European Commission

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European Business Cycle indicators

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

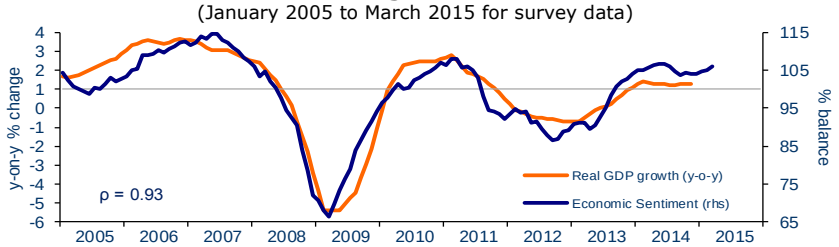
Developments in business and consumer survey data in 2015Q1

- *Both the EU and the euro-area Economic Sentiment Indicator (ESI) increased over the first quarter of 2015. In March 2015, the ESI scored rather comfortably above the long-term average of 100 in both the EU (at 106.1) and the euro area (at 103.9).*
- *At EU sector level, confidence improved markedly among consumers and in the retail trade sector, while industry confidence improved only slightly and services and construction confidence worsened over the quarter. Euro area developments were similar, except for stable confidence in construction.*
- *Compared to December's readings, the ESI brightened in four of the seven largest EU economies (Italy, Spain, France and Germany). By contrast, the indicator weakened in the Netherlands, Poland and the UK.*
- *Capacity utilisation in the manufacturing sector increased in the first quarter and currently stands at its long-term average in the EU and the euro area. In the services sector, capacity utilisation remained stable in both areas, indicating a pause in the upward trend that started in early 2013.*

Highlight: Revisiting the relation between inventories and production using survey data

Using data from the manufacturing survey of the Joint Harmonised EU Programme of Business and Consumer Surveys (BCS), this highlight section investigates the impact of developments in inventories on economic activity for the euro area at the level of both total manufacturing and main industrial groupings. The analysis shows that, when firms assess stocks as being "too large", they react by cutting production in the following months. The opposite holds true when inventories are reported to be "too small". With the outbreak of the global crisis, the negative relationship has substantially intensified, suggesting that production in manufacturing has become more sensitive to imbalances between inventories and expected demand.

ESI and GDP growth for the EU
(January 2005 to March 2015 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

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

After the flat development over the last quarter of 2014, the EU and the euro-area Economic Sentiment Indicators (ESI) embarked on an upward trend in the first quarter of 2015, improving for three months in a row. At the end of the first quarter of 2015, the ESI scored rather comfortably above the long-term average of 100 in both the EU (at 106.1) and the euro area (at 103.9).

Compared to the readings at the end of the fourth quarter of 2014, the ESI registered significant gains in the EU (+1.9 points) and the euro area (+3.0 points). The positive signals were echoed by the Ifo Business Climate Index (for Germany) and Markit Economics' Composite PMI for the euro area, which also improved over the first quarter of 2015.

At EU sector level, the positive development of the sentiment indicator over the first quarter was fuelled by confidence increases among consumers and managers in the retail trade sector, while sentiment in industry improved only slightly. By contrast, the services and construction confidence indicators are now at a lower level than at the end of 2014. In the euro area, sectoral developments paralleled those in the EU, except for confidence in construction, which remained unchanged compared to the end of 2014. In terms of levels, all sectoral EU indicators currently score around or above their corresponding historical mean. For the euro-area, services and construction confidence remain below their long-term average.

At country level, sentiment improved in four of the seven largest EU economies compared to December, namely in Italy (+7.2), Spain (+3.5), France (+2.6) and Germany (+1.7). The Netherlands (-0.8), Poland (-1.0) and the UK (-2.2), by contrast, saw sentiment worsening.

Sector developments

The improvement of economic sentiment in the first quarter is clearly dominated by consumer confidence and confidence in the retail sector. This is likely to reflect to a large extent the increase in households' real incomes related to the sharp drop in energy prices since last summer. By contrast, confidence in the industry and services sectors has been moving sideways for more than a year now, pointing to a modest pace of growth. Looking ahead, the assessment of domestic and export orders as well as managers' expectations suggest positive economic developments in the euro area, while they remain broadly flat in the EU. Moreover, the fact that capacity utilisation has increased back to its long-term average in manufacturing may indicate some scope for a pick-up of equipment investment in the quarters ahead. Price expectations appear to point to a bottoming-out of the negative inflation rates induced mainly by falling energy and food prices in recent months. Finally, employment is expected to increase across all the sectors in the euro area, while in the EU prospects are less positive in particular in retail trade and in construction.

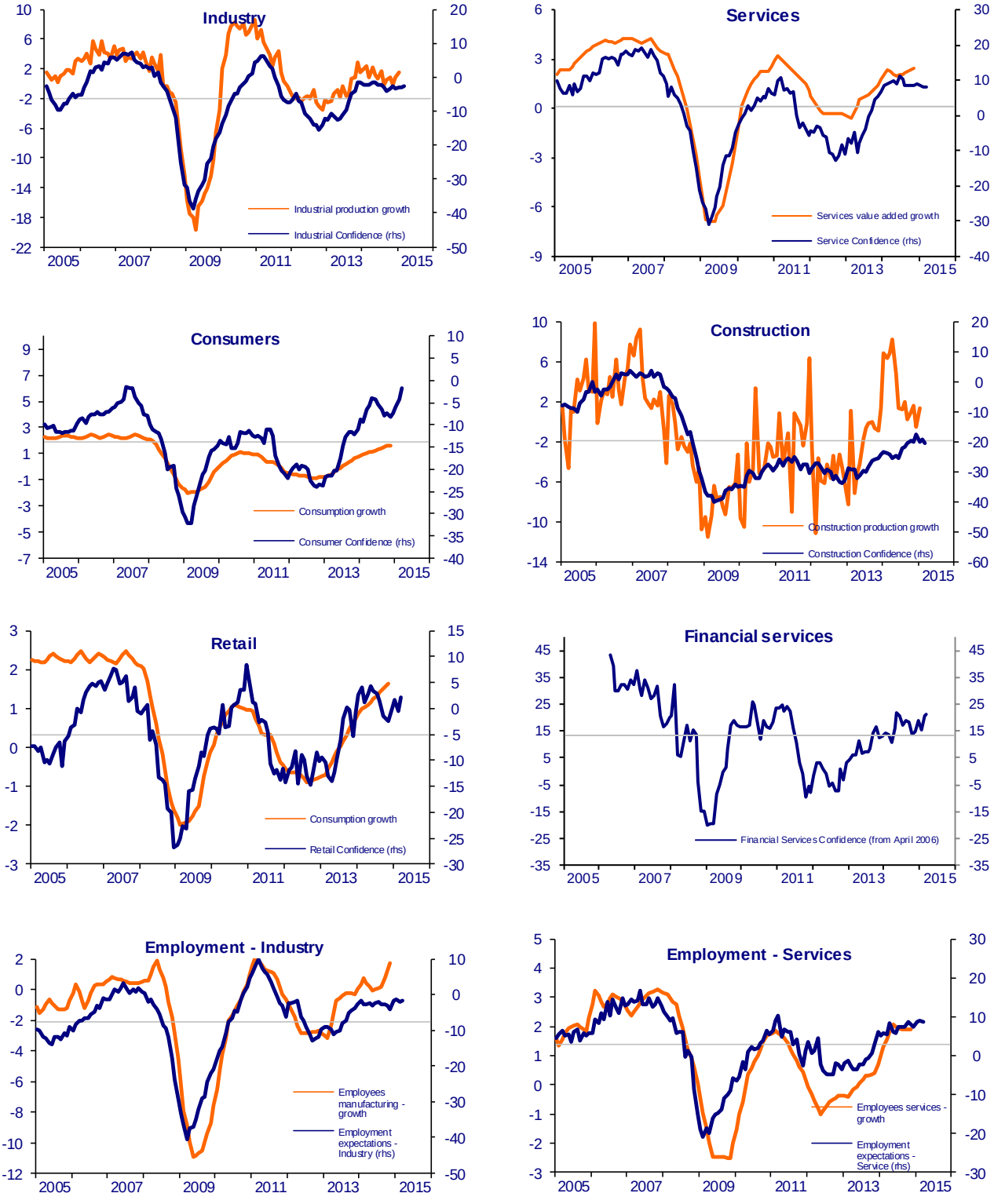
Over the first quarter of 2015, **industrial** confidence in the EU was on a moderate upward trend, while in the euro area it improved slightly in January, remained broadly stable in February and picked up strongly in March. On balance, a comparison of March's readings to those of last December shows the indicator having booked increases in the EU (+0.7 points) and, in particular, the euro area (+2.1 points).

In both European aggregates, managers' assessments of order books and the stocks of finished products improved over the quarter, while production expectations improved in the euro area, but remained broadly stable in the EU. Managers' appraisals of past production trends were revised upwards in both areas, while their views on export order books improved in the euro area, but worsened in the EU. In March, selling price expectations were at a lower level than in December in both areas. However, the monthly profile saw price expectations edging up in February and, in the EU, also in March. Managers' employment expectations improved markedly over the first quarter in the euro area, while they remained broadly unchanged in the EU. In the seven largest EU countries, compared to the end of the fourth quarter 2014, industry confidence increased strongly in Italy and Spain (by more than 3.5 points). Confidence improved also in Germany and France (by around two points). By contrast, it worsened in the Netherlands and the UK and remained stable in Poland.

The latest readings from the quarterly manufacturing survey showed that, compared to the last quarter of 2014, **capacity utilisation in manufacturing** increased by 0.6 and 0.7 percentage points in the EU and the euro area respectively. In both areas the level of capacity utilisation was 81.0% in January, corresponding to the long-term average for both areas (EU 80.8%; euro area 81.2%).

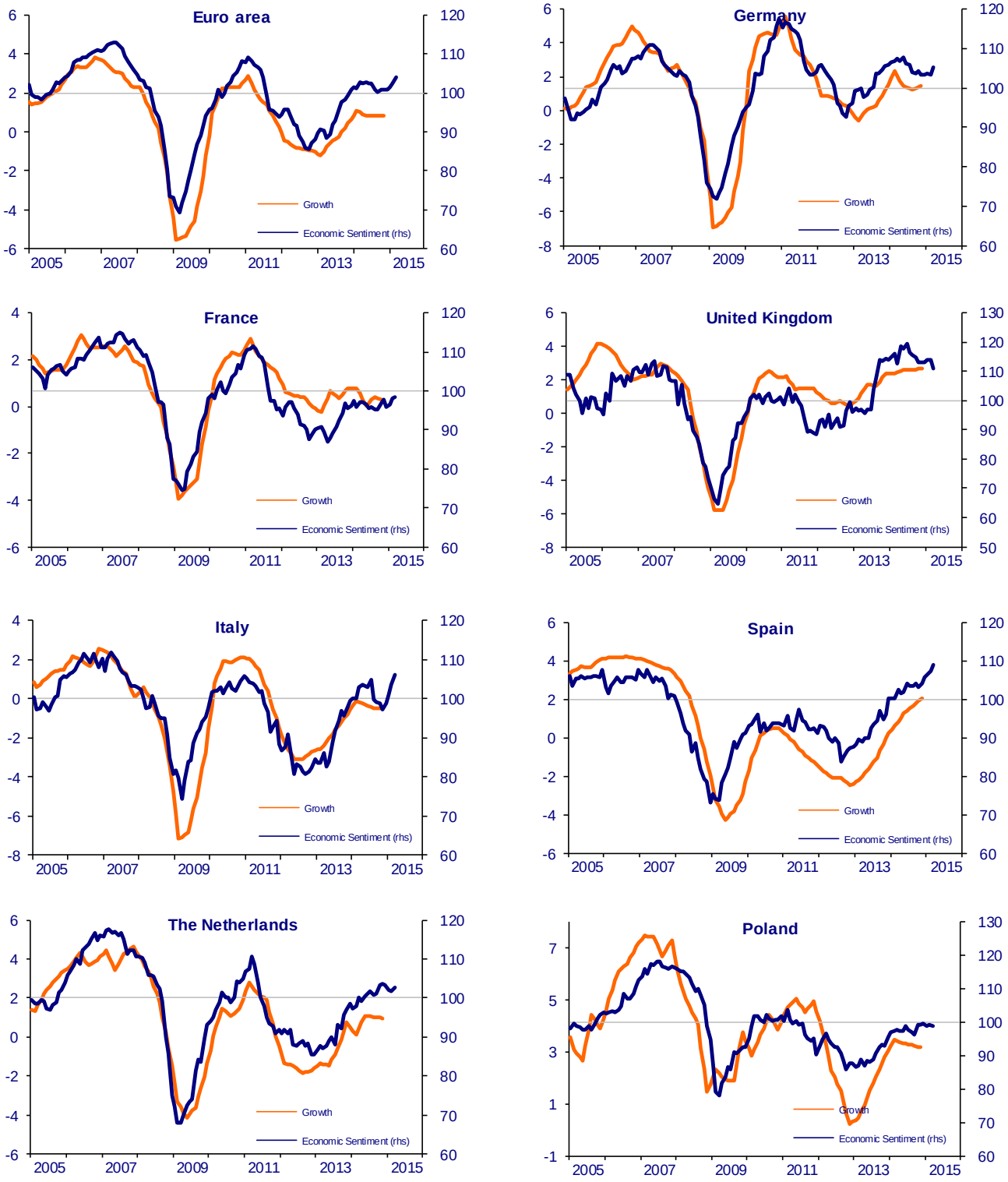
Confidence in **services** decreased somewhat over the first quarter of 2015. The EU currently scores around its historical average, while confidence in the euro area remains below its long-term mean. Having decreased in both areas in January, services confidence in the euro area stabilised in February and edged up in March, while, in the case of the EU, it continued declining in February and only stabilised in March.

Graph 1.1: **Sectoral confidence indicators and reference series for the EU (January 2005 to March 2015 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.

As for the individual components of the confidence index, in both areas managers' views on the past business situation improved, while past and expected demand worsened. The decline was particularly pronounced in the case of EU managers' demand expectations. Looking at the largest EU countries, compared to December 2014, confidence rallied in Italy (+7.6), while it only improved moderately in Germany (gains of 0.6 points) and remained broadly unchanged in the Netherlands. France, Poland and the UK saw the indicator decreasing by around 2½ percentage points. Confidence decreased also in Spain (-3.3) offsetting however only partly the important gains registered in the previous quarter.

The latest readings of the quarterly survey on **capacity utilisation in services** indicated a pause in the upward tendency that had started in early 2013, with both the EU and the euro area indicator remaining broadly stable at 88.5% and 87.8%, respectively.

Retail trade confidence increased in the first quarter of 2015 in both the EU and the euro area. While the improvement in the EU resulted from increases in January and March, which were only partly offset by a drop in February, the euro area scored three increases in a row. Improved confidence in both areas resulted from positive developments in all three components of the indicator, i.e. managers' appraisals of the past and expected business activity, as well as their views on the adequacy of the volume of stocks. From a country perspective, confidence improved markedly in France, Germany and Spain (+7.3, +4.9 and +4.6 points compared to December), and, less so, in Italy. By contrast, it remained broadly stable in Poland, while decreasing in the Netherlands and the UK.

Compared to the end of 2014, confidence in **construction** worsened in the EU, while it remained unchanged in the euro area. From a month-on-month perspective, both areas saw the indicator dropping in January (especially in the EU). Subsequently, the euro area indicator remained stable in February and edged up in March, while EU confidence saw an improvement in February, which was, however offset by a loss in March. In the EU, both components of the indicator - managers' views on current order books and their employment expectations – declined. In the euro area, managers' assessments of their current order books remained broadly stable and employment expectations increased slightly. Focusing on individual countries, the indicator picked up markedly in Italy and Spain and, to a lesser extent, in the Netherlands and Poland. By contrast, it deteriorated in Germany, France and the UK. In Germany and the UK, in spite of particularly strong losses, the indicator remained at high levels.

In both the EU and the euro area, confidence among **consumers** improved markedly in the first quarter of 2015, resulting from improvements in all three months of the quarter. This pattern was backed by strong improvements in all four components of the indicator (consumers' expectations about their personal financial situation, the general economic situation, unemployment and savings). Consumers were particularly more optimistic about the future general economic situation and future unemployment developments. Confidence improved in all of the seven largest EU Member States, except for Poland, where the indicator remained virtually unchanged compared to December 2014.

EU and euro-area confidence in **financial services** (not included in the ESI) improved over the first quarter of 2015, continuing the upward trend observed since the end of 2012. In the EU, the increase was backed by managers' more positive answers to all questions feeding into the indicator construction, while, in the euro area, confidence increased thanks to managers' more optimistic views on expected demand, which was partially offset by a slight downward revision of their appraisal of past demand and the past business situation.

The developments in survey data over the first quarter are illustrated by the evolution of the climate tracers. After several months in the region between the expansion and the downswing quadrant, the economic climate tracer for the EU moved more clearly into the expansion quadrant (see Annex 1 and Annex 2 for further details). This movement was driven mainly by the climate tracers for consumers and the retail trade sector. The climate tracers for industry and services have settled just between the downswing and the expansion areas, while the climate tracer for construction remained in the upswing area, moving into the direction of the intersection of the two axes, which hints at a stable situation around the historic average level. Also for the euro area, the overall economic climate tracer is located in the expansion quadrant. In contrast to the EU, the euro-area climate tracer for the service sector is just on the border between the upswing and the contraction areas and the construction climate tracer is in the upswing quadrant, but approaching the expansion area more clearly than in the EU.

2. Recent developments in selected Member States

During the first quarter of 2015, sentiment has improved strongly in Italy and Spain and - to a lesser extent - in France and Germany, while it has deteriorated in the Netherlands, Poland and the UK. The sentiment index scored above its long-term average in Germany, Italy, Spain, the Netherlands and the UK.

In **Germany,** the ESI increased in the first quarter of 2015 compared to the end of 2014, thanks to a sizeable increase in March 2015. The indicator is now well above its long-term average of 100, at 105.1 points. Confidence improved among consumers and in all business sectors except for construction, which dropped over the quarter and is now 5.3 point lower than at the end of 2014. In terms of the climate tracer, Germany is moving from the downswing area directly to the expansion quadrant, an indication that growth should be firming further.

Economic sentiment in **France** improved over the first quarter; the indicator increased in all three months, but gains were particularly significant in February. At 98.5 points, however, the sentiment index remains clearly below its long-term average of 100. Confidence worsened in construction and services, while it improved in the other business sectors and among consumers. The climate tracer is getting closer to the expansion quadrant, pointing to the potential for a growth rebound.

Sentiment in **Italy** rose in all three months of the quarter, resulting in a marked increase compared to December 2014. The sentiment index is now well above its long-term average of 100, at 106.1 points. At sector level, confidence improved markedly in all the business sectors and among consumers, where the improvement has been particularly strong. The climate tracer on the border between the upswing and the expansion areas also points to a gradual return to growth.

Also the ESI in **Spain** improved compared to December 2014, thanks to gains registered in all three months of the quarter. At 109.1 points, the sentiment indicator is well above its long-term average of 100. Confidence decreased in services, while it registered solid gains in all remaining business sectors and among consumers. Notably confidence in retail trade reached its historical high in March 2015 (at +14.5). The climate tracer for Spain moved further into the expansion area indicating a sustained recovery.

In the **Netherlands**, sentiment worsened over the first quarter of 2015. The ESI decreased in January and February, while it increased in March. At 102.6, the indicator remains above its long-term average. At sector level, sentiment improved in construction and among consumers, while confidence declined in industry and retail trade and remained broadly stable in services. The climate tracer remains in the expansion quadrant, but close to the downswing area.

In the **United Kingdom**, sentiment decreased in the first quarter compared to December 2014, due to a sharp drop in March that offset a slight increase booked in January. Nevertheless, the indicator remains well above its long-term average of 100, at 111.1. Worsened sentiment resulted from clear downward revisions in all the business sectors, which were only partially offset by improvements among consumers. The climate tracer in the downswing quadrant also points to a maturing cycle.

Sentiment in **Poland** worsened in January, improved in February and registered another decrease in March, resulting in an overall decline compared to December 2014. The ESI continues to score below its long-term average at 98.7. At sector level, confidence decreased in services, while it remained broadly unchanged in industry and among consumers and improved slightly in retail trade and construction. Also for Poland, which has registered very robust GDP growth in recent quarters, the climate tracer is moving closer to the downswing quadrant.

3. Highlight: Revisiting the relation between inventories and production using survey data

One of the main interests of macroeconomists is to understand which economic variables drive business cycle developments and to gauge the relative magnitude of their impacts. Since Abramowitz (1950),[1] it is well-known that inventories are an important determinant of economic fluctuations: Inventory build-ups reinforce the economy during expansions, while inventory liquidations tend to exacerbate recessions. A clear understanding of the relationship between inventories and economic output is thus key to grasping the underlying dynamics of the business cycle.

The vast majority of pre-crisis studies on the subject is set in a framework where conceivable links between the two variables mainly follow an accounting logic: If the stock of inventories increases, this must, ceteris paribus, be reflected in an increase in aggregate output.[2] Departing from the observation that average volatility levels of GDP have declined since the mid-eighties, the studies investigate whether this observation can be explained, inter alia, by reduced volatility levels in inventory growth. The latter might be caused by

[1] Abramowitz, M. (1950), *Inventories and Business Cycles*. National Bureau of Economic Research, New York.

[2] See, among others, Filardo, A.J. (1995), "Recent Evidence on the Muted Inventory Cycle", *Federal Reserve Bank of Kansas City Economic Review*, 2, 27-43; Ahmed, S., Levin, A. and Wilson, B.A. (2004), "Recent U.S. Macroeconomic Stability: good Policies, Good Practices, or Good Luck?", *Review of Economics and Statistics*, 86, 824-832; McCarthy, J. and Zakrajšek, E. (2007),. "Inventory Dynamics and Business Cycles: What has Changed?", *Journal of Money, Credit and Banking*, 39, 591-613.

advances in information technology fostering just-in-time inventory management.

In this highlight section, the relation between inventories and output is approached from a different angle. The research question addressed is whether and to what extent the perceived affluence (or scarcity) of today's inventories in the light of expected demand has a bearing on tomorrow's production levels. Clearly, the underlying economic rationale is that since inventories are costly, binding financial resources and warehouse space, they should not be larger than necessary to meet demand in the short-term.

Since the reaction of firms to variations in the perceived appropriateness of inventories might change depending on the economic circumstances, the subsequent analysis pays special attention to periods of economic turmoil (2008/09 financial crisis and ensuing sovereign debt crisis), where demand has been subject to drastic changes.

Data

The variable chosen to represent the affluence (or scarcity) of inventories in the light of expected demand is question 4 of the EU harmonised manufacturing survey. The question asks managers for an assessment of the *current* stock of finished products, with the three answering categories "too large (above normal)", "adequate (normal for the season)" and "too small (below normal)". As is readily apparent, the variable does not only capture the level of inventories, but also the appropriateness of that level ("too large", "adequate", "too small"). Assuming that responding firms think in particular of expected demand levels when they evaluate whether a given level of inventories is appropriate, question 4 can be considered a good proxy of the affluence / scarcity of inventories in the light of expected demand.

The second component for our analysis, the level of production, is measured by question 1 of the EU harmonised manufacturing survey. It inquires the development of production *over the past 3 months*, with the answering categories "increased", "remained unchanged" and "decreased".

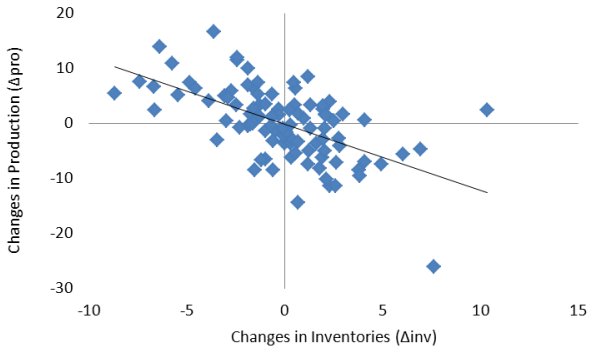
Since the two questions refer to different time-horizons, the latter must be "aligned" before the analysis can be conducted. To do this, quarterly figures are derived from monthly data as follows: For past production, managers' assessments in quarter t are represented by the indicator's reading in the last month of that quarter (i.e. the March value represents quarter 1, the June value quarter 2, etc.). The intuition is that the survey question inquires the developments in production over the "past 3 months" so that the value for the third month adequately represents the developments over the quarter. By contrast, in the case of the inventories question, which inquires an assessment of the current situation, the average of three monthly readings is considered to represent a given quarter.

Since the present analysis focusses on the effect of changes in inventories on production developments, its set-up needs to ensure the anteriority of the inventories variable vis-à-vis the production question. Practically, the calculation of the quarterly averages of the inventories variable is based on monthly stocks data shifted two months ahead. Thus, quarter 1 of a given year corresponds to the average of November, December and January, etc. The reason for shifting the data by two rather than just one month is that the period considered by a firm in answering the survey question on production "over the past three months" is not entirely clear-cut. If a firm is surveyed at the beginning of a month, the assessment might include developments over the last month of the preceding quarter, while this is less likely when the survey is conducted more towards the middle of the month. By shifting the inventories series two months ahead, its anteriority is ensured in all conceivable scenarios.

Results for the aggregate manufacturing sector

Graph 3.1 plots (the first differences of) euro-area past production (Δpro) against inventories (Δinv) over the sample from 1990q2 to 2014q4. It clearly emerges that there is a negative relationship between the two: A quarter-on-quarter (q-o-q) increase in the relative share of enterprises reporting to have "too large" stocks is associated with a q-o-q decrease in the relative share of businesses with increased production.

Graph 3.1: **Changes in Production vs. changes in Inventories**



Source: European Commission.

Since the inventories variable is constructed on the basis of observations being moved two months ahead, the scatter plot suggests that if enterprises notice that their stocks are "too large", they decrease their production in the following months so as to re-establish an appropriate relation between the two. To

better formalise the results, the following bi-variate regression is run:

$$\Delta pro(t) = c1 + c2 \times \Delta inv(t) + e(t) \quad (1)$$

expressing changes in production by changes in inventories and a constant. In condition (1), t indicates the calendar quarter of reference and e(t) represents the error term.

The estimation results for the full sample are collected in column "ALL" of Table 3.1., where heteroskedasticity and autocorrelation consistent (HAC) standard errors are in parentheses. The bottom part of the Table reports some diagnostic tests and statistics, namely the no serial correlation residual test (up to the fifth order) (LM(5)), the Jarque-Bera normality test (JB), the F-test for the joint non-significance of regressors, with p-values in square brackets, the standard error of regression (SE Regr.) and the overall goodness of fit statistics (Adj. Rsq).

Table 3.1: **Regression results (1990q2 to 2014q4): aggregate manufacturing sector**

	ALL	ALL-pre	ALL-post
c1	-0.093	-0.015	-0.318
	(0.476)	(0.436)	(0.671)
c2	-1.699	-1.372	-2.172
	(0.205)	(0.181)	(0.248)
LM(5)	[0.097]	[0.002]	[0.119]
JB	[0.002]	[0.832]	[0.351]
F	[0.000]	[0.000]	[0.000]
SE Regr.	5.127	4.538	6.338
Adj. Rsq	0.372	0.286	0.499

Source: European Commission.

The evidence shows that, if the q-o-q change in the share of enterprises reporting "too large", rather than "too small", inventories grows by 1 percentage point (pp), this translates into a 1.7 pp increase in the q-o-q change of the share of enterprises reducing their production. As the Table shows, the results are significant at the 1% significance level.

As stated in the introduction, the present analysis aims to also inquire whether inventories help explain the increased output volatility witnessed in the course of the financial and ensuing sovereign debt crisis. To this end, multiple re-runs of the regression are performed, extending every time the sample span by one observation (recursive estimation) starting from the period 1990q2-2005q1. Graph 2 plots how the estimate of the coefficient on inventories changes over time, together with the 90% significance interval (grey area).

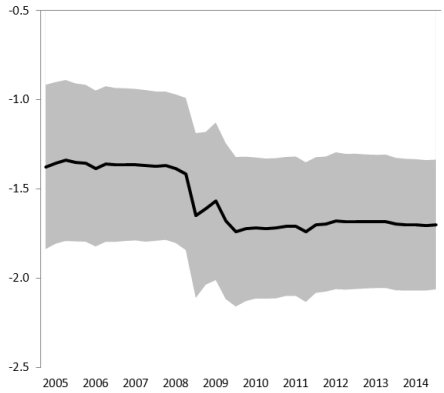
The first chunk of estimations shows the coefficient relatively stable around -1.4. When estimations include 2008q4 for the first time though, the coefficient drops sharply. Subsequent extensions of the sample period aggravate the drop. From 2010q1 onwards, the coefficient settles at around -1.7.

These findings suggest a number of conclusions: First of all, the relation between inventories and production, while usually rather constant over time, has turned more negative in recent years. When firms consider their inventories affluent compared to expected demand, production is driven down more sharply than in previous years.

A second observation concerns the magnitude of the change. With the coefficient on the effect of inventories on production decreasing by some 25% (from roughly -1.4 to -1.7), the change appears non-negligible.

Thirdly, the change in the relationship seems to have been triggered by the financial crisis, since it occurred quite abruptly at a point in time coinciding with the peak of the financial crisis.[3] While a number of factors could potentially impact on how decisively firms react to a perceived affluence of inventories (e.g. rising input prices, making excessive stocks particularly damaging, or a shortage of warehouse space), they are unlikely to have been affected by the financial crisis to the same degree as another relevant factor, namely demand, which plummeted in a matter of a few quarters.

Graph 3.2: **Recursive estimates: All sectors**



Source: European Commission.

This suggests that the observed shift in the relationship between stocks and production, which essentially constitutes a move towards a more

[3] Note that, during the financial crisis, the lowest q-o-q growth rates of industrial production in manufacturing have been registered in 2008q4 and 2009q1.

cautious way of managing production, has been caused by the experience of dramatically dropping levels of demand.

Finally, the most striking result is that the coefficient remains stable from 2010q1 onwards and does not increase to pre-crisis levels any more. Given that the financial crisis of 2008/09, as well as the peak of the sovereign debt crisis, which is usually associated with the year 2012, date back several quarters, this result underlines that the financial crisis is still taking its toll on enterprises. Amid elevated uncertainty levels, firms seem to feel uncomfortable about the idea of discarding the cautious approach to production management adopted in the financial crisis and reverting to a more risk-taking attitude. Furthermore, persistent deleveraging needs caused by the financial crisis might reinforce firms' dedication to lowering stocks, in case the latter depend on external funding.

In the light of these findings, the analysis can be rounded off by re-running the regression on two different samples, one covering the pre-crisis period (1990q2 to 2007q4) and another one the period thereafter (2008q1 to 2014q4). The focus is hereby on the development of the adjusted R-squared. As shown in columns "ALL-pre" and "ALL-post" of Table 3.1, the goodness of fit statistic indeed almost doubles from about 0.30 to 0.50. This result is plausible, suggesting that entrepreneurs are not only more reactive to changes in the affluence or scarcity of stocks, but that the practice of frequently, and drastically, adapting their production in response to such changes has a higher influence on aggregate output than before.

Results at MIG-level

The next step focusses on whether, and to which degree, the conclusions reached so far also hold at the level of main industrial groupings (i.e. production of consumption - CONS, intermediate - INTM, and capital goods - INVE). In this context, it is particularly interesting to see whether the timing of the change in the relationship between inventories and production differs between the sectors.

Table 3.2 reports the results of regressing the assessment of changes in production on changes of the appraisal of inventories. It turns out that, in the case of all sectors, there is a statistically significant, negative relationship between the two variables. The magnitude of the coefficients is rather similar and thus does not provide evidence that the reaction of entrepreneurs to a given level of stocks would differ much, depending on the sector looked at.

Table 3.2: **Regression results (1990q2 to 2014q4): MIGS**

	CONS	INTM	INVE
c1	-0.140	-0.079	-0.101
	(0.346)	(0.659)	(0.671)
c2	-1.215	-1.443	-1.336
	(0.262)	(0.194)	(0.248)
LM(5)	[0.278]	[0.103]	[0.027]
JB	[0.790]	[0.000]	[0.081]
F	[0.000]	[0.000]	[0.000]
SE Regr.	3.414	6.767	7.114
Adj. Rsq	0.202	0.322	0.243

Source: European Commission.

In accordance with the previous section on aggregate developments, the sector-specific regressions are re-run on an incrementally growing sample period. The evolution of the coefficient expressing the association between inventories and production is plotted in Graph 3.3.

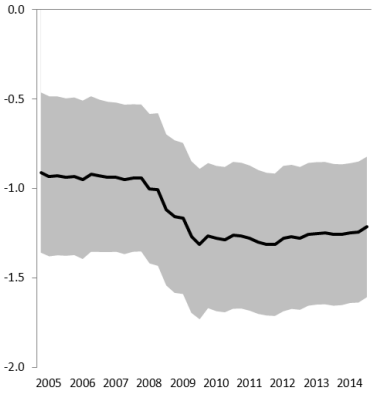
All three sectors register an intensification of the negative relation in the period of the 2008/09 financial crisis. Thus, a first conclusion is that the observation of a change in the relationship between inventories and production at aggregate level is the result of similar changes at the level of MIGs. A second observation focusses on the relative magnitude of the drop. For each sector, we determine the average size of the coefficient prior to the drop and after the drop, i.e. when the line graph in Figure 3 turns horizontal again, and calculate the percentage change.[4] The most drastic change is observed in the investment and consumer goods sectors, where the coefficient drops, respectively, by 36% and 35%. The intermediate goods sector witnessed a comparatively smaller change of about 25%. Finally, focussing on the speed with which enterprises in different sectors have reacted to the financial crisis, it clearly emerges that the response from the investment goods sector was the fastest and most articulated one. Within two quarters (2008q3 and q4), the coefficient shed some 30%. This contrasts especially with the consumer goods sector, which adapted to the new environment more gradually over time. Taken together, the last two observations suggest that the developments at euro-area level result especially from a quick and sweeping change in the behaviour of the investment goods sector. This is in line with economic theory, which suggests that investment goods work as a

[4] Depending on the sector looked at, the drop starts in 2008q2, 2008q3 or 2008q4 and ends in 2010q1 or 2010q2.

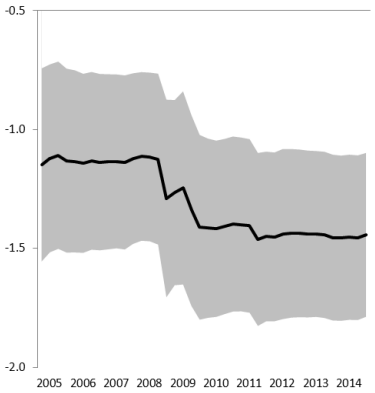
pacemaker of the business cycle, anticipating developments which later on find repercussion in other main industrial groupings.

Graph 3.3: **Recursive estimates: MIGS**

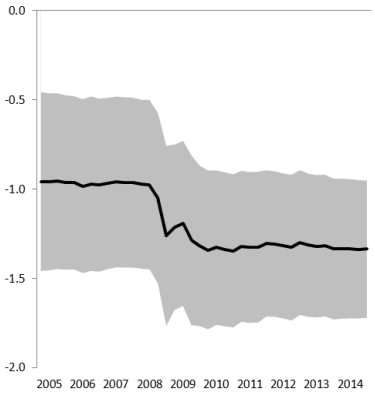
A. Consumption Goods



B. Intermediate Goods



C. Investment Goods



Source: European Commission.

Conclusions

The analysis has shown that the dynamics of production are strongly affected by the affluence or scarcity of stocks in relation to demand. When firms declare stocks as being "too large", they react by cutting production in the following months. The opposite holds true when inventories are reported to be "too small". As evidenced by the results of recursive regressions this negative relationship has intensified significantly since the onset of the global crisis. Interestingly, in the last two years, which have seen the economy moving back to calmer waters, the relationship has not been reverted to the pre-crisis regime. The above conclusions are confirmed when conducting the analysis at MIG level and especially for the investment goods sector. All in all, these findings suggest that firms have become more sensitive to mismatches between inventories and expected demand, reacting to affluent stocks with decisive reductions in production.

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.

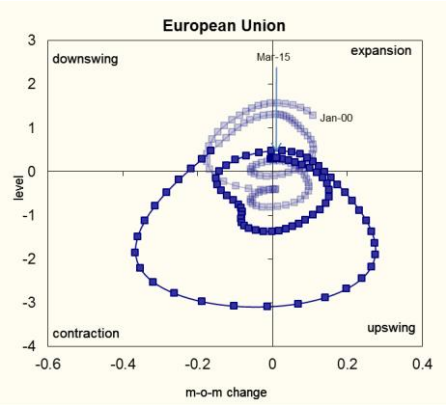
The series levels are plotted against their first differences (m-o-m changes), so that each chart depicts — at the same time — the current stance of the sector/country and its most recent dynamics. Series are smoothed to eliminate short-term fluctuations.

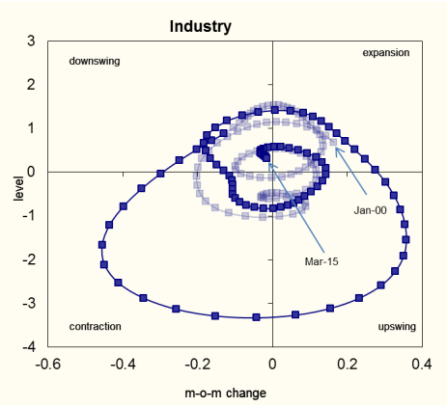
The four quadrants of the graphs enable to distinguish four phases of the business cycle: "expansion" (top right quadrant), "downswing" (top left), "contraction" (bottom left), and "upswing" (bottom right).

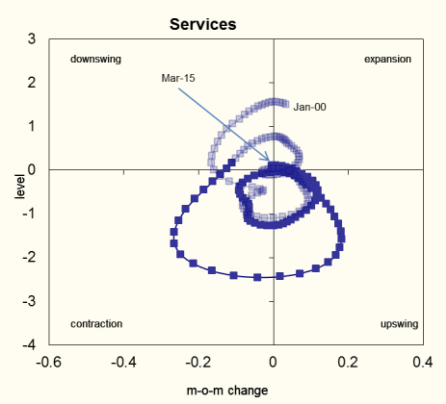
Cyclical peaks are positioned in the top centre of the graph, and troughs in the bottom centre.

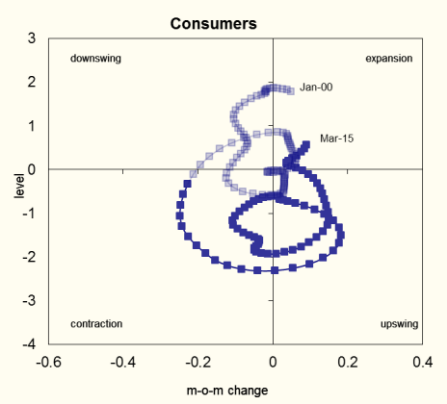
In order to make the graphs more readable, two colours have been used for the tracer. The darker line shows developments in the current cycle, which in the EU and euro area roughly started in January 2008.

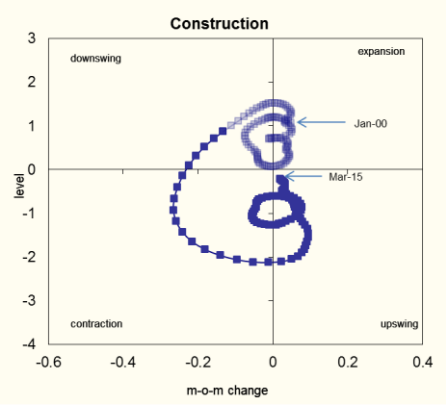
Economic climate tracer across sectors, EU



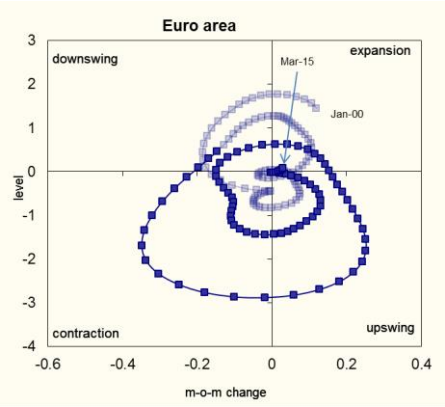


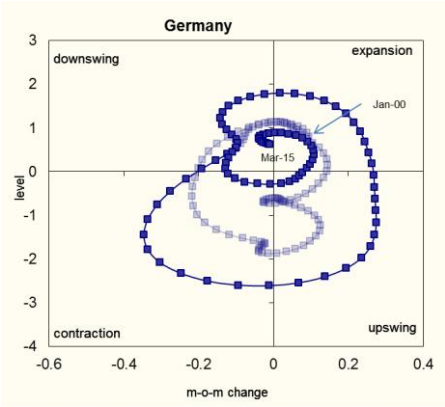


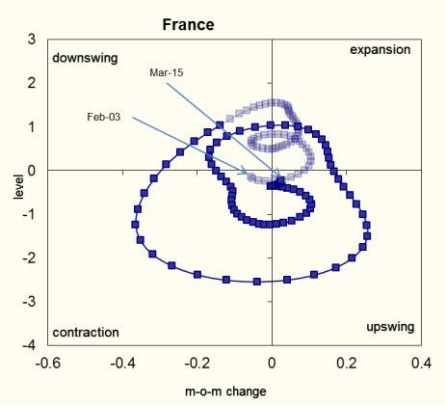


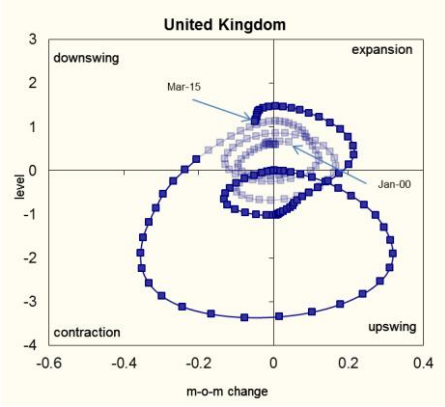


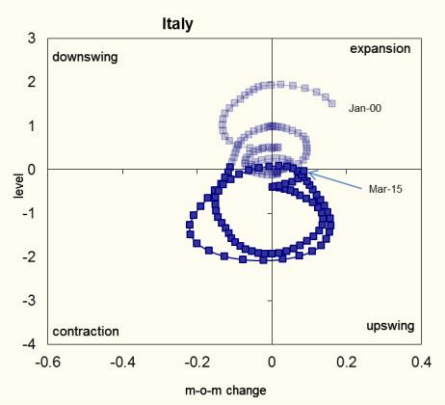
Economic climate, largest EU Member States

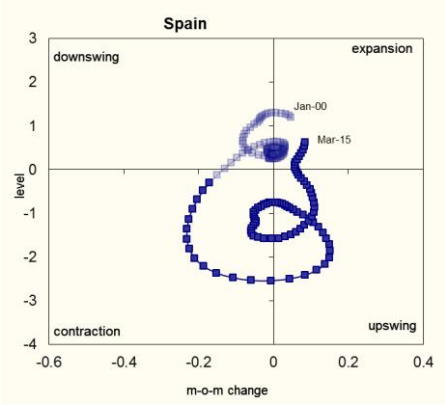


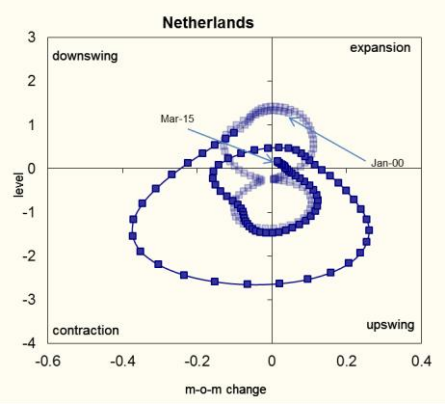


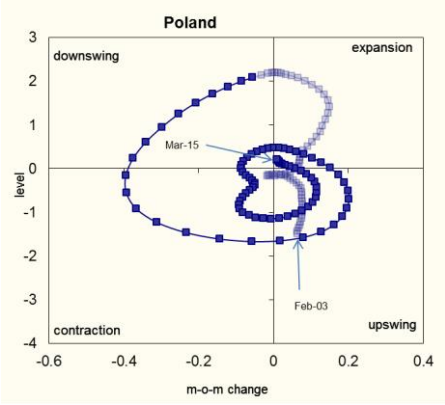












Annex 2: Reference series

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.