

ECONOMIC SENTIMENT INDICATOR AND ITS INFORMATION CAPABILITY IN THE CZECH REPUBLIC

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Abstract

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The paper focuses on the indicators of economic agents' perceptions in the Czech Republic. We assume that these information are provided by economic sentiment indicator surveys based on the Joint Harmonised EU Programme. The aim of this paper is to offer the alternate methodology of qualitative data transformation (balance statistic data) in relation with the macroeconomic quantitative indicators.

In the empirical analysis we distinguished between the indicators of confidence in industry, construction, retail and consumer confidence indicator. We found link between the aggregate economic sentiment indicator and economic activity. Especially, aggregate economic sentiment indicator copies the development of the GDP. However, partial indicators does not follow changes in the specific sectors of the economy. We also found that economic agents underestimate the intensity of the economic recession after the year 2007.

Finally, we cannot recommend the economic sentiment indicator as the leading indicator of the future economic activity in the Czech Republic. Our methodological contribution is in quantifying of the consumer survey results by standardization.

perception, expectation, consumer survey, confidence indicator, standardization

Economic sentiment is not fully appreciated or incorporated into the mainstream economics. However, controversial economists such as Keynes or Minsky put a lot of emphasis on sentiment changes to explain business cycle fluctuations. The modern economics increasingly focuses on the economic agents' perception and anticipation, especially on the effects of information on the economic activity and asset prices fluctuation. The key point is in quantification of the qualitative data sets at this research area. E.g. Hanousek *et al.* (2008), Kočenda and Hanousek (2010) or Ěgert and Kočenda (2012) provided empirical analysis of the asset prices fluctuation in relation with the news published at the market. They focused on the news published by Bloomberg and Reuters and evaluated the effects on the markets with number of the news and subjective assessment of their impact. Springer

and Welpé (2011) or Bollen *et al.* (2011) deal with similar topic. They used data from social networks, especially Twitter feeds and likes from Facebook. On the contrary, Weyerstrass *et al.* (2010) or Aguiar-Conraria *et al.* (2011) focused on the economic sentiment indicator its synchronization among the countries and business cycles.

We assume that if consumers and entrepreneurs react positively to the news and feel confident about the current and future economic situation, they might increase their consumption and production. If so, they diffuse perceptions and anticipations to economic behaviour. In this paper we focus on the economic sentiment indicators. They are based on economic agents' judgements about current and future economic developments. Therefore, these indicators provide new information since they are available earlier than most economic indicators like

GDP or industrial production. They are compiled by many statistical offices and commercial agencies around the world. Even if these data have a number of conceptual limitations compared to hard business cycle data, they are widely discussed by many economists, analysts and used in business and economic policy decision making process.

Aarle and Kappler (2012) point out importance of the economic sentiment indicators in the context of the recent financial crisis. They identified significant impact of the indicators on important macroeconomic variables, such as output, retail sales and unemployment. They showed that economic condition shocks affect economic sentiment and reversely, changes in economic sentiment can explain business cycle fluctuations.

Gelper and Croux (2010) employed dynamic factor analysis and partial least squares to discuss construction of the European aggregate sentiment indicator published monthly by the European Commission. They focused on its predictive power of economic activity and concluded that it has not much additional explanatory power for industrial production compared to autoregressive forecasting methods. They recommend sentiment indicators as an early barometer of the economy, yielding a simple and accurate index that non-academics can follow, but do not contain much relevant information that is not observable in the past of the industrial production series.

Kangasniemi *et al.* (2010) deal with differences between consumer and manufacturing surveys in Finland. They did not find any systematic conflict between consumer and manufacturing surveys. However, they argue that consumer surveys collect information both from macro level economy and from personal economy. They show that the consumer confidence indicator is more forward-looking and it is also more broadly based on overall sentiment and feelings plus economic intentions.

We deal with the economic sentiment indicators and focus on its information capability in the Czech Republic. The aim of this paper is to offer the alternate methodology of qualitative data transformation (balance statistic data) in relation with the macroeconomic quantitative indicators. We compare selected economic sentiment indicators with the main macroeconomic indicators (especially GDP, investments, employment and stocks) within the Czech economy. Data sets obtained from the surveys are generally presented as balances between the percentage of positive and negative answers to the selected questions.

METHODS AND RESOURCES

Economic sentiment indicator surveys are based on the Joint Harmonised EU Programme

Commission Decision of 15 July 1997 (European Commission, 2006). The surveys cover industry, services, retail trade, building and consumers. Moreover, synthetic indicators such as confidence indicators and economic sentiment indicators are also presented. Generally, the indicators provide information about the economic agents' perceptions and anticipations. The questionnaires contain questions regarding expected and running tendencies. The questions are put in the form of evaluation scales, mostly with three possible alternatives of answers such as improvement, constancy, worsening, and the like.

The economic sentiment indicator¹ (composite confidence indicator) is a weighted average of the business and consumer confidence indicators. These indicators cover both business (industry, construction, trade, selected services) and consumer site (expected financial situation of consumers, expected total economic situation, expected total unemployment and savings expected in 12 months to come). Except the aggregate economic sentiment indicator we apply industrial confidence indicator, construction confidence indicator, retail confidence indicator and consumer sentiment indicator.

Industrial confidence indicator represents 40% share of the aggregate confidence indicator. This indicator is formed as the average of seasonally adjusted balances of three different indicators – total demand, stocks of finished products and expected manufacturing activity.

Construction confidence indicator comprises 5% share of the aggregate economic sentiment indicator. Construction confidence indicator is formed as the average of two indicators, perception of total demand and expected changes in employment.

Retail confidence indicator represents 5% share of the aggregate economic indicator and it is formed as an average of three different indicators, perception of the aggregate economic situation, stock and expected economic activity.

The consumer confidence indicator represents share of 20% of the aggregate economic indicator. This indicator covers four indicators provided by GfK Praha. Among these four indicators belong expected financial situation of the consumer, expected aggregate economic situation, expected total unemployment and expected savings over the next 12 months.

The last part of the aggregate confidence indicator is the confidence indicator in selected services 30%, which is formed as the of three fields – the assessment of economic situation, the assessment of demand and expected demand (ČSÚ, 2010).

For the purposes of the empirical analysis are balance statistic data transformed by statistic standardization (Kapounek, Lacina, 2011):

1 We use the term aggregate economic indicator for this composite indicator in the next part of the text, to reduce possible desinterpretation of the economic sentiment indicator with its individual components.

$$\frac{Y_{it}^p - \bar{Y}_i}{s_{Y_i}} = \frac{ESI_{it} - \bar{ESI}_i}{s_{ESI_i}}, \quad (1)$$

where Y_{it}^p represents a quantified measure of economic agents' perception, $\bar{Y}_i$ is mean of the selected macroeconomic indicator and s_{Y_i} is its standard deviation. Correspondently, variables ESI_{it} , $\bar{ESI}_i$ and s_{ESI_i} represent economic sentiment indicator, its mean and standard deviation. The equation (1) is reversed in the following form:

$$Y_{it} = \frac{(ESI_{it} - \bar{ESI}_i)}{s_{ESI_i}} s_{Y_i} + \bar{Y}_i. \quad (2)$$

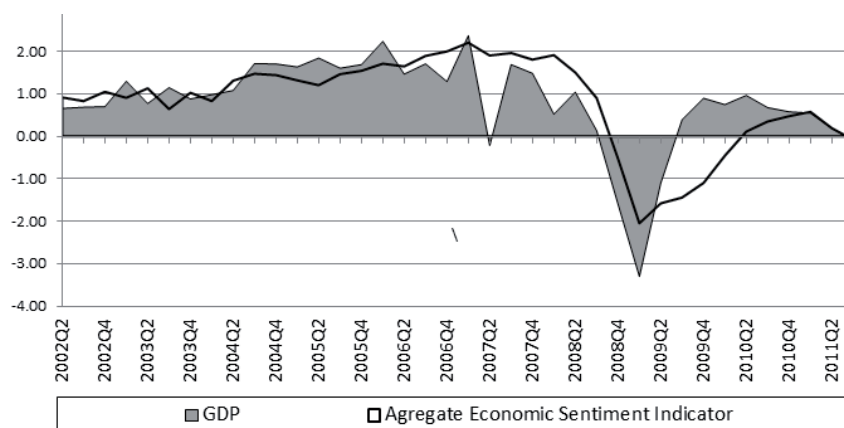
The selected macroeconomic indicators constitute GDP, employment, gross fixed investments, stocks, households' expenditure, industrial production, retail and construction. The selection follows appropriate indicators which are perceived by economic agents. We used seasonally adjusted data (prices of the year 2005) in the period 2002/Q1–2011/Q3. The source of the datasets is Eurostat (National Accounts) and Czech Statistical Office.

RESULTS

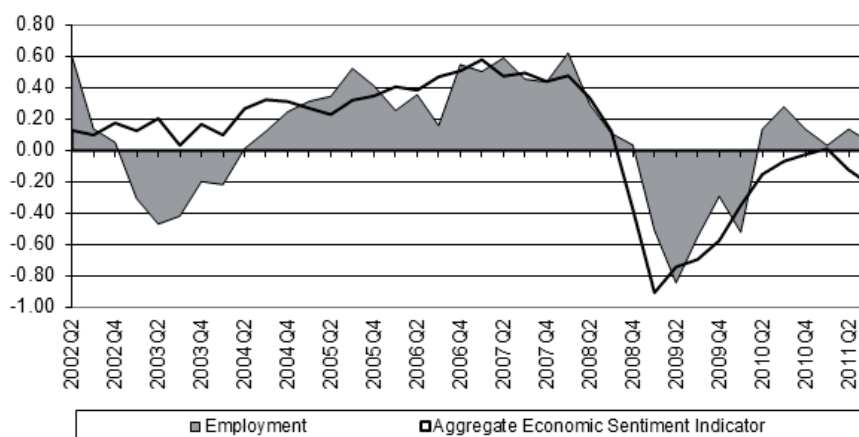
Our results are presented by figures where area charts represents real macroeconomic indicators and bars represents economic sentiment indicators. The data received from surveys as the expected values of the future development are transformed by correspondent lags.

The first two figures (Fig. 1, Fig. 2) describe relations between the aggregate macroeconomic indicator and sentiment at the national level. We can see that aggregate economic sentiment indicator copy the development of the GDP. During the financial crisis after the year 2007, there is evident tendency to underestimate the intensity of the economic recession by economic agents' expectations. Simultaneously, employment is lagged to the economic sentiment and decline of the GDP.

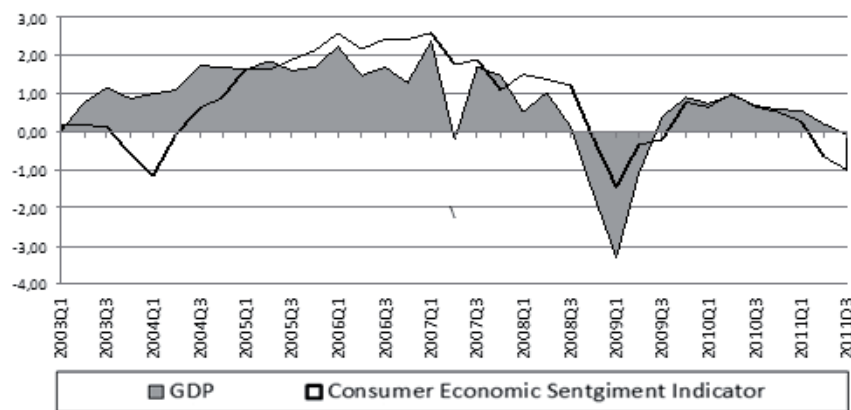
Similar results we obtain from the relation between GDP and consumer confidence indicator (Fig. 3). However, selected components of the aggregate economic activity include higher variability and short-term shocks which do not allow predict the behavior by economic sentiment (Fig. 4, Fig. 5 and Fig. 6).



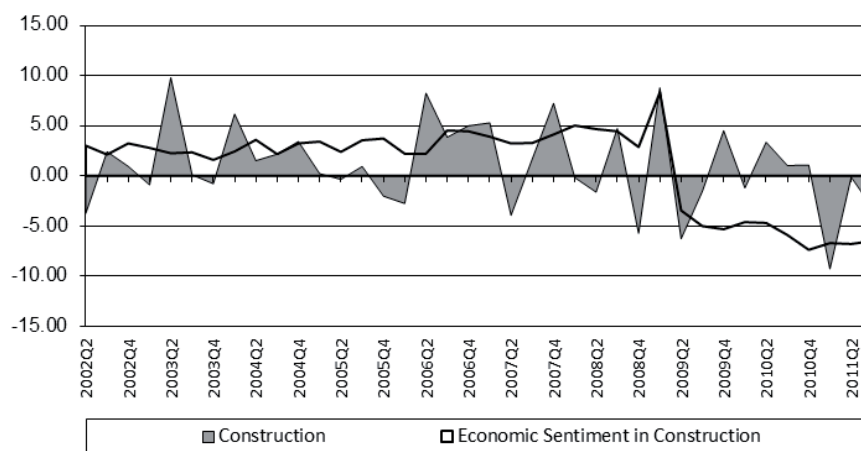
1: Percentage changes of GDP and its expectations (aggregate economic sentiment indicator)



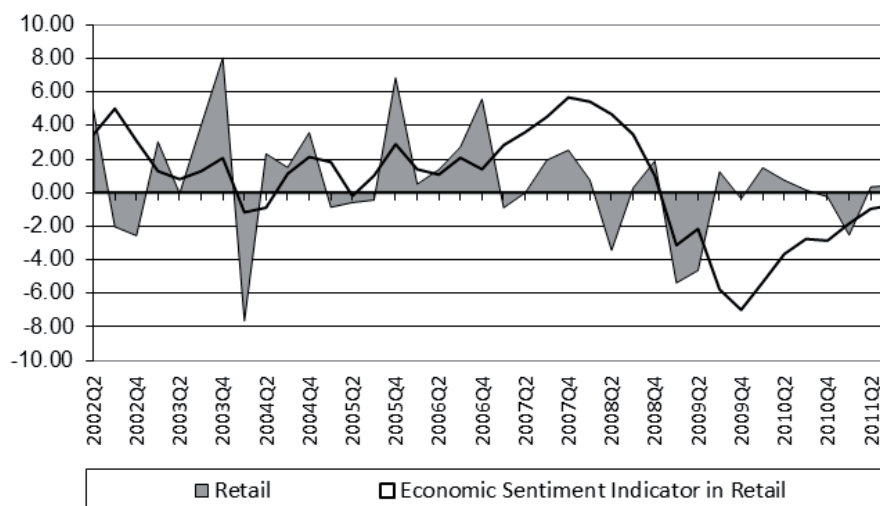
2: Percentage changes of employment and aggregate economic sentiment indicator



3: Percentage changes of GDP and consumer confidence indicator



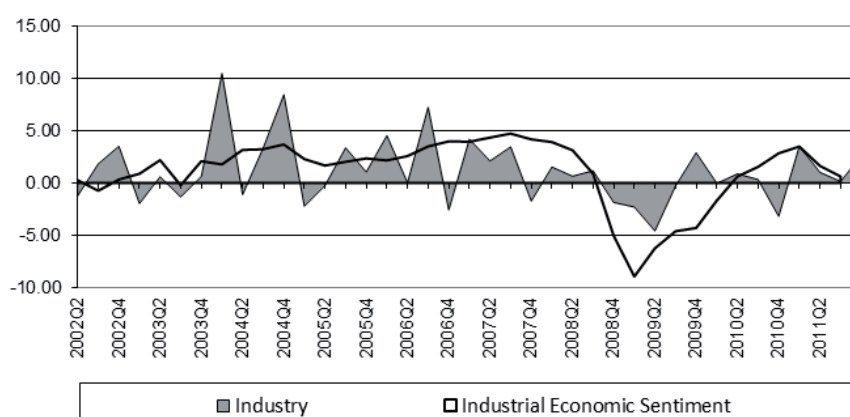
4: Percentage changes of construction and its confidence indicator



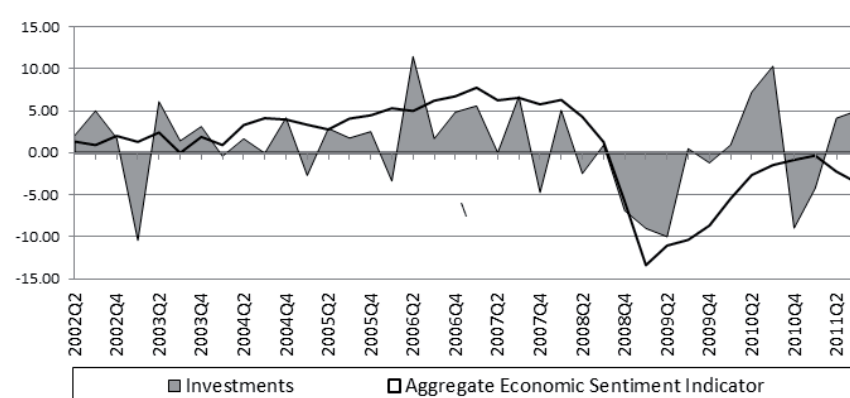
5: Percentage changes of retail and its confidence indicator

It is important to mention that the aggregate economic sentiment indicator is weighted average of the five economic sentiment indicators: (1) economic sentiment indicator in the industry, (2) consumer economic sentiment indicator, (3) economic sentiment indicator in the services, (4)

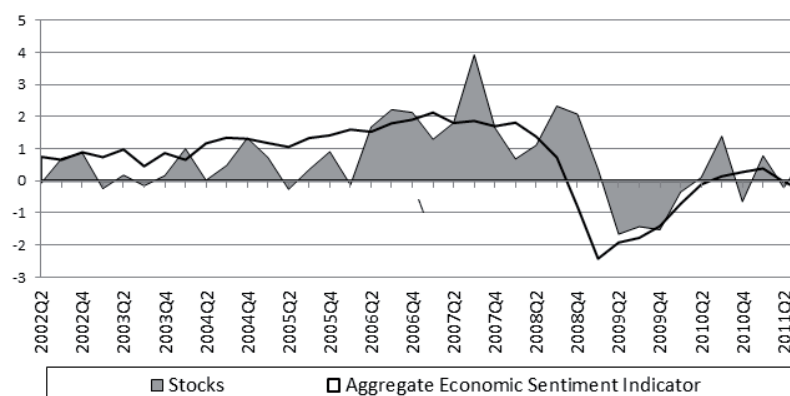
the construction and (5) the retail. The partial, specific economic indicators, consist of expected employment in the sector, expectation and perception of demand and stock changes. It is not surprising that we identified lower variability of the aggregate economic sentiment than the output of



6: Percentage changes of industrial production and its confidence indicator



7: Percentage changes of gross fixed investments and Aggregate Economic Sentiment indicator

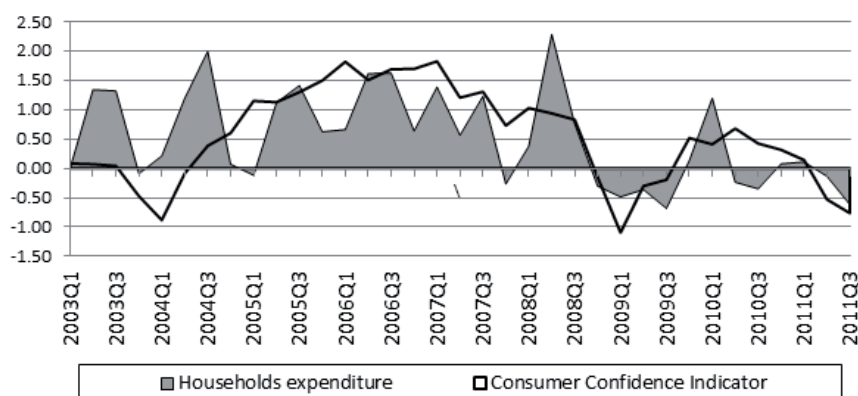


8: Percentage changes of stocks and aggregate economic sentiment indicator

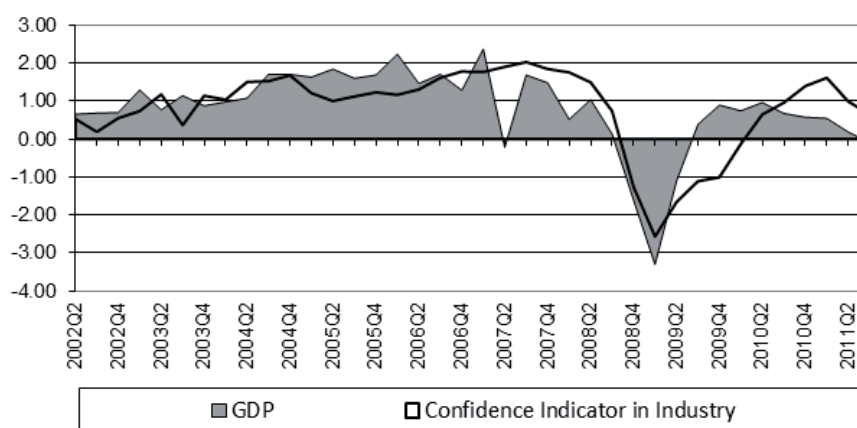
the selected sectors within the economy, because the economic sentiment represents average of perceptions and expectations within the selected sector of the national economy.

In comparison with aggregate economic sentiment indicator we identified different short term movements of the sentiment indicators related to the specific sectors. These shocks might be explained by heterogeneous price adjustment, risk perceptions and expected demand. However, we can see large decline of the economic sentiment

during the year 2008. In the case of retail confidence indicator, industrial production confidence indicator and consumer confidence indicator, the changes in perceptions and expectations caused by financial crisis have temporary character. On the contrary, decline in the construction confidence indicator represents long-term change (Fig. 4). Obviously, the change in economic agents' perception and expectation is a structural change. Despite the increase of activity during the years 2009 and 2010, economic sentiment of the sector remains



9: Percentage changes of households expenditure and consumer confidence indicator



10: Percentage changes of GDP and confidence indicator in industry

very low without the background in real economic activity of this sector.

Opposite to the retail, construction and industrial production, the gross fixed investments declined rapidly after the financial crisis (Fig. 7). As well, there is rapid decline in stocks (Fig. 8). These parts of the national sector were compared with the movements of the aggregate economic sentiment indicator. Whereas aggregate economic sentiment indicator is leading indicator of the future stock development, gross fixed investments changed at the same time as economic sentiment.

Short term effects of the financial crisis can be found in the case of the household expenditures (Fig. 9). In comparison with the other economic sentiment indicators, the consumer confidence indicator increased during the year 2009. The negative effect of the financial crisis has only temporary character.

Finally we showed relation between the GDP and industrial confidence indicator. We can see similar tendency in comparison with the aggregate economic sentiment indicator (because the industrial confidence indicator represents 40% share of the aggregate economic sentiment indicator). Despite the theoretical assumptions, aggregate economic sentiment indicator and industrial

confidence indicator are lagged after the aggregate economic activity in the Czech Republic.

DISCUSSION

Summarily, we found correlation significant correlation at the 1% significance level (correlation coefficient 0.73) between the GDP changes and the aggregate economic sentiment indicator. In the case of national account components we found correlation significant at the 5% level (e.g. correlation coefficient in industry was 0.37, construction 0.36 and retail 0.23). In comparison with the empirical study provided by Jeřábková (2010) our results are totally different. Jeřábková (2010) found 0.91 correlation between the business cycle and economic sentiment in construction (our result of the same relation is -0.009). Similar differences we can find in the case of retail confidence indicator and retail. Correlation 0.93 was identified by Jeřábková (2010), we estimated correlation 0.33. Other partial indicators from national accounts and partial economic confidence indicators fluctuate around 0.8–0.9 (Jeřábková, 2010). Our results fluctuate around 0.2–0.4.

CONCLUSION

The paper presents economic sentiment indicator published by the Czech statistical office and its components related to the specific sectors of the economy. We applied transformation by standardization with respect to the aggregate macroeconomic variables. We recommend this

transformation because it provides dimensionless variables, which are much more comparable with the real economic activity indicators. Finally, we cannot recommend the sentiment indicators (received from questionnaire surveys) as the leading indicator of the economic activity in the Czech republic.

SUMMARY

The aim of this paper is to offer the alternate methodological approach of qualitative data transformation in relation with the macroeconomic quantitative indicators. The novelty of the approach is the ability to compare qualitative and quantitative data and to identify the relations.

In the paper we assumed that the aggregate economic sentiment indicator and its components are useful indicator of the future aggregate economic activity. However, we found that the aggregate economic sentiment indicator is lagged after the aggregate economic activity. Therefore, even if there is a link between the aggregate economic sentiment indicator and the real economic activity, we cannot use it as the leading economic indicator and predict the future development.

These results were evident during and after the financial crisis in the year 2007. We can see that aggregate economic sentiment indicator copy the development of the GDP but there is the evidence of tendency to underestimate the intensity of the economic recession by economic agents' expectations. Different results were obtained in the case of partial economic sentiment indicators. We found permanent change of the construction confidence indicator and temporary effects of financial crisis on the other selected partial economic sentiment indicators. However, correlation between the real economic activity of the selected sectors and its confidence indicators is very low. The main contribution of the paper is in the methodological approach. We transformed the qualitative datasets (balance statistic data) received from questionnaire surveys by standardization. This transformation provides comparable indicators with the real economic activity within the economy and its partial sectors.

In the discussion we critically compared our results with the results of empirical study presented by Jeřábková (2010). We received lower degree of correlation between the analyzed time series. We assume that our methodological approach improves the robustness of perception and anticipation analyses and its relations to the quantitative indicators.

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