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European *Business Cycle* indicators

SHORT - TERM ANALYSIS FROM EUROPEAN COMMISSION'S DIRECTORATE GENERAL FOR ECONOMIC AND FINANCIAL AFFAIRS

Developments in business and consumer survey data in 2014Q4

- Both the EU and the euro-area Economic Sentiment Indicator (ESI) remained broadly stable over the fourth quarter of 2014. At the end of 2014, the EU ESI remained comfortably above the long-term average of 100 (at 104.2), while the headline indicator for the euro area scored a value of 100.7, just above its historical average.
- At EU sector level, confidence in industry, services and among consumers barely changed, while retail and construction confidence improved slightly over the quarter. Euro area developments were similar, except for rising confidence in services.
- Compared to September's readings, the ESI barely changed in three of the seven largest EU economies (Germany, France and Italy). The indicator picked up in the Netherlands, Spain and, to a greater extent, Poland; by contrast, it weakened in the UK.
- Capacity utilisation in the manufacturing sector was unchanged in October and remained below its long-term average in the EU and the euro area. Capacity utilisation in services continued its upward trend with an increase over the quarter in both areas.
- Manufacturing managers foresee positive growth rates for real investment in both European aggregates. For the euro area, managers expect a 1.7% increase for 2014 and a further 2.8% increase in 2015. For the EU, survey results point to positive growth of 3.9% in both 2014 and 2015.

Highlight: Evaluation of the forecast content of the bi-annual investment survey

The highlight section aims at assessing the usefulness of bi-annual data on (real) investment plans collected in the framework of the Joint Harmonised EU Programme of Business and Consumer Surveys (BCS) to forecast equipment investment growth rates. Using data for selected EU countries, covering about 90% of the EU-28 in terms of investment in equipment, the analysis shows that the BCS investment projections tend to go in the right direction with respect to the growth/acceleration rates of the target series. Moreover, BCS projections seem to convey additional forecast-relevant information to the projections of equipment investment in the European Commission's Economic Forecasts.



Note 1: The horizontal line (rhs) marks the long-term average (=100) of the sentiment indicator.

Note 2: Both ESI and y-o-y GDP growth are plotted at monthly frequency. Monthly GDP data are obtained by linear interpolation of quarterly data.

"European Business Cycle Indicators" provides short-term analysis based on Business and Consumer Survey data. It appears quarterly.

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1. Recent developments in survey indicators for the EU and the euro area

After the stabilisation over April to June/July 2014, the EU and the euro-area Economic Sentiment Indicators (ESI) embarked on a downward trend in the third quarter of 2014. Since then, the deterioration came to a halt due to the slight increase in October and the virtually flat developments in November and December. At the end of 2014, the EU ESI remained comfortably above the long-term average of 100 (at 104.2), while the headline indicator for the euro area scored a value of 100.7, just above its historical average.

Compared to the readings at the end of the third quarter of 2014, the ESI registered marginal gains in the EU (+0.6 points) and the euro area (+0.8 points). Though the evolution in individual months varied slightly, the quarterly profile of the ESI is broadly in line with both the results of the Ifo Business Climate Index (for Germany), and Markit Economics' Composite PMI for the euro area.

At the sector level, the largely flat development of the sentiment index in the EU over the quarter was backed by barely changed sentiment in industry, services and among consumers. Construction confidence booked an increase for the second consecutive quarter; also confidence in retail trade improved somewhat. In the euro area, sectoral developments paralleled those in the EU, except for confidence in services, which picked up relative to the end of the third quarter of 2014. These similarities notwithstanding, all EU indicators currently score around or above their corresponding historical mean, while euro-area service and construction confidence indexes turn out to be well below their long-term average.

At the country level, sentiment improved in three of the seven largest EU economies compared to September. Sentiment brightened in Poland (+3.3) and, to a lesser extent, the Netherlands (+2.2) and Spain (+1.6). After its historical high in June, the UK ESI has been weakening almost monotonically, scoring a further small loss (-1.6) over the fourth quarter. In Germany, France and Italy the headline indicators barely changed.

Sector developments

Over the fourth quarter of 2014, **industrial** confidence for the EU and the euro area lost ground in December after the moderate gains booked in October and November. Compared to September 2014, the indicator scored only marginal positive changes in both the EU (+0.6 points) and the euro area (+0.3 points), prolonging the roughly horizontal trend which characterised the second half of 2014.

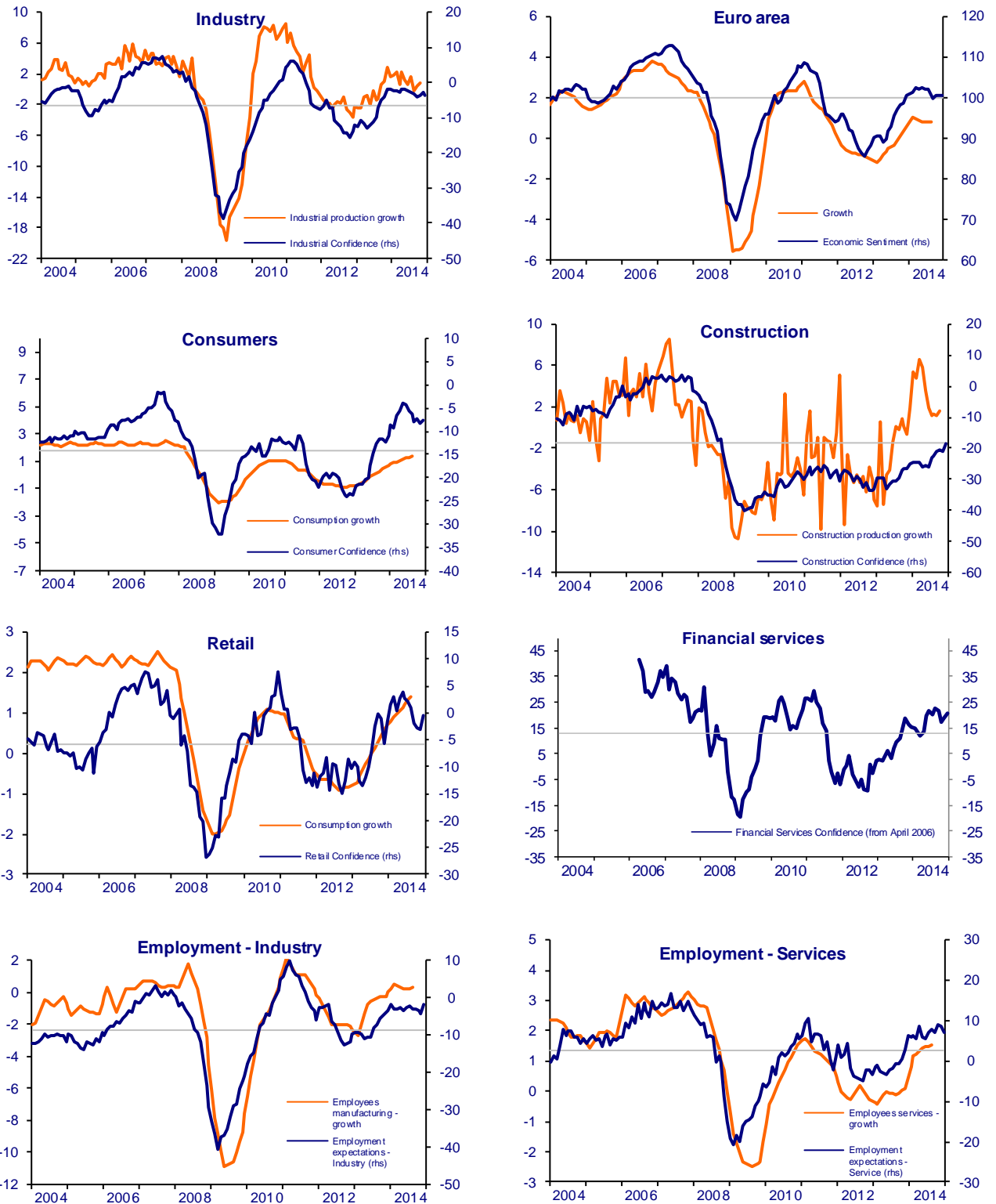
In both European aggregates, managers' production expectations and their assessment of the stocks of finished products remained broadly unchanged over the quarter. Despite a downward correction in December, EU/euro area managers' assessment of the current level of order books improved thanks to the gains recorded in October and November. Managers' assessments of export order books were revised upwards in both areas, while managers' appraisal of past production trends declined in the EU and remained broadly flat in the euro area. Also selling price expectations were revised downwards in both areas; by contrast, employment expectations were virtually flat in the EU and improved in the euro area. In the seven largest EU countries, compared to the end of the third quarter 2014, confidence increased slightly (of about 1 or 2 points) in the Netherlands, the UK, Poland, Italy and Spain; by contrast, the indicator remained almost unchanged in Germany and Spain.

The October results for the quarterly manufacturing survey showed that **capacity utilisation in manufacturing** in the EU and the euro area remained broadly stable (at 80.2 and 80.0%, respectively) compared to the third quarter. In both cases, the level was slightly below the long-term average (80.8 and 81.1%, respectively).

In the fourth quarter of 2014 confidence in **services** remained broadly flat in the EU and increased slightly in the euro area. Nonetheless, the EU currently scores around its historical average, while confidence in the euro area remains below the long-term mean. Having increased in both areas in October, services confidence paused in November. It increased again markedly in December in the euro area, but remained unchanged in the wider EU. As for the individual components of the confidence index, EU managers' views on the past business situation and expected demand improved while their assessment of past demand declined slightly; by contrast, the euro area recorded an upward revision of all components. Looking at the largest EU countries, compared with September 2014, confidence brightened in Spain and the Netherlands (+7.6 and +5.8, respectively). More moderate gains (of about one point) were recorded for France and Italy, while Germany and Poland saw the indicator broadly unchanged. By contrast, confidence plummeted in the UK (-6.7) for the second quarter in a row.

The October readings of the quarterly survey on **capacity utilisation in services** signalled further continuation of the upward tendency that started in early 2013, with an increase of the indicator in both the EU (by 0.7 points to 88.4%) and the euro area (by 0.5 points to 87.8%).

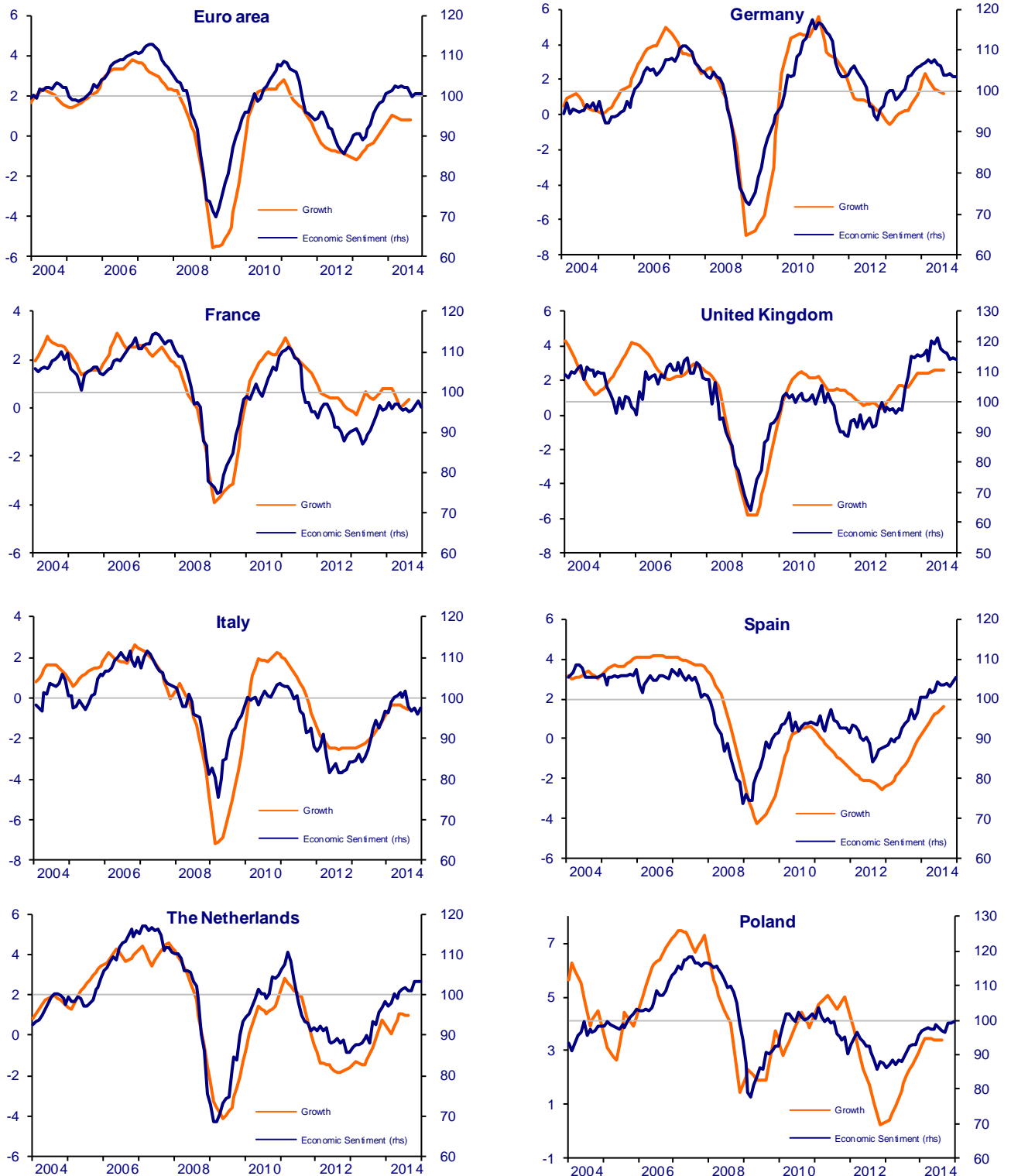
Graph 1.1: Sectoral confidence indicators and reference series for the EU (January 2004 to December 2014 for survey data)



Note 1: The horizontal line (rhs) marks the long-term average of the survey indicators.

Note 2: Confidence indicators are expressed in balances of opinion and hard data in y-o-y changes. If necessary, monthly frequency is obtained by linear interpolation of quarterly data.

Graph 1.2: **Economic Sentiment Indicator — Selected EU Member States**
(January 2004 to December 2014 for survey data)



Note 1: The horizontal line marks the long-term average (=100) of the sentiment indicator.

Note 2: Confidence indicators are expressed in balances of opinion and GDP in y-o-y changes. Both variables are plotted at monthly frequency. Monthly GDP data are obtained by linear interpolation of quarterly data.

Retail trade confidence increased in the fourth quarter of 2014 in both the EU and the euro area. While the plus in the EU was due to a single marked increase in December, the euro area scored three increases in a row over the quarter. Improved confidence in both areas resulted from positive developments in managers' appraisal of both past and expected business activity; managers' views on the adequacy of their volume of stocks worsened. Confidence improved markedly over the quarter in France and Italy (+5.4 and +10 points compared to September); Spain, the Netherlands and Poland experienced more moderate improvements. The UK saw confidence broadly unchanged, while it plummeted in Germany.

Compared to the end of the third quarter of 2014, confidence in **construction** improved in both the EU and the euro area. For both aggregates the indicator increased in October (especially in the euro area) and December, while it registered a loss in November. The increases were fuelled by marked improvements in managers' employment expectations and more optimistic views on current order books. Focusing on individual countries, the indicator in Spain, Germany, the UK, the Netherlands and, to a much lesser extent, Poland picked up; by contrast, Italy and, especially, France booked losses.

In both the EU and the euro area, confidence among **consumers** remained broadly stable in the fourth quarter of 2014, resulting from improvements in October and December and declines in November. This pattern was backed by broadly unchanged expectations about unemployment and savings. Consumers' expectations about the general economic situation improved slightly in both areas, while their views on expected personal financial situation increased in the EU and remained broadly unchanged in the euro area. Confidence improved in France, Spain and, particularly, Poland. Germany and the UK saw the indicator virtually unchanged compared to September, while in Italy and the Netherlands the indicator declined.

After the loss registered in the third quarter of 2014, EU confidence in **financial services** (not included in the ESI) stabilised over the fourth quarter. This outcome was backed by managers' broadly unchanged assessments of expected demand and past business situation, while their assessment of the past demand improved. In the euro area, confidence increased compared to September 2014 thanks to managers' more optimistic views on past demand and past business situation, partially offset by a downward revision of their appraisal of expected demand.

The developments in survey data over the fourth quarter are illustrated by the evolution of the climate tracers. The economic climate tracer for the EU moved into the downswing quadrant (see Annex 1

and Annex 2 for further details). This movement was driven mainly by the climate tracers for industry and retail trade. Also the climate tracer for services and consumers entered the downswing quadrant. On the contrary, the climate tracer for the construction sector remained in the upswing area moving in the direction of the expansion quadrant. For the euro area, the overall economic climate tracer is located in proximity to the origin of the axes (i.e. pointing to a stable situation around the historic average level). In contrast to the EU, the euro-area consumer climate tracer is still in the upswing quadrant, while the climate tracer for the service sector is just on the border between the upswing and the contraction areas. At the country level, the climate tracers for Germany and the UK moved further into the downswing area. Italy pointed to the contraction quadrant directly from the upswing quadrant, while the French tracer has been stuck between the contraction quadrant and the upswing quadrant. A more positive cyclical situation emerges for Spain, the Netherlands and Poland, where the indicator remains in the expansion quadrant.

2. Recent developments in selected Member States

During the fourth quarter of 2014, sentiment has improved in Spain, the Netherlands and Poland, while it remained broadly unchanged in Germany, France, and Italy. Only the UK saw a deterioration of the indicator. The sentiment index scored above its long-term average in Germany, Spain, the Netherlands and the UK.

In **Germany**, the ESI increased in October, dropped in November and remained stable in December, resulting in an unchanged situation over the quarter. The indicator remains above its long-term average of 100, at 103.7 points. Confidence remained stable in industry, services and among consumers. Construction registered a sizable increase, which was offset by the deterioration in retail trade.

Economic sentiment in **France** remained broadly flat compared to September 2014, resulting from gains in October and November almost outweighed by an important loss in December. At 96.1 points, the sentiment index remained clearly below its long-term average of 100. Confidence worsened in construction, while it improved in the other business sectors and among consumers.

In the **United Kingdom** sentiment decreased in the fourth quarter compared to September 2014 due to a marked drop in October followed by virtually flat developments in November and December. Yet, the indicator remains well above its long-term average of 100, at 114.4. Worsened sentiment resulted from an important downward revision in services partially

offset by improvements in industry and construction. Confidence in retail trade and among consumers remained broadly unchanged.

December's reading of the ESI pointed to a broadly stable development compared to the end of the third quarter in **Italy**. This outcome resulted from a somewhat volatile pattern with an increase in October, followed by a marked decline in November and an important recovery in December. The sentiment index remained below its long-term average of 100, at 97.5 points. At sector level, confidence improved markedly in retail trade and, to a lesser extent, industry and services, while it decreased in construction and among consumers.

Compared to September 2014, the ESI in **Spain** improved, resulting from a mild loss recorded in October that was followed by important gains registered in November and December. At 105.6 points, the sentiment indicator is well above its long-term average of 100. Confidence remained virtually flat in industry, while it registered gains in all remaining business sectors and among consumers. Notably confidence in retail trade reached its historical high in December 2014 (at +10.0).

In the **Netherlands**, sentiment improved over the fourth quarter of 2014. The ESI increased markedly in October, while it remained flat in November and December. At 103.4, the indicator remains comfortably above its long-term average. At sector level, sentiment improved in all business sectors; by contrast, consumer confidence declined.

Sentiment in **Poland** improved markedly in October, remained stable in November and scored a further increase in December, resulting in an important gain compared to September. Nonetheless, the ESI continues to score slightly below its long-term average at 99.7. All surveyed sectors, except for services that remained broadly unchanged, marked positive changes on a quarterly basis; confidence brightened also among consumers.

3. Results of the autumn 2014 EU Investment Survey in the manufacturing sector

Developments in overall investment

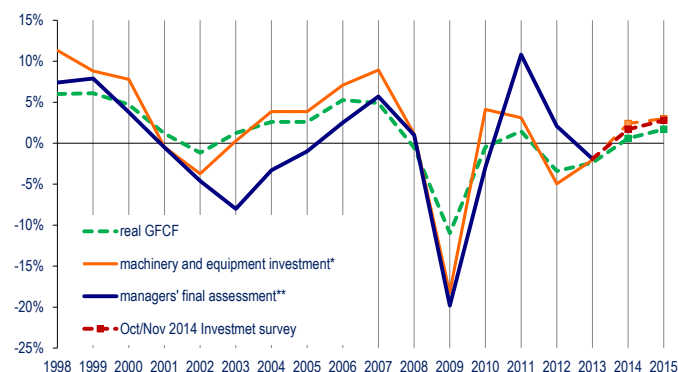
According to the latest Investment Survey carried out in October/November 2014, real manufacturing investment in the euro area is expected to have increased by 1.7% in 2014 compared with 2013. Concerning 2015, manufacturers expect a further increase in investment of around 2.8% (see Graph 3.1). Compared with the previous survey conducted in March/April 2014, managers revised downwards their assessment for 2014 (by 6.1 pp). Results for the EU are more optimistic as managers anticipate an increase of 3.9% for investment in 2014 (down from

7.6% in March/April) and expect a further increase of 3.9% for 2015.

The results from the investment survey are not directly comparable with available Eurostat figures on investment growth. The Investment Survey covers only investment by manufacturing companies and therefore only roughly 40% of total gross fixed capital formation (GFCF) in the economy; a Eurostat breakdown for GFCF in the manufacturing sector is not available. Instead, investment in 'machinery and equipment and weapons systems' can be used as a rough proxy for investment activity in the manufacturing sector. Compared to total GFCF, investment in these activities typically reacts stronger to the business cycle, a feature that is likely also for manufacturing investment. Nevertheless, there is no full congruency between the two concepts.

Graph 3.1 presents manufacturing managers' estimates of investment growth for 1998-2013 (surveyed in March/April of each subsequent year) along with Eurostat estimates for GFCF and 'machinery and equipment and weapons systems' investment in the euro area, plus the respective Autumn Commission forecasts and the latest survey result for 2014 and 2015.

Graph 3.1: Growth in real gross fixed capital formation (GFCF) and surveyed change of investments in the euro area (annual changes in %)



*Real GFCF in transport equipment and other machinery and equipment.

**Mar/Apr year t surveys, managers' assessment of investment in year t-1.

Source: Commission services.

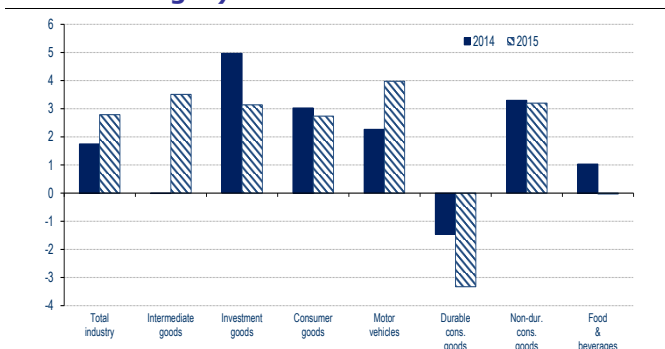
Until 2002, manufacturing managers' assessments were quite close to the outcomes of the two investment series. Between 2003 and 2006, managers underestimated past investment growth. Prior to the crisis in 2007 and up to 2010, the graph shows a good fit between the series again, apart from the underestimation by manufacturing managers of the recovery in machinery and

equipment investment dynamics in 2010. For 2011 and 2012, the results from the Investment Survey were significantly above the Eurostat figures, while for 2013, results from the Investment survey were closely aligned again. Currently, manufacturing managers' plans (+1.7% in 2014 and 2.8% in 2015) are slightly higher than the Commission's Autumn forecasts for GFCF (+0.6% in 2014 and 1.7% for 2015), while marginally lower than the Commission's forecasts for investment in 'machinery and equipment and weapons systems' (+2.4% in 2014 and 3.0% in 2015). Available data for total investment in the first three quarters of 2014 indicate annual growth rates of +0.6% for the EA and 2.4% for the EU.

Investment dynamics by sectors in the euro area

Looking at the sectoral breakdown of the survey (see Graph 3.2), the consumer goods and investment goods sectors are reported to have registered an increase (of 3.0% and 5.0%, respectively) in investment in real terms in 2014, while investment in the intermediate goods sector has remained stable. Managers in the motor vehicle sector – which is part of the investment goods sector – estimated an increase in investment of around 2.3%. The increase in the consumer goods sector is the result of a decrease of 1.5% in the durable consumer goods sector and an increase of 3.3% in the non-durable consumer goods sector. Within the latter, investment increased by 1.0% in the food and beverages sub-sector.

Graph 3.2: **Surveyed change of investments in the euro area by sectors (annual % changes)**



Source: Commission services.

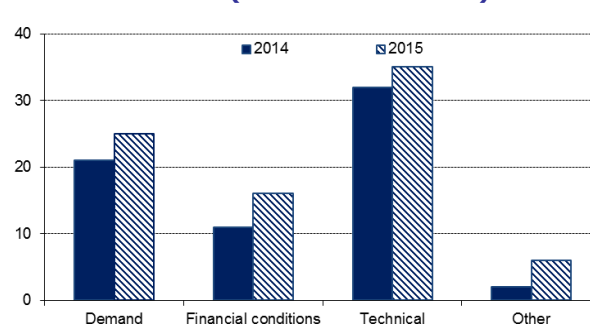
For 2015, managers in all three sectors expect to increase their investment: by 3.5% in the intermediate goods sector, 3.1% in the investment goods sector and 2.7% in the consumer goods sector. At sub-sector level, investment in the durable consumer goods sector is forecast to decrease further by 3.3%, while in the non-durable goods sector investment should increase by 3.2%. Rises in investment are foreseen also in the motor vehicle (+4.0%) branch of investment goods while in the

food and beverages branch investment should remain unchanged.

Factors influencing investments

The autumn Investment Survey also provides information on the factors influencing investment, namely: demand, financial resources (availability and cost of financing, opportunity costs of investment, etc.), technical (e.g. technological developments and the availability of labour) and other factors (e.g. taxation and the possibility of moving production abroad). For both 2014 and 2015, all the factors are reported as stimulating investment in the euro area (see Graph 3.3). In addition, all the four factors became more supportive in 2014 compared with 2013 and are expected to stimulate investment even more positively in 2015 than in 2014.

Graph 3.3: **Factors influencing investment in the euro area (balance statistic*)**



*Balances are the weighted averages of the percentages of answers describing each factor as 'very stimulating' (coefficient 1), 'stimulating' (0.5), 'limiting' (-0.5) and 'very limiting' (-1).

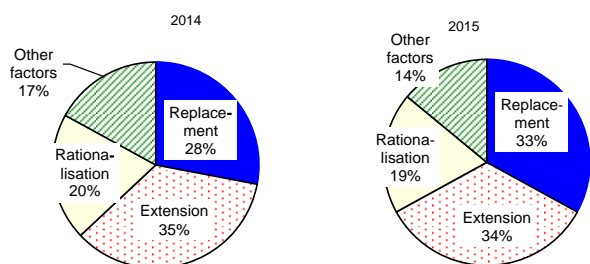
Source: Commission services.

Investment structure

Firms are also asked to assign their investments to four categories: replacement of worn-out plant or equipment, extension of production capacity, investment designed to streamline production (rationalisation), and other investment objectives (pollution control safety, etc.).

For 2014, the largest share of investments has gone to extension purposes (35%), followed by replacement (28%), rationalisation purposes (20%) and other objectives (17%). Compared to 2013 there has been a shift from rationalisation objectives to extension purposes, which was mainly due to a change in the allocation of Spanish investments. The structure of investment is expected to change somehow in 2015: a larger share will serve replacement investment (33%), while the share for extension purposes (34%) and rationalisation (19%) should remain broadly stable and only 14% will be used for other investment objectives (see Graph 3.4).

Graph 3.4: Investment structure in the euro area (percentage of total investment)



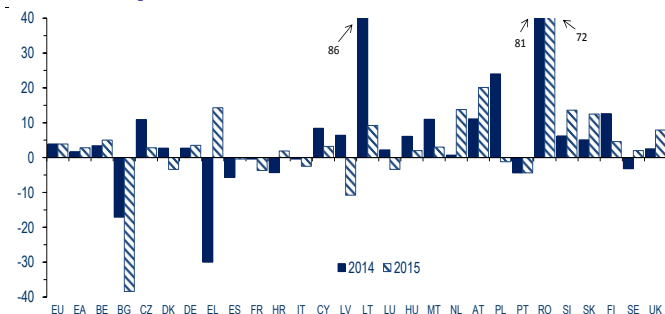
Source: Commission services.

Developments by country

At country level, the picture is rather positive for both 2014 and 2015 with managers in most countries reporting an increase in real investment.

For 2014 only three countries in the euro area and six in the EU have reported decreases. For 2015 the number of countries expecting a decrease slightly increases to five in the euro area and eight in the EU (Graph 3.5).

Graph 3.5: Surveyed change of investments in the EU Member States (annual changes in %) (1)



(1) Data for Estonia are under verification.

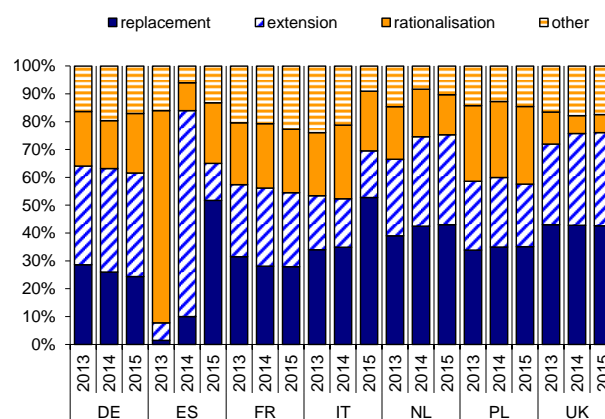
Source: Commission services.

Among the largest Member States manufacturing managers assessed their investment in 2014 to have increased in Poland (+24%), the Netherlands (+11%), Germany (+3%) and the UK (+2%), while managers in France and Italy reported an unchanged situation in 2014 compared with 2013. Only managers in Spain estimated a decrease (-6%). For 2015, managers in Germany, the Netherlands and the UK expect to further increase their investment by, respectively, 4%, 14% and 8%. Investment is foreseen to decrease in France (-4%), Italy (-3%) and Poland (-1%), while Spanish managers expect their investment volumes to remain stable in 2015.

The structure of investment in 2014 varies across countries (see Graph 3.6). Investments have mainly

served extension purposes in Germany and Spain. In France extension investment has been as important as replacement investment, while in Italy, the Netherlands, Poland and the UK investments have been driven mainly by replacement needs. For 2015, the picture remains broadly the same. The main change concerns Spain, where a much larger share of investments is foreseen for replacement purposes, while the importance of extension investment should drop to around 13%.

Graph 3.6: Structure of investments in the big Member States in 2013, 2014 and 2015 (share in %)

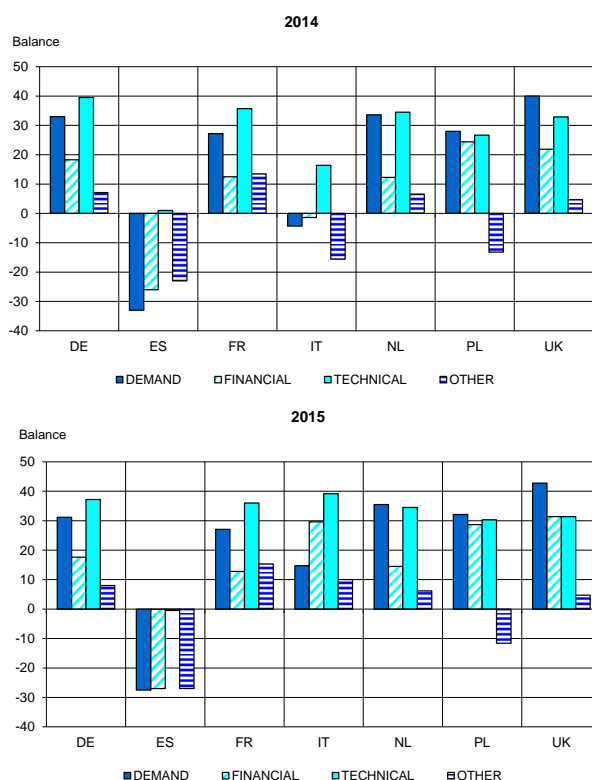


Source: Commission services.

Graph 3.7 shows which factors are stimulating or limiting investment in the largest Member States in 2014 and 2015.

For 2014, demand and financial conditions were considered as stimulating investments in Germany, France, the Netherlands, Poland and the UK, while they were assessed as a limiting factor only in Spain and, to a lesser extent, Italy. Technical factors stimulated investment in all the largest Member States. Finally, other factors (e.g. taxation and the possibility of moving production abroad) were seen as limiting in Spain, Italy, and Poland but as stimulating in Germany, France, the Netherlands, and the UK. These patterns change very little for 2015. The main exception is Italy, where managers expect demand, financial conditions and other factors to become supportive of investment.

Graph 3.7: Factors influencing investment decisions in large EU Member States in 2014 and 2015 (balance statistic)

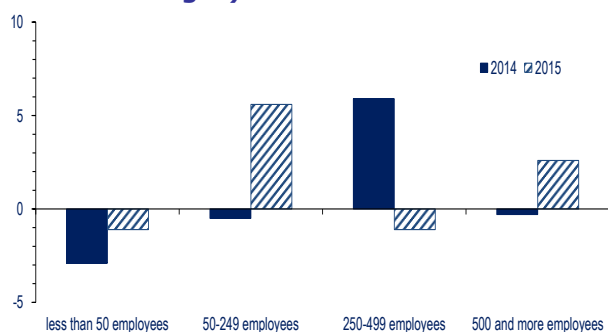


Source: Commission services.

A closer look at developments in investment by enterprise size

According to the survey, only large firms (employing between 250 and 499 people) experienced an expansion in real investment in 2014 (see Graph 3.8).

Graph 3.8: Surveyed change of investments in the euro area by company size (annual % changes)



Source: Commission services.

Small and medium -sized enterprises (respectively, those employing up to 50 and between 50 and 249 people) experienced a decrease of around 3% and 1%, respectively. Very large enterprises (employing

more than 500 people), reported a broadly unchanged situation compared with 2013. For 2015 this structure changes somewhat: while managers of small-sized firms expect a further decrease of 1%, also large enterprises project to slightly reduce their investments by 1%. On the other hand, medium and very large-sized enterprises expect an increase in real investment of 6% and 3%, respectively.

As visible in Graph 3.9 - which shows the breakdown by size of enterprises across countries - the decrease in 2014 among small enterprises is mainly due to a strong decline (-17%) for small enterprises in Spain and to a lesser degree to decreases in Germany and the Netherlands.

Graph 3.9: Surveyed change of investments in large EU Member States by size (annual % changes)



Source: Commission services.

Also the decrease among medium-sized firms is mainly due to a large decrease (-20%) of medium enterprises in Spain. By contrast, the decline reported for very large enterprises is rather broad-based across countries, with only German and, particularly, Polish managers expecting investment to have increased in 2014. Concerning large firms, investments should have increased in all the large Member States, expect for Italy and Spain where investment has remained broadly unchanged. For 2015, the decrease expected among small firms results from decreases in Spain, France, Italy and Poland, while managers of small enterprises in Germany, the Netherlands and the UK expect to increase their investments. Concerning the other size

classes, expectations are generally positive with a few exceptions: notably, French managers expect to decrease their investment in 2015 compared to 2014 across all size classes. Moreover, managers in large German enterprises foresee a small reduction of their investment.

4. Highlight: Evaluation of the forecast content of the bi-annual investment survey

Investment spending plays a crucial role in economics since it affects both fluctuations in aggregate activity at business-cycle horizons and (future) long-term growth. Modelling and forecasting investment is also relevant for policy makers as it is widely recognised that a pre-requisite for a strong and well-balanced pace of economic growth relies on a significant contribution from the business sector in the form of increasing private investment.

International evidence, however, suggests that forecasting business investment is a notoriously difficult task, due to the high volatility of this component of GDP. One way to potentially improve forecasts of business investment is to use survey data. The underlying idea is that survey data on firms' investment plans should work as a leading indicator for the real variable being forecasted. In addition, to the extent that the survey data is released before hard statistical data is available for a given period, the results should be very useful for short-term analysis and forecasting purposes.

The predictive power of survey data for the real economy has been analysed in a number of studies, both within and out-of-sample.¹ However, so far only a few studies have investigated the potential role of investment-related survey data in forecasting investment growth for the case of European economies. By examining the information content of a range of qualitative investment indicators and other investment related survey indicators, Barnes and Ellis (2005) concluded that several indicators contain information about the path of investment and can usefully supplement official statistical data when

¹ See, among others, Ludvigson, S. (2004), "Consumer Confidence and Consumer Spending", *Journal of Economic Perspectives* 18, 29-50; Dreger, C. and Schumacher, C. (2005), "Out-of-sample Performance of Leading Indicators for the German Business Cycle: Single vs. Combined Forecasts", *Journal of Business Cycle Measurement and Analysis* 2005/1, 71-87; Siliverstovs, B. (2013), "Do Business Tendency Surveys Help in Forecasting Employment? A Real-Time Evidence for Switzerland", *Journal of Business Cycle Measurement and Analysis* 2013/1, 1-20.

interpreting recent movements in investment.² Abberger (2005) investigated whether survey-based capacity assessments can be useful for a timely analysis of current investment behaviour and for forecasting investment growth in the short term. He documented that managers' capacity assessments are a valuable tool for tracking investment growth.³ Using French data, Ferrari (2005) proposed a quarterly indicator based on revisions of firms' investment plans that was found to be closely correlated with the quarterly evolution of official business investment figures.⁴ Focusing on aggregate euro-area data, augmented by a partial analysis of some of its large Member States, Friz and Gayer (2007) highlighted the valuable contribution of survey data in short-term forecasting exercises.⁵ More recently, Brunner and Schwarz (2012) pointed to the inability of Austrian firms in anticipating their investment behaviour: while relatively small investors tended to overestimate their future and present investments, an overall tendency of underestimation of actual investments emerged for the case of large investors.⁶

Against this backdrop, this highlight section aims at comparing survey-based forecasts to ex-post realizations of the reference series for private investment mimicking a real-time context for a number of countries over a given forecasting horizon. Specifically, data collected in the framework of the Joint Harmonised EU Programme of Business and Consumer Surveys (BCS) are conceived as a direct tool for forecasting investment in manufacturing (i.e. they do not enter a forecasting model, but represent the outcome of the forecast itself). As for the reference series, spending in equipment investment (metal products, machinery and transport) is used to approximate investment activity in the manufacturing sector. In order to conduct the analysis in a real-time framework, ex-post realisations for a given year t are

² Barnes, S. and C. Ellis (2005), "Indicators of short-term movements in business investment", Bank of England Quarterly Bulletin, Spring, 30-38.

³ Abberger, K. (2005), "The Use of Qualitative Business Tendency Surveys for Forecasting Business Investment in Germany", ifo Working Paper No. 13, June.

⁴ Ferrari, N. (2005), "Forecasting Corporate Investment: An Indicator Based on Revisions in the French Investment Survey", *Journal of Business Cycle Measurement and Analysis*, 2, 277-305.

⁵ Friz, R. and C. Gayer (2007), "The harmonised EU investment survey: What can it tell us about investment growth in the euro area?", DG-ECFIN mimeo, European Commission.

⁶ Brunner, R. and G. Schwarz (2012), "Investment Oddity: The future's uncertain ... even for corporations", paper presented at the 31st CIRET Conference, Vienna.

given by the estimates published in the first edition of the subsequent year (i.e. $t+1$). Finally, the analysis covers a 14-year horizon (2000-2013) for 14 EU countries.

The empirical evidence shows that forecast errors (i.e. the differences between reference series and survey-based forecasts) are often important and tend to be systematically positive or negative, depending on the forecast horizon. Despite this biasedness, BCS investment projections tend to go in the right direction with respect to the growth/acceleration rates of the target series and clearly outperform naïve models (where forecasts are generated by using constant and/or lagged terms of the target series). Moreover, they seem to convey additional information to the projections of equipment investment published by the European Commission (EC).

Data

Since 1966 the EC has been collecting data on annual investment plans in the manufacturing sector within the framework of the BCS Programme.

The investment survey is carried out twice a year - in March/April ("Spring" - S) and in October/November ("Autumn" - A) - among about 44,000 companies in the manufacturing industry sector. In more detail, the Spring questionnaire asks for the percentage change in investment of the company from year $t-2$ to $t-1$ (S1) and from year $t-1$ to t (S2). The Autumn questionnaire asks for the percentage change in investment of the company from year $t-1$ to t (A1) and from year t to $t+1$ (A2).⁷ According to this scheme, four consecutive estimates of investment growth are available for each year, out of which one is a backcast (S1), two are nowcasts (S1 and A1) and one is a forecast (A2). For a given year, the results of the survey carried out in Spring are available at the end of April and the results of the Autumn survey are available at the end of November. The A1, S1, and A2 cases can be thought of as

⁷ The Autumn questionnaire also contains a question on the type of investment (replacement, extension, technical progress, and others) planned in years t and $t+1$ and a question on the factors driving investment (demand, profitability, technical factors, and others) in years t and $t+1$. In a large number of countries, the survey is carried out as an attachment to the industry survey, using the same panel of companies. In some countries, however, samples are different and in one country (Sweden), the two surveys are conducted by different institutes. For a complete overview of this survey see the DG-ECFIN "Methodological User Guide" available at: http://ec.europa.eu/economy_finance/db_indicators/surveys/documents/bcs_user_guide_en.pdf.

corresponding roughly to two, eight, and fourteen month-ahead projections, respectively.

Regarding questions on the percentage change of investment, in the absence of any further information, it is assumed that companies report nominal changes rather than real (inflation-adjusted) changes. Indeed, many companies would probably find it hard to provide figures on the growth of real investment. From these nominal changes (values), real investment growth (volumes) is derived by deflating survey's results with the investment deflator taken from DG ECFIN's AMECO database.⁸

Using investment spending in real terms has two main advantages: i) it is of higher economic interest than its nominal counterpart; ii) it makes it possible to compare changes in investment plans surveyed by the BCS programme to macroeconomic forecasts published by international organisations and/or private analysts. Specifically, projections taken from the Spring and Autumn editions of the European Economic Forecasts published by the EC for both the current year and the year ahead are used as competing forecasts.

In order to ensure consistency with the survey-based forecast, for a target year t , only projections from the Spring and Autumn current-year forecasts (reported in year t) and the Autumn next-year forecasts (reported in year $t-1$) are considered. Since official investment breakdowns by branches do not include the manufacturing sector as such, equipment investment (metal products, machinery and transport) is chosen as the reference series to approximate investment activity in the manufacturing sector. Finally, choosing real-time data or the latest vintage data might influence the size and the interpretation of the forecast error, particularly when the economic aggregate under analysis is subject to significant data revisions. Since forecasts should be judged by their ability to predict the early releases of data (rather than the later revisions), the first-available data for a given year t reported in the Spring forecast exercise of the following year ($t+1$) is used.

Some descriptive statistics

Data refer to the period 2000-2013 for selected European countries: Austria (AT), Belgium (BE), Germany (DE), Greece (EL), Spain (ES), Finland (FI), France (FR), Italy (IT), Luxembourg (LU), the Netherlands (NL), Portugal (PT), Denmark (DK), Sweden (SE), and the United Kingdom (UK). These economies cover about of 90% of EU-28 in terms of

⁸ DG ECFIN's macro-economic database can be found at: http://ec.europa.eu/economy_finance/db_indicators/ameco/index_en.htm

equipment investment. When considering the euro area-18 aggregate, the coverage is even higher (96% of the region).

The most direct manner to use changes in investment plans is to assume that firms' forecasts correspond to the outcomes as reflected in the (later) national accounts. Accordingly, the evaluation of BCS forecasts starts with the calculation of the traditional accuracy indicators based on the forecast error (*fer*), defined as the difference between the outcome/actual value (*act*) and the BCS forecast. For each target year *t*, we analyse three different forecast errors corresponding to three different forecasting horizons ($h=A1, S1, A2$). According to this notation, the forecast error can be written as:

$$fer(h,t)=act(t)-bcs(h,t) \quad (1)$$

where *bcs(.)* indicates changes in investment plans surveyed by the BCS programme.

The mean error (ME), the mean absolute error (MAE), the root mean squared error (RMSE), and the Theil-inequality coefficient (TI) are considered. Since RMSE are scale-dependent measures, RMSE have been adjusted by the standard deviation of outcomes so as to take into account the variability of the series being forecasted. Moreover, using the standardised version of RMSE makes it possible to ensure comparability across vintages and countries (Koutsogeorgopoulou, 2000).⁹ The Theil-inequality coefficient (Theil, 1966) compares the forecasts to a naïve no-change forecast (the last rate of change known at the time of forecasting), where a coefficient smaller than one indicates the superiority of the forecasts compared to the benchmark.¹⁰

Panel A of Table 1 reports the evaluation statistics for the ME. In general, mismatches between estimates and outcomes are expected due to the different coverage of the survey (investment in the manufacturing industry) and the reference series (total equipment investment). Nevertheless, some clear patterns emerge: i) ME do not tend to decline as the forecasting horizon shortens; ii) A1 projections have in general positive ME (over-pessimistic forecasts); iii) on the contrary, S1 forecasts tend to be overoptimistic; iv) MEs greater than 10 percentage points occur for some countries (notably Italy); v) these exceptionally large ME are generally positive, thus pointing to a significant negative bias, i.e. underestimation of the outcomes.

⁹ Koutsogeorgopoulou, V. (2000) A post-mortem on economic outlook projections, OECD Economics Department Working Papers, No. 274.

¹⁰ Theil, H. (1966) *Applied Economic Forecasting*, North Holland, Amsterdam.

For most countries, the 1-year ahead forecasts show higher MAE than those for nowcasts (with the exceptions of Austria, Finland, Netherlands and Portugal) (Panel B). Moreover, for a group of four countries (namely Greece, Spain, Italy and Luxembourg) MAE turn out to be well above 10 percentage points in all three vintages, pointing to a limited ability to predict the *level* of the target series.

Table 1: Descriptive statistics

	Panel A: ME			Panel B: MAE		
	A1	S1	A2	A1	S1	A2
AT	2.814	-0.907	-1.586	6.314	6.893	5.500
BE	6.664	-6.050	-9.150	8.036	7.693	11.036
DE	-2.114	-3.757	-2.350	4.486	6.129	6.364
EL	14.650	-4.170	-6.479	19.607	12.145	12.650
ES	8.479	-5.152	-4.386	13.664	18.148	14.529
FI	1.600	2.686	-0.700	10.400	9.714	7.614
FR	4.507	-0.050	2.843	4.864	2.779	4.700
IT	10.407	14.771	14.321	11.021	14.771	14.321
LU	5.445	-7.434	5.416	15.155	14.838	18.212
NL	0.200	-9.950	-3.243	9.829	12.150	9.714
PT	13.886	6.407	4.714	14.200	10.764	8.114
DK	-2.486	-5.300	4.529	6.271	8.486	8.814
SE	-0.443	-4.107	3.757	4.957	7.364	6.900
UK	-3.257	-2.279	-3.836	5.357	4.836	7.050
	Panel C: RMSE			Panel D: TI		
	A1	S1	A2	A1	S1	A2
AT	1.230	1.367	1.076	0.456	0.481	0.493
BE	2.168	1.968	2.633	0.694	0.566	0.643
DE	0.648	0.804	0.893	0.332	0.446	0.633
EL	1.751	1.218	1.158	0.654	0.497	0.579
ES	1.982	2.580	2.108	0.735	0.742	0.737
FI	1.843	1.561	1.259	0.570	0.528	0.581
FR	1.122	0.663	1.076	0.454	0.287	0.639
IT	1.878	2.241	2.358	0.594	0.612	0.636
LU	1.218	1.135	1.469	0.516	0.519	0.606
NL	1.442	1.601	1.337	0.606	0.596	0.682
PT	2.191	1.591	1.337	0.592	0.536	0.521
DK	0.943	1.245	1.283	0.399	0.464	0.695
SE	0.704	0.988	1.017	0.345	0.452	0.578
UK	0.806	0.688	1.079	0.486	0.414	0.699

Source: European Commission.

According to the (adjusted) RMSEs, the forecasting performance differs markedly across countries: the largest values (close to or greater than 2) are found for Italy as well as Belgium, Spain and Portugal; by contrast, changes in investment plans yield relatively more accurate predictions for Sweden, the UK, France and Germany.

Finally, TI are computed so as to evaluate changes in investment plans with respect to available alternative forecasts, serving to establish a minimum level of accuracy that a forecast should have. As Panel D shows, TI are in all countries smaller than one, pointing out that *bcs* are better than naïve 'no-change' forecasts.

All in all, the exploratory analysis based on simple descriptive statistics suggests that forecast errors are often important and systematically positive or negative, i.e. forecasts are biased. At the same time, changes in investment plans do contain useful information (at least compared to a naive alternative). The econometric evaluation in the next sections addresses these issues in more detail.

Qualitative accuracy measures

A key requirement for useful forecasts is that they should go in the right direction with respect to the growth/acceleration rates of the series being forecasted. In order to give a first insight into the directional accuracy of survey-based forecasts, i.e. the correctness of the projected growth rates of investment in equipment, Table 2 presents the correlation coefficients between *bcs* and ex-post realisations for the three vintages (A1, S1 and A2).

Table 2: Correlation between BCS forecast and ex-post realisations

	A1	S1	A2
AT	0.762	0.675	0.486
BE	0.448	0.478	0.345
DE	0.800	0.710	0.517
EL	0.110	0.597	0.413
ES	0.053	0.099	-0.008
FI	0.615	0.663	0.322
FR	0.868	0.846	0.390
IT	0.535	0.789	0.607
LU	0.547	0.473	0.346
NL	0.307	0.474	0.029
PT	0.770	0.568	0.487
DK	0.490	0.314	0.039
SE	0.760	0.622	0.420
UK	0.698	0.766	0.212

Source: European Commission.

Changes in investment plans tend to move closely to the target series. In most countries, the correlation coefficients for nowcasts (A1 and S1) are above 0.5 (and larger than 0.8 for France), while the degree of association worsens markedly in the year-ahead projections (A2). There is also confirmation of a good tracking performance for Sweden, the UK, France and Germany; by contrast, correlation coefficients for Spain are very low (for the current-year cases) or even negative (for the year-ahead case).

Further evidence on the degree of directional accuracy provided by the BCS investment survey can be drawn from the analysis of contingency tables. Directional data for both forecasts and ex-post realisations can be arranged in a 2x2 matrix, in which the two columns represent positive and negative/null changes in the outcome (act+, act-) and the two rows represent positive and negative/null changes in the forecast (bcs+, bcs-):

$$\begin{array}{ccc}
 & \text{act-} & \text{act+} \\
 \text{bcs-} & n1 & n2 \\
 \text{bcs+} & n4 & n3
 \end{array} \quad (2)$$

from which the following directional accuracy rates can be computed: $p(\text{all})=(n1+n3)/n$, $p(\text{up})=n3/(n2+n3)$, $p(\text{down})=n1/(n1+n4)$, where n indicates the total number of observations. When the number of cases in the diagonal ($n1$ and $n3$) in condition (2) is sufficiently large compared to n , the forecasts can be considered to be directionally accurate. To test this feature, a χ^2 independence test was run.¹¹

Table 3 reports these metrics computed for both growth and acceleration rates for the three successive surveys considered.

Table 3: Directional accuracy statistics

	GROWTH RATES								
	Frequencies				Directional accuracy rates			χ^2 test	
	Correct		Incorrect		$p(\text{all})$	$p(\text{up})$	$p(\text{down})$	stat	Pval
	$n1$	$n3$	$n2$	$n4$					
A1	59	70	48	19	0.658	0.593	0.756	23.2	0.000
S1	43	90	28	35	0.679	0.763	0.551	20.0	0.000
A2	44	76	42	34	0.612	0.644	0.564	8.3	0.004

	ACCELERATION RATES								
	Frequencies				Directional accuracy rates			χ^2 test	
	Correct		Incorrect		$p(\text{all})$	$p(\text{up})$	$p(\text{down})$	stat	Pval
	$n1$	$n3$	$n2$	$n4$					
A1	66	58	28	30	0.681	0.674	0.688	37.5	0.000
S1	66	59	27	30	0.687	0.686	0.688	39.1	0.000
A2	59	46	40	37	0.577	0.535	0.615	17.0	0.000

Source: European Commission.

Overall, the survey results provide a good reflection of investment growth rates (Table 3 - upper part). The percentage of cases where the surveys indicate the correct sign of investment growth is reasonably high, ranging between 61 (for the year-ahead vintage) and 66-68 (for the nowcast cases). Looking at the directional accuracy rates by distinguishing between positive and negative rates, the share of correct cases ranges between 55 and 76%. Investment plans from the investment survey indicate correctly the cyclical development in equipment investment as well (Table 3 - lower part): the direction of change indicated by the nowcasts is correct in about 68% of cases. The result for the year-ahead vintage is less clear-cut (around 58%), although similar to the results for growth rates.

¹¹ The null hypothesis is that the signs of the two series are independent; see Carnot, N., Koen, V. and Tissot, B. (2005), *Economic Forecasting*, Palgrave MacMillan, p. 240.

Finally, the rejection of the null hypothesis of the χ^2 -based independence test suggests the existence of statistically significant association between the actual and the predicted direction of change. Hence, it can be concluded that forecasts are directionally accurate.

Economic content of the investment survey: comparison with respect to naïve alternatives

The above findings show that the results of the investment survey can be used to get insights into the current and future course of investment activity, with respect to turning points, accelerations or decelerations. This section investigates whether the individual vintages of investment survey results embed economic value when forecasting actual investment growth (despite their apparent).

Under the standard assumption of a quadratic objective function, forecasts can be called 'optimal' when they are unbiased and forecast errors are serially uncorrelated (Timmermann, 2007).¹² Even if this is not the case, forecasts might be economically valuable if their quality is superior to alternative forecasts. The obvious alternative is a naïve one, consisting in an extrapolation of the most recent observation. The question about the information content of any particular forecast (in our case changes in investment plans surveyed within the BCS programme) thus boils down to whether the difference between this forecast and the last available realization reduces, in a statistically significant way, the errors of the forecast of the target variable.

To map from the survey results to investment growth we use basic regression methods, allowing for any bias by including a constant. Specifically, the regression approach proposed by Vuchelen and Gutierrez (2005) is applied to test the information content of BCS forecasts.¹³ This information content is defined as the difference between the survey forecast and a benchmark forecast. The chosen framework has two main advantages:

Firstly, since the sign of the coefficient of the information content reveals how the direction of the forecasts differs from the direction of the realization, the decomposition of the forecasts can also be viewed as incorporating a directional test. Secondly, the extension to multi-period forecasts is

¹² Timmermann, A. (2007), 'An evaluation of the World Economic Outlook forecasts', *IMF Staff Papers*, 54, 1–33.

¹³ Vuchelen, J. and Gutierrez, M.-I. (2005) A direct test of the information content of the OECD forecasts, *International Journal of Forecasting*, 21(1), 103–18.

straightforward: a test of the quality of the year-ahead forecast can be viewed as a joint test on the forecast performance based on three elements: i) the last realization; ii) the current year compared to the last realization; iii) the year-ahead forecast compared to the forecast for the current year.

More formally, the relevant regressions read:

$$act(t) = a_1 + a_2 \times act(t-1) + a_3 \times [bcs(h,t) - act(t-1)] + u(t) \quad (3)$$

for $h=A1, S1$ and

$$act(t+1) = a_1 + a_2 \times act(t-1) + a_3 \times [bcs(h,t) - act(t-1)] + a_4 \times [bcs(h,t) - bcs(h,t-1)] + u(t+1) \quad (4)$$

for $h=A2$ and where $u(\cdot)$ is the error term. The first adjustment $[bcs(h,t) - act(t-1)]$ in (3) and (4) reflects how forecasters see current growth to differ from the last observed growth rate. The second adjustment $[bcs(h,t) - bcs(h,t-1)]$ in (4) measures how forecasters see growth next year to differ from the growth forecasted for the current year.

Equations (3) and (4) are used to test for four relevant economic hypotheses: unbiasedness (H1), extrapolative growth model (H2), random walk specification (H3), encompassing test (i.e. dominance in terms of economic content) of survey-based forecasts over the extrapolative growth model (H4). Under H1, forecasts are unbiased, meaning that $a_1=0$ and $a_2=a_3=1$ for the current year growth forecast (3), while the conditions are $a_1=0$ and $a_2=a_3=a_4=1$ for the 1-year-ahead forecast (4). The extrapolative growth model (H2) describes the situation when forecasts do not add any information to the most recent observation; then a_3 must be 0 for the current year forecasts and the restriction $a_3=a_4=0$ should not be rejected for the 1-year-ahead forecasts. If, in addition, $a_2=0$, the best available forecast is a random walk - in levels since $act(t)$ is a rate of growth - with a_1 as the drift parameter (H3). On the contrary, valuable current year survey forecasts (H4) imply that the restriction $a_2=a_3$ must not be rejected in the regression (3), while valuable year-ahead forecasts require that $a_2=a_3=a_4$ in (4).

The estimation results of conditions (3) and (4) are collected in Table 4, where robust standard errors are reported in parentheses and p-values in square brackets. The central part of the table provides some diagnostic tools, including the adjusted coefficient of determination (R^2_{adj}), the F-test for the joint non-significance of the regressors entering the model (Ftest), the Durbin-Watson statistics (DW) and the total number of observations (Nobs).

The coefficient of determination shows that one-fifth of the variation in growth in equipment investment is captured in the two nowcasts; for the year-ahead

case, the adjusted R^2 is even lower (about 10%). However, no regression suffers from autocorrelation. All adjustment terms are statistically significant; furthermore, they all come out positive, indicating that these adjustments are directionally correct. Looking at the test for the hypotheses H1-H4, results indicate that: i) changes in investment plans are biased forecast; ii) despite their bias, there is no empirical support for naïve models (H2 and H3 are both rejected); iii) on the contrary, BCS forecasts encompass the naïve alternatives; iv) these conclusions hold true for all three vintages (A1, S1 and A2).

Table 4: Economic content: comparison with respect to naïve alternatives

	A1	S1	A2
a1	1.511 (0.468)	-0.372 (0.486)	0.572 (0.738)
a2	0.360 (0.097)	0.388 (0.107)	0.036 (0.143)
a3	0.292 (0.055)	0.296 (0.054)	0.180 (0.042)
a4	.	.	0.241 (0.047)
R2adj	0.217	0.244	0.088
Ftest	[0.000]	[0.000]	[0.000]
DW	1.877	1.892	1.877
Nobs	182	182	168
H1	[0.000]	[0.000]	[0.000]
H2	[0.000]	[0.000]	[0.000]
H3	[0.000]	[0.000]	[0.000]
H4	[0.633]	[0.395]	[0.214]

Source: European Commission.

Economic content of the investment survey: comparison with respect to the EC's forecasts

The previous section has compared BCS forecasts to an alternative projection given by previous values of the target series. Obviously, the choice of the alternative model can be modified. Here the focus is on the assessment of the relative performance of survey-based forecasts compared to the EC's European Economic Forecasts (*eef*).

While the previous assessment of *bcs* with respect to naïve alternatives served to test if BCS investment plans have a 'minimal' information content, the use of *eef* represents a very strong benchmark since *eef* are forecasts made explicitly for the target series of interest (equipment investment).

Using the same regression-based approach as above, the regressions for current year and year-ahead forecast evaluation become:

$$act(t) = b_1 + b_2 \times eef(h,t) + b_3 \times [bcs(h,t) - eef(h,t)] + u(t) \quad (5)$$

for $h=A1, S1, A2$. Model (5) is used to test two polar hypotheses. The first hypothesis (H5) tests for $b_2=b_3$ such that *eef* would not play a role and would be encompassed by the survey-based forecasts. The second one, H6, conversely, aims at assessing whether changes in investment plans do not convey additional information to the one embedded in the EC's forecasts by testing the restriction $b_3=0$. Estimation results are reported in Table 5, where robust standard errors are in parentheses and p-values in square brackets.

Table 5: Economic content: comparison with respect to EC's forecasts

	A1	S1	A2
b1	0.475 (0.393)	-0.909 (0.491)	-1.796 (0.640)
b2	1.014 (0.046)	0.981 (0.063)	1.123 (0.075)
b3	0.057 (0.032)	0.102 (0.026)	0.111 (0.043)
R2adj	0.789	0.585	0.261
Ftest	[0.000]	[0.000]	[0.001]
DW	1.896	2.146	2.166
Nobs	196	196	196
H5	[0.000]	[0.000]	[0.000]
H6	[0.079]	[0.000]	[0.010]

Source: European Commission.

The empirical evidence is consistent across vintages. As expected, EC's forecasts *eef* are found to contain forecast-relevant information, as witnessed by the statistical significance of the b_2 parameter. As for H5, the restriction $b_2=b_3$ can be rejected at the conventional level of significance so that *bcs* projections fail to encompass *eef*. Conversely, $b_3=0$ can also be rejected, implying that changes in BCS investment plans add information to *eef*. These results are confirmed by the p-values collected in the rows labelled "H5" and "H6" (except for the case of A1 forecasts, where *bcs* is found to be informationally redundant at the 5% level of significance).

Taken together, the evidence for testing the 'extreme' hypotheses H5 and H6 points to a somewhat intermediate case where changes in investment plans seem to convey additional information to the economic projections published by the EC.¹⁴

Conclusions

This analysis has provided some preliminary cross-country evidence on the usefulness of survey data on

¹⁴ Due to their timing, (Spring and Autumn) *eef* cannot take into account investment plans surveyed in the (Spring and Autumn) bi-annual investment surveys.

changes in investment plans to predict equipment investment growth rates. Survey-based forecasts are found to be biased, especially for Italy, but highly correlated with the reference series (except for Spain). They clearly outperform naïve alternatives; moreover information taken from the investment survey seems to provide additional information compared to the projections published by the EC in its European Economic Forecasts.

The presented analysis only looked at country-specific investment forecasts. Future research could usefully include an analysis of the relative forecast accuracy of the published survey figures for European aggregates, including comparisons to "synthetic" aggregates where less performing country data might be discarded. The reported evidence also calls for a better understanding of the sources behind cross-country differences in terms of forecasting accuracy.

Annex 1: The Economic Climate Tracer

The graphs below show the economic climate tracer for the EU (including sectoral components), the euro area and the seven largest EU Member States.

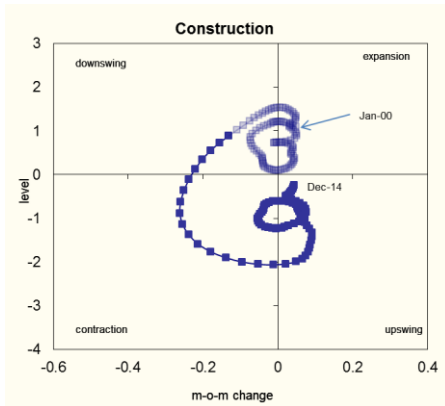
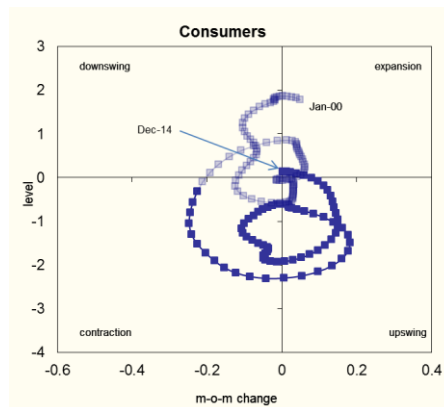
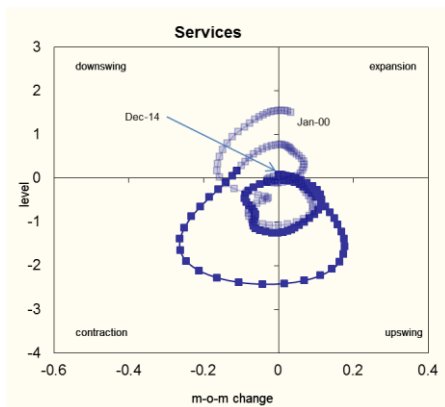
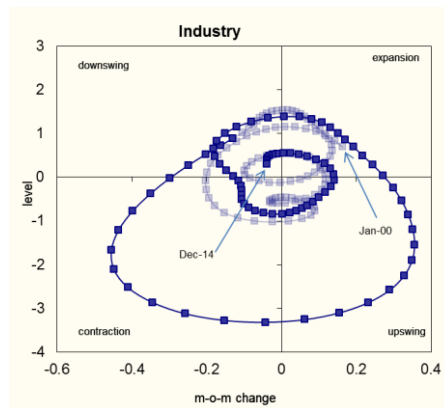
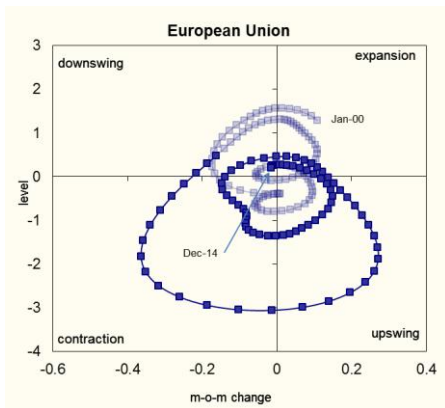
The series levels are plotted against their first differences (m-o-m changes), so that each chart depicts — at the same time — the current stance of the sector/country and its most recent dynamics. Series are smoothed to eliminate short-term fluctuations.

The four quadrants of the graphs enable to distinguish four phases of the business cycle: "expansion" (top right quadrant), "downswing" (top left), "contraction" (bottom left), and "upswing" (bottom right).

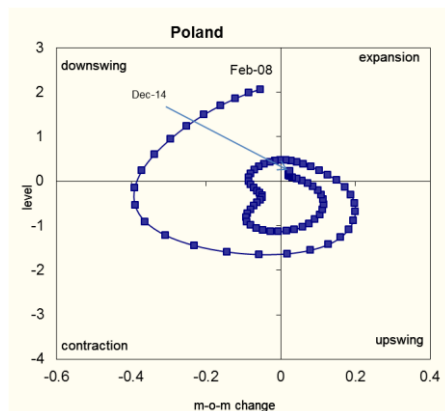
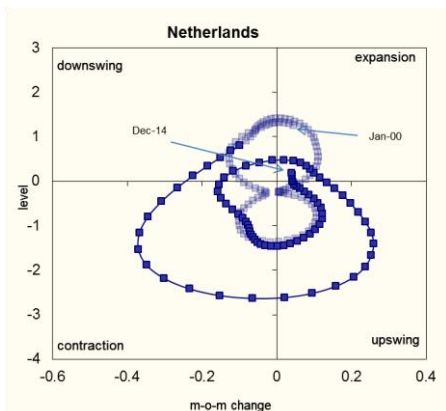
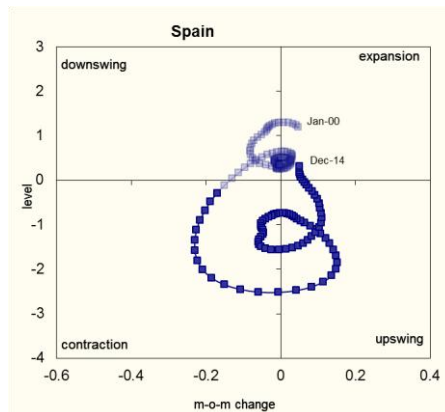
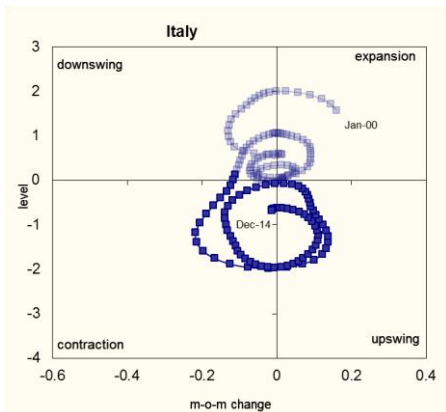
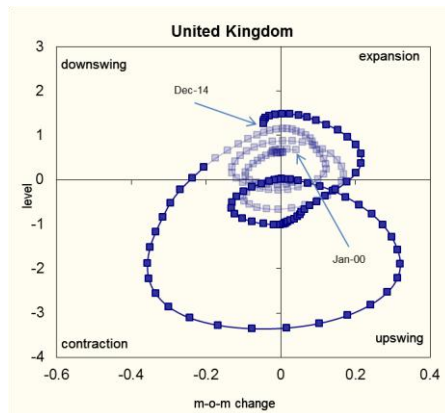
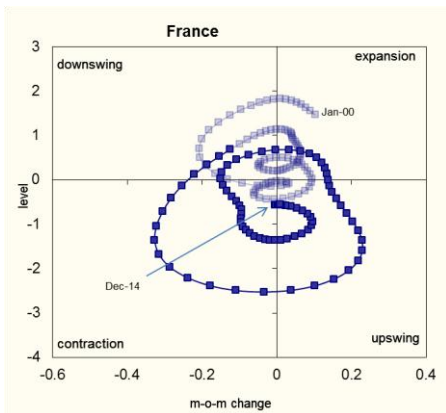
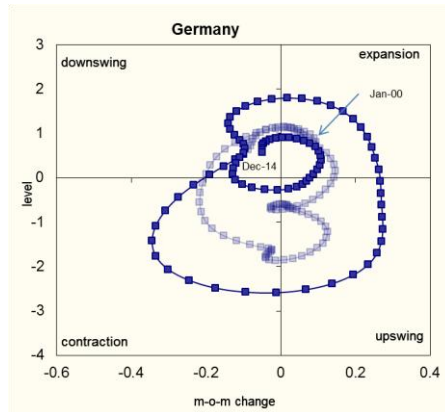
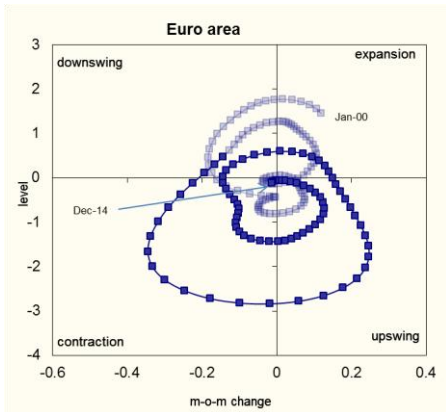
Cyclical peaks are positioned in the top centre of the graph, and troughs in the bottom centre.

In order to make the graphs more readable, two colours have been used for the tracer. The darker line shows developments in the current cycle, which in the EU and euro area roughly started in January 2008.

Economic climate tracer across sectors, EU



Economic climate, largest EU Member States



Annex 2: Reference series

The reference series are from Eurostat, via Ecwin:

Confidence indicators	Reference series (volume/year-on-year growth rates)
Total economy (ESI)	GDP, seasonally- and calendar-adjusted
Industry	Industrial production, working day-adjusted
Services	Gross value added for the private services sector, seasonally- and calendar-adjusted
Consumption	Household and NPISH final consumption expenditure, seasonally- and calendar-adjusted
Retail	Household and NPISH final consumption expenditure, seasonally- and calendar-adjusted
Building	Production index for building and civil engineering, trend-cycle component

Economic Sentiment Indicator

The economic sentiment indicator (ESI) is a weighted average of the balances of replies to selected questions addressed to firms and consumers in five sectors covered by the EU Business and Consumer Surveys Programme. The sectors covered are industry (weight 40 %), services (30 %), consumers (20 %), retail (5 %) and construction (5 %).

Balances are constructed as the difference between the percentages of respondents giving positive and negative replies. The Commission calculates EU and euro-area aggregates on the basis of the national results and it seasonally adjusts the balance series. The indicator is scaled to have a long-term mean of 100 and a standard deviation of 10. Thus, values greater than 100 indicate above-average economic sentiment and vice versa. Further details on the construction of the ESI can be found at:

[Methodological guides - Surveys - DG ECFIN website](#)

Long time series of the ESI and confidence indicators are available at:

[Survey database - DG ECFIN website](#)

Economic Climate Tracer

The economic climate tracer is a two-stage procedure. The first stage consists of building economic climate indicators. These are based on principal component (PC) analyses of balance series (s.a.) from the surveys conducted in industry, services, building, the retail trade and among consumers. In the case of industry, five of the monthly questions in the industry survey are used as input variables (employment and selling-price expectations are excluded). For the other sectors the number of

input series is as follows: services: all five monthly questions; consumers: nine questions (price-related questions and the question about the current financial situation are excluded); retail: all five monthly questions; building: all four monthly questions. The economic climate indicator (ECI) is a weighted average of the five PC-based sector climate indicators. The sector weights are equal to those underlying the economic sentiment indicator (ESI), i.e. industry 40 %; services 30 %; consumers 20 %; construction 5 %; and retail trade 5 %. The weights were allocated on the basis of two broad criteria: the representativeness of the sector in question and historical tracking performance in relation to GDP growth.

In the second stage of the procedure, all climate indicators are smoothed using the HP filter in order to eliminate short-term fluctuations of a period of less than 18 months. The smoothed series are then standardised to a common mean of zero and a standard deviation of one. The resulting series are plotted against their first differences. The four quadrants of the graph, corresponding to the four business cycle phases, are crossed in an anti-clockwise movement. The phases can be described as: above average and increasing (top right, 'expansion'), above average but decreasing (top left, 'downswing'), below average and decreasing (bottom left, 'contraction') and below average but increasing (bottom right, 'upswing'). Cyclical peaks are positioned in the top centre of the graph and troughs in the bottom centre.