11	9.2	0.90	0.74	0.52	0.28
1987:1/2003:2	q	EC	b.r.	s.a.	Duration of production (months) assured by current order books	4	0.4	0.48	0.39	0.34	0.33
1987:1/2003:2	q	EC	b.r.	s.a.	New order in recent months	-3	14.9	0.89	0.71	0.50	0.26
1987:1/2003:2	q	EC	b.r.	s.a.	Export expectations for the months ahead	9	12.2	0.81	0.64	0.41	0.23

(*to be continued*)

Table 1

QUALITATIVE SURVEYS

Questions and descriptive statistics

Period	Freq.	Source	Units		Variable	Average	Standard deviation	Autocorrelation[a]			
								t-3	t-6	t-9	t-12
1989:01/2003:06	m	EC	b.r.	s.a.	**Construction Confidence Indicator**	-22	16.3	0.91	0.84	0.72	0.57
1989:01/2003:06	m	EC	b.r.	s.a.	Assessment of order books	40	18.7	0.89	0.84	0.74	0.61
1989:01/2003:06	m	EC	b.r.	s.a.	Employment expectations for the months ahead	4	16.1	0.87	0.77	0.65	0.47
1989:01/2003:06	m	EC	b.r.	s.a.	Trend of activity over recent months	5	12.9	0.80	0.68	0.52	0.35
1989:01/2003:06	m	EC	b.r.	s.a.	Price expectations for the months ahead	-7	21.2	0.89	0.83	0.74	0.65
1989:01/2003:06	m	EC	b.r.	s.a.	**Retail Trade Confidence Indicator**	-7	7.1	0.81	0.73	0.59	0.46
1989:01/2003:06	m	EC	b.r.	s.a.	Business activity over recent months	19	11.8	0.83	0.75	0.62	0.51
1989:01/2003:06	m	EC	b.r.	s.a.	Assessment of Stocks	-10	5.1	0.51	0.31	0.23	0.18
1989:01/2003:06	m	EC	b.r.	s.a.	Expected business activity	-8	11.4	0.76	0.64	0.54	0.40
1989:01/2003:06	m	EC	b.r.	s.a.	Orders placed with suppliers	13	12.2	0.79	0.67	0.56	0.46
1989:01/2003:06	m	EC	b.r.	s.a.	Employment expectations	3	7.1	0.75	0.62	0.51	0.37
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	**Wholesale Trade Confidence Indicator**[b]	1	5.7	0.81	0.69	0.69	0.64
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Turnover	0	11.9	0.53	0.47	0.33	0.55
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Level of inventories	2	3.8	0.15	0.21	0.02	-0.10
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Order books	-2	10.1	0.51	0.50	0.39	0.60
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Selling price	6	6.5	0.14	-0.26	0.05	0.32
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Current activity	-8	9.6	0.87	0.80	0.72	0.62
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Future activity	14	8.8	0.73	0.49	0.53	0.71
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Employment expectations	-5	8.6	0.63	0.53	0.44	0.32
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	**Total Trade Confidence Indicator**[b]	-2	6.1	0.93	0.86	0.80	0.70
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Turnover	-4	11.8	0.66	0.66	0.46	0.61
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Level of inventories	4	3.0	-0.03	0.17	-0.14	0.12
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Order books	-7	10.7	0.65	0.77	0.52	0.69
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Selling price	7	6.8	0.16	-0.14	0.09	0.46
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Current activity	-14	10.3	0.91	0.85	0.77	0.67
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Future activity	10	9.5	0.82	0.70	0.67	0.69
1994:06/2003:06	m	*INE*	b.r.	n.s.a.	Employment expectations	-4	8.1	0.76	0.63	0.47	0.40
1989:01/2003:06	m	EC	1995=100	s.a.	**Economic Sentiment Indicator**	98.7	1.7	0.93	0.81	0.64	0.45

Note:

(a) Account is taken of monthly lags, with the exception of the quarterly data, for which the calculation refers to the four lagging quarters.

(b) The methodology used on the construction of the retail trade confidence indicator was applied to the calculation of the wholesale trade confidence indicator and the total trade confidence indicator.

Charts 1
CONFIDENCE INDICATORS (b.r.)

Consumer confidence indicator (s.a.)

Manufacturing industry confidence indicator (s.a.)

Retail trade confidence indicator (s.a.)

Construction confidence indicator (s.a.)

Wholesale trade confidence indicator (n.s.a.)

Total trade confidence indicator (n.s.a.)

Economic sentiment indicator (s.a.)
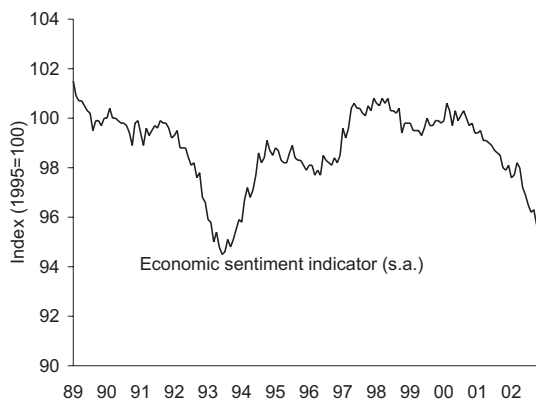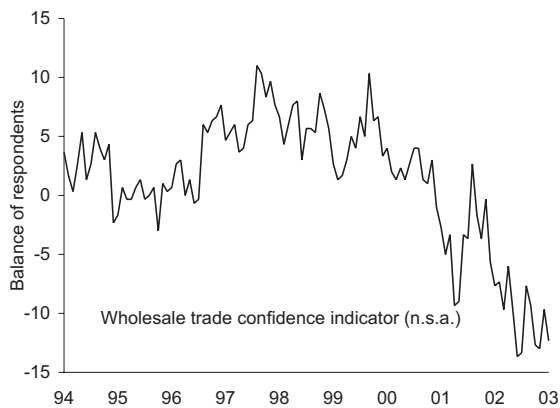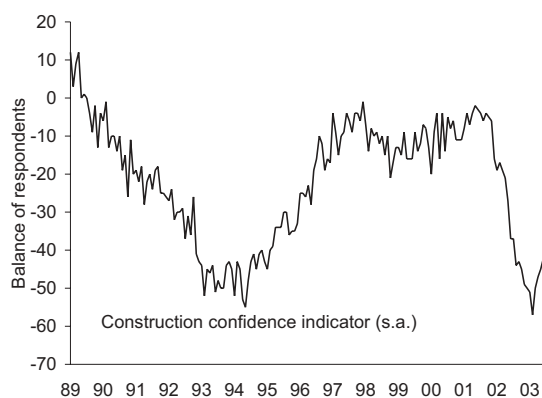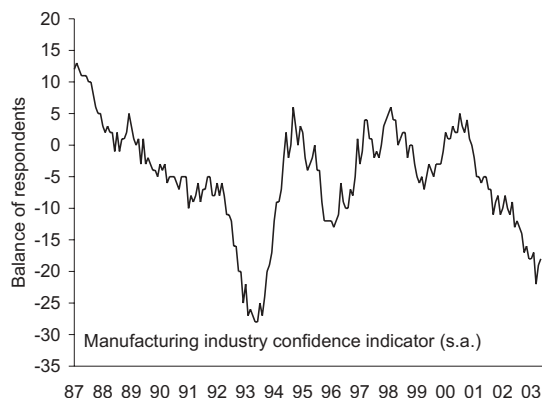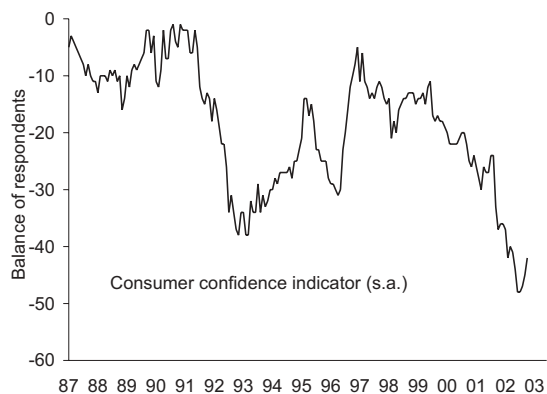
similar analysis, drawing conclusions on the importance of qualitative data to the current and future macroeconomic assessment.

The results are shown in Table 2 and Charts 2. The lag with the highest correlation coefficient is used to classify the qualitative indicator as lagging, coincident or leading.

The main conclusions are the following:

(a) The Consumer Confidence Indicator leads by around two quarters vis-à-vis private consumption. The questions with the highest correlations (around 0.80) refer to the general economic and financial situations over the last and the next 12 months, with coincident and leading indications in one quarter, respectively;

(b) Similarly, the balances of respondents calculated on the basis of consumers' responses provide very useful indications on the breakdown of consumption into durable and non-durable goods. Correlations are high, ranging from 0.70 to 0.80;

(c) In the retail trade survey, correlations with the series considered are lower. Business activity over recent months seems to be somewhat lagging compared with private consumption;

(d) As regards total trade, survey responses show high correlations when compared with the reference series for consumption, GFCF or even GDP. Questions on the company's turnover and current activity are very informative, despite their coincident or lagging nature in the first and second cases, respectively. The total trade confidence indicator also exhibited strong statistical associations. However, the short size of the sample used and the fact that it was not seasonally adjusted may be hindering a more robust analysis. The same can be said for the wholesale trade;

(e) Manufacturing industry survey results seem to be less significant, with correlation coefficients of around 0.50 for GVA and 0.60 for IPI. This may indicate that the effect of the launch of large projects (such as those in the car industry) on industrial production is significantly stronger than the corresponding effect on qualitative indicators. The corre-

spondent chart stresses the importance of this aspect to the 95-97 period[5]. Higher correlations are obtained when comparing manufacturing industry survey questions with GDP or GFCF rather than IPI or industrial GVA.

(f) The Economic Sentiment Indicator provides contemporaneous indications on activity developments, with a correlation coefficient of 0.70. Stress should be laid on the strong correlation with GFCF (0.75 in the coincident period) and the significant leading indication in one quarter of developments in employment (0.88).

Some specific questions included in these surveys also made it possible to draw interesting conclusions within the scope of the study of additional variables: total employment, unemployment rate, savings, exports and prices. Table 3 and Charts 3 summarise the results.

It can be seen that:

(a) In general, there is a significant correlation between survey questions and the additional variables under analysis. Stress should be laid on the role played by qualitative data in the monitoring of labour market situation: expectations of developments in sectoral employment – manufacturing industry, retail trade and wholesale trade – show a high statistical association with the pace of total employment. In turn, the question regarding consumer unemployment expectations over next 12 months is strongly correlated with the rate effectively observed;

(b) Questions on savings included in the consumer survey are slightly correlated (around 0.55) with the savings rate, expressed as a percentage of disposable income;

(c) Questions included in the manufacturing industry survey regarding the order-book levels and export expectations for the months ahead, show a statistical association

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(5) Stronger statistical associations were found in studies carried out for other countries (e.g. Goldrian *et al* (2001) and Santero and Westerlund (1996)).

Table 2

CORRELATION ANALYSIS – QUALITATIVE VARIABLES AND REFERENCE SERIES

Consumer Survey	Reference variables	Correlation coefficient of x(t) with the reference variable (t+i)								
		i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Consumer Confidence Indicator	Private consumption	0.54	0.64	0.70	0.73	0.76	0.77	0.78	0.77	0.71
	Consumption of durables	0.52	0.59	0.64	0.65	0.66	0.66	0.62	0.59	0.52
	Consumption of non-durables	0.42	0.51	0.57	0.61	0.66	0.70	0.76	0.77	0.75
Financial situation over last 12 months	Private consumption	0.58	0.67	0.74	0.79	0.82	0.80	0.76	0.69	0.58
	Consumption of durables	0.53	0.59	0.64	0.69	0.70	0.66	0.60	0.51	0.39
	Consumption of non-durables	0.48	0.57	0.65	0.70	0.74	0.75	0.76	0.72	0.66
Financial situation over next 12 months	Private consumption	0.52	0.63	0.70	0.74	0.79	0.81	0.81	0.79	0.71
	Consumption of durables	0.42	0.52	0.59	0.62	0.66	0.68	0.66	0.64	0.55
	Consumption of non-durables	0.45	0.54	0.60	0.64	0.69	0.73	0.77	0.77	0.73
General economic situation over last 12 months	Private consumption	0.62	0.70	0.77	0.81	0.84	0.84	0.80	0.74	0.66
	Consumption of durables	0.54	0.61	0.68	0.73	0.75	0.74	0.68	0.61	0.51
	Consumption of non-durables	0.52	0.60	0.67	0.71	0.74	0.75	0.76	0.73	0.68
	GDP	0.70	0.72	0.71	0.68	0.68	0.62	0.53	0.43	0.32
General economic situation over next 12 months	Private consumption	0.52	0.61	0.69	0.73	0.77	0.80	0.80	0.78	0.74
	Consumption of durables	0.46	0.54	0.62	0.66	0.69	0.73	0.70	0.68	0.62
	Consumption of non-durables	0.42	0.51	0.57	0.60	0.65	0.68	0.73	0.73	0.71
	GDP	0.61	0.65	0.66	0.66	0.69	0.64	0.60	0.52	0.43

Retail Trade Survey	Reference variables	Correlation coefficient of x(t) with the reference variable (t+i)								
		i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Retail Trade Confidence Indicator	Private consumption	0.38	0.44	0.54	0.58	0.64	0.66	0.60	0.56	0.46
	Consumption of durables	0.42	0.46	0.59	0.68	0.73	0.73	0.59	0.46	0.31
	Consumption of non-durables	0.27	0.33	0.40	0.40	0.46	0.49	0.51	0.53	0.49
Business activity over recent months	Private consumption	0.57	0.62	0.68	0.68	0.66	0.61	0.54	0.50	0.44
	Consumption of durables	0.60	0.66	0.74	0.76	0.73	0.59	0.43	0.30	0.19
	Consumption of non-durables	0.43	0.47	0.51	0.49	0.50	0.52	0.53	0.56	0.54
Expected business activity	Private consumption	0.29	0.33	0.45	0.54	0.67	0.74	0.73	0.71	0.61
	Consumption of durables	0.31	0.27	0.38	0.50	0.61	0.72	0.65	0.56	0.46
	Consumption of non-durables	0.22	0.30	0.39	0.45	0.56	0.59	0.63	0.66	0.60

Table 2

CORRELATION ANALYSIS – QUALITATIVE VARIABLES AND REFERENCE SERIES

Total Trade Survey	Reference variables	Correlation coefficient of x(t) with the reference variable(t+i)								
		i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Total Trade Confidence Indicator	Private consumption	0.60	0.63	0.71	0.72	0.75	0.78	0.73	0.63	0.51
	Consumption of durables	0.64	0.66	0.73	0.74	0.73	0.72	0.62	0.49	0.39
	Consumption of non-durables	0.37	0.46	0.55	0.55	0.63	0.68	0.71	0.65	0.53
	GFCF	0.47	0.50	0.63	0.70	0.74	0.67	0.53	0.38	0.26
	GDP	0.54	0.61	0.68	0.68	0.80	0.71	0.62	0.58	0.44
Turnover	Private consumption	0.48	0.56	0.68	0.70	0.77	0.70	0.56	0.55	0.34
	Consumption of durables	0.54	0.62	0.71	0.68	0.73	0.66	0.48	0.47	0.25
	Consumption of non-durables	0.26	0.38	0.53	0.58	0.65	0.61	0.56	0.54	0.38
	GFCF	0.37	0.44	0.61	0.71	0.79	0.66	0.46	0.32	0.10
Order books	Private consumption	0.49	0.59	0.66	0.72	0.78	0.78	0.77	0.66	0.57
	Consumption of durables	0.56	0.65	0.70	0.72	0.77	0.73	0.68	0.57	0.48
	Consumption of non-durables	0.24	0.37	0.49	0.56	0.63	0.67	0.72	0.63	0.57
	GFCF	0.45	0.50	0.62	0.75	0.79	0.70	0.59	0.41	0.33
Current activity	Private consumption	0.72	0.80	0.85	0.84	0.81	0.75	0.66	0.55	0.42
	Consumption of durables	0.76	0.80	0.83	0.80	0.75	0.66	0.54	0.40	0.26
	Consumption of non-durables	0.47	0.63	0.72	0.72	0.73	0.72	0.70	0.65	0.54
	GFCF	0.61	0.63	0.68	0.69	0.65	0.53	0.38	0.23	0.09
	GDP	0.71	0.74	0.76	0.74	0.77	0.66	0.56	0.45	0.31
Future activity	Private consumption	0.48	0.47	0.57	0.58	0.65	0.68	0.61	0.56	0.43
	Consumption of durables	0.51	0.51	0.61	0.63	0.65	0.68	0.50	0.46	0.38
	Consumption of non-durables	0.29	0.32	0.40	0.40	0.50	0.50	0.56	0.52	0.35
	GFCF	0.29	0.31	0.54	0.62	0.73	0.72	0.53	0.38	0.31
	GDP	0.36	0.47	0.56	0.55	0.74	0.61	0.55	0.53	0.45

Table 2

CORRELATION ANALYSIS – QUALITATIVE VARIABLES AND REFERENCE SERIES

Wholesale Trade Survey	Reference variables	Correlation coefficient of x(t) with the reference variable (t+i)								
		i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Wholesale Trade Confidence Indicator	Private consumption	0.47	0.52	0.61	0.62	0.68	0.74	0.70	0.64	0.58
	Consumption of durables	0.55	0.58	0.65	0.66	0.67	0.69	0.61	0.52	0.47
	Consumption of non-durables	0.25	0.33	0.44	0.43	0.54	0.63	0.64	0.63	0.58
	GFCF	0.42	0.49	0.64	0.74	0.78	0.64	0.53	0.39	0.31
Turnover	Private consumption	0.34	0.42	0.56	0.59	0.66	0.63	0.48	0.50	0.37
	Consumption of durables	0.42	0.53	0.61	0.63	0.65	0.59	0.42	0.44	0.31
	Consumption of non-durables	0.15	0.20	0.40	0.42	0.49	0.48	0.41	0.45	0.36
	GFCF	0.25	0.35	0.56	0.73	0.79	0.64	0.44	0.31	0.18
Current activity	Private consumption	0.69	0.78	0.81	0.80	0.77	0.76	0.70	0.62	0.53
	Consumption of durables	0.74	0.80	0.81	0.78	0.72	0.67	0.59	0.48	0.36
	Consumption of non-durables	0.44	0.59	0.67	0.67	0.67	0.73	0.73	0.71	0.64
	GFCF	0.64	0.69	0.72	0.72	0.67	0.51	0.38	0.27	0.15
Future activity	Private consumption	0.33	0.36	0.45	0.46	0.56	0.57	0.50	0.47	0.42
	Consumption of durables	0.39	0.42	0.52	0.54	0.58	0.58	0.43	0.39	0.38
	Consumption of non-durables	0.15	0.18	0.27	0.25	0.37	0.37	0.42	0.41	0.35
	GFCF	0.19	0.27	0.49	0.62	0.71	0.62	0.49	0.38	0.37

Construction Survey	Reference variables	Correlation coefficient of x(t) with the reference variable (t+i)								
		i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Confidence Indicator in Construction	Consumption of durables	0.38	0.37	0.40	0.36	0.32	0.26	0.23	0.24	0.28
Activity trend vs. activity in previous months	Consumption of durables	0.36	0.40	0.47	0.43	0.34	0.26	0.24	0.29	0.39
Order books	Consumption of durables	0.38	0.36	0.37	0.32	0.27	0.21	0.17	0.18	0.20

Table 2

CORRELATION ANALYSIS – QUALITATIVE VARIABLES AND REFERENCE SERIES

Manufacturing Industry Survey	Reference variables	Correlation coefficient of x(t) with the reference variable (t+i)								
		i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Manufacturing industry Confidence Indicator	GDP	0.23	0.33	0.45	0.54	0.60	0.59	0.53	0.49	0.46
	GVA in manufacturing industry	0.37	0.39	0.39	0.39	0.39	0.34	0.27	0.23	0.18
	IPI in manufacturing industry	0.26	0.32	0.39	0.48	0.56	0.57	0.51	0.45	0.36
	GFCF	0.22	0.37	0.51	0.67	0.76	0.73	0.66	0.54	0.39
Production trend observed in recent months	GDP	0.33	0.42	0.56	0.63	0.67	0.68	0.61	0.61	0.57
	GVA in manufacturing industry	0.43	0.41	0.41	0.41	0.38	0.33	0.23	0.20	0.17
	IPI in manufacturing industry	0.26	0.31	0.40	0.50	0.57	0.56	0.49	0.43	0.31
	GFCF	0.26	0.38	0.53	0.68	0.78	0.76	0.70	0.61	0.47
Production expectations for the months ahead	GDP	0.36	0.45	0.57	0.63	0.68	0.70	0.61	0.61	0.52
	GVA in manufacturing industry	0.39	0.43	0.40	0.38	0.42	0.33	0.25	0.21	0.13
	IPI in manufacturing industry	0.27	0.34	0.40	0.48	0.55	0.51	0.46	0.41	0.32
	GFCF	0.20	0.33	0.49	0.66	0.76	0.76	0.69	0.60	0.48
Order books	GVA in manufacturing industry	0.44	0.45	0.44	0.45	0.42	0.37	0.29	0.24	0.19
	IPI in manufacturing industry	0.30	0.37	0.45	0.55	0.61	0.61	0.54	0.47	0.35
	GFCF	0.27	0.40	0.52	0.65	0.71	0.68	0.61	0.51	0.38
New orders in recent months	GVA in manufacturing industry	0.28	0.37	0.39	0.41	0.47	0.42	0.39	0.36	0.32
	IPI in manufacturing industry	0.09	0.24	0.33	0.49	0.63	0.65	0.63	0.59	0.48
	GFCF	0.12	0.29	0.44	0.62	0.71	0.67	0.61	0.51	0.42

Composite indicators	Reference variables	Correlation coefficient of x(t) with the reference variable (t+i)								
		i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Economic Sentiment Indicator	GDP	0.48	0.56	0.63	0.67	0.70	0.64	0.58	0.50	0.40
	Private consumption	0.19	0.27	0.35	0.39	0.43	0.46	0.49	0.51	0.53
	GVA in manufacturing industry	0.49	0.49	0.44	0.42	0.37	0.26	0.13	-0.05	-0.19
	GFCF	0.40	0.49	0.61	0.70	0.75	0.69	0.57	0.42	0.23
	Total employment	0.47	0.56	0.66	0.77	0.85	0.88	0.83	0.71	0.53
	Unemployment rate	0.36	0.24	0.09	-0.08	-0.25	-0.38	-0.49	-0.59	-0.67
	Savings	-0.04	-0.03	-0.01	0.05	0.10	0.13	0.14	0.15	0.13

Charts 2
QUALITATIVE INDICATORS AND YEAR-ON-YEAR RATES OF CHANGE
OF REFERENCE VARIABLES

Private consumption

Consumption of durable goods

- y-o-y rate of change - Private consumption
- - - CI Retail trade
— CI Consumers

- y-o-y rate of change - Consumption of durables
- - - CI Retail trade
— CI Consumers

Consumption of non-durable goods

IPI Manufacturing Industry

- y-o-y rate of change - Consumption of non-durables
- - - CI Retail trade
— CI Consumers

- y-o-y rate of change - IPI manufacturing industry
— CI Manufacturing Industry

GDP

GFCF

- y-o-y rate of change - GDP
— Economic Sentiment Indicator

- y-o-y rate of change - GFCF
— CI Manufacturing Industry

Note:
(a) The scale of the variables was changed in order to obtain average equal to zero and standard deviation equal to one.

that, albeit moderate, is more significant to nominal exports than to real exports (with correlation coefficients of 0.64 and 0.56 respectively)[6].

Questions results regarding price developments are of particular importance. On the one hand, the qualitative assessment of the price trends over the last 12 months is highly correlated with contemporaneous inflation; the price trends over the next 12 months, in turn, has a virtually nil correlation with actual inflation. Thus, there is no useful prospective indication in this survey. By contrast, selling price expectations for the months ahead, available in the manufacturing industry survey, show leading indications (in approximately two quarters) on developments in the CPI or in the GDP deflator itself. Finally, assessments of entrepreneurs in the trade sector regarding future developments in selling price show a positive, albeit low, correlation with developments in the CPI and in private consumption and GDP deflators.

4. NOISE/INFORMATION ANALYSIS

Opinion surveys will only be effectively usefull in the economic analysis if they make it possible to appropriately capture the trend of the macroeconomic variables. Within this scope, the fact that the latest observations of the series might reflect irregular fluctuations causes a problem, given that it can induce wrong conclusions for the assessment of the economic situation in the short term. In such cases, the higher the erratic component of the series, the greater caution should be taken in their interpretation. In particular, a higher number of recent balances of respondents will be necessary for their indications to be truly credible and capable of signalling turning points in the activity.

In order to quantify this information, use was made of the "*Months of Cyclical Dominance*" (*MCD*) measure which, in essence, consists in weighing the erratic part in the original series minus that same component. Thus, for a given Y series, the *MCD* corresponds to the ratio between the average

change in the irregular component throughout n months and the average change for the same time frame of the initial series minus that irregular component[7]. Considering a sample of T elements we have:

$$MCD_n(Y) = \frac{\sum_{k=1}^{T-n}\left|I_{k+n}^y - I_k^y\right|}{\sum_{k=1}^{T-n}\left|\left(Y_{k+n}^y - I_{k+n}^y\right) - \left(Y_k^y - I_k^y\right)\right|}$$

where Y is the original series and I its irregular component. The ratio compares the differences between the $k+n$ and k periods, in absolute terms, of the erratic component of the series with the corresponding changes in the trend-cycle (i.e. of the total series minus the irregular component).

When n is increasing, the $MCD_n(Y)$ tends to be progressively lower. When the ratios are higher than 1, the erratic component has a more important bearing on the behaviour of the series, and the n months considered will not be enough to assign confidence to the information contained therein.

For the extraction of the irregular component, use was made of the band-pass filter developed by Baxter and King (1995), where fluctuations with a frequency below 12 months[8] were considered to be that erratic part and where $k=36$, normally used for monthly data. This analysis focused on the Commission's confidence indicators and on the series of balances of respondents related to total employment, unemployment rate, savings, nominal exports and prices. Table 4 summarises the calculations made, emphasising the number of months required for the ratio to become lower than 1. Charts 4 show the irregular component and the trend-cycle of the confidence indicator series.

The following conclusions can be drawn:

(a) The consumer and manufacturing industry confidence indicators and the Economic Sentiment Indicator are less noisy, and only three months of balances of respondents are required for the *MCD* ratio to become lower than 1. This observation suggests the use of

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(6) Esteves (1988) notes that the question on the export order book is a better proxy for the year-on-year rate of change in external demand than in real exports.

(7) For this purpose, account was taken of the additive model, with a breakdown of the original series into trend, cyclical component and irregular component.

(8) Other bands were tested, such as 6 and 9-months, but the relative analysis required does not change the conclusions expressed in this article.

Table 3

CORRELATION ANALYSIS – EXPLORING ADDITIONAL VARIABLES OF QUALITATIVE SURVEYS

Year-on-year change in total employment	Correlation coefficient of x(t) with the reference variable (t+i)								
	i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Manufacturing Industry Survey									
Employment expectations for the months ahead	0.42	0.54	0.68	0.79	0.85	0.84	0.77	0.68	0.60
Retail Trade Survey									
Employment expectations for the months ahead	0.64	0.61	0.58	0.57	0.59	0.59	0.54	0.43	0.26
Wholesale Trade Survey									
Employment expectations for the months ahead	0.15	0.07	0.11	0.36	0.59	0.68	0.70	0.69	0.60
Total Trade Survey									
Employment expectations for the months ahead	0.32	0.22	0.22	0.41	0.60	0.67	0.67	0.63	0.52

Unemployment rate	Correlation coefficient of x(t) with the reference variable (t+i)								
	i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Consumer Survey									
Unemployment expectations over next months.	0.00	0.13	0.26	0.41	0.55	0.67	0.76	0.83	0.87

Saving (as a % of disposable income)	Correlation coefficient of x(t) with the reference variable (t+i)								
	i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Consumer Survey									
Savings at present	0.49	0.52	0.55	0.57	0.52	0.47	0.39	0.30	0.26
Savings over next 12 months	0.47	0.51	0.53	0.54	0.48	0.42	0.35	0.29	0.27
Major purchases at present.	0.51	0.53	0.57	0.58	0.56	0.53	0.48	0.43	0.42
Major purchases over next 12 months	0.68	0.70	0.71	0.74	0.74	0.75	0.73	0.72	0.70

Year-on-year change in nominal exports	Correlation coefficient of x(t) with the reference variable (t+i)								
	i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Manufacturing Industry Survey									
Export order book	0.16	0.34	0.53	0.62	0.64	0.53	0.38	0.21	0.04
Export expectations for the months ahead	0.24	0.47	0.54	0.62	0.64	0.55	0.44	0.28	0.15

Year-on-year change in real exports	Correlation coefficient of x(t) with the reference variable (t+i)								
	i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Manufacturing Industry Survey									
Export order book	0.05	0.23	0.42	0.52	0.55	0.45	0.31	0.16	0.02
Export expectations for the months ahead	0.11	0.37	0.44	0.52	0.56	0.46	0.38	0.23	0.11

Year-on-year change in CPI	Correlation coefficient of x(t) with the reference variable (t+i)								
	i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Consumer Survey									
Price trends over last 12 months	0.78	0.77	0.77	0.77	0.77	0.76	0.72	0.68	0.62
Price trends over next 12 months.	0.17	0.14	0.14	0.15	0.15	0.17	0.15	0.14	0.11
Manufacturing Industry Survey									
Selling price expectations for the months ahead	0.54	0.57	0.61	0.63	0.67	0.70	0.72	0.73	0.73
Wholesale Trade Survey									
Selling price.	0.00	-0.03	0.02	0.05	0.17	0.31	0.39	0.42	0.24
Total Trade Survey									
Selling price.	-0.06	-0.05	0.00	0.05	0.17	0.33	0.41	0.45	0.27

Year-on-year change in the private consumption deflator	Correlation coefficient of x(t) with the reference variable (t+i)								
	i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Consumer Survey									
Price trends over last 12 months	0.75	0.73	0.70	0.68	0.65	0.65	0.61	0.57	0.52
Price trends over next 12 months.	0.07	0.06	0.03	0.03	0.01	0.03	0.02	0.01	-0.01
Manufacturing Industry Survey									
Selling price expectations for the months ahead	0.62	0.69	0.74	0.78	0.79	0.79	0.77	0.74	0.70
Wholesale Trade Survey									
Selling price.	-0.07	0.02	0.07	0.10	0.18	0.32	0.37	0.36	0.26
Total Trade Survey									
Selling price.	-0.10	-0.02	0.02	0.05	0.15	0.30	0.34	0.34	0.25

Year-on-year change in the GDP deflator	Correlation coefficient of x(t) with the reference variable (t+i)								
	i=-4	i=-3	i=-2	i=-1	i=0	i=1	i=2	i=3	i=4
Consumer Survey									
Price trends over last 12 months	0.75	0.74	0.69	0.66	0.65	0.69	0.64	0.58	0.52
Price trends over next 12 months.	0.16	0.16	0.10	0.06	0.03	0.08	0.05	0.02	-0.02
Manufacturing Industry Survey									
Selling price expectations for the months ahead	0.48	0.54	0.63	0.68	0.73	0.78	0.79	0.79	0.75
Wholesale Trade Survey									
Selling price.	-0.25	-0.18	-0.08	0.04	0.19	0.32	0.40	0.44	0.32
Total Trade Survey									
Selling price.	-0.26	-0.17	-0.09	0.04	0.15	0.26	0.31	0.39	0.28

Charts 3

**QUALITATIVE INDICATORS AND YEAR-ON-YEAR RATES OF CHANGE
OF THE ADDITIONAL VARIABLES**
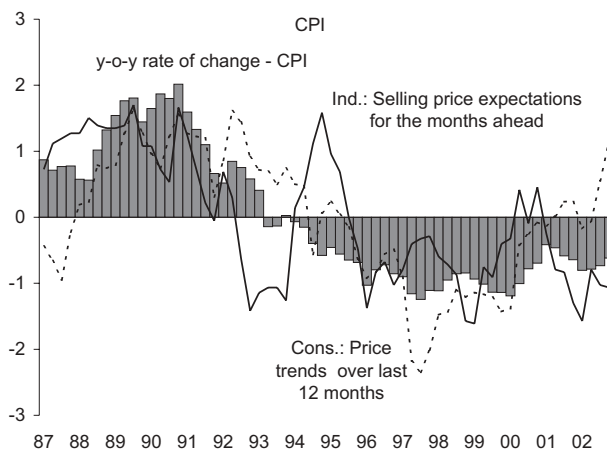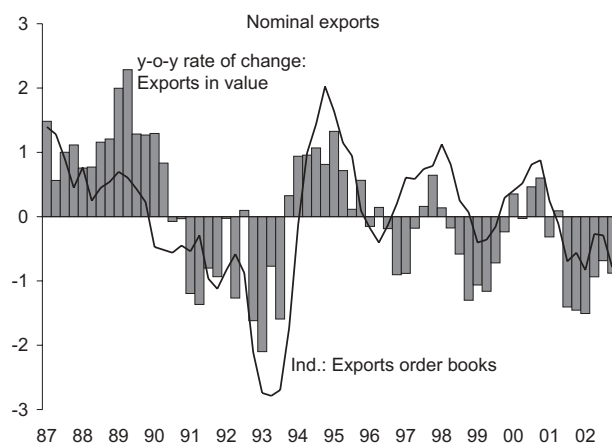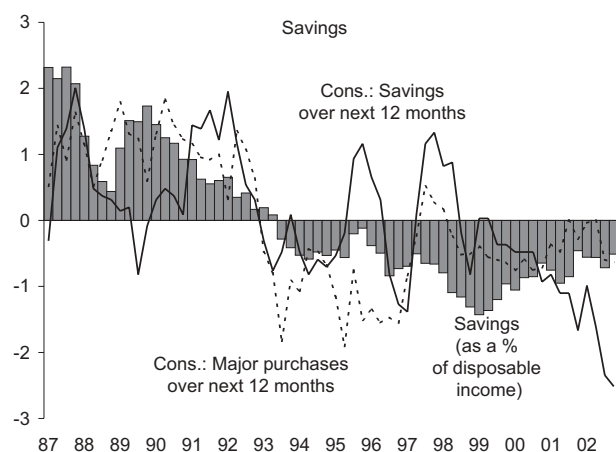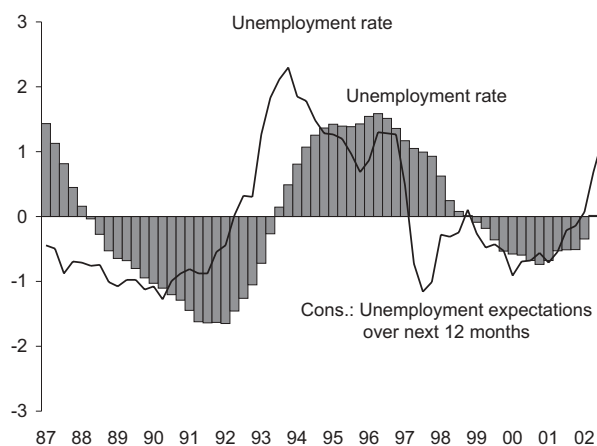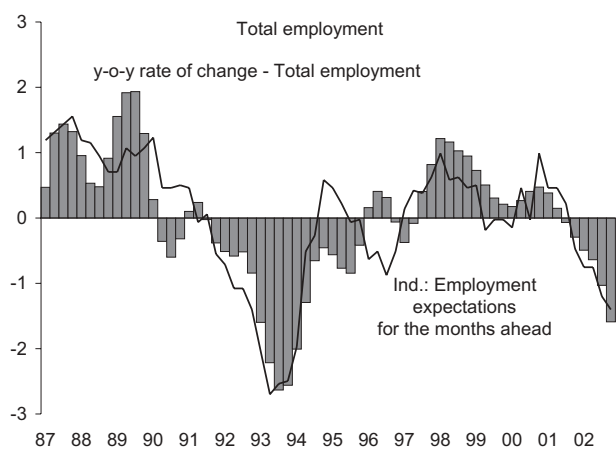
Total employment

Unemployment rate

Savings

Nominal exports

CPI

Note:

(a) The scale of the variables was changed in order to obtain average equal to zero and standard deviation equal to one.

Table 4

**IRREGULAR COMPONENT AND TREND-CYCLE**

Summary of qualitative indicators note: Trend-cycle= [12 months; + ∞ [	Number of months (n)					
	1	2	3	4	5	6
Consumer Confidence Indicator	2.06	1.30	0.88	0.72	0.64	0.53
Manufacturing Industry Confidence Indicator	2.23	1.26	0.82	0.65	0.57	0.45
Economic Sentiment Indicator	2.18	1.16	0.71	0.54	0.50	0.37
Retail Trade Confidence Indicator	4.86	2.35	1.80	1.26	0.90	0.78
Construction Confidence Indicator	5.06	2.70	1.80	1.33	1.03	0.84
Total Employment						
Manufacturing Industry Survey	1.68	1.20	0.91	0.68	0.52	0.39
Retail Trade Survey	3.62	2.59	1.78	1.52	1.30	1.05
Unemployment rate (Consumer Survey)	2.37	1.15	0.92	0.67	0.58	0.48
Exports (Manufacturing Industry Survey)	2.22	1.19	0.80	0.61	0.48	0.43
Savings (as a % of disposable income)						
Savings over next 12 months (Consumer Survey)	4.37	2.42	1.52	1.24	1.03	0.84
Major purchases over next 12 months (Consumer Survey)	4.61	2.63	1.68	1.42	0.97	0.85
Consumer Price Index (CPI) - Price trend over next 12 months						
Consumer Survey	2.79	1.60	1.10	0.80	0.69	0.57
Manufacturing Industry Survey	2.62	1.55	1.19	0.85	0.69	0.54

Charts 4

CONFIDENCE INDICATORS: RESIDUAL AND TREND-CYCLE
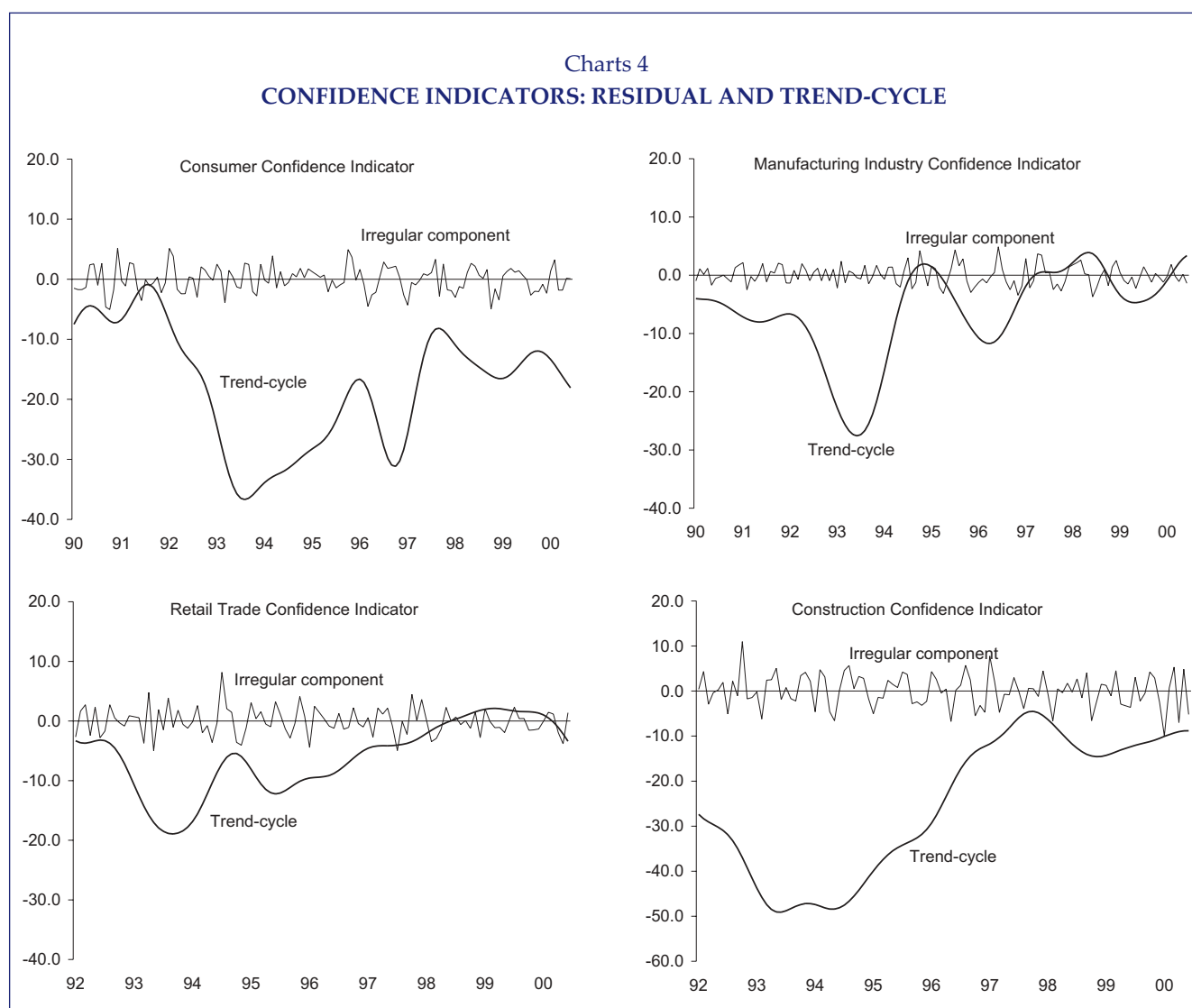
3-month moving averages in the analysis of these series;

(b) In turn, retail trade and construction confidence indicators are much affected by erratic fluctuations, wherefore the latest monthly observations of the series must be used with great caution within the scope of short term analysis. This result suggests a further exception in the use of the retail trade survey, since the correlation with the macro variables is generally quite high;

(c) Labour market series, nominal exports and manufacturing industry expectations for prices have a low irregular component. Less positive results were obtained for savings, employment in retail trade and the price level trend, when assessed by consumers.

5. PRINCIPAL COMPONENTS

The analysis of principal components makes it possible to assess to what extent responses to the various survey questions follow a common trend or if, by contrast, they contain some specific information. The degree of proximity among results can be measured by the proportion of the variance of the considered questions, which is explained by the first component.

Table 5 shows the values for the six surveys, use being initially made of the questions included in the calculation of the respective confidence indicator and, subsequently, of the whole survey.

It can be concluded that, especially for consumer, manufacturing industry and construction surveys, the proportion of variance explained by the first principal component is rather strong. This can mean that, in such cases, agents tend to respond on the basis of a general feeling of optimism or pessimism vis-à-vis the economic situation. For trade surveys, the values obtained are lower, with no significant changes when all the questions are considered. This is not the case for the first set of surveys, which explore different variables, such as employment, savings or prices.

Correlations between the principal components of the surveys and the reference variables are high,

as shown in Charts 5 for private consumption and GDP, even exceeding the coefficients calculated for the Consumer Confidence Indicator (from 0.78 to 0.82) and the Economic Sentiment Indicator (from 0.72 to 0.77). These results suggest that the current definition of confidence indicators – based on the calculation of simple arithmetic means – may not be the most appropriate to establish direct relationships with the reference macroeconomic aggregates.

6. CONCLUSIONS

The analysis carried out throughout this study showed that:

(a) Information contained in qualitative opinion surveys is extremely useful to monitor the short term economic analysis;

(b) Reference should be made, in particular, to the strong statistical association – coincident or leading (generally in one quarter) – between balances of respondents of the consumer survey and the various components of private consumption (with values close to 0.80);

(c) With regard to activity, qualitative indicators, in general, do not provide leading indications. However, since they are made available with some lead on quantitative indicators, developments in these series eventually provide more timely indications on output behaviour. The most useful information is taken from the manufacturing industry survey from the question on production expectations for the months ahead and from the Economic Sentiment Indicator, which summarises the general economic situation;

(d) Opinion surveys also make it possible to explore additional variables. For example, the manufacturing industry survey provides information with a relative lead on short-term price developments;

(e) Most surveys also show leading indications on developments in employment. In addition, consumers anticipate in a fairly accurate manner future developments in the unemployment rate;

(f) Questions on the exports order books and on exports expectations for the months

Table 5

PROPORTION OF THE VARIANCE OF THE SET OF QUESTIONS EXPLAINED
BY THE FIRST MAIN COMPONENT

Period	Survey	Questions included in the calculation of the Confidence Indicator	All the survey questions
1987:01 a 2003:06	Consumption	0.81	0.63
1987:01 a 2003:06	Manufacturing Industry	0.83	0.76
1989:01 a 2003:06	Construction	0.87	0.73
1989:01 a 2003:06	Retail Trade	0.62	0.67
1994:06 a 2003:06	Wholesale Trade	0.58	0.54
1994:06 a 2003:06	Total Trade	0.64	0.59

Charts 5
FIRST MAIN COMPONENT AND QUANTITATIVE SERIES
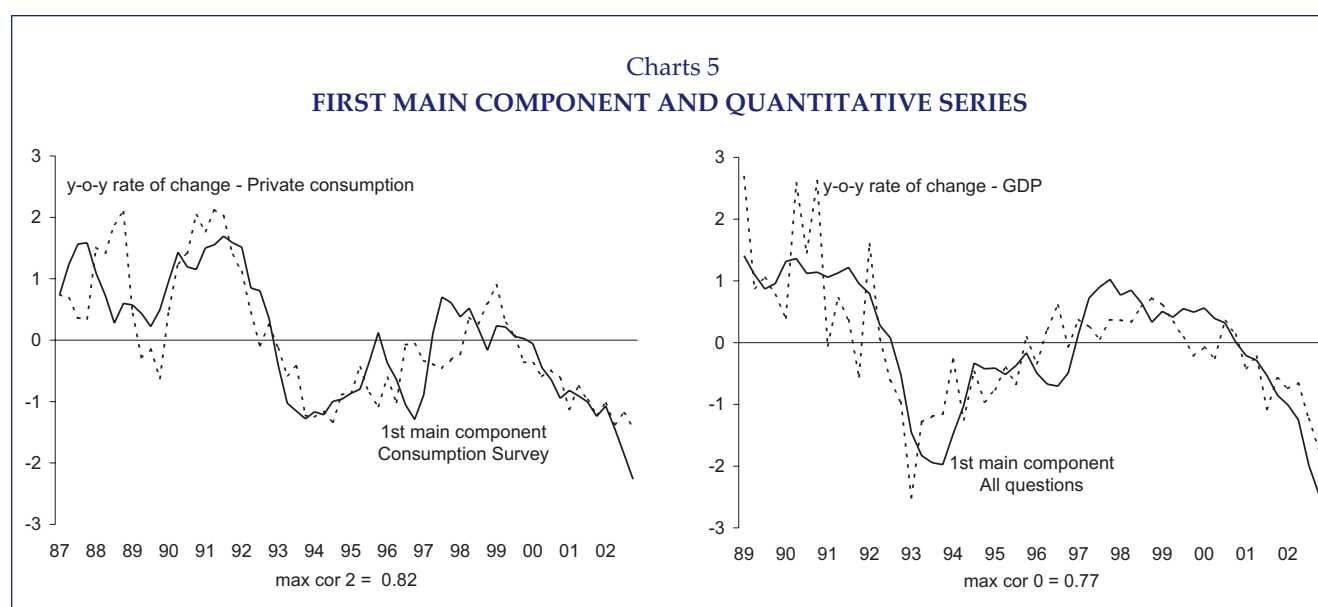
ahead show some statistical association with the growth rate of exports, especially when expressed in nominal terms;

(g) With a view to assessing the quality of survey responses, a noise/information ratio was calculated. Results show that consumer and manufacturing industry confidence indicators and the Economic Sentiment Indicator have a less important irregular component, thereby providing overall adequate indications for the analysis of the short-term behaviour of the associated variables. In such cases, only three months of responses are required in order to have an effectively informative interpretation of the indicators;

(h) Retail trade and construction surveys have a weaker performance compared with other surveys, not only because statistical associations are lower, but also because the irregular component of the series is quite high;

(i) The analysis of principal components suggests that survey responses develop more or less in parallel. Thus, in all questions, economic agents tend to express their general sentiment vis-à-vis the current economic environment;

(j) Confidence indicators constructed on the basis of the simple arithmetic mean methodology are not always the best proxies for the variables under analysis in the Portuguese

case. In fact, the preliminary results shown in Section 5 suggest that individual survey questions, if more efficiently combined, might show a stronger statistical association with the macroeconomic variables of interest.

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