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European Business Cycle indicators

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

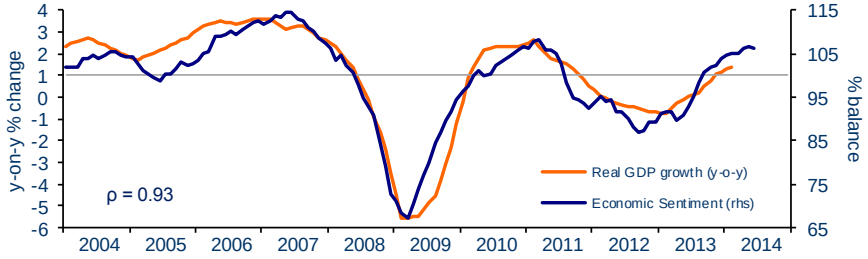
Developments in business and consumer survey data in 2014Q2

- *While EU-wide sentiment continued to improve in April and May and remained broadly stable in June, the euro-area indicator fluctuated around a flat trend and finished the quarter slightly lower than in March 2014.*
- *Improved sentiment in the EU reflected more optimistic consumers and managers in services and retail trade which offset losses in construction, while in the euro area the slight decrease was mainly due to declines in industry and construction.*
- *Compared with March 2014, the ESI increased in four of the seven largest EU economies (Spain, the Netherlands, Poland and the UK), while it decreased in Germany and France. In Italy, the indicator remained broadly unchanged.*
- *In Greece, the ESI surpassed its long-term average for the first time since August 2008.*
- *Capacity utilisation in the manufacturing sector decreased and currently stands around 1½ percentage points below its long-term average in both the EU and the euro area.*
- *EU manufacturing managers assess their real investment to have increased by 2.5% in 2013 and expect a further increase of 6.9% for 2014. For the euro area, managers report a decrease in manufacturing investment of 1.9% for 2013 and a rebound to 7% in 2014.*

Highlight: Expectations and macroeconomic fluctuations in the euro area: evidence from BCS survey data

The highlight section investigates the usefulness of survey-based expectations in explaining business cycle developments in the euro area. The analysis is based on a dynamic multivariate system where variables are aligned in order to reflect actual data availability at the time when agents form their assessment about the future developments of the economy. The results indicate that expectation shocks acted as the main driver of economic fluctuations in the Great Recession of 2008-2009, with the subsequent recovery being the result of a wave of optimism (which more than compensated negative developments in fundamentals). In contrast, the euro-area business cycle over the most recent period was almost entirely backed by shocks on fundamentals with a negligible role for expectations. This evidence supports the view that survey expectations contain relevant information about economic activity which is not always reflected in current fundamentals.

ESI and GDP growth for the EU
(January 2004 to March 2014 for survey data)



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.

European Commission Economic and Financial Affairs Directorate-General Directorate A – Policy strategy, coordination and communication Unit A4 – Economic situation, forecasts, business and consumer surveys http://ec.europa.eu/economy_finance/db_indicators/index_en.htm

For questions, comments and further information, contact: Christian.Gayer@ec.europa.eu

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

Over the second quarter of 2014, the Economic Sentiment Indicator (ESI) for the EU continued to increase in April and May - though the upward tendency that started in May 2013 slowed down - and remained broadly unchanged in June. In the euro area the indicator fluctuated around a flat trend, decreasing slightly in April, rebounding in May and declining again in June. For both European aggregates, latest readings of the headline sentiment index remain well above their respective long-term averages (at 106.4 in the EU and 102.0 in the euro area).

Compared to the readings at the end of the first quarter of 2014, the ESI increased by 1.1 points in the EU and decreased slightly (by 0.5 points) in the euro area. In the EU, the momentum of the recovery has moderated further compared to the gains observed over the past three quarters. Though the evolution in the individual months is slightly different, 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.

The recent survey developments are also in line with the Commission's Spring forecast, which foresees moderate growth for this year as a whole.

At the sector level, the improvement of the sentiment index in the EU was backed mainly by more confident consumers, with gains in April and May and flat developments in June. Services and retail trade managers' confidence marked improvements too, with some signs of deterioration in June for the retail trade index and in May for services. The EU industry indicator is currently broadly at the same level as in March, since the increase registered in April was offset by declines in May and June. As for construction, the indicator dropped, ending the timid recovery that was visible until the end of the first quarter of 2014. In the euro area, the slight decline of the ESI over the second quarter resulted from weakening confidence in industry and construction, only partly counterweighed by increases in the retail trade and consumer indicators. Confidence in services remained broadly stable.

At the country level, sentiment improved in four of the seven largest EU economies compared to March. Sentiment improved markedly in the UK (+7.9) thanks mostly to a marked increase registered in April. The indicator now stands at its highest level ever recorded (120.7). Confidence increased also in Spain (+1.6), Poland (+1.1) and the Netherlands (+1.0), while it remained unchanged in Italy and decreased in Germany (-1.0) and France (-2.0). While in Germany the indicator seesawed, in France confidence remained unchanged in April and then declined in both May and June. Worth highlighting are the developments in Greece where, following a slight set-back in April, marked increases in May and June brought the ESI above its long-term average for the first time since August 2008.

Sector developments

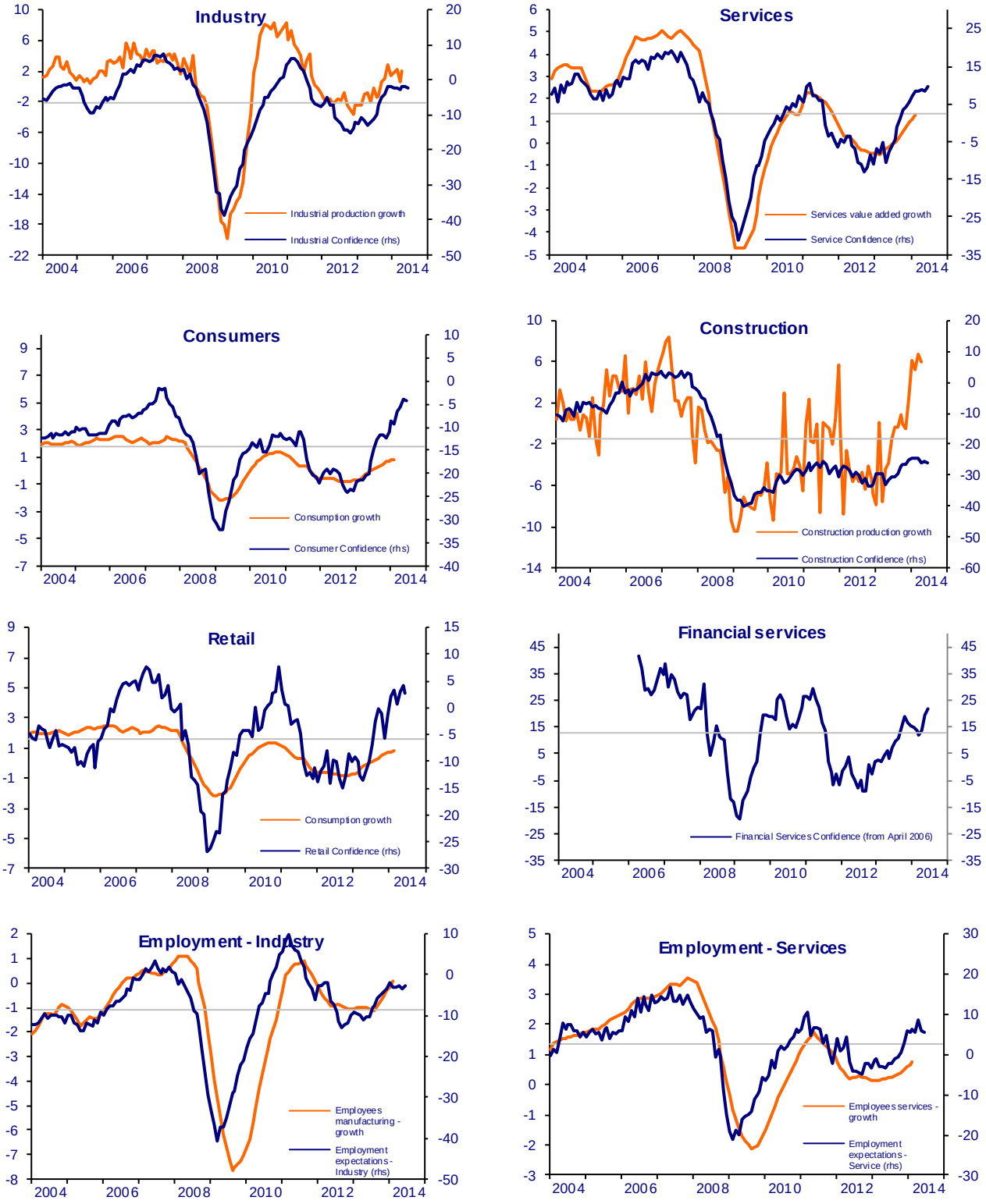
Over the second quarter of 2014, **industrial** confidence for the EU increased in April, remained stable in May and decreased slightly in June. For the euro area the path has been somewhat different as the indicator remained broadly stable in April, increased slightly in May and registered a more pronounced decrease than in the EU in June. Compared with March 2014, the indicator now stands broadly at the same level in the EU and registered a decrease (-1.0 point) in the euro area. All in all, the developments over the most recent months corroborate the flattening out of industrial confidence that started around December 2013/January 2014.

In both European aggregates, managers' assessment of the current level of order books increased over the quarter. In the EU both managers' production expectations and their assessment of the stocks of finished products remained broadly stable, while in the euro area both components worsened. Of the survey questions not included in the industrial confidence indicator, managers' assessment of production trends observed during recent months and export order books declined in both the EU and the euro area. Only slightly more positive were employment expectations, which edged up over the quarter in the EU, while remaining broadly unchanged in the euro area. Selling price expectations were revised slightly upward in both areas. In the seven largest EU countries the picture was rather mixed: compared to the end of the first quarter 2014, industry confidence increased markedly in the UK (owing to a striking increase in April) and – to a lesser degree – in Spain, Poland and Italy, while remaining broadly unchanged in the Netherlands and booking notable losses in France and Germany.

April's results for the quarterly manufacturing survey confirmed the losing of momentum of the recovery in industry. Capacity utilisation dropped to 79.4% in the EU (from 80.1%) and 79.5% in the euro area (from 80.1%). These figures are around 1.5 points below their respective long-term averages.

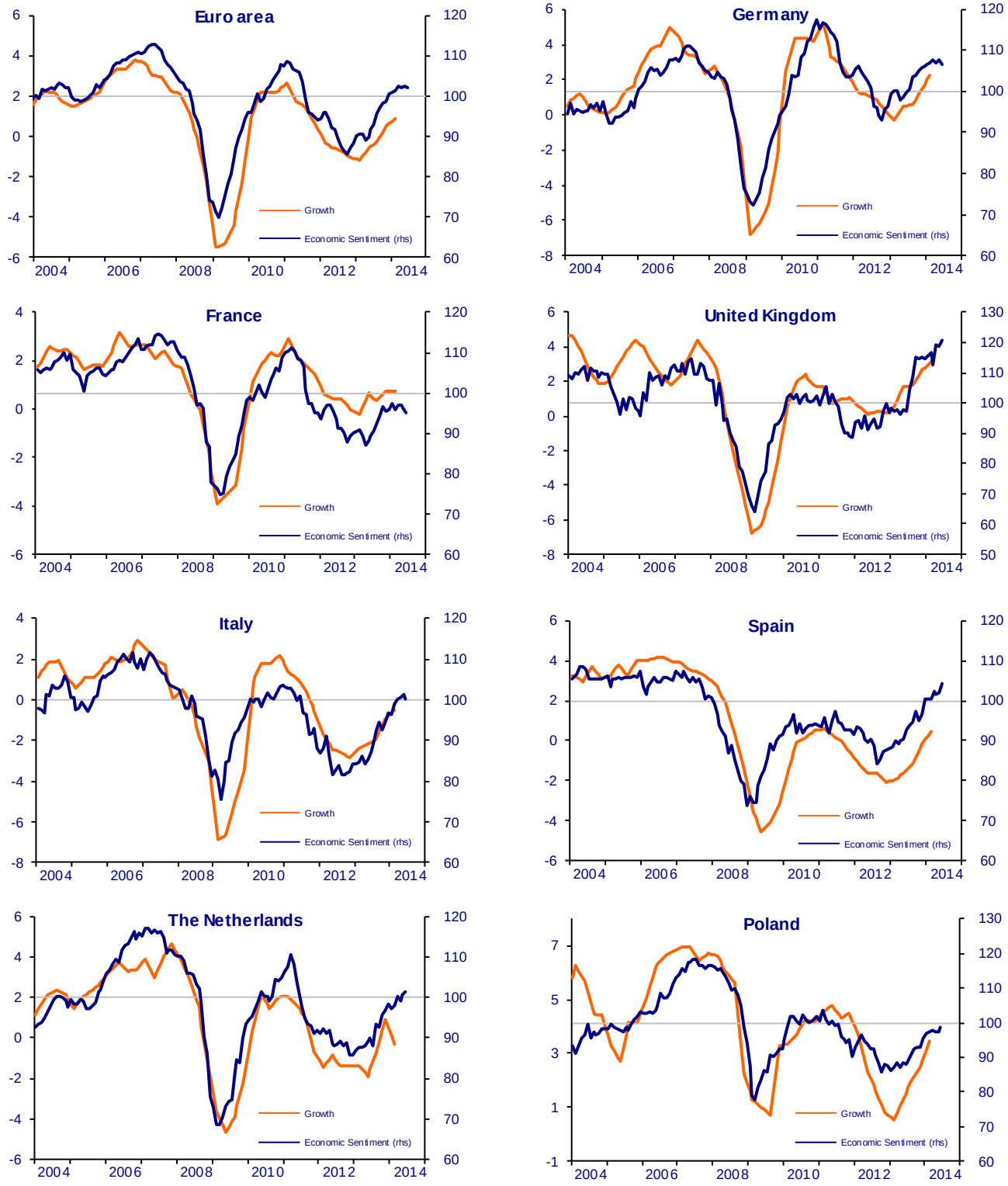
According to the latest ***bi-annual investment survey*** carried out in March-April 2014, manufacturing managers in the EU were somewhat more optimistic than in the previous survey carried out in October/November 2013, estimating a 2.5% increase in their real investment for 2013 and expecting a 6.9% rise for 2014. For the euro area, survey results point to a decrease of 1.9% for 2013, unchanged from managers' assessment of last autumn, and an increase of 7.0% for 2014,

Graph 1.1: **Sectoral confidence indicators and reference series for the EU (January 2004 to March 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 March 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.

higher than envisaged last autumn. While not fully comparable, these figures for growth in manufacturing investment are somewhat more optimistic than Eurostat estimates (for 2013) and Commission forecasts (for 2014) of growth in equipment investment.[1]

In the second quarter of the year confidence in **services** increased further in the EU – albeit at a lower speed compared with the previous quarter - and remained broadly stable in the euro area, halting the upward trend that was visible since mid-2013. The monthly profile shows, however, that in both areas the indicator improved in June, partly (or completely in the case of the EU) offsetting the decreases registered in May (EU) or April (euro-area). In the EU, improved confidence was fuelled by improved views on the past business situation and expected demand, while managers' assessment of past demand remained virtually unchanged. By contrast, in the euro area managers were more optimistic about the future than about the past; indeed both past business situation and past demand were assessed more negatively in June compared with three months ago, while managers were more optimistic about their expected demand. Looking at the largest EU countries, compared with March 2014, confidence increased markedly in the UK (+7.3) and, to a lesser degree, in Spain (+0.9) and Poland (+0.7). It decreased markedly in Italy (-4.6) and slightly in the Netherlands (-1.0) and France (-0.7), while it remained unchanged in Germany.

Retail trade confidence increased in the second quarter of 2014 in both the EU and the euro area, though in the latter the increase was very small and supported more by past developments than by future perspectives. In the EU, the indicator increased strongly in April and May and registered a slight decrease in June, while in the euro area confidence remained broadly flat throughout the quarter, putting on halt the recovery that had started in the second quarter of 2013. Improved confidence in the EU resulted from very positive developments in managers' appraisal of companies' past and expected business activity, which more than offset a worsening of managers' assessment of the adequacy of their volume of stocks. A similar picture emerged for the euro area, except for managers' expectations on business activity that remained virtually unchanged and a less important increase in their appraisal of past activity. Focusing on individual countries, Italy and the UK marked sizable increases and the Netherlands registered a small improvement. Germany and France remained virtually unchanged over the quarter, while the indicator decreased slightly in Poland and more markedly in Spain. The important rise in the UK masked extremely volatile dynamics: the gains booked in April (+12.7) and May (+5.2), which lifted the indicator up to its historical maximum, were followed by an important loss (-8.9 points) in June.

Compared to the end of the first quarter of 2014, confidence in **construction** worsened in both the EU and the euro area. The indicator decreased strongly in April, remained broadly stable in May and decreased again in June. While construction confidence is well below its long-term average in both areas, this is particularly the case for the euro area. For both aggregates the decreases are due to a marked decline in managers' employment expectations, while their appraisal of current order books increased in the EU and remained broadly unchanged in the euro area. Confidence declined strongly over the quarter in Germany, France, and Spain; by contrast, it increased substantially in the Netherlands and Italy. Though less strongly, confidence improved also in the UK, where it had risen significantly in the first quarter, and Poland.

Confidence among **consumers** continued to increase in the second quarter of 2014. Consumers were generally more positive on both past and future developments. In the EU and the euro area, confidence increased in April and May. In June the indicator remained stable in the EU and decreased marginally in the euro area. In the EU optimism among consumers was fuelled by positive developments of all components of the indicator: improved expectations about the personal financial situation, the general economic situation and savings coupled with sharp downward revisions of unemployment expectations; in the euro area savings expectations were broadly flat. All the seven largest EU economies except France booked significant improvements, ranging from about 2 points (in Germany) to 4.4 points (in Spain). France registered a decrease mainly due to a decline in April. The indicator then remained broadly unchanged in May and June.

After the decline registered in the first quarter of 2014, confidence in **financial services** – which is not included in the ESI – improved strongly over the second quarter. The sharp upward movement of April and May was however halted in June. Compared to March 2014, improved sentiment was backed by managers' more positive assessment of all three components: past business situation and past and expected demand.

The developments in survey data over the first quarter are illustrated by the evolution of the climate tracers. The economic climate tracer for the EU is in the expansion quadrant (see Annex 1 and Annex 2 for further details). This movement was driven by the climate tracers for industry, services, retail trade and

[1] The Investment Survey covers only investment by manufacturing companies and therefore only roughly 40% of total GFCF in the economy. Equipment investment is therefore a better, while still not fully congruent statistical benchmark.

consumers, which moved further into the expansion quadrant. By contrast, the climate tracer for the construction sector moved toward the contraction area and stands now just on the border between the upswing and the contraction quadrant. Also for the euro area, the overall economic climate tracer remained in the expansion area. As opposed to the EU, the euro-area services climate tracer is still in the upswing quadrant, pointing to expansion, while the construction climate tracer moved to the contraction area. At the country level, the climate tracers for the Netherlands and Spain entered the expansionary quadrant, and Germany, the UK and Poland have moved further into it. By contrast, the climate tracers remained in the upswing quadrant for Italy and France. While the tracer for Italy is pointing to the expansionary quadrant, for France it seems to be heading toward the contraction area.

2. Recent developments in selected Member States

During the second quarter of 2014, sentiment has further recovered in Spain, the Netherlands, Poland and the UK, reaching its historical maximum in June 2014 in the latter. By contrast, sentiment declined in France and Germany and remained unchanged in Italy. The sentiment index has kept scoring below its long-term average only in France and Poland.

Economic sentiment in **Germany** interrupted the recovery that was visible since May 2013. Compared to March 2014, the indicator lost 1.0 point, resulting from a slight decrease in April, followed by an increase in May and a stronger decline in June. Nevertheless the ESI is comfortably above its long-term average of 100, at 106.5 points. The decrease of the headline indicator was driven by decreases in industry and construction confidence. Service and retail trade confidence indicators showed a broadly flat quarterly profile, while confidence among consumers increased.

In **France,** the ESI remained unchanged in April and decreased in May and June, resulting into a relatively strong decline over the quarter. At 95.1 points, the sentiment index remained clearly below its long-term average of 100. Except for retail trade confidence, which remained flat, all the other confidence indicators worsened; the declines were particularly strong in industry and construction.

The evolution of the sentiment index in the **United Kingdom** was V-shaped, increasing in April and June and declining in May. Overall the indicator increased markedly compared to March and reached its historical high in June (120.7), well above its long-term average of 100. Improved sentiment was fuelled by improved confidence in all sectors. The increases have been particularly strong in industry, retail trade and services.

In **Italy,** the ESI stayed at its March levels. This outcome resulted from two small increases observed in April and May that were offset by a decrease in June. The sentiment index remained at 100.3 points, only fractionally above its long-term average of 100. At sector level, confidence increased in retail trade, construction, consumers and – to a lesser degree – industry. These increases were cancelled out by a pronounced decrease in services.

The second quarter of the year saw the ESI increasing in **Spain**, resulting from gains in May and June after a decline in April. At 104.1 points, the sentiment indicator is well above its long-term average of 100. While industry, consumer and – to a lesser extent – services confidence improved, confidence in construction decreased dramatically due to a steep fall in June. Confidence in retail trade decreased to a minor degree.

In the **Netherlands**, sentiment picked up in the second quarter of 2014 compared to March 2014. The ESI declined in April and booked gains in May and June. At 101.3, the indicator currently stands above its long-term average. The positive developments were fuelled by strong rises in construction and among consumers and a less pronounced increase in retail trade. Confidence in industry remained flat, while it worsened in services.

Sentiment in **Poland** remained broadly unchanged in April and May and picked up in June. At 98.7 points the ESI currently still scores slightly below its long-term average. All surveyed sectors, except for retail trade that registered a slight decrease, marked positive changes on a quarterly basis.

Economic sentiment in **Greece** continued the recovery visible since the end of 2012. Compared to March 2014, the indicator gained 6.2 points, resulting from a slight decrease in April, followed by two marked increases in May and June which brought the ESI to a level of 103.7, well above its long-term average. The increase of the headline indicator was fuelled by important increases in confidence among consumers and in all the business sectors except for construction where the indicator decreased by 5.6 points compared to March.

3. Highlight: Expectations and macroeconomic fluctuations in the euro area: evidence from BCS survey data

Although business and consumer surveys (BCS) are widely used tools in monitoring the evolution of key macroeconomic indicators, there is still disagreement among macroeconomists about their intrinsic information content.

Sceptics cast doubt on the usefulness of qualitative data in economic analysis since their informational role is judged to be limited or even null when

compared to that in other leading indicators. Under this viewpoint, surveys are (poor) *substitutes* for quantitative indicators. In contrast, advocates of BCS argue that qualitative data may provide additional information compared to the picture described by national account data and/or other quantitative indicators. Such a *complementary* value added stems from not only timeliness but also broader sectoral coverage and the forward looking nature of certain questions answered by respondents.

A number of recent contributions to the literature on macroeconomic forecasting has documented that a proper assessment of the role of survey indicators must take into account the timing of data releases, as it plays a crucial role in forecast evaluation.[2] By contrast, the vast majority of the existent works investigating the usefulness of survey-based measures in explaining macroeconomic developments (like inflation dynamics or business cycle fluctuations) do not model the asynchronous releases of different sources of data (e.g. financial data, qualitative measures, real activity variables), except for a few contributions confined to the US and the UK economies.[3]

Against this background, this highlight section investigates the role of survey-based expectations in explaining business cycle developments in the euro area. In doing that, we employ a dynamic multivariate system where variables are aligned in order to reflect their actual availability at the time when agents form their assessment on the future developments of the economy. The results indicate that shifts in survey-based expectations about future economic activity are a significant driver of economic fluctuations in the euro area.

Data and identification strategy

Following Leduc and Sill (2013), the quantification of the role of unanticipated shocks to expectations in explaining business cycle fluctuations in the euro area is based on a stylised model of the whole economy based on a four-variable Vector AutoRegressive (VAR) model comprising an indicator of the state of the real economy, a survey-based measure of expectation, a price index and an interest rate series.[4]

In detail, the unemployment rate (UR) is used to proxy the stance of the overall economic activity as it is subject to only minor revisions. Accordingly, using latest available data is almost equivalent to the case where a "genuine" real time dataset is employed.

The measure of expectations (UX) is taken from the Joint Harmonised EU Programme of Business and Consumer Surveys carried out by DG ECFIN. The survey among consumers is based on more than 20,000 respondents, categorised according to income, occupation, education, age and sex and interviewed in the first two to three weeks of each month. The survey asks households about their evaluation of the current and future economic situation of the general economy, their assessment of the financial situation of their own households (both during the past and the next 12 months), various questions referring to their views on the advisability of saving and of purchasing durable goods, their intentions to save and invest as well as their expectations about price and unemployment developments.

Specifically, the question about unemployment reads "How do you expect the number of people unemployed in this country to change over the next 12 months?", while possible answers are "increase sharply" (PP), "increase slightly" (P), "remain the same" (=), "fall slightly" (N), "fall sharply" (NN), "don't know" (U). Answers are then aggregated in the form of “balances”, which are constructed as the

[2] Angelini, E., G. Camba-Mendez, D. Giannone, L. Reichlin and G. Runstler (2011), "Short-term forecasts of euro area GDP growth", Econometrics Journal, Vol. 14, pp. 25-44; Banbura, M. and G. Rünstler (2011), "A look into the factor model black box: publication lags and the role of hard and soft data in forecasting GDP", International Journal of Forecasting, Vol. 27, pp. 333-346; Barhoumi, K., S. Benk, R. Cristadoro, A. den Reijer, A. Jakaitiene, P. Jelonek, A. Rua, G., Runstler K., Ruth and C. van Nieuwenhuyze (2009), "Short-term forecasting of GDP using large datasets: a pseudo real time forecast evaluation exercise", Journal of Forecasting, Vol. 28, pp. 595-611.

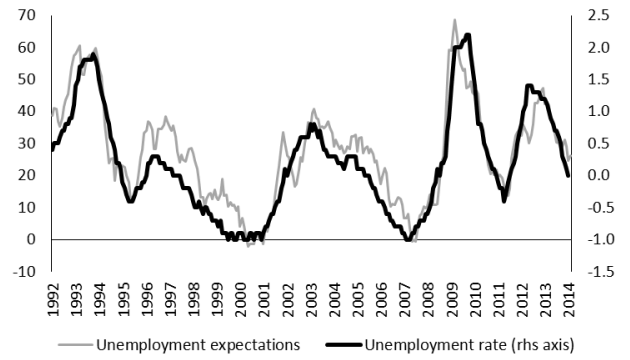
[3] Leduc, S., K. Sill and T. Stark (2007), "Self-fulfilling expectations and the inflation of the 1970s: Evidence from the Livingston Survey", Journal of Monetary Economics, Vol. 54, pp. 433-459; Leduc, S. and K. Sill (2013), "Expectations and economic fluctuations: an analysis using survey data", Review of Economics and Statistics, Vol. 95, pp. 1352-1367; Leduc, S. and Z. Liu (2012), "Uncertainty Shocks are Aggregate Demand Shocks", Federal Reserve Bank of San Francisco Working Paper, 2012-10.

[4] While it is customary to model the US as a closed economy where all shocks are domestic (with the only possible exception of energy price shocks), there is disagreement among economists about the appropriateness of such an assumption for the case of the euro area. Although the baseline model here presented is specified as if the European region were a closed economy, it will be shown later on in the section that the results are robust even controlling for external factors like oil price shocks or exchange rate developments.

difference between the percentages of respondents giving positive and negative replies according to the following condition: B=(PP+0.5×P)−(0.5×M+MM).[5]

Since the consumer survey inquires about the expected changes in unemployment over the next twelve months, we relate that qualitative series to the yearly change in the actual unemployment rate (rather than its level). Although respondents only provide a qualitative assessment about the expected evolution of unemployment, the resulting balance series tracks the quantitative series quite well (correlation equal to 0.90), as Graph 1 shows.[6]

Graph 1: **Unemployment expectations, UX** (balance) **and unemployment rate, UR** (y-o-y percentage changes; axis on the right)**: 1992m1-2014m2**



Source: European Commission.

The other variables of the model are the (annualized) realized CPI inflation rate (IR), and the (annualized) realized nominal three-month Euribor rate (SR).[7]

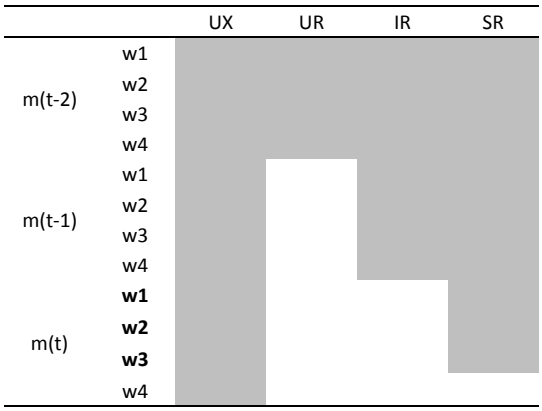
The identification scheme in the estimated VAR is recursive with the variables ordered as follows: UX, UR, IR, SR. Placing UX first implies no contemporaneous response of expected unemployment to other shocks in the system. Furthermore, UR is assumed to have no immediate effects on IR, while price has no immediate effect on the monetary policy.

Technically, this amounts to estimating the reduced form, then computing the Cholesky factorization of the reduced form VAR covariance matrix.

The placement of expected unemployment first in the recursive identification is motivated by the timing of the surveys: when making forecasts in a certain month m(t), the information set on which consumers base their expectations do not include, by construction, the realization of the unemployment rate for that month (since agents do not have that information when interviewed).[8]

Table 1 provides a stylized description of the timing of the information flow for the months of a certain calendar quarter. Areas in grey indicate data availability, while areas in white denote the publication lag at the time when consumers form their expectations.

Table 1: **Data availability throughout a given calendar quarter**



Source: European Commission.

On the basis of this publication calendar, data are aligned so that agents have past values of the unemployment rate and inflation rates in their information set when the surveys are filled out - i.e. the first week(s) of m(t) (reported in boldface in the Table). In order to adopt a "conservative" approach, we assume that surveys are filled out at the end of the fieldwork (third week of the calendar month), so that agents have almost complete information on interest rates.

[5] A detailed description of the Joint Harmonised EU Programme of Business and Consumer Surveys can be found in the "Methodological User Guide" available at: http://ec.europa.eu/economy_finance/db_indicators/surveys/method_guides/index_en.htm.

[6] See also on this European Commission (2011), *European Business Cycle Indicators*, Issue 3, "Do survey data help in assessing employment dynamics?".

[7] All variables are taken via Data Insight.

[8] See on this Leduc, S., K. Sill and T. Stark (2007), *ibid.*; Leduc, S. and K. Sill (2013), *ibid.*.

Dynamic simulations

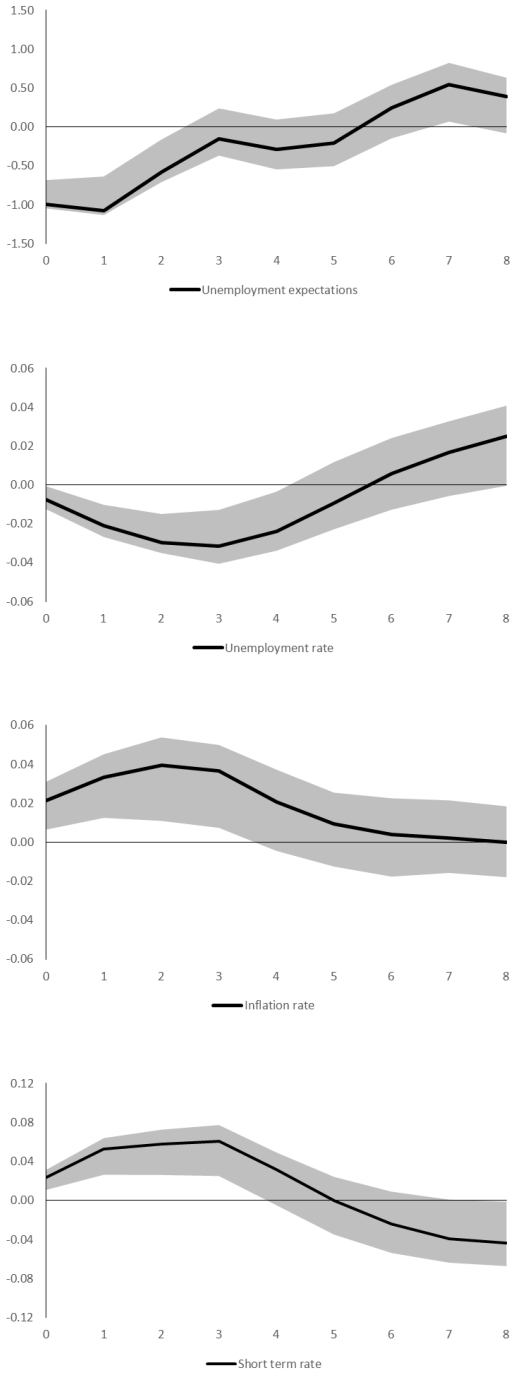
Data are monthly and cover the period 1990m1-2014m2. As the use of annualized growth rates recorded at a monthly basis tends to induce serial correlation in the estimated residuals, the model is estimated by taking into account only the month at the end of a given quarter (that is the time-series used in the analysis are sequences of monthly values of March, June, September, December).

According to the AIC criterion the optimal autoregressive structure turns out to be of order five (with maximum number of lags being set to eight). Though overlapping observations still persist in that specification, the estimated models do not exhibit miss-specification problems related to autocorrelation.[9]

Graph 2 shows the impulse responses to a normalized 1 unit negative shock to UX on the four variables of the system, where responses are in solid lines while the grey areas represent 90% confidence intervals generated *via* iid bootstrap with 500 replications. On *average* across the *entire sample*, a negative shock that lowers the balance series of UX by 1 percentage point leads to a fall in the current unemployment rate, a rise in inflation, and a tightening of monetary policy. All responses are significantly different from 0 at the 90% confidence level. UR is significantly below its pre-shock level (given by the horizontal axis) for about four quarters. Deviations of IR and SR with respect to the baseline path are somewhat less persistent, staying above the zero level for three quarters.

Further evidence on the role of expectation shocks for the business cycle dynamics can be drawn from the variance decomposition. Graph 3 shows that expectations shocks have a marginal role in explaining the variability of UR on impact (about 8%), but they gain relevance over the simulation horizon peaking after three quarters (at 37%) and then stabilizing at just below 30% five years after the shock.

Graph 2: **Impulse response functions to a unit negative shock on unemployment expectations** (solid lines) **and 90% confidence intervals** (grey areas)

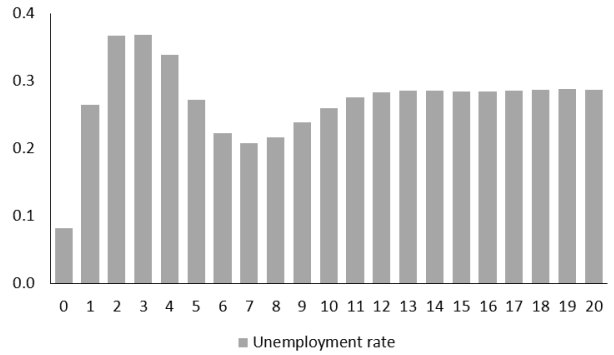


Source: European Commission.

[9] While there are no traces of heteroskedasticity or structural instability, departures from the normality assumption can be detected. On the grounds of the results from the diagnostic tests, a proper modelling strategy so as to assess the dynamic impact of expectation shocks on the variables of the system should be based on bootstrap schemes (rather than resorting to asymptotic inference or Monte Carlo methods) in order to take account of non-normal residuals. Moreover, the absence of heteroskedasticity suggests that standard iid bootstrap resampling would be a feasible option as discussed in Goncalves, S. and L. Kilian (2004), "Bootstrapping autoregressions with conditional heteroskedasticity of unknown form," Journal of Econometrics, Vol. 123, pp. 89-120. Finally, parameter stability indicates that the estimated model can be employed to adequately describe the sequence of cyclical phases over the entire sample span. Complete results for diagnostic tests are not reported here for the sake of brevity but available upon request.

All in all, the evidence from both impulse response analysis and forecast error variance decomposition exercises is qualitatively and quantitatively similar to the US case studied by Leduc and Sill (2013).[10] Moreover, the results from the baseline model are robust to changes in the specification related to the inclusion of further variables.

Graph 3: **Forecast error variance decomposition of unemployment rate: contribution of expectation shocks** (percentage values)



Source: European Commission.

In order to verify whether the inclusion of such variables reduces the impact of shocks to expectations on current economic activity, the baseline model has been augmented by: A) exogenous factors like real oil prices, financial markets and policy uncertainty shocks; B) additional measures of real activity (viz., the industry confidence index, IC, compiled by the European Commission); C) additional financial variables (viz., annualized yields on 10-year bonds, LR); D) additional measures of real activity *and* financial variables together (namely, IC *and* LR).[11]

Under all four different extended schemes, the results (not reported to preserve space) are qualitatively similar to those discussed above.

A closer look at the Great Recession period

To gauge the relative importance of expectation shocks for unemployment in different business cycle episodes, we resort to the historical decomposition analysis. By construction, if all shocks in the system were turned on, the simulated series generated as sequences of realizations of those shocks would be equivalent to the actual series.

Since the interest is on the assessment of the contribution of expectation shocks to the observed unemployment changes in busts and booms over the last years (including the double-dip recession that started in 2008), all shocks but the expectation shock in the VAR model are turned on. The implied unemployment path is thus determined by shocks on fundamental (as opposed to shocks on expectations).

One theoretical explanation of how shocks to agents' beliefs can be an independent source of business cycle fluctuations can be found in the class of dynamic general equilibrium models with indeterminacy and a continuum of stationary rational expectations equilibria.[12] According to Harrison and Weder (2006), for example, agents' self-fulfilling expectations are one of the primary impulses behind economic fluctuations, finding that this kind of shocks can well explain the Great Depression (1929-32), the subsequent slow recovery and the recession that occurred in 1937-38.[13] A further justification for the role of expectations as a driver of economic developments is that changes in the levels of uncertainty perceived by economic agents may affect their actions (consumers' spending decisions and/or firms' investment and hiring plans). The ultimate effect of these waves of pessimism and optimism translates into overreactions in the evolution of the

[10] Leduc, S. and K. Sill (2013), *ibid*.

[11] Specification A) is based on the same recursive ordering as the one of the baseline model (UX→UR→IR→SR), conditioned on the inclusion of real oil, financial and policy uncertainty shocks. Those shocks are identified as the difference between the current value and the average over the previous four quarters. When (the absolute value of) the difference is greater than two times the standard deviation this, the shock is the difference between the current value and the average over the last four quarters, and zero otherwise. See on this procedure Hamilton, J.D. (1996), "This is what happened to the oil price-macroeconomy relationship", Journal of Monetary Economics, Vol. 38, pp. 215-220. The order scheme under specifications B), C) and D) is set as: UX→UR→IR→IC→SR, UX→UR→IR→LR→SR, and UX→UR→IR→IC→LR→SR, respectively.

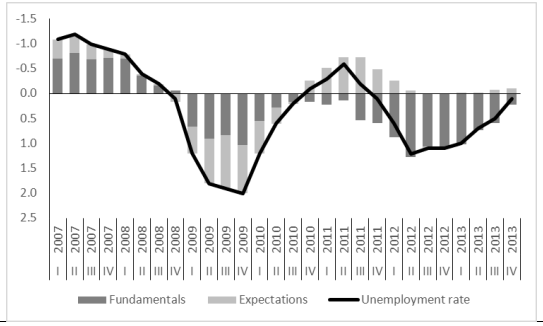
[12] Farmer, R.E.A. and J.T. Guo (1994), "Real Business Cycles and the Animal Spirits Hypothesis", Journal of Economic Theory, Vol. 63, pp. 42-72; Farmer, R.E.A. and M. Woodford (1997), "Self-Fulfilling Prophecies and the Business Cycle", Macroeconomic Dynamics, Vol. 1, pp. 740-769.

[13] Harrison, S.G. and M. Weder (2006), "Did Sunspot Forces Cause the Great Depression?", Journal of Monetary Economics, Vol. 53, pp. 1327-1339.

business cycle with sharp recessions and recoveries (Bloom, 2009; Bachman et al. 2013).[14]

Graph 4 shows the changes in the unemployment rate since 2006 (solid line) as well as the contribution of the two categories of shocks (expectations vs fundamentals).

Graph 4: **Historical decomposition of the actual unemployment rate** (y-o-y percentage changes; axis on the right; inverted axis)



Source: European Commission.

During the expansionary phase prior to the Great Recession (2008-2009), the evolution of the euro area business cycle saw the dominance of fundamentals. Afterwards, expectation shocks contributed more than half of the 1.5-2 percentage point increase from the end of 2008 to the beginning of 2010. Likewise, the subsequent recovery was the result of a wave of optimism (negative shocks on unemployment expectations) which more than compensated negative developments in fundamentals. Focusing on the most recent period (from 2012q2 onwards), the dynamics of realized unemployment was almost entirely driven by shocks on fundamentals.

All in all, the evidence here reported indicates that survey expectations contain relevant information about business cycle developments which is not always reflected in current fundamentals, especially around periods of extreme cyclical swings like the ones occurred at the end of the past decade.

Causality and omitted fundamentals

The above discussed empirical results indicate a relevant role of expectations shocks in explaining euro area business cycle fluctuations over the last decade. Expectations shocks can be interpreted as either measurement error due to omitted fundamentals or as truly exogenous factors.[15]

In order to assess the exogeneity of the estimated expectation shocks it is therefore required to test if: *i*) causality runs from shocks on consumers' beliefs to changes in unemployment rates, and not viceversa; *ii*) the statistical model includes all the fundamentals that drive movements in expected unemployment.

Point *i)* requires testing the null hypotheses that expectation shocks do not Granger cause UR and vice versa. Table 2 reports the *p-values* associated with the two hypotheses using dynamic specifications with lags from one to eight.

Table 2: **Unemployment rate and expectation shocks: causality analysis** (p-values)

Lag	H_0: Unemployment rate does not cause expectation shocks	H_0: Expectation shocks do not cause unemployment rate
1	0.956	0.018
2	0.996	0.088
3	0.997	0.064
4	0.990	0.028
5	0.983	0.000
6	0.853	0.003
7	0.884	0.007
8	0.861	0.005

Source: European Commission.

Results clearly indicate that the expectation shocks Granger cause unemployment changes, and not vice versa: the *p*-values on all the reported tests are essentially 0 for the null of no causality from expectation shocks to unemployment changes, and roughly 1 for the null of no causality from UR to expectation shocks.

As for point *ii*), shocks to expected unemployment implied by our VAR are tested for exogeneity with respect to variables that might plausibly affect expected unemployment along the lines of Francis and Ramey (2002).[16]

Accordingly, expected unemployment shocks are regressed on a constant and, alternatively, four (or eight) lags of the (annualized) growth rates of (unrevised) industrial production, the (annualized) real stock index returns, the (annualized) real exchange rate volatility, as well as the above

[14] Bachmann R., S. Elstner, E. Sims (2010), Uncertainty and economic activity: evidence from business survey data. NBER Working paper 1643; Baker S., N. Bloom, S. Davis (2013), Measuring economic policy uncertainty. Chicago Booth Research Paper No. 13-02.

[15] Farmer, R.E.A. and M. Woodford (1997), *ibid*.; Leduc, S., K. Sill and T. Stark (2007), *ibid*.

[16] Francis, N. and V.A. Ramey (2002), "Is the technology-driven business cycle hypothesis dead?", National Bureau of Economic Research Working Paper, 8726.

presented exogenous shocks in real oil prices, financial markets and policy uncertainty.

The results of this exercise are reported in Table 3. It reports the resulting adjusted R^2 measures and the p-values of the F-test statistics of the null of joint non-significance of the lagged regressors.

Table 3: **Omitted fundamentals** (p-values)

	Lag 4		Lag 8	
	R2adj	F-test (p-values)	R2adj	F-test (p-values)
Industrial production	0.000	0.622	0.059	0.147
Real stock prices	0.000	0.924	0.000	0.880
Real exchange volatility	0.012	0.300	0.000	0.572
Real oil shocks	0.000	0.723	0.000	0.699
Uncertainty shocks (financial markets)	0.000	0.680	0.029	0.269
Uncertainty shocks (surveys)	0.039	0.139	0.013	0.362

Source: European Commission.

When considering the case of four lags, there emerges scant significance of the candidate explanatory variables, with the adjusted R^2 ranging between 0 and 4%. Moreover, the null hypothesis of joint non-significance of the regressors is comfortably rejected at the usual confidence levels. Specifications based on eight lags indicate a slight increase in the explanatory power of the regressions (in the case of industrial production the adjusted R^2 is around 6%), although the F-test still rejects the null hypothesis.

All in all, none of the variables predict expectations shocks even at the 10% significance level and explain very little of their variation, giving support to the hypothesis that the measure of expectations shocks derived from the estimated VAR can reasonably be thought of as exogenous.

Conclusions

Based on the results from a four variable VAR model containing survey-based expectation measures, this highlight section has shown that shifts in expectations about future economic activity are a significant driver of economic fluctuations in the euro area.

From an empirical perspective, the findings are broadly consistent with the existent evidence from the US economy: an anticipation of good times ahead leads to a fall in current unemployment, a rise in inflation, and a tighter monetary policy. From a theoretical viewpoint, the documented evidence is consistent with the predictions of the class of business cycle models implying that expectations of good times in the future lead to current-period booms rather than busts.

More generally, the analysis has documented that surveys can be viewed a complement to official statistics, which are often available after long delays. Interestingly, the value added offered by survey data stems from their forward looking content, providing a further motivation for the usefulness of qualitative indicators in macroeconomic analysis which goes beyond the commonly held view (especially in the macroeconomic forecasting literature) of timeliness as unique (or at least predominant) strength of qualitative data compared to real activity series.

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.

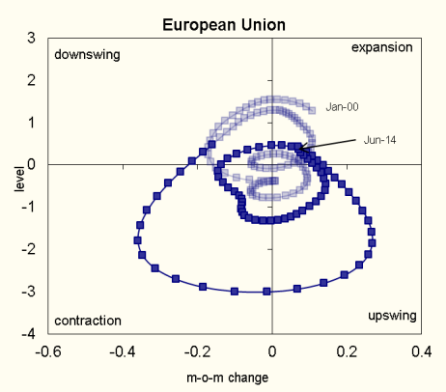
The series levels are plotted against their first differences (m-o-m changes), so that each chart depicts — at the same time — the current stance of the sector/country and its most recent dynamics. Series are smoothed to eliminate short-term fluctuations.

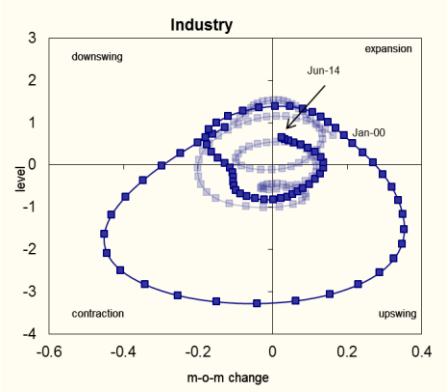
The four quadrants of the graphs enable to distinguish four phases of the business cycle: "expansion" (top right quadrant), "downswing" (top left), "contraction" (bottom left), and "upswing" (bottom right).

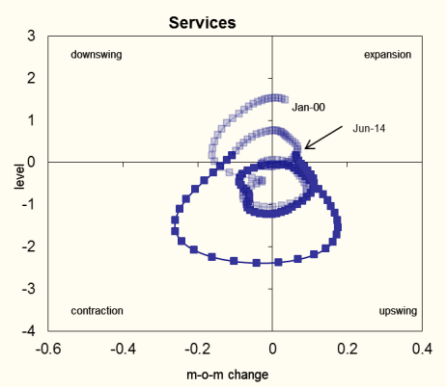
Cyclical peaks are positioned in the top centre of the graph, and troughs in the bottom centre.

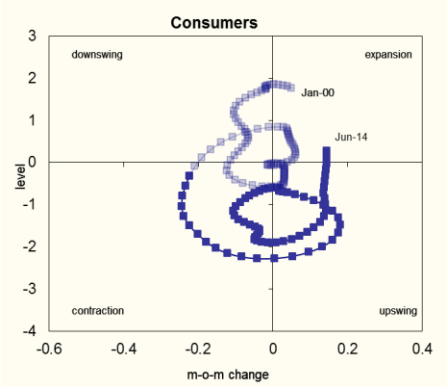
In order to make the graphs more readable, two colours have been used for the tracer. The darker line shows developments in the current cycle, which in the EU and euro area roughly started in January 2008.

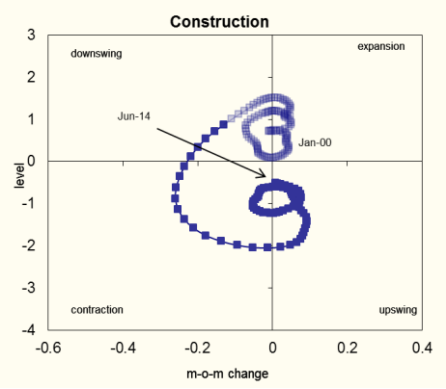
Economic climate tracer across sectors, EU

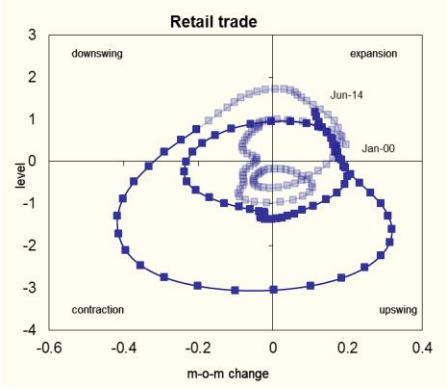




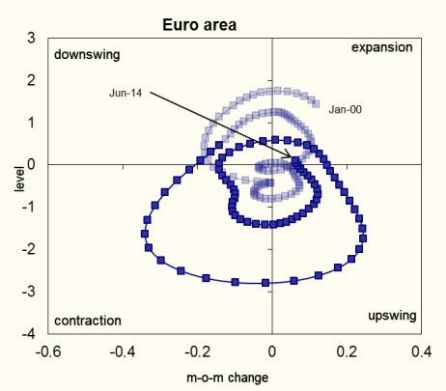


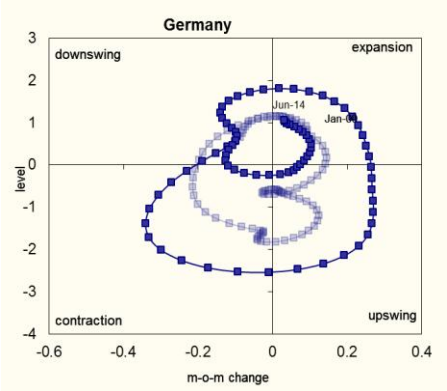


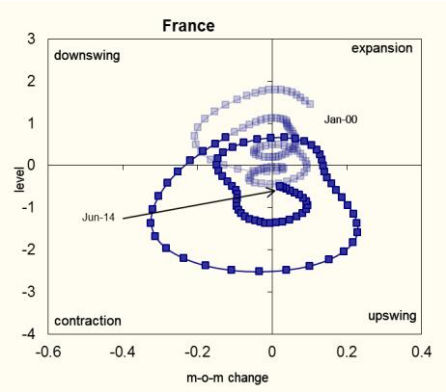


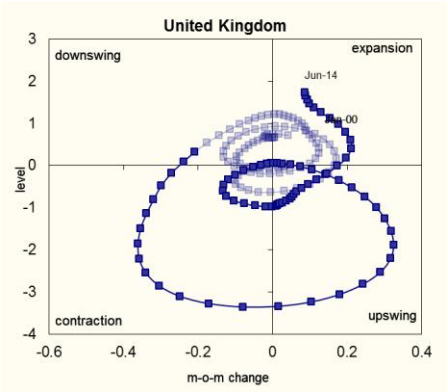


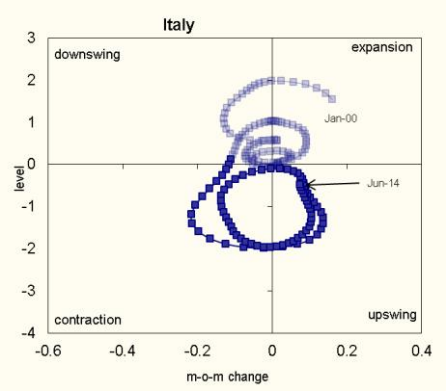
Economic climate, largest EU Member States

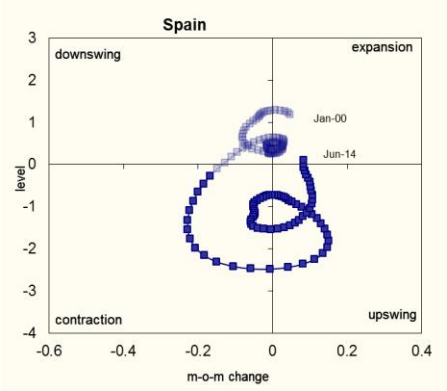


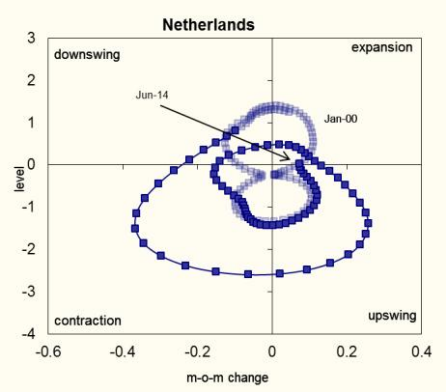


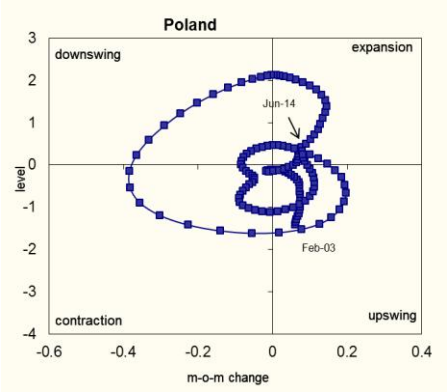












Annex 2: Reference series

The reference series are from Eurostat, via Ecowin:

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.