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Composite indicators in the business tendency surveys: Practice of Central Statistical Office of Poland and European Commission

Magdalena Święcka, Katarzyna Walkowska, Izabella Zagoździńska
Central Statistical Office of Poland

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Abstract

The aim of this paper[1] is to compare composite indicators for the business tendency surveys calculated by Central Statistical Office of Poland and European Commission on the basis of the results of surveys conducted by CSO. To this comparisons general climate indicators (CSO) and confidence indicators (EC) in manufacturing industry, construction and retail trade were used.

For each sector of the economy the confidence and general climate indicators and their elements were presented. In the second part of the analysis balances used by CSO and European Commission for the construction of the composite indicators are compared. There were shown similarities and differences in level and trend of those indicators in connexion with the present economic situation of Poland and the economic and legal environment in which the activity of the enterprise is conducted.

Results of the analysis gave answers on questions on causes of observed differences between composite indicators used by European Commission and CSO for general assessment of the situation of Polish manufacturing industry, construction and retail trade. They also gave answer on question whether Polish definition of the composite indicator should be kept or replaced by indicators used by European Commission.

[1] Main thesis of this paper were presented at the seminar on Consumer Tendency Surveys organised in Poland in October 2005 by the Central Statistical Office of Poland and INSEE as this subject is important for us and we would like to receive more remarks.

Introduction

Qualitative business tendency surveys are specific, different from the official statistics because of their aim, method and character of gathered information. They do not provide specific quantitative information but base on sentiments of respondents by gathering information on their subjective assessments of current and future trends. The aim of tendency surveys is quick presentation of sentiments of entrepreneurs concerning situation in the field of their economic activity.

Specific qualitative questions asked in business tendency survey questionnaires require different method of calculation and presentation of results. On the basis of data collected for individual questions weighted percentages of respondents choosing given variant of reply are calculated. Differences between weighted percentage of positive and negative replies for each question give balances that reflect present and future economic situation in the given sector of the economy.

Balances are the basis for calculation of composite indicators that provide synthetic information on the situation of enterprises. They are constructed as an aggregation of chosen balances, in some cases with the use of weights for individual components. On the higher level of aggregation synthetic indicators based on composite indicators for different sectors of economy are calculated. Because of their macroeconomic character they could be used for the assessment of general economic situation of the country or group of countries.

Qualitative business tendency surveys in Central Statistical Office of Poland were introduced at the beginning of 90s in co-operation with international institutions: European Commission (DG-ECFIN), OECD and experts from the French Institut National de la Statistique et des Etudes Economiques (INSEE), German Institut fur Wirstschaftsforschung (Ifo) and Polish scientific institutes: Economic Academy in Poznan and Institute of the Internal Market and Consumption [1, 2].

Gradually there were introduced business tendency surveys in manufacturing industry, construction, retail trade and in the last phase (since January 2003) – in other services. At the beginning the questionnaires contained questions recommended for Central and Eastern European Countries and additional questions appropriate for the specificity of the Polish economy at the time of transformation. Because of stabilisation of the economic situation, in

1998 harmonisation of questionnaires with the questionnaires recommended by European Commission for the member states was done. Thanks to this harmonisation now it is possible to compare results obtained for Poland with data from other European countries.

In spite of the harmonisation the method of calculation of composite indicators in CSO was not changed. Since the definition of CSO indicators is different from the one used by European Commission [3, 4] it is interesting whether – and to what extent – they differ and what would be the consequence of harmonisation of the Polish survey also in this field. This analysis is also important because the results of the business tendency surveys conducted by CSO are sent to European Commission and used for the construction of the composite indicators for Poland, widely available in publications and on Internet sites of Commission.

The aim of this paper is to compare indicators calculated for different fields of the economy: manufacturing industry, construction and retail trade and to indicate possible directions of future works. Results of business tendency survey in services have not been taken into account because of too short time series available for this sector for Poland.

1. Construction of composite indicators in CSO and European Commission

Basic composite indicator used in CSO is general business climate indicator calculated in the same way for each sector of the economy. Its construction is based on the composite indicator introduced in 1960s by Ifo. It is calculated as average of balances of responses on present and expected for the next three months economic situation of the enterprise.

European Commission calculates composite indicators (so called *confidence indicators)* differently for each of the sectors. They are constructed on the basis of the following balances:

- manufacturing industry – current order books, level of stocks and forecasted production,
- construction – current order books and forecasted employment,
- retail trade – past and future situation of the enterprise (or sale) and present level of stocks.

As it was mentioned above, the basis for calculation of composite indicators for Poland are data provided monthly by CSO. Those indicators for manufacturing industry, construction and retail trade are shorter than analogical indicators calculated in CSO what is caused by the fact that some questions that are elements of the adequate confidence indicators were introduced to the Polish questionnaires at the last stage of the harmonisation of the surveys. This problem will be explained in a more detailed way in the further part of the paper.

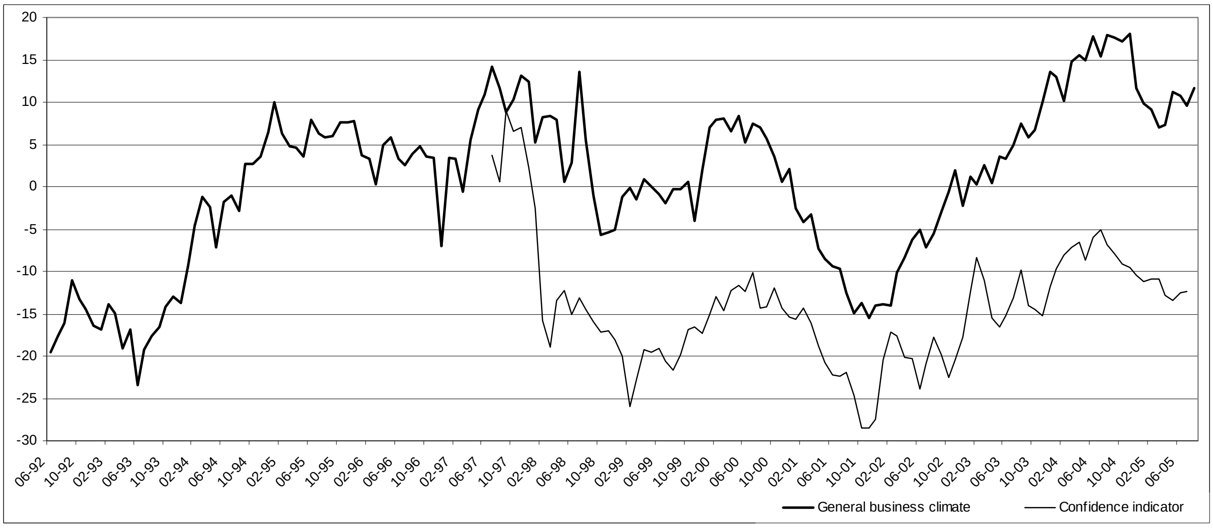
Important element of analysis is seasonal adjustment of time series. At present in CSO there is used method X-11 ARIMA but for the needs of this paper one of two methods recommended by Eurostat was used: TRAMO/SEATS included in Demetra. This method is also used in CSO for seasonal adjustment of time series in short term statistics and quarterly national accounts. Since DG ECFIN utilise Dainties, data in the paper are seasonally adjusted with both methods: Dainties for elements of confidence indicators (there were used results of the seasonal adjustments available at the internet site of European Commission) and TRAMO/SEATS for general climate and remaining time series (differences between results of seasonal adjustment with the use of two methods for those time series were not significant). There was also no harmonisation of order of seasonal adjustment of composite indicators used by both institutions: in CSO composite indicators are seasonally adjusted while in European Commission – their components used for construction of those indicators.

2. Manufacturing industry

Business tendency survey in manufacturing industry was started in Central Statistical Office of Poland in June 1992 as the first of all business tendency surveys. There are included manufacturing industry enterprises from section D of NACE (without division 37) with 10 and more employed persons. There are about 3500 enterprises in the sample.

First question asked in diagnostic and prognostic part of the questionnaire concerns assessment of general situation of the enterprise. Obtained results are used for construction of basic indicator called general business climate, calculated as arithmetic mean of those two balances of responses. Confidence indicator for industry calculated by European Commission that is arithmetic mean of balances of responses on questions on present order books, level of stocks (with inverted sign) and expected production. Both indicators are shown on graph 1.

***Graph 1**. Manufacturing industry – confidence indicator (European Commission) and general business climate (CSO)*

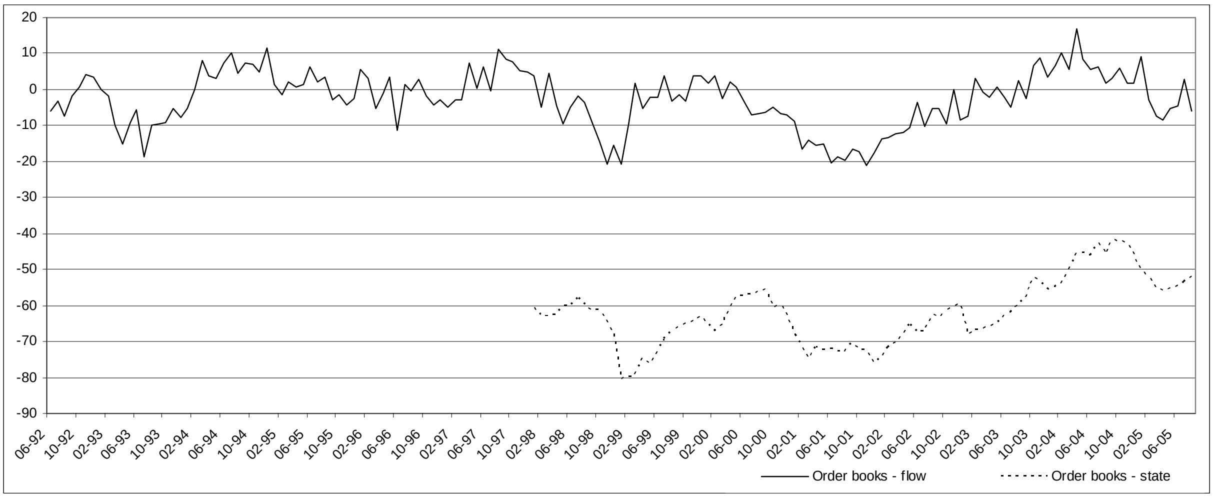


Comparing trend of general climate and confidence indicators it could be noticed that their directions are similar (correlation 0.74). There are also turning points in similar moments – at the turn of 1997 and 1998, in the middle of 2000, at the turn of 2001 and 2002 and in the middle of 2004.

On the other side the level of both indicators is different: lower for confidence indicator of European Commission than for the general climate of CSO with differences that sometimes amount to more than 20%. Additionally in the case of the European Commission indicator is below zero while the results of CSO surveys in many periods show that situation is satisfactory for Polish enterprises. Those differences cause that the change of the confidence indicator to the European definition should not be done automatically. It would have to be proceeded by the detailed analysis of factors influencing level of trend of both indicators with assessment which of them better reflects the state of the Polish industry. Below the first attempt of the answer to this question is presented.

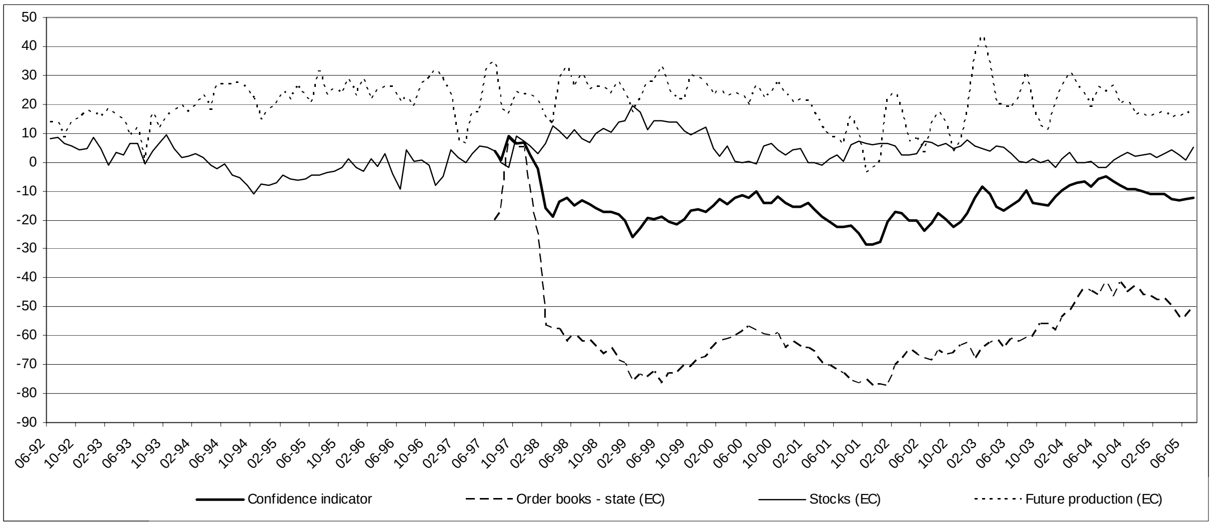
Before the analysis of both indicators is done it should be explained what caused such significant decrease of the indicator of European Commission on the turn of 1997 and 1998. At the beginning of 1998 Commission started to calculate the confidence indicator based on the newly introduced to the Polish questionnaire question on present order books. It was harmonised with recommendations of European Commission and contained following variants of answers on question on assessment of order books: *more than sufficient* / *sufficient* / *not sufficient* (in abbreviation called question on “state”) instead of earlier used variants of replies: *increased* / *remained the same* / *decreased* (question on “flow”). European Commission added to the time series of order books “flow” for the last six months of 1997 new time series of order books “state” that started in January 1998. The difference in level of both time series seen at graph 2 is caused by the fact that, for instance, the entrepreneur answering on the first question that choose the first variant of answer – *order books increased* – at the same time in the second question may choose the third variant of the answer – *order book is* – in spite of the increase – still *not sufficient*.

Graph 2. *Manufacturing industry – current order books (flow and state)*



Change to the new question concerning order books caused not only rapid decrease of confidence indicator on the turn of 1997 and 1998 but also – as it is shown on graph 3 – this time series had a negative influence on the level of this indicator in the following years.

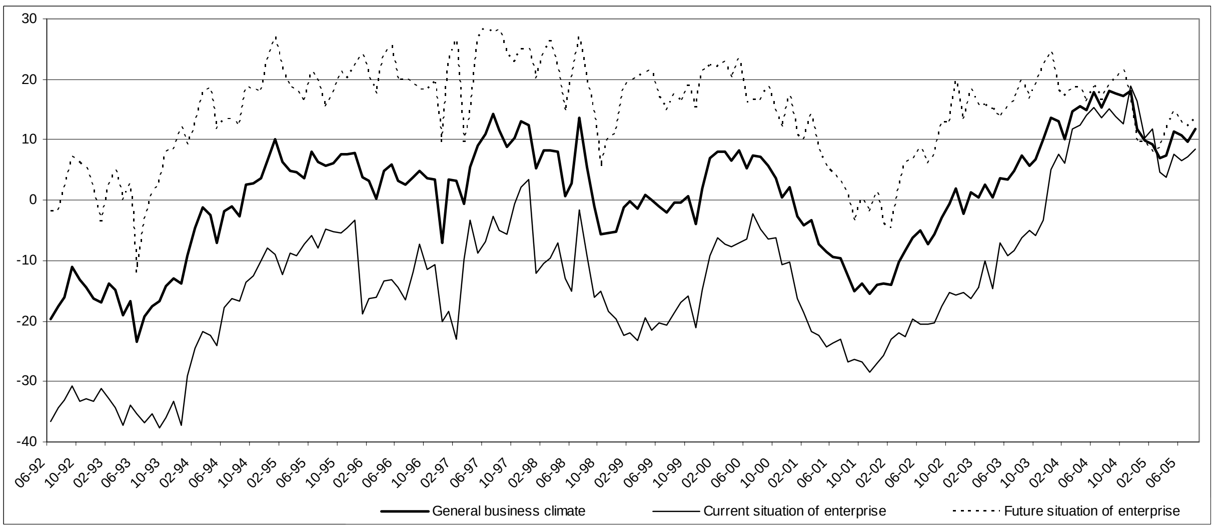
Graph 3. *Manufacturing industry – confidence indicator (European Commission) and its components*



The second diagnostic indicator concerning present level of stocks has positive influence on the confidence indicator for manufacturing industry. Its third element (the only prognostic one) – expected production – is on the highest level. It is typical because forecasts of enterprises are usually more optimistic than the later assessment of present situation.

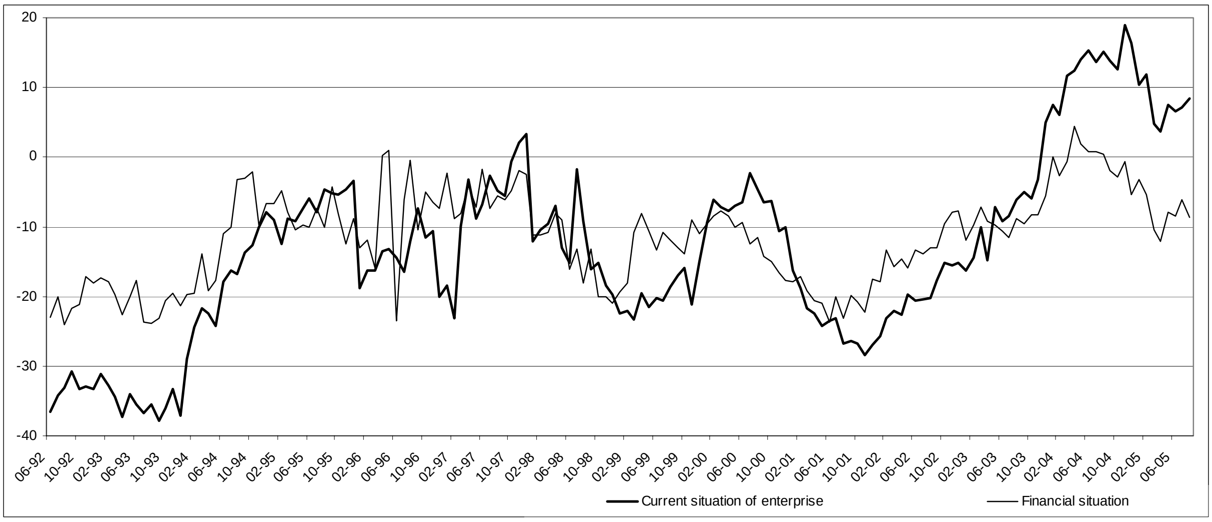
Analysis of components of CSO's general economic climate (graph 4) confirms higher optimism of respondents while they forecast than assess their situation. It is very well seen on example of time series of present and expected situation of the enterprise. Those two time series – although covergent – lie on different levels (but not the same for the whole period).

Graph 4. *Manufacturing industry – general economic climate (CSO) and its components*



Answering on question on general situation of the enterprise used to the construction of the Polish composite indicator respondents take into account different factors. It is interesting to check what are those factors and which of them have the decisive influence on the fact that the enterprise reports improvement or deterioration of its general situation. First of all it should be remembered that earlier analysis made in CSO [5, 6] shows that the variable that mainly influence general situation of enterprise is its financial situation (graph 5).

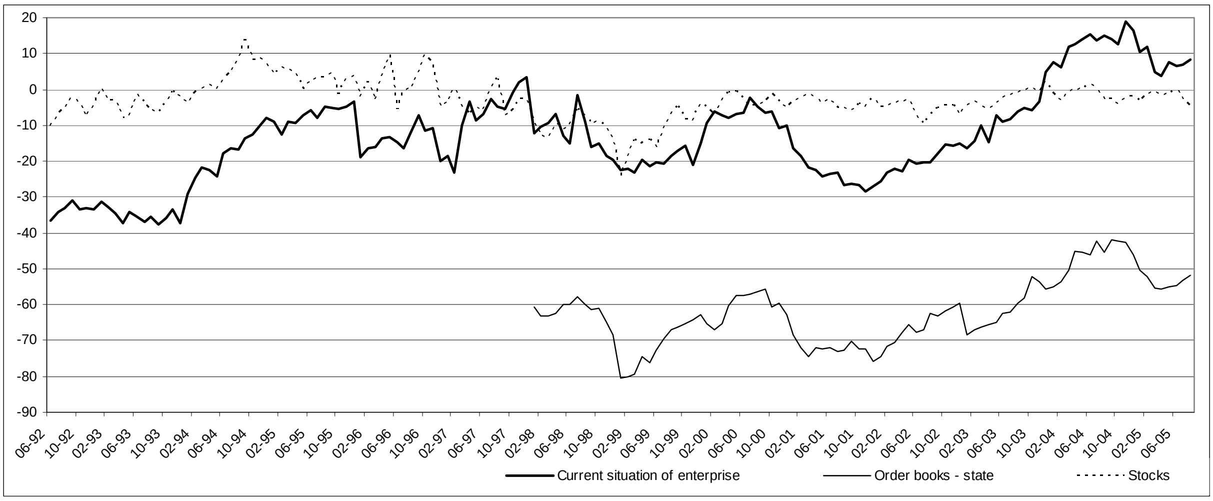
Graph 5. *Manufacturing industry – current economic situation and ability of the enterprise to pay current debts.*



It is confirmed by high correlation equal to 0.78. It is obvious that good financial situation first of all depends on order books that – as a consequence – allow to develope production. In Polish conditions – with difficult general situation of enterprises – there is also an influence of other factors. First of them is the possibility of receiving payments from contracting parties on time, the second – exceeded payments to state revenue (in the quarterly business tendency survey, in 3rd quarter 2005 59% of respondents mention *high payments to state revenue* as one of the barriers of their activity).

Looking for differences in the assessment of general business situation in the Polish industry with use of European Commission and CSO indicators it was checked how the components of confidence indicator are connected with balances of general economic situation of enterprise (diagnostic and prognostic). On graph 6 there are shown current general situation compared with current assessment of order books and stocks i.e. with two diagnostic indicators used by European Commission to the construction of confidence indicator.

Graph 6. *Manufacturing industry – current general business situation, order books (state) and stocks*

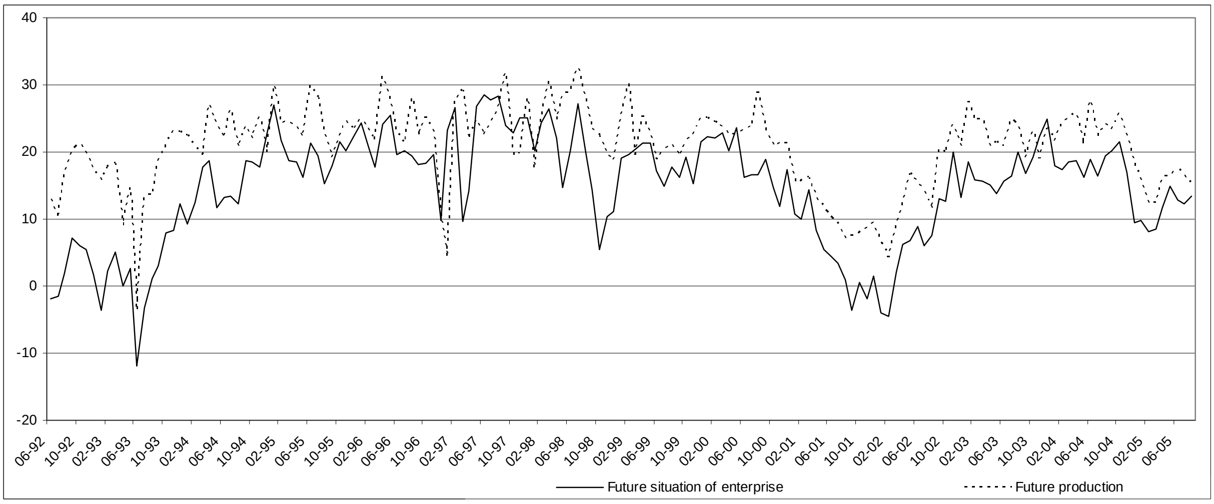


This variables show that assessment formulated by entrepreneurs on order books are on much lower level than assessments of general situation (difference amounts to 50%). Even if since the beginning of 2004 general situation of enterprises is regarded as satisfactory respondents report very insufficient order books. It should be also underlined that there is a very high correlation of both indicators (correlation coefficient amounts to 0.92). It could be stated that order books – certainty of a sales of current production – have a significant influence on opinions of entrepreneurs. Its low level is caused by too small demand in comparison with possibilities and expectations of enterprises: in quarterly manufacturing industry questionnaire *insufficient domestic demand* was the most often chosen variant of answers on question on limits to activity (chosen by 61% of respondents in 3rd quarter 2005).

In some periods indicator of stocks is much higher than indicator of general situation, in some – it is close to it, in others – it is significantly lower. Finally when entrepreneurs assessed their general situation positively they managed to adjust their stocks to the needs of the market. Changes of excessive stocks noted down in a given period were parallel to improvement of general business situation or to its deterioration. Excess of stocks could mean not the forecast of real increase of future sales but wrong or too optimistic assessment of possibility to find customers for produced goods. Difficulties in the proper settlement of level of stocks could be caused by very quick changes of economic and legal surrounding. We could go back again to the quarterly business tendency survey in manufacturing industry – as the third and forth in importance limit to production in the 3rd quarter 2005 there were chosen *uncertainty of economic situation* (47%) and *unclear and inconsistent law* (44%).

The third component of European Commission confidence indicator is prognostic variable concerning future production. Correlation between assessments of present production and future general economic situation of enterprise showed on graph 7 is high (0.77). But attention should be turned to the fact that level of expressed by entrepreneurs assessments of their general situation is usually a little lower than level of future production. This justifies suppositions that on future general business situation of Polish enterprises there could also influence another factor that makes assessments respondents more prudent –variability of economic and legal surrounding and – mentioned above – too weak financial situation of enterprises.

Graph 7. *Manufacturing industry – future general situation of enterprises and forecasted production*



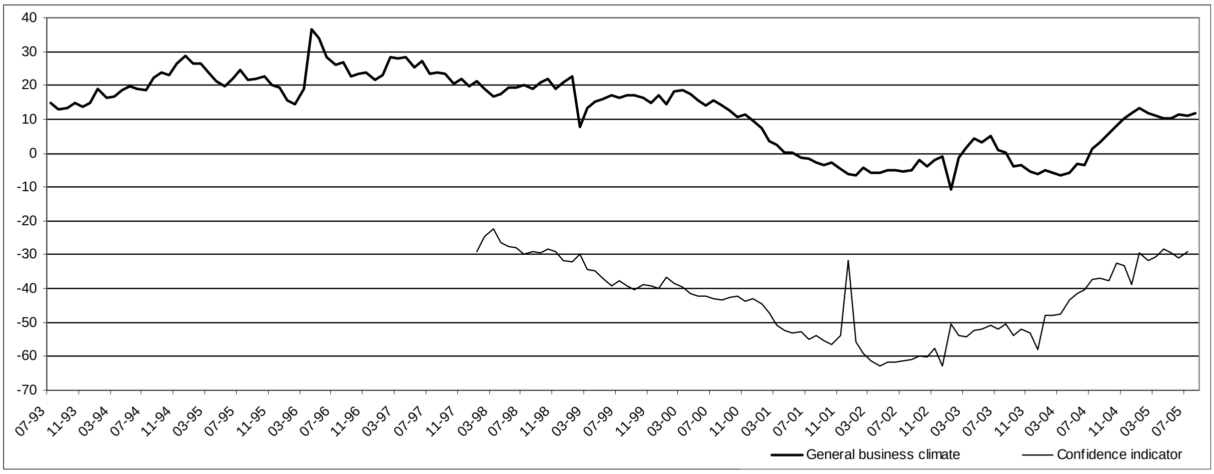
Summing up it should be stated that difference between European Commission confidence indicator and general climate indicator of CSO observed for manufacturing industry is connected with difference between assessments of order books and those of general economic situation of enterprises. Influence of two remaining components of confidence indicator that is level of stocks and future production turned up – in spite of presented limitations – decidedly less significant.

3. Construction

Business tendency survey in construction was introduced in Central Statistical Office in July 1993. There are comprised enterprises from section F division 45 (with exclusion of group 45.5) according to NACE with 10 and more employed persons. In the sample there are about 3500 enterprises.

General business climate in construction is calculated according to the same definition as general business climate in manufacturing industry that is as arithmetic mean of balances of responses on questions on present and future economic situation of the enterprise. Confidence indicator for construction calculated by European Commission: arithmetic mean of balances of responses on questions on present order books and future employment. In both cases there are used one diagnostic and one prognostic balance with indicators that are elements of the composite indicator of CSO being more general than balances chosen by European Commission. Both indicators are presented on graph 8.

Graph 8. *Construction – confidence indicator (European Commission) and general business climate (CSO)*

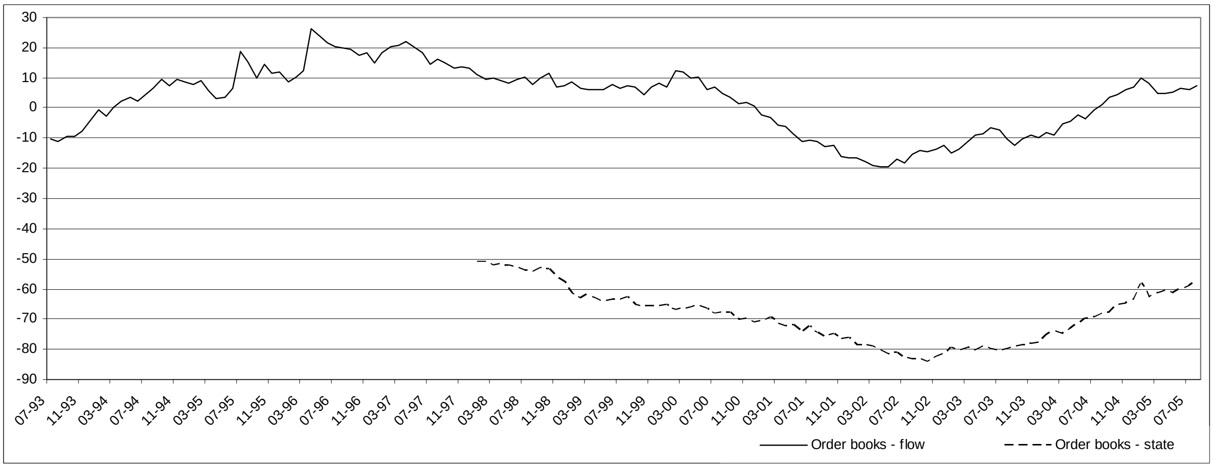


In case of construction enterprises high correlation between both indicators is seen (0.79) as well as difference in their levels. General climate indicator of CSO is only slightly below zero (since the middle of 2001 to the middle of 2004) while confidence indicator of European Commission shows very difficult situation in Polish construction in the whole period. Therefore data presented by CSO and European Commission might lead to significant differences in assessment of situation of Polish construction.

There should be noticed that – similarly as in case of manufacturing industry – also in construction there was introduced additional question on current level of order books within harmonisation in 1998 (*more than sufficient*, *sufficient*, *not sufficient*), next to the question on flow of order books used before. For order books in construction European Commission presents results since 1998.

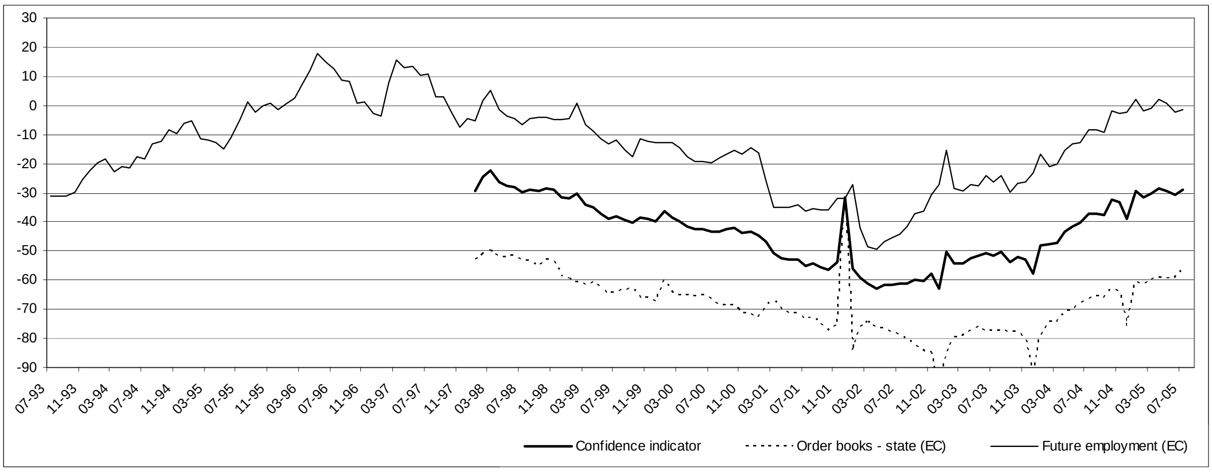
There is strong correlation between order books based on two different questions (correlation 0.89) but the difference in their levels is significant (compare graph 9). During the whole survey time series for order books "state" has only negative values while order books "flow" was assessed negatively only on the turn of 1993 and 1994 and since the beginning 2001 to the middle of 2004 [7, 8].

Graph 9. *Construction – current order books (flow and state)*



On graph 10 there are shown two balances used by European Commission as components of confidence indicator for construction: present situation is to be illustrated by level of order books on construction and assembly works, future situation – employment forecasted by the enterprise.

__Graph 10.__ Construction – confidence indicator (European Commission) and its components

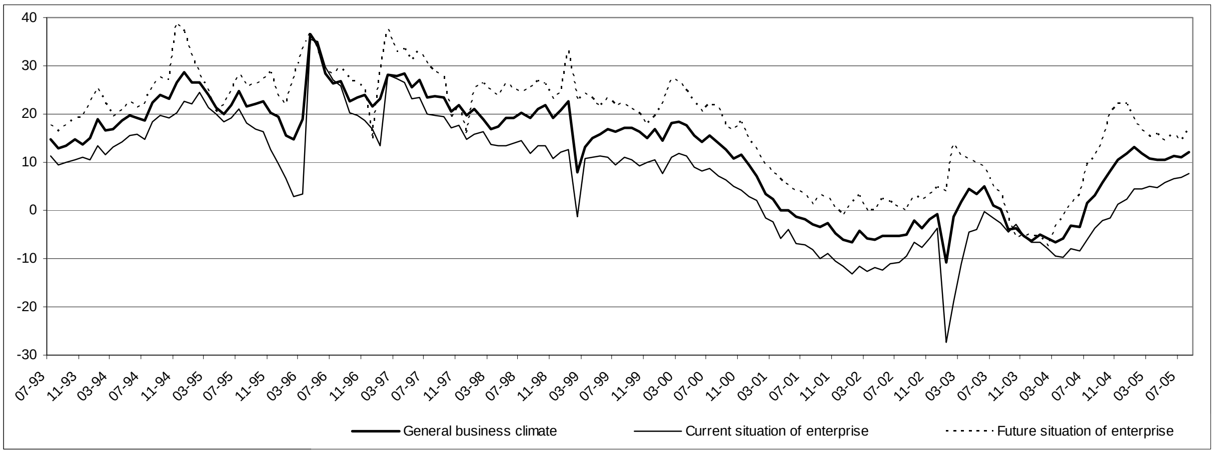


In compliance with generally observed greater optimism of respondents answering on prognostic questions also in this case, the component that positively influence confidence indicator is variable of forecasted employment. It should be underlined that Polish entrepreneurs mainly suppose that they should reduce employment (with exception of very positive for construction period since the middle of 1995 to middle 1997) what justifies fact that this indicator (in spite of the fact that prognostic one) is – besides the break mentioned above – below zero. Very important factor influencing this opinion are costs of employment – this is the third of barriers of constructing activity mentioned by 45% of respondents.

The second of elements concerning current order books influence negatively confidence indicator. Also in this case we could refer to opinions of entrepreneurs on limits of their activity – in August 2005 74% respondents mentioned *competition from other firms*, and 50% – *insufficient demand*.

On graph 11 there are presented indicator of CSO’s general business climate and its two components: assessments of present and future general situation of the enterprises.

Graph 11. *Construction – general business climate (CSO) and its components*

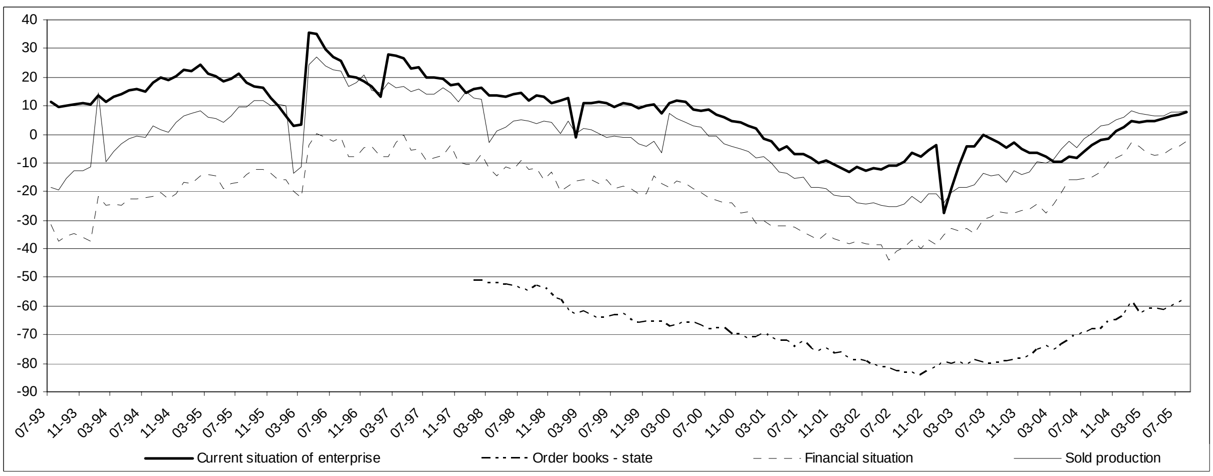


Also in this case optimism of forecasts in comparison with later assessments of present situation is bigger but in construction this correction is less significant than in case of industry and there is a similar distance between both variables all the time. There are also similar tendencies of trend of both variables (correlation 0.87).

Looking for reasons for differences observed between levels of European confidence indicator and Polish general business climate in construction we compared two balances used by European Commission with diagnostic and prognostic indicator of general situation of enterprise.

On graph 12 there is shown influence of current order books on formulated by the enterprise assessments of its current general business situation. Additionally on this graph there are shown two other variables: current production and financial situation.

Graph 12. *Construction – current general economic situation of the enterprise and factors influencing it*

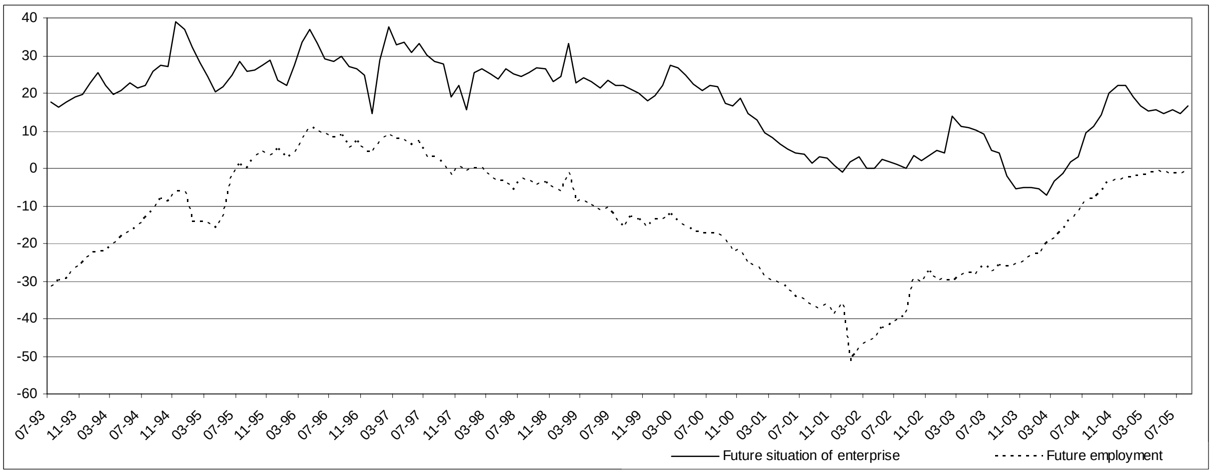


Interdependence between order books and general economic situation of enterprises is significant (correlation 0.92), there are also turning points in similar moments but the variable that is the component of confidence indicator is much below the general business climate. It might suggest that current order books are not decisive in formulating by enterprises assessments of their general situation.

In present conditions of functioning of Polish construction firms other factors than order books influence general situation. It might be indicated by entrepreneurs' assessments of their present financial situation and – even more – assessments of present production. At present situation Polish construction entrepreneurs are not sure if and how quickly possessed order books will result in real production and – later – in improvement of situation of the enterprise. Besides – similarly as in the case of manufacturing industry – financial situation is also significant for assessment of situation, influenced by punctuality of payments made by clients and too high payments to state revenue.

Connections between assessment of future general situation of enterprise and assessment of future employment are shown on graph 13.

Graph 13. *Construction – future general situation of the enterprise and future employment*



Also in this case correlation between both time series is significant (0.76) and turning points are in similar moments but level of both time series is different: as in the case of diagnostic time series assessments of future employment are lower than forecast of general situation.

Looking for causes for such differences first of all it should be noted that difficult financial situation of enterprises causes that entrepreneurs look for possibilities of reducing costs of production, also by reduction of employment. Partly it is possible thanks to introduction of new technologies to the production and partly – by employment on commission contracts or in the hidden economy what probably is not revealed by entrepreneurs in business tendency survey questionnaire. That is why positive assessments of future general business situation in the field of construction and assembly works could not be reflected by equally positive decisions on new employment.

Summing up in case of construction significant difference between the level of confidence indicator of European Commission and general business tendency indicator influence two factors: used by European Commission balance of order books and – in a smaller scale – forecast of employment. First of them is lower even more than 70% than balance of general situation of enterprise, in case of the second one this difference comes to 50%.

4. Retail trade

Business tendency survey in retail trade is conducted in Central Statistical Office since October 1993. It covers retail trade units of all size classes according to employment of section G of NACE. There are about 5000 units in the sample.

Similarly as in the case of business tendency surveys in manufacturing industry and construction the trend of business tendency in retail trade is showed by general business climate defined as arithmetic mean of balances of responses on questions on present and future economic situation of the enterprise. Confidence indicator for retail trade calculated by European Commission equals arithmetic mean of balances of responses on questions on situation of enterprise or sale (depending on variant of question chosen by the country) in the last and future three months and present level of stocks (with inverted sign). Relation between Polish and European indicator in the years 1997-2005 is shown on graph 14.

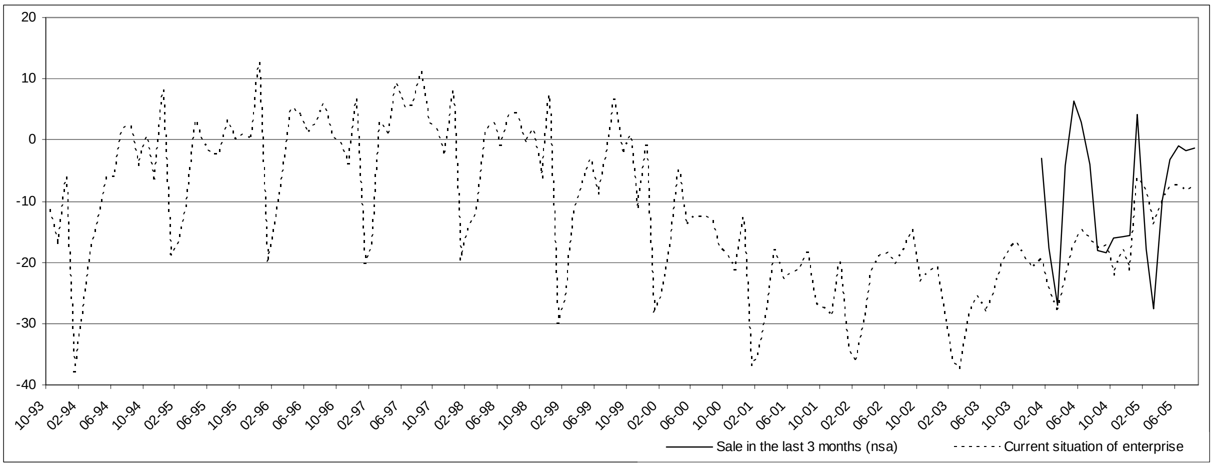
Graph 14. *Retail trade – confidence indicator (European Commission) and general business climate (CSO)*

Till 2003 in both composite indicators there are used the same two components what caused that there is not only strong correlation between general climate and confidence indicator (0.88) but also their negative trend is similar. For both composite indicators there is visible gradual deterioration of situation since 1998 till the beginning of 2002, and since then following slow improvement. Contrary to manufacturing industry and construction, for retail trade it is characteristic that the level of CSO indicator is lower than level of Commission indicator.

Business tendency questionnaire in retail trade was also harmonised by introduction of new question so one of indicators used for confidence indicator was changed: instead of question on current situation question on situation or sale (according to the variant chosen by the country) in the last three months was introduced. This change had smaller influence on confidence indicator than in the case of changes of introduced questions in manufacturing industry and construction. It is not surprising as we remind that earlier analysis shows that at the present stage of development of Polish economy it is easier for entrepreneurs to refer in their answers to the shorter time horizon.

That is why till December 2003 to DG-ECFIN there were send data concerning general business situation of units and since January 2004 – questions concerning sales in the last three months. The whole time series used by European Commission consists of two parts: to the end of 2003 – general business situation and from the beginning of 2004 – sale in the last three months.

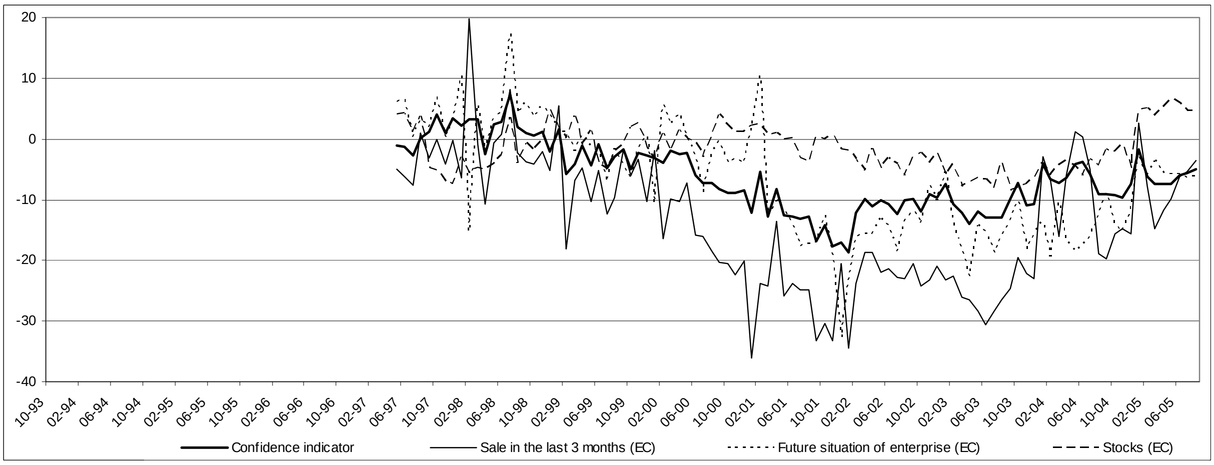
Graph 15. *Retail trade – current general business situation and sale in the last three months (data not seasonally adjusted)*



On graph 15 (because of length of time series *sales in the last three months* both time series were not seasonally adjusted) it could be noticed that replies on question on sale in the last three months are higher than time series concerning general business situation of enterprise so introduction of harmonised question and its connection with time series delivered till the end of 2003 influenced some increase of confidence indicator in retail trade.

They are shown on graph 16 to analyse their influence on confidence indicator.

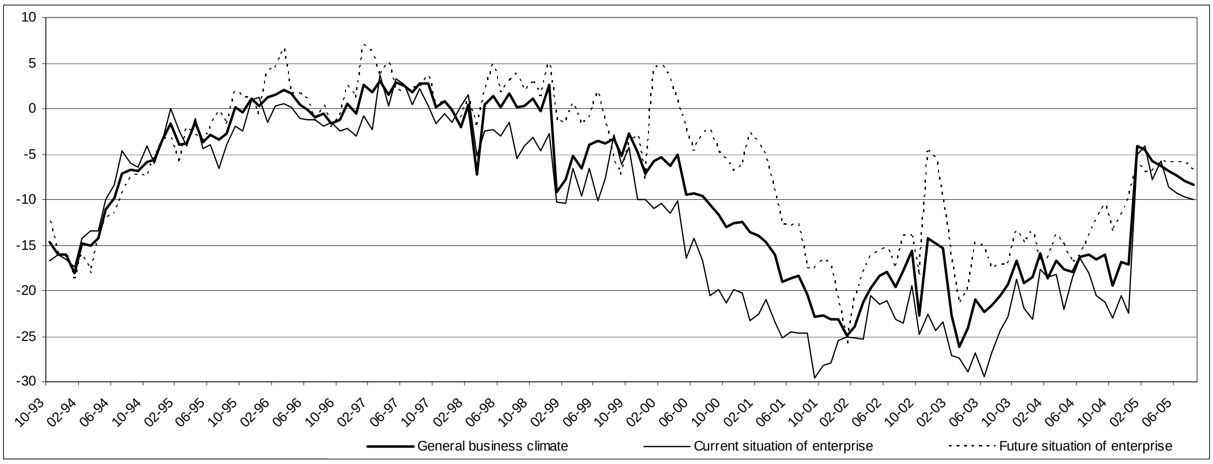
Graph 16. *Retail trade – confidence indicator (European Commission) and its components*



Among three balances composing confidence indicator variable of sale in the last three months is on the lowest level. It negatively influences confidence indicator in the whole period of the survey. A little bit higher is the curve of forecast of business situation but it positively influence confidence indicator only at the beginning of the surveyed period. Since the half of 2001 this variable is much lower, below the confidence indicator. The only element that positively influences confidence indicator is variable of stocks (although it is diagnostic variable). This is the main reason why general climate for retail trade of CSO is below the indicator of European Commission as stocks are the only variable that differ those two composite indicators.

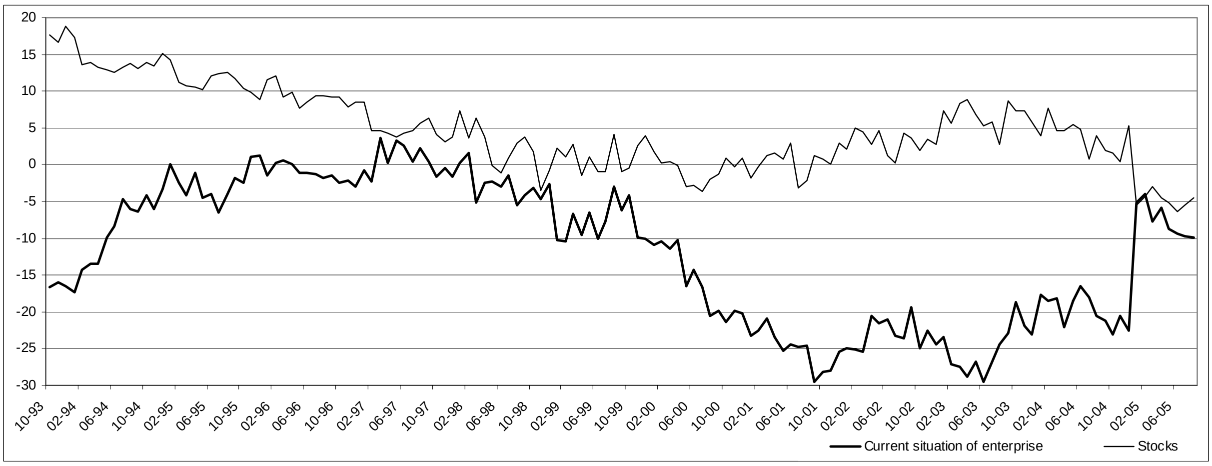
Analysing general climate indicator and its components (graph 17) – assessment of present and future general business situation of enterprise, strong correlation between them is visible (correlation equals to 0.81). The level of those two variables is also similar and in following years – in the period of worse business situation – prognostic curve is higher than diagnostic one. This divergence is especially evident in the first years when fast deterioration of retail trade companies was visible.

Graph 17. *Retail trade – general business climate (CSO) and its components*



Now it is interesting to see what is the relation between respondents' assessments of general situation and of possessed stocks (graph 18).

Graph 18. *Retail trade – current general business situation of the unit and stocks*



First of all Polish retail trade enterprises mainly regarded stocks to be insufficient in comparison with the needs of the market. With improvement of general situation the shortage of stocks was decreasing (in the first years of the surveyed period and since the beginning of 2003) but the tendency to limit stocks even when the situation is better is visible. There were only short periods when level of stocks slightly exceeded level regarded as sufficient. The entrepreneurs do not gather merchandises first of all because of their difficult financial situation that is shown on graph 19.

Graph 19. *Retail trade – current general business situation of the unit and its financial situation*

Variable of financial situation is below zero for the whole period and indicator does not exceed value -10%. The fact that entrepreneurs has to be careful using their capital causes that they try not to lock up capital in stocks by limiting them to the necessary minimum.

Summary

Analysis done in this paper shows that there are differences between composite indicators calculated and published by CSO and by European Commission. The biggest differences are for construction, smaller – but also significant – for manufacturing industry, the smallest – for retail trade. It is also characteristic that in case of manufacturing industry and construction Polish indicator is higher than European one, while for retail trade this relation is opposite.

The differences mentioned above comes from the particular way of assessment of the situation made by enterprises, connected with legal and economic environment in which the economic activity is conducted in Poland and on the second hand – of a present situation of Polish enterprises and particularly financial one. Mainly observed differences in the assessment of the business situation are influenced by:

– in manufacturing industry – very pessimistic assessments of present order books that are not the basic factor influencing general situation of the enterprise,
– in construction – similarly as in manufacturing industry – pessimistic assessment of order books that do not determine assessment of general situation of enterprise and additionally – negative forecasts of employment that are also below the assessment of general situation,
– in retail trade – tendency of entrepreneurs to limit stocks to the minimum so the general improvement of the situation is not reflected by the rise of stocks.

Taking into account all aspects mentioned above it seems that at the present stage of Polish economy indicators used by now by CSO better reflect the actual situation of manufacturing and construction enterprises as well as retail trade ones. Formulating replies on questions on their present and future general situation respondents usually take into account the most important factor influencing real situation of enterprises and further – tendency in those sectors of economy.

Therefore it seems that at present for the needs of CSO general business climate indicators should be used but changing situation of units and factors that respondents regard as decisive in formulating assessment of their situation should be observed. It would allow to decide in the future whether Polish business tendency surveys should be harmonised also in this field.

Another problem are differences in methods of seasonal adjustment that are used in CSO and European Commission. It should be also remembered that harmonisation of composite indicators will shorten them, especially in manufacturing industry and construction.

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