Box I.2: A 'new modesty'? Level shifts in survey data and the decreasing trend of 'normal' growth

The experience of the double-dip recession in the euro area in 2008-09 and in 2011-13 and the ensuing slow recovery may arguably have led consumers and business managers to adjust their economic expectations to a more modest 'new normal'. Analytically, this would imply a pre/post crisis break in the relationship between qualitative survey ('soft') and quantitative ('hard') data, which has traditionally been remarkably stable. Using pre-crisis correlations of survey indicators and underlying real variables could then be misleading. This box examines to what extent survey data for the euro area lends support to the hypothesis of a 'new modesty' and how this may be connected with the decline in potential output growth observed in recent years.

Two major arguments can be brought forward to explain the 'new modesty' hypothesis for survey data. [1] The first one is a technical argument related to the sampling of the surveys: it explains a positive bias in the surveys by the assumption that the businesses that survive the crises and keep answering the surveys are doing better than the others. Against this hypothesis, it can be argued that such a bias would equally apply to hard data, which are also based on sampling. Moreover, there is no empirical evidence to support the hypothesis that a selection effect occurred during the crisis period. [2]

The second argument is of a psychological or cognitive nature: respondents' answers to survey questions are relative to a 'normal' benchmark, or level of aspiration. For instance, the reference for businesses is generally what they planned to produce. In this case, their views on a 'normal' situation are necessarily subject to change.

Evidence of a shift

A straightforward way to check whether the relationship between euro area soft and hard data has changed over time is to model GDP growth using the European Commission's Economic Sentiment Indicator (ESI), which is calculated to track overall economic activity, as an explanatory variable [3]. The linear model chosen is simple and widely used: it includes the level of the survey and its first difference [4].

$$Y_t = b_0 + b_1.ESI_t + b_2.\Delta ESI_t + u_t$$

By estimating this model twice, once over a pre-crisis sample (up until Q2-2007), and once over a post-crisis [5] sample (from Q3-2009), it is possible to compute GDP growth corresponding to the level of ESI in a pre-crisis versus a post-crisis world. Graph 1 illustrates that the relationship between GDP growth and the ESI changed in the euro area around the 2008-2009 recession: GDP growth nowcasted with pre-crisis coefficients is consistently higher than what is suggested by a post-crisis model.

Beyond these aggregate results for the euro area, there is evidence of similar shifts for individual countries, sectors, and specific survey questions. [6] For instance, Bruno et al. (2016), using Italian micro-data on capacity utilisation, provide evidence that the level of capacity utilisation that managers consider as 'sufficient' has significantly declined after the crisis.

(1) See European Commission (2016), "'New normal'? - The impact of the financial crisis on business and consumer survey data", *European Business Cycle Indicators*, 3rd quarter.

(2) See Bruno G., Crosilla L., Margani P. (2016), "Inspecting the relationship between business confidence and industrial production: evidence based on Italian survey data", paper presented in September 2016 at the CIRET conference in Copenhagen.

(3) The ESI summarises developments in five sectors (industry, services, retail trade, construction, and among consumers), see the BCS User Guide on https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys_en for details

(4) This model has been used for instance in Rioust De Largentaye T., Roucher D. (2015), "How closely do business confidence indicators correlate with actual growth?", *Trésor-Economics* No. 151, or European Commission (2011), "Is there a decoupling between soft and hard data", *European Business Cycle Indicators,* July. For a review of the use of bridge models, see Ferrara L., Guégan D. and Rakotomarolahy P. (2010), "GDP nowcasting with ragged-edge data: a semi-parametric modelling", *Journal of Forecasting*, 29(1-2), pp. 186-99.

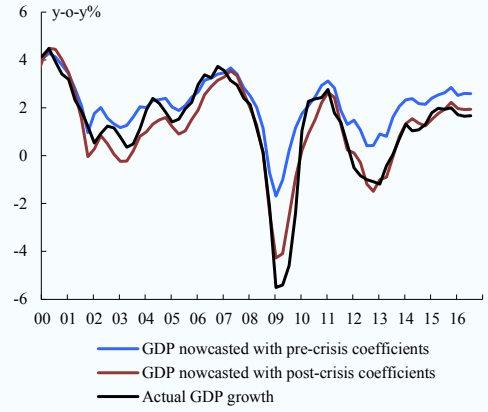
(5) Only the first dip of the Great Recession is excluded for the pre/post-crisis analysis, mainly to avoid an undue effect on the length of the post-crisis sample. Moreover it is the steep 2008-2009 financial crisis that has arguably introduced non-linearities in the link between soft and hard data.

(6) For sector-specific results on the basis of the components of the ESI, see European Commission (2016).

(Continued on the next page)

Box (continued)

Graph 1: **Euro area actual and nowcasted GDP growth**



Estimation of the relationship between GDP growth and survey data

The approach described above is 'discretionary' in the sense that it assumes a clear distinction between the pre- and post-crisis implications of a given level of survey results for economic growth. To widen the perspective and better understand how the link between the surveys and GDP growth may have changed over time, one may allow for a continuous adjustment over a large sample. [7] To this end, two different econometric methods have been applied. The first one is based on the same linear model as the pre/post-crisis method, but instead of estimating it twice, it is estimated multiple times over rolling samples of 45 quarters.

The choice of a 45-quarter period ensures a sample long enough for stable ordinary least square (OLS) estimation of the coefficients. At the same time, the model results can be considered as a 45-quarter moving average of the parameters. This means that any shift in the link between the ESI and the GDP growth will take 45 quarters (11 years) to be completely taken into account by this model.

Alternatively, one can estimate a time-varying parameter model (TVP). [8] Thus, departing from the same structure as above, the coefficients are allowed to vary over time. The advantage of the TVP model compared to the rolling regression is that it does not depend on the choice of the length of the moving average. The coefficients are estimated using Kalman filtering, in a classical state-space representation. [9]

How strong is economic growth when the ESI equals 100?

When applied to the relationship between GDP growth and the ESI for the euro area, both approaches (i.e. rolling regression and TVP model) provide evidence that the estimated coefficients have changed significantly over the past decades. This implies that for a given level of the ESI, the projected GDP growth did vary over time.

A straightforward way to visualise the changing relationship between the ESI and GDP growth over time is to calculate the annual GDP growth corresponding to the long-term average of the ESI (of 100), which should reflect survey respondents' 'normal' assessment of a 'neutral' economic situation.

The TVP and the rolling regression methods give similar results for 'normal' annual GDP growth for the euro area corresponding to an ESI level of 100 (see Graph 2): such growth used to be above 2% before 2000, and decreased more or less steadily until 2003. It appears to have stabilised somewhat between 2003 and 2008, before falling steeply in 2008 and 2009. Probably because the rolling regression method is closer to a moving average of the parameters, it shows a slower decrease than the TVP method in the aftermath of the Great Recession. However, estimates from both models confirm that the annual GDP growth corresponding to a level of 100 in ESI is currently just above 1%, as opposed to close to 2% before the crisis.

The method can robustly be applied to other survey data. For instance, the Business Climate Indicator (BCI) differs from the ESI in that it is based only on the manufacturing sector and is calculated as the first factor of a principal component analysis. [10] The projection of annual GDP growth corresponding to the long-term average of the BCI (see Graph 3) gives comparable results to those based on the ESI, although the volatility appears to

[7] Data for the euro area since 1995 were aggregated by Eurostat. GDP growth up until 1995 is based on Fagan G. J. Henry, and R. Mestre (2001), 'An Area-wide Model (AWM) for the euro area', *ECB working paper* No. 42, January.

[8] As suggested in European Commission (2011) cited above.

[9] For the state-space representation, see for instance Kim, C.-T. and C. R. Nelson (1989). 'The Time-Varying-Parameter Model for Modeling Changing Conditional Variance: The Case of Lucas Hypothesis'. *Journal of Business and Economic Statistics* 7(4), pp. 433-40. The model was estimated with a diffuse initialisation, as defined in Koopman, S. J. and J. Durbin (2003). 'Filtering and smoothing of state vector for diffuse state-space models'. *Journal of Time Series Analysis* 24(1), pp. 85-98.

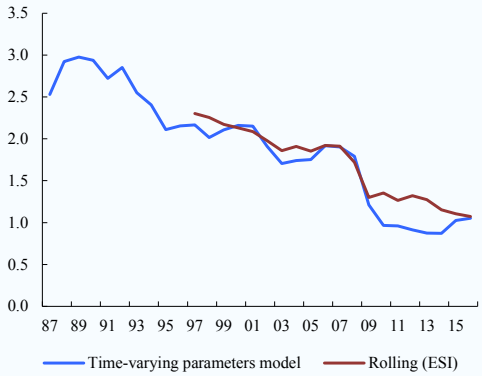
[10] See the BCS User Guide cited above for details.

(Continued on the next page)

Box (continued)

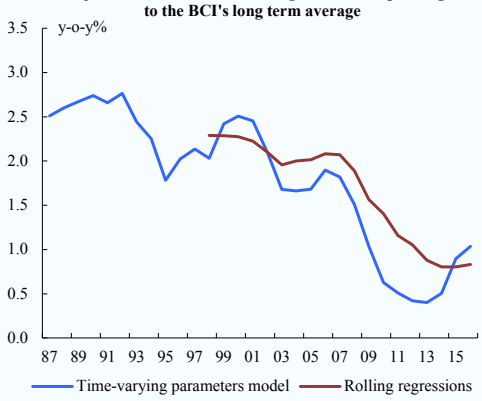
be somewhat higher. In both cases, the estimated annual GDP growth is close to but below 3% around 1990, and follows a slowly decreasing trend up until the steep fall during the Great Recession. This slump is even larger when estimated with the BCI (1.5% from peak to through) than with the ESI (1.0% from peak to through). However, for both survey indicators, the annual GDP growth corresponding to the long-term average estimated with the TVP model is just above 1% in 2016. The rolling regression method seems to be lagging compared to the TVP method, but it confirms the general trend.

Graph 2: **euro area GDP annual growth corresponding to a level of 100 in ESI**



The particularly steep fall around the crisis period of 2008-09 provides some justification for the discretionary 'pre-/post-crisis' view adopted in European Commission (2016); however, the graph shows that, in addition, there is also a more gradual underlying trend of given survey levels being associated with lower growth rates.

Graph 3: **euro area GDP annual growth corresponding to the BCI's long term average**

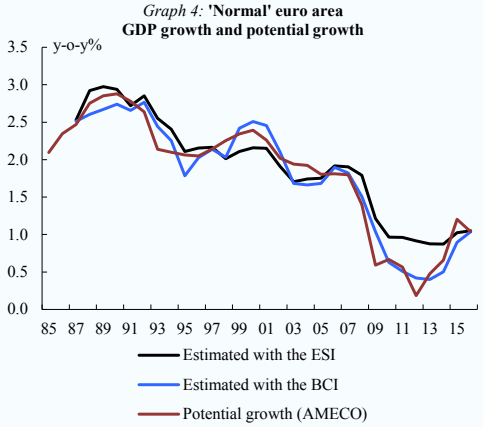


An alternative measure of potential GDP growth

The long-term averages of the survey indicators describe a neutral or normal assessment of the economic situation by economic agents. Growth rates corresponding to this neutral reference point can arguably be interpreted as the 'underlying' trend, or potential, growth. The results are consistent with the hypothesis that the level of economic activity which people consider as 'normal' changes over time: they adapt their views to the average growth experienced, or perceived, over the mid- to long-term.

Graph 4 shows the 'normal' annual GDP growth estimated with the TVP model using the ESI and the BCI, compared with the potential growth estimated by DG ECFIN using a production function [11]. Despite the completely different underlying methodologies, the similarity between the three curves is striking. It suggests that business and consumer survey results can be used, beyond their usual short-term forecasting purposes, to gauge changes in long-term, or potential growth.

Graph 4: **'Normal' euro area GDP growth and potential growth**



Overall, the presented results call for caution when translating survey data into actual economic growth rates. While the current level of the ESI, which is well above its long-term average, is compatible with expanding economic activity, it also hints at lower growth rates than those implied in the pre-recession period.

(11) On the methodology for estimating the potential growth, see Havik K., Mc Morrow K., Orlandi F., Planas C., Raciborski R., Röger W., Rossi A., Thum-Thysen A., Vandermeulen V. (2014), 'The Production Function Methodology for Calculating Potential Growth Rates & Output Gaps'. *European Economy*, Economic Papers 535.