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Bas van Aarle* and Marcus Kappler**

Economic Sentiment Shocks and Fluctuations in Economic Activity in the Euro Area and the USA

Economic sentiment indicators can provide a wealth of information for macroeconomic policy formulation and analysis. Despite this, economic sentiment is often neglected by mainstream economics. This article assesses whether there is a potential role for economic sentiment to amplify business cycle fluctuations. This paper integrates the European Commission Economic Sentiment Indicator data into an econometric analysis of the euro area business cycle. The investigation of the euro area economy suggests that sentiment shocks do have an impact on important macroeconomic variables such as output, retail sales, and unemployment. There is furthermore significant evidence that economic conditions and shocks affect economic sentiment.

This study contributes to the literature on business cycle analysis by integrating survey data into an analysis of the euro area business cycle. More specifically, we assess the extent to which the euro area business cycle is affected by shocks in consumer and producer business cycle evaluations, as summarised by the Economic Sentiment Indicator of the European Commission. We develop a VAR model to analyse these propagations of shocks to economic sentiment, industrial production, retail sales and unemployment in the euro area. We conclude that there is a potential role for economic sentiment to amplify business cycle shocks.

The concept of “economic sentiment” and changes therein – while intuitive in the real world for citizens, businessmen, practitioners in financial markets and politicians – has not found solid footing in mainstream modern macroeconomics. Clearly, controversial economists such as John Maynard Keynes and Hyman Minsky recognised the presence of sentiment and put a lot of emphasis on sudden sentiment changes to explain business cycle fluctuations in their writings, but their ideas have not been fully appreciated by mainstream economics. One of the problems with such an explanation results from the unclear, undefined content of the concept. Consequently, it is not easy to observe and quantify a sentiment variable.

Keynes links sentiment to “the state of long-term expectation” and “the state of confidence”, and his interpreta-

tion is usually referred to as “animal spirits”.¹ In Keynes’s analysis, consumer and producer sentiment plays a key role in explaining economic fluctuations. The interpretation of economic sentiment as an additional macroeconomic variable may appear strange at first sight but would come close to interpretations of Keynes’s “animal spirits”. Though generally missing in mainstream interpretations of his work, it is clear that Keynes himself attached strong importance to the role of consumer and producer sentiment in the economy as a sort of gyrating force, both in case of booms and recessions.

The recent financial and economic crisis brings these ideas back onto the agenda, as it appears to be fraught with aspects that can be related to sentiment. A strong decline in economic sentiment certainly contributed to the size and rapidness of the outburst of financial turbulence following the collapse of Lehman Brothers and the ensuing economic slowdown. Clearly, if economic sentiment

1 In Chapter 12 of the General Theory, Keynes notes: “We may sum up the state of psychological expectation which covers the latter [future events] as being the state of long-term expectation; – as distinguished from the short-term expectation upon the basis of which a producer estimates what he will get for a product when it is finished if he decides to begin producing it today with the existing plant”. He further notes: “The state of long-term expectation, upon which our decisions are based, does not solely depend, therefore, on the most probable forecast we can make. It also depends on the confidence with which we make this forecast – on how highly we rate the likelihood of our best forecast turning out quite wrong. If we expect large changes but are very uncertain as to what precise form these changes will take, then our confidence will be weak. The state of confidence, as they term it, is a matter to which practical men always pay the closest and most anxious attention. But economists have not analysed it carefully and have been content, as a rule, to discuss it in general terms.” J.M. Keynes: *The General Theory of Employment, Interest and Money*, New Delhi 2006, p. 133.

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falters, the first adjustment that agents typically make is to slow down spending and shift from risky assets to money; firms may stop hiring and postpone capital investment. Output falls and unemployment rises. In turn, as economic agents become more aware of financial turmoil, economic slowdown and adverse unemployment dynamics – even if they are not directly affected – they are likely to revise downward economic sentiment, adding momentum to the slowdown.

In a recent book, Akerlof and Shiller² reconsider the role of “animal spirits” during the financial crisis and refine the concept. In their approach, animal spirits are linked to confidence, fairness, corruption and bad faith, money illusion and stories. Changes in these aspects may trigger a change in animal spirits and economic sentiment in general. Cycles of over-optimism and over-pessimism by economic agents may then be driving (speculative) boom-bust cycles along the lines of Minsky’s panics and manias. Traditional macroeconomics would mostly ignore these more psychological factors and their effects on business cycle fluctuations.

This study includes economic sentiment in an analysis of business cycle fluctuations in the euro area. In this sense, it also seeks to contribute to increase our understanding of the recent period of financial turmoil and economic slowdown by giving a role to economic sentiment fluctuations in explaining business cycle fluctuations. In order to do so, we include the European Commission’s Economic Sentiment Indicator (ESI)³ in a small-scale vector autoregressive (VAR) model that also contains industrial production, retail sales and unemployment. The ESI is an indicator of economic sentiment and confidence based on an analysis of broad-scale survey data. It will be used as our proxy for sentiment and its effects. More specifically, we assess the extent to which sentiment shocks affect the euro area business cycle. This is done by analysing the impulse response functions and variance error decomposition of the propagations of shocks to economic sentiment, industrial production, retail sales and unemployment in the euro area. In addition, the setup allows us to investigate the impact of economic conditions on economic sentiment. It is clear that apart from such psychological factors, economic sentiment is also likely to be itself affected by business cycle conditions.

2 G. Akerlof, R. Shiller: *Animal spirits: How human psychology drives the economy, and why it matters for global capitalism*, Princeton 2010, University Press.

3 European Commission: *The joint harmonised EU programme of business and consumer surveys*, European Economy, Special Report No. 5, 2006.

We also contribute to the analysis of survey data in general by providing an additional application for these data. Business cycle analysts routinely use business and consumer survey data on economic agents’ judgements about current and future economic developments even if these data have a number of conceptual limitations compared to hard business cycle data. Their assessment provides policymakers, economists and business managers with useful information about the current state of the economy and may be used in forecasting short-term developments.

Our analysis is also indirectly related to the recent literature that looks at news shocks in financial markets, following Beaudry and Portier.⁴ In this literature, expectational shocks in the form of unanticipated shocks or news about technological change and innovations can generate waves of optimism (or pessimism) among otherwise rational agents who evaluate the potential future effects on the economy of such technological changes. Over time, the economy adjusts, and agents readjust their expectations.

Clearly, economic sentiment is also linked to information flows (including e.g. news about technological change) and its processing by agents. In particular, we find it intuitively appealing that notwithstanding a rational approach to news in general, economic agents may start to frame news in periods with strongly declining or rising economic sentiment. In that case, economic agents overemphasise news that is in line with their sentiment and tend to downplay news that is not consistent with their sentiment. Such a subjective filtering or framing may be one of the factors at the base of large sentiment shifts. While the news shock literature assumes rational agents that are subject to expectational shocks, in the economic sentiment context an even broader interpretation is possible that does not necessarily rely only on news and its interpretation by otherwise rational agents.

At the same time, we argue, changes in economic sentiment should be seen as an independent source of macroeconomic shocks: shocks to consumer and producer confidence may induce changes in their consumption and production decisions. This issue is very relevant in the context of the current global economic slowdown, as the sudden drop in consumer and producer confidence due to the turmoil in the financial markets and banking sector can be considered crucial factors in the transmissions from the financial sector to real economic activity,

4 P. Beaudry, F. Portier: *When can changes in expectations cause business cycle fluctuations in neo-classical settings?*, In: *Journal of Economic Theory*, Vol. 135, 2007, pp. 458-477.

in particular output, sales and employment. In this sense, economic sentiment indicators may guide policymakers in a manner similar to inflation expectations. Sentiment indicators may provide valuable information for macroeconomic policy design by providing indications of consumers and producers' expectations about the current and near-future state of the economy.

Implicitly or explicitly, sentiment survey data are usually assumed to be leading variables relative to business cycles (typically a lead of approximately four to six months is assumed by analysts). Following the notions of the rational expectations hypothesis, the expectations of consumers and producers could be interpreted as unbiased estimators of the business cycle, as rational agents will process all relevant information in their decision-making. This also explains the usefulness of such survey data in business cycle analysis. At an empirical level, the span of lead time in survey data, however, is less certain and subject to empirical verification. The amount of lead time may differ between countries and may change over time. In fact, one cannot rule out that lagging elements also enter survey data as some agents may base their expectations of current and future business cycle dynamics on experiences in the (recent) past, therefore forming adaptive expectations.

Business Cycles and Economic Sentiment in the Euro Area

In this section, patterns of the business cycle and business cycle sentiment in the euro area and the EU are analysed using Eurostat data. Our dataset comprises the EU Commission's economic sentiment indicator and three "hard" business cycle indicators: industrial production, retail sales and unemployment. The euro area aggregate data were collected monthly for the period from January 1990 to September 2011.

The ESI is composed of the industrial, services, consumer, construction and retail trade confidence indicators.⁵ The industrial confidence indicator has a weight of 40%, the services confidence indicator a weight of 30%, the consumer confidence indicator a weight of 20% and the two other indicators a weight of 5% each. The economic sentiment indicator is calculated as an index with a mean value of zero and a standard deviation of ten over a fixed standardised sample period. Values of the economic sentiment indicator above (below) zero indicate above-average (be-

5 Confidence indicators are arithmetic means of seasonally adjusted balances of answers to a selection of questions closely related to the reference variable they are supposed to track. Surveys are defined within the Joint Harmonised EU Programme of Business and Consumer Surveys.

low-average) economic sentiment. Currently, mean and variance are fixed over the period 1990-2007.

Figure 1 displays the ESI and the (annual) growth rates of industrial production⁶, retail sales⁷ and number of unemployed⁸. The first variable serves as a proxy of consumers' and producers' mindsets about the general state of the economy. The last three variables characterise the business cycle from the perspective of production and supply, consumption and demand and the labour market. Together, these four variables will constitute the endogenous variables in the small VAR model of the euro area that will be used below to analyse the impact of sentiment shocks. By including the sentiment indicator as one of its variables, it becomes possible to analyse such sentiment shocks and their impact.

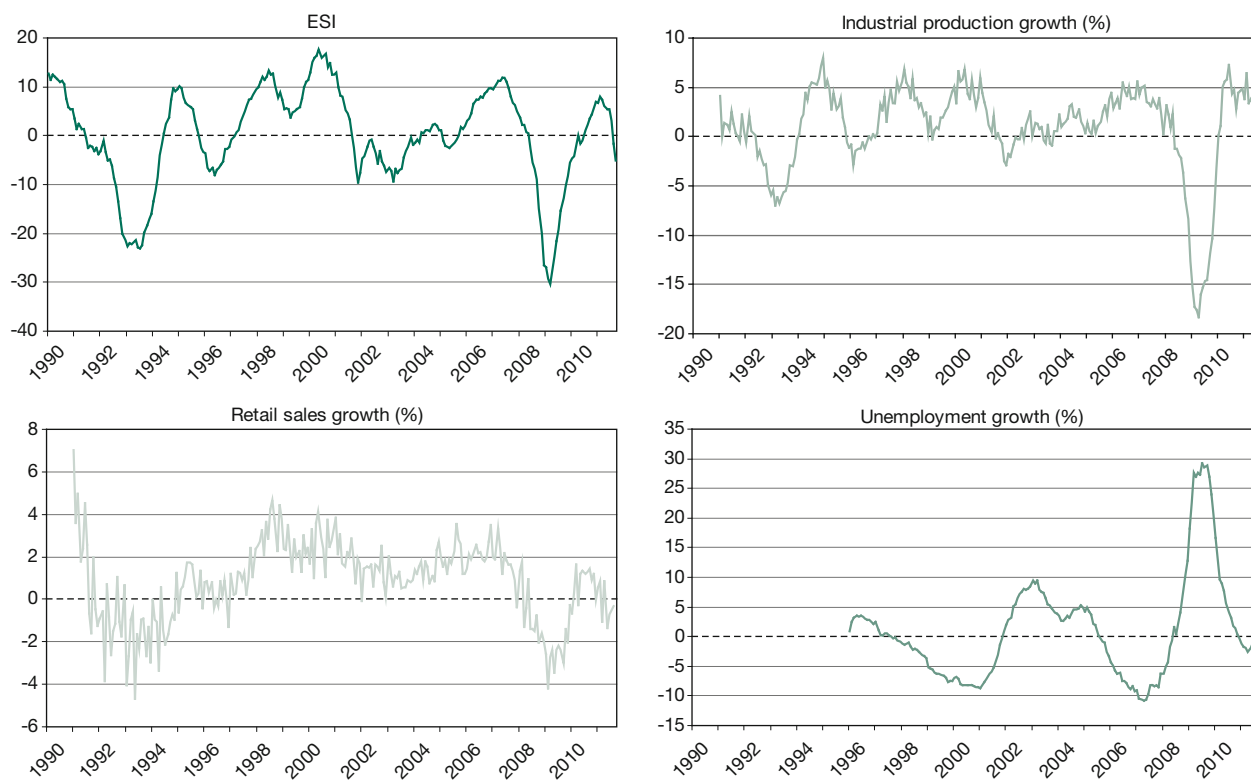
The large drop in economic activity and economic sentiment following the financial crisis that spread after the collapse of Lehman Brothers on 15 September 2008 is clearly visible in Figure 1, as is the stabilisation since the end of 2009. The figures suggest that the correlations between the indicators are high. A positive association appears to exist between economic sentiment, production and retail sales, whereas unemployment displays a negative relation with the sentiment indicator. At an intuitive level these correlations are quite straightforward to interpret, e.g. negative economic sentiment may make consumers and producers reluctant to spend, invest, hire, etc., vice versa, an economic slowdown may lead to a reduction in economic sentiment. It is important to note that causalities may indeed run in both directions if one recognises economic sentiment as a real economic variable that plays a distinct role in the economy's productive process, as essentially proposed by Keynes. This also explains why our small model of economic sentiment and business cycles is based on a VAR model. The VAR approach has the advantage that it does not *a priori* impose a causal structure on the model variables and instead offers a rich pattern of

6 The industrial production index measures the output and activity of the industry sector. It measures changes in the volume of output on a monthly basis. Data are compiled according to the statistical classification of economic activities in the European Community (NACE Rev.2, Eurostat). Industrial production is compiled as a "fixed base year Laspeyres type volume-index". The current base year is 2005 (Index 2005=100). The index is presented in seasonally adjusted form.

7 The index of deflated turnover for retail trade shows the monthly activity in volume of the retail trade sector. It is a short-term indicator for consumer demand. Data are compiled according to the statistical classification of economic activities in the European Community (NACE Rev.2, Eurostat). Deflated turnover for retail trade is compiled as a "fixed base year Laspeyres type volume-index". The current base year is 2005 (Index 2005=100). The index is presented in seasonally adjusted form.

8 Unemployment is measured with monthly data on the number of unemployed as provided by Eurostat based on harmonised unemployment statistics.

Figure 1
Economic Sentiment and Business Cycle Fluctuations in the Euro Area, January 1990 - September 2011



Source: Eurostat.

possible linkages between variables. Inspection of the autocorrelations and cross-correlations suggests patterns of small leads and lags between these variables, which will be picked up by the VAR model given its dynamic structure.

It is important to note that behind the euro area aggregate data are the individual data of the Member States. Economic sentiment, industrial production, retail sales and unemployment indicators of the individual countries display different degrees of commonality and divergence. Synchronisation among country data is assessed in Figure 2 that shows averages of bilateral correlations between the variables of each Member State over a five-year rolling window.

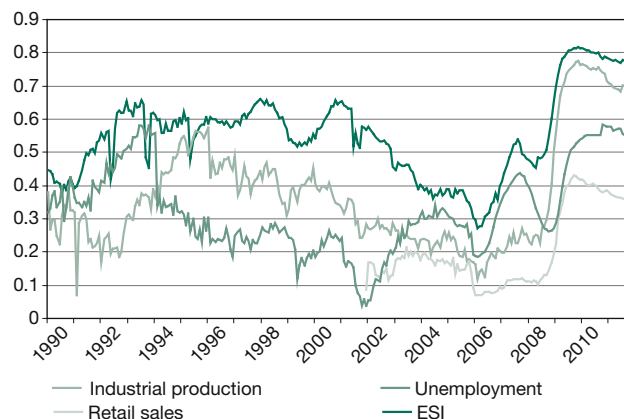
Several illuminating features appear: first, synchronisation of sentiment in the euro area is pronounced and persistently higher than synchronisation of “hard” business cycle data. Sentiment is more similar among Member States than actual economic activity. Second, synchronisation is time varying. The movements between sentiment and output synchronisation mimic each other and there is no time lag. After the introduction of the euro, co-movement in both sentiment and industrial production decreased for

several years, pointing to the quite different experiences that the European countries made with sharing a single currency and common monetary policy. Third, synchronisation increased enormously after entering the financial and economic crisis, as shown in Figure 3. During the most severe recession year 2009, average correlation of economic sentiment peaked at 80% and average correlation of industrial production at 75% – the highest record since the beginning of the time series.

The synchronisation of output has been studied in the literature on business cycles in the euro area, since business cycle synchronisation is a prerequisite for a well-functioning monetary union. This literature⁹ has established that business cycle synchronisation in the euro area is high. Synchronisation of economic sentiment may also be relevant from a policy perspective: if sentiment shocks can indeed be seen as an independent source of macroeconomic fluctuations, it is of considerable relevance to know

⁹ See e.g. C. Gayer: A fresh look at business cycle synchronisation in the euro area, *European Economy – Economic Papers* No. 28, 2007; and K. Weyerstrass, B. van Aarle, M. Kappler, A. Seymen: Business Cycle Synchronisation with(in) the Euro Area: In Search of a ‘Euro Effect’, in: *Open Economies Review*, Vol. 22, No. 3, 2011, pp. 427-446.

Figure 2
Synchronisation in the Euro Area, Average Correlations of Euro Area Countries over Five-Year Rolling Windows, January 1990 – September 2011



Source: Eurostat.

the extent to which economic sentiments and shocks are synchronised among countries. This could reflect a rapid diffusion (or contagion) of economic sentiment shocks inside the currency union. The substantial synchronisation of the member states' economic sentiment indicators also indicates that a focus on the euro area rather than on individual countries is appropriate when analysing sentiment shocks and their transmission.¹⁰

A VAR Model of Business Cycle (Sentiment) in the Euro Area

Estimation and Identification Strategy

At a macroeconomic level, causality between consumer and producer confidence – such as measured by the ESI variable introduced above – and macroeconomic variables – here in particular unemployment (UNE), industrial production (IND) and retail sales (RET) – may run in both ways: increased confidence may boost spending, production and employment; at the same time, increased production, employment and incomes may boost confidence. This aspect suggests that a VAR model may be the most appropriate tool if one is interested in studying the interaction between confidence indicators and macroeconomic adjustments. Equation (1) shows this VAR model of the euro area economy; it comprises industrial production, unemployment, retail sales and economic sentiment as its variables.

10 To be on the safe side, however, we compare the results for the euro area in the robustness section with the outcomes of the same model for individual euro area countries.

$$y_t = c + C_1 y_{t-1} + C_p y_{t-p} + e_t,$$

$$y_t = \begin{bmatrix} \%IND_{m-12} \\ \%UNE_{m-12} \\ \%RET_{m-12} \\ ESI \end{bmatrix}, \quad e_t = \begin{bmatrix} e^{IND} \\ e^{UNE} \\ e^{RET} \\ e^{ESI} \end{bmatrix} \quad (1)$$

y denotes the vector of endogenous variables, and e is the vector of residuals; p denotes the lag length, c is a constant, and C_1, \dots, C_p are coefficient matrices.

Industrial production, unemployment and retail sales are included in the form of annual growth rates (indicated by the “%” sign in front of the variables and the $m-12$ subscript that implies that growth rates are calculated with respect to the same month of the previous year). These variables are non-stationary in levels and stationary in their growth rates. Economic sentiment enters the VAR in levels since it is already defined as a deviation from its long-run average. The VAR model, if interpreted as a reduced form macroeconomic model, therefore seeks to explain the joint dynamics of production, consumption (retail sales can be thought of as a broad proxy for consumption), labour markets and economic sentiment.

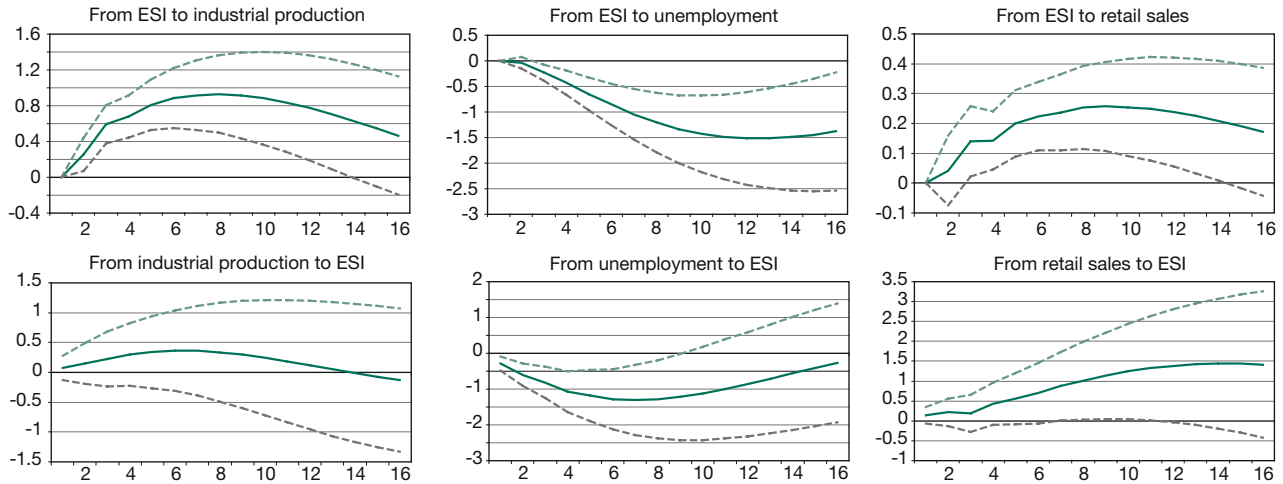
The sample period of the estimated VAR model is from April 1996 to August 2011 (185 observations). Lag length and specification tests suggest that including three lags is appropriate. To transform the reduced form residuals from equation (1) into a set of orthogonal shocks that can be given a structural interpretation, the Cholesky decomposition is applied.¹¹ We checked if changing the ordering of the variables or using generalised impulses would change the results of impulse response functions and variance decompositions, but this is not the case, which provides at the same time additional confidence about the robustness of these results.

Results: Impulse Response Functions and Variance Decompositions

A practical advantage of the VAR specification of our sentiment-business cycle model is that it comes with two very useful analytical instruments: impulse response functions can be used to analyse the impact of different shocks – including sentiment shocks – to explain fluctuations in the endogenous variables, and variance decompositions can be used to determine the relative importance of the different types of shocks in explaining fluctuations of the endog-

11 The Cholesky decomposition uses the inverse of the Cholesky factor of the residual covariance matrix to orthogonalise the impulses. This decomposition imposes an ordering of the variables in the VAR and attributes the effect of any common component to the variable that comes first in the VAR system.

Figure 3
Impulse Response Functions for the Euro Area VAR Model



Source: Eurostat.

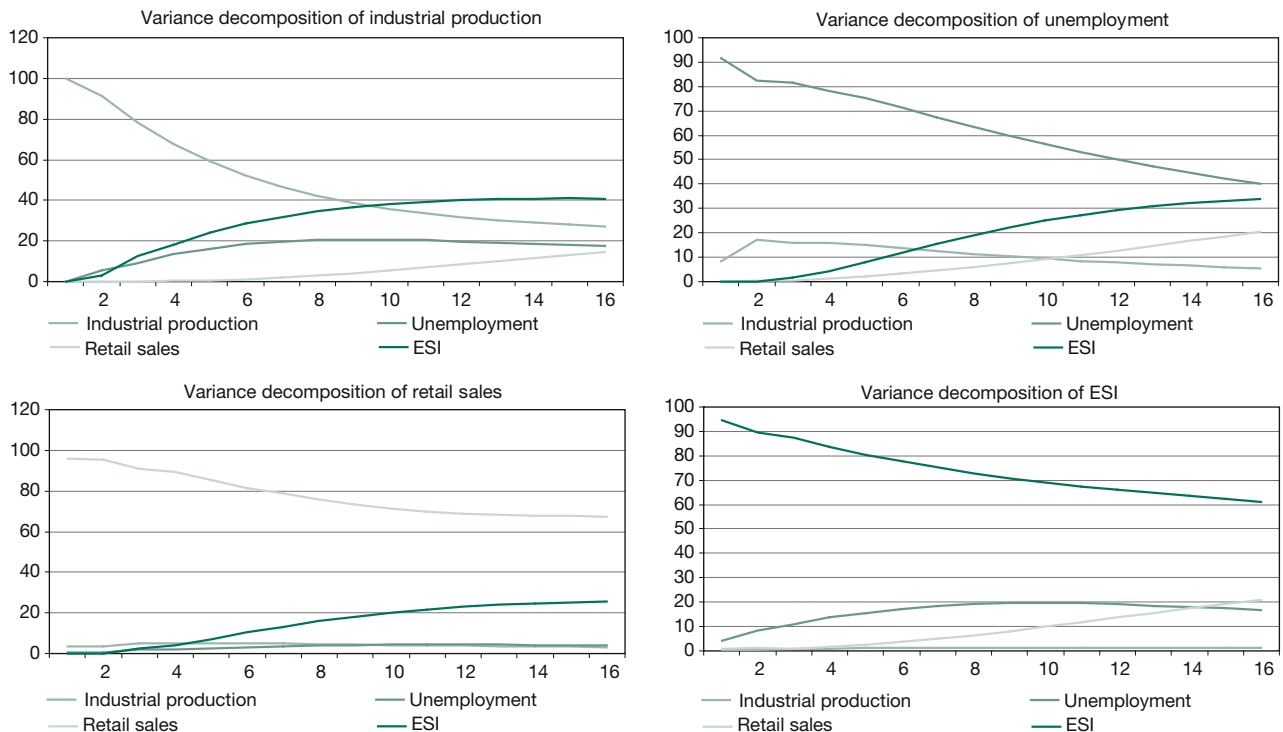
enous variables. Figure 3 provides the impulse response functions that are obtained from the VAR model (1).

The impulse response functions strongly suggest that economic sentiment shocks (row 1) have economic impacts: the effects on production (column 1), unemployment (column 2) and retail sales, viz. consumption (column 3) are

significant, prolonged and of the correct sign. At the same time economic shocks also have a significant impact on economic sentiment (row 2).

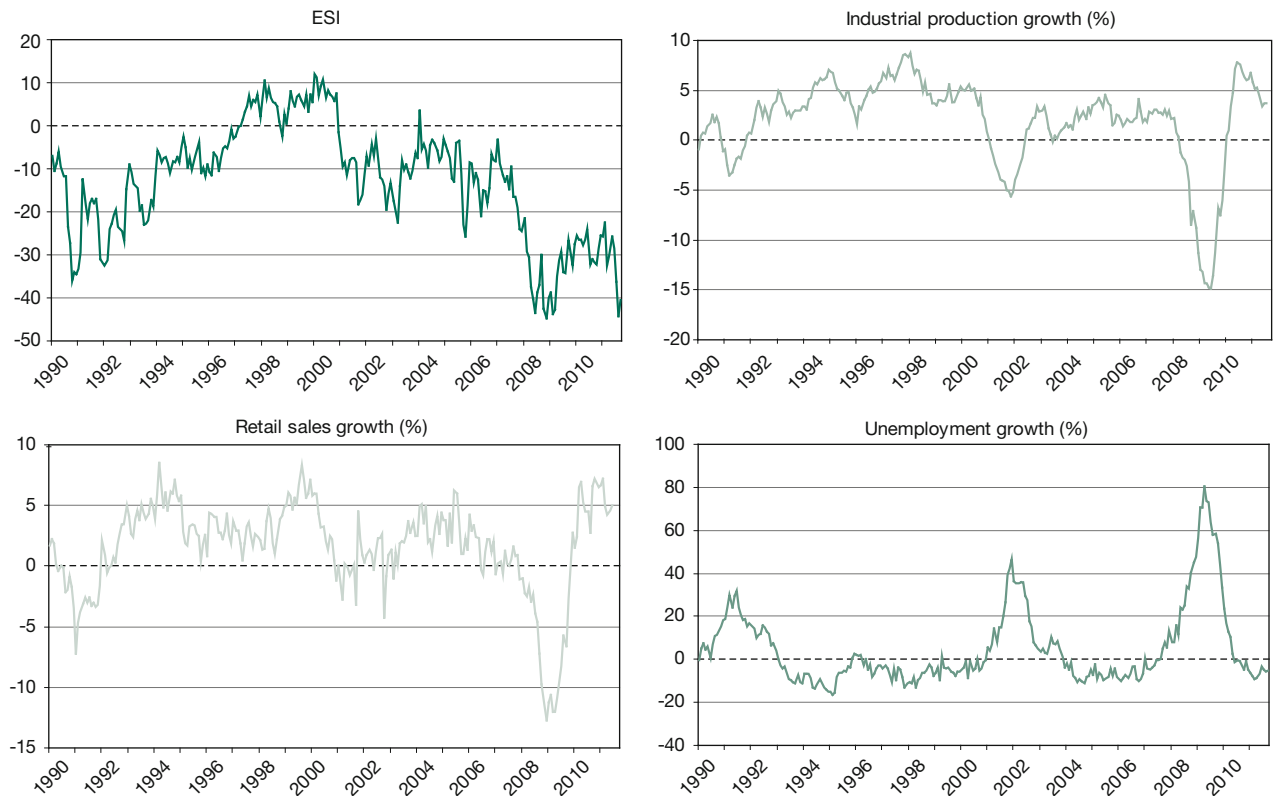
Another very informative tool is the variance decomposition. This instrument can be used to see how important sentiment shocks are in explaining fluctuations in the busi-

Figure 4
Variance Error Decomposition for the Euro Area VAR Model



Source: Eurostat.

Figure 5
Economic Sentiment and Business Cycle Fluctuations in the USA



Source: University of Michigan, OECD.

ness cycle variables and if the level of economic sentiment is in turn affected by shocks to the business cycle.

Figure 4 provides the variance decompositions that are obtained from the VAR model (Equation 1).

The most important and interesting finding in the decompositions is that our sentiment shocks largely contribute to the variance in the business cycle variables. In particular, a long-run contribution of up to 40% is observed. Business cycle shocks also explain about 40% of the observed variation of the economic sentiment indicator.

A Comparison with the USA

The USA has a long tradition of using household survey data to assess consumer and producer confidence. These data are used in the context of business cycle forecasting and financial market analysis in particular. Our aim here is a different one: to repeat the euro area exercise for the USA and search for similarities and differences in the role of sentiment shocks in the economy and the formation of sentiment. Our US sentiment data come in the form of the well-known University of Michigan Consumer Sentiment

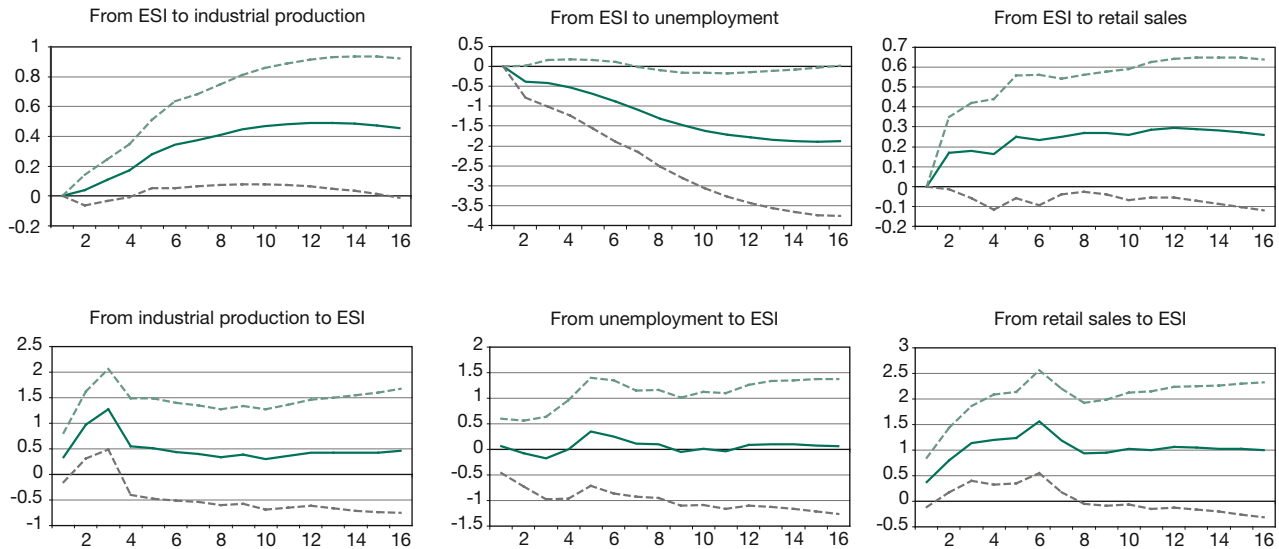
indicator. Industrial production, retail sales and total unemployment are obtained from the OECD Main Economic Indicators. Figure 5 shows the developments of these variables during the period 1990-2011.

As in the euro area, economic sentiment, production, retail sales and unemployment moved jointly in the USA during the recent financial crisis and ensuing Great Recession. Another dramatic period is difficult to overlook in the data: the impact and transmission of 9/11 on the US economy during 2001 and 2002.

A similar VAR model as in the euro area case is estimated for these US data. Six lags of the endogenous variables are included; the sample used for estimation of the VAR model is from January 1990 to July 2011 (259 observations). Figure 6 reports the impulse response functions.

Interestingly, many of the features of the euro area VAR model can also be observed in the US model. In particular sentiment shocks appear to have a significant positive effect on industrial production, a (nearly) significant positive effect on retail sales (i.e. consumption) and a significant negative effect on unemployment. Economic sentiment

Figure 6
Impulse Response Functions for the US VAR Model



Source: University of Michigan, OECD.

itself also appears to be positively affected by shocks to industrial production and to retail sales.

Robustness

This section assesses the robustness of our findings on the links between economic sentiment and the business cycle. First, we estimated VAR models for individual euro area countries using individual country data from Eurostat in the same manner as for the total euro area. Impulse response functions are computed for two large euro area countries, France and Germany, and two smaller euro area economies, Belgium and the Netherlands. We find that the transmissions of sentiment (and other) shocks display a quite uniform pattern in these diverse economies which is similar to the transmission in the euro area analysed before. This strengthens our previous insight that economic sentiment shocks are possibly important in explaining business cycle fluctuations and are transmitted in a relatively similar way across euro area countries.

Secondly, we experimented with a similar euro area aggregate VAR model but with monthly growth rates instead of annual growth rates. Monthly growth rates of industrial production, unemployment and retail sales in the euro area are much more volatile than annual growth rates – reflecting e.g. incidental and erratic short-term fluctuations. In this VAR model with monthly growth rates, four lags were found to be appropriate. Even if monthly growth rates are much harder to fit, the resulting VAR model broadly confirms our previous results regarding the effects of sentiment shocks

on the economy. Also here, we find that a positive sentiment shock is followed by an increase in industrial production, a decrease in unemployment and an increase in retail sales. Economic sentiment itself is again driven by positive shocks to industrial production and retail sales and negative shocks to unemployment.

Conclusions

The role of economic sentiment is interesting though perhaps not fully uncontroversial. The recent financial crisis and ensuing economic slowdown could constitute a case for taking the importance of this variable more seriously. Our investigation of the euro area economy suggests that economic sentiment shocks do have an impact on important macroeconomic variables, e.g. output, retail sales and unemployment. At the same time, we also find significant evidence that economic conditions and shocks, in turn, affect economic sentiment. A comparison with the USA and a number of robustness tests confirm the possible role of sentiment changes in explaining business cycle fluctuations. At the policy level, an important insight from our analysis is that the potential role of economic sentiment should not be underestimated. To the extent that they are under the control of policymakers, actions that foster economic sentiment can therefore have an important positive effect on macroeconomic conditions. Alternatively, actions or even announcements that ruin economic sentiment will inevitably transmit themselves into the broader economy. Restoring confidence and economic sentiment could thus constitute a crucial factor to exiting the current global economic slowdown.