RELATIONSHIP BETWEEN CYCLICAL FLUCTUATIONS IN THE BANKING AND THE SERVICES SECTOR IN POLAND

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Abstract

The aim of the paper is to explore the relationship between the business tendency survey indicators for the banking sector and the sections and divisions of the services sector in Poland.

In the paper, the results are presented of analyses conducted on the basis of data from the business tendency surveys. The time range of analyses covers the period from the first quarter of 2003 to the first quarter of 2020. The data for the banking sector stem from the survey which is carried out quarterly by the Department of Market Research and Services of the Poznań University of Economics and Business. The data for the eleven sections and two divisions of the services sector (according to the Polish PKD code classification) were obtained from the survey conducted by Statistics Poland on a monthly basis. The monthly data were transformed into quarterly with the use of two formulas.

In the paper, the results are presented of cross-correlation analysis, in which the maximum length of lags and leads equal four quarters was adopted.

Keywords: banking sector, services sector, cyclical fluctuations, business tendency survey.

JEL codes: E32, G20.

Introduction

The theory of strategic complementarity between economic operators assumes that the increase in the economic activity of companies is a result of expectations that the other companies with which they cooperate will also increase economic activity. The dominant pessimistic expectations of entrepreneurs translate into the deterioration of conditions for not only one industry, but also affect the 'health' of other industries (Banerjee, 1992). Analyses on the number of hours worked have shown a high degree regarding concurrency of cyclical fluctuations for the sectors of the US economy. Improvement (or deterioration) of the economic situation occurred

in most sectors of the economy almost simultaneously (Christiano & Fitzgerald, 1998). Similar findings about great similarity of cyclical fluctuations were obtained for branches of the industry sector in Poland. It is worth noting that the cyclical fluctuations of the food and light industries were found as leading in relation to other ones (Kijek, 2013).

The influence of financial development on economic growth was confirmed in many studies across countries (Christopoulos & Tsionas, 2004; Osborn & Sensier, 2002). In some bi-directional causal relationships between financial development and economic growth were found (Demetriades & Hussein, 1996; Hassan, Sanchez, & Yu, 2011).

The results of conducted analyses allow to state that the change in economic situation happens earlier in the banking sector than in section K of the services sector. This means that the observation of the economic situation in the banking sector makes it possible to anticipate changes that will occur with a slight delay in the entire financial sector (section K of the services sector) (Skikiewicz & Garczarczyk, 2018).

The abovementioned results encourage analysis of the relationship between the business tendency survey indicators for the banking sector and the sections and divisions of the services sector in Poland. This will allow to conclude whether the cyclical fluctuations in the banking sector are leading, coincident or lagged in relation to the cyclical fluctuations in the sections and divisions of the services sector.

1. Business tendency survey data used in analyses

1.1. Business tendency survey in the banking sector

The business tendency survey in the banking sector was initiated in the second quarter of 1992 by the team managed by Prof. Józef Garczarczyk at the Department of Market Research and Services of Poznań University of Economics and Business (Garczarczyk, Mocek, & Matusewicz, 2001). The survey has been conducted quarterly in the branches of commercial banks and headquarters of cooperative banks. The questions from the business tendency survey questionnaire for the banking sector were constructed with the use of 5-point scales. These scales allow to assess the direction and intensity of changes. Simple indicators (economic balances) are calculated for each question, based on the following formula:

$$\text{Balance} = 1 \cdot \text{SP} + 0{,}5 \cdot \text{NP} + 0 \cdot \text{BZ} - 0{,}5 \cdot \text{NS} - 1 \cdot \text{SS}$$

SP: percentage of responses indicating strong improvement/strong increase in the phenomenon;

NP: percentage of responses indicating slight improvement/small increase in the phenomenon;

BZ: percentage of responses indicating no change in the phenomenon;

NS: percentage of responses indicating slight deterioration/slight decrease in the phenomenon;

SS: percentage of responses indicating strong deterioration/strong drop in the phenomenon.

The main synthetic indicator for the banking sector is the PIKBANK index, which is calculated on the basis of 5 simple indicators (Garczarczyk, Mocek, Olejnik, Skikiewicz, 2006).

$$\text{PIKBANK} = \frac{\text{BOPS} + \text{BOWK} + (-\text{BOWN}) + \text{BOSF} + \text{BPSB}}{5}$$

BOPS: assessment of obtained financial means;

BOWK: assessment of given loans

BOWN: assessment of doubtful and loss loans;

BOSF: assessment of financial situation;

BPSB: forecast of balance sheet sum.

1.2. Business tendency survey in the services sector

The results of the business tendency survey conducted in the services sector by Statistics Poland are available for as many as eleven sections and twenty divisions of the services sector. The abovementioned business tendency survey in the services sector has been conducted since January 2003. The questions in business tendency survey questionnaire for the services sector are, in general, the same for each entity of the services sector, regardless of the section and division in which the business activity is classified (with only some exceptions introduced lately). The questions were built with the use of 3-point scales. These scales allow only to assess the direction of change (e.g. improvement, no change and deterioration).

The simple indicator (the economic balance) for each question is calculated based on the following formula:

$$\text{Balance} = 1 \cdot \text{P} + 0 \cdot \text{BZ} - 1 \cdot \text{S}$$

P: percentage of responses indicating improvement/increase for the phenomenon;

BZ: percentage of responses indicating no change for the phenomenon;

S: percentage of responses indicating deterioration/decrease for the phenomenon.

The main synthetic indicator for each section and division of the services sector is the general business climate indicator (GBCI). This indicator is calculated on the basis of 2 simple indicators—the balance for a diagnostic question regarding

the current general economic situation of the unit and the balance for a forecasting question, regarding the general economic situation of the unit in the future (in the next 3 month).

Analyses will concern the set of selected PKD sections and divisions of services sector which are presented in Table 1.

Table 1. Abbreviations for the general business climate indicator regarding the sections and selected divisions of services sector

Abbreviation	PKD sections and divisions
GBCI_H	Transportation and storage
GBCI_I	Accommodation and food service activities
GBCI_J	Information and communication
GBCI_K	Financial and insurance activities
GBCI_K64	Financial service activities, excluding insurance and pension funding
GBCI_K65	Insurance, reinsurance and pension funding, except compulsory social security
GBCI_L	Real estate activities
GBCI_M	Professional, scientific and technical activities
GBCI_N	Administrative and support service activities
GBCI_P	Education
GBCI_Q	Human health and social work activities
GBCI_R	Arts, entertainment and recreation
GBCI_S	Other services activities

Source: Own elaboration.

2. Methodology of analysis

Different frequencies of conducting business tendency surveys by Statistics Poland (monthly) and the Department of Market Research and Services at the Poznań University of Economics and Business (quarterly) required the data to be converted to a comparable form. The monthly data from surveys conducted by Statistics Poland was transformed into quarterly terms with the use of 2 formulas. According to the first formula, quarterly values were calculated as the average of monthly data for each quarter. The variables obtained by using the first formula have been marked with the symbol '_a' at the end of the abbreviations. According to the second formula, the value from the last month of each quarter was assumed as the quarterly value. At the end of abbreviations, for the variables obtained with the use of the second formula, the symbol '_l' was added.

The 'growth cycle' approach was applied in analyses. The values of economic balance range between –100 and +100 points and that is why the time series with economic balances are considered as a trend-free time series. This means, that there is no need to eliminate the long-term trend with the use of filters, such as the Hodrick-Prescott filter (Dudek & Walczyk, 2013).

The time series used in analyses have been seasonally adjusted with the use of ARIMA X12 procedure in Gretl program. The obtained seasonally adjusted variables with the cyclical component of the time series have been marked additionally with the symbol '_c'at the end of abbreviations.

The relationship between the cyclical fluctuations in the banking sector and the sections as well as divisions of the services sector was verified on the basis of the cross-correlations analysis. The four quarters were adopted as the maximum length of lags and leads (Nilsson & Gyomai, 2007). The conducted analysis allowed to classify the synthetic indicator of banking business tendency survey—PIKBANK—as leading, coincident or lagged in relation to the synthetic indicator of the business tendency survey—the general business climate indicator (GBCI) for each section and division of the services sector.

3. Analysis of relationship between PIKBANK and general business confidence indicator for the sections and selected divisions of the services sector

Among the eleven sections of the services sector, the following three were characterised by the highest similarity of cyclical fluctuations compared to the banking sector: section I (accommodation and food service activities), section J (information and communication) and section K (financial and insurance activities) (Tables 2 and 3).

Cross-correlation analysis indicates a strong relationship only between 2 variables—PIKBANK and BGCI_K, regardless of the formula used to obtain the quarterly values of the general business confidence indicator for section K of the services sector (financial and insurance activities). Moreover, it should be underlined that PIKBANK was found to be a leading indicator for section K of the services sector (Tables 2 and 3).

The relationship between PIKBANK and the general business confidence indicator for both divisions of section K—financial service activities, except insurance and pension funding (division 64) and insurance, reinsurance and pension funding, excluding compulsory social security (division 65), was found to be moderate and positive.

The same strength of positive correlations (moderate) was obtained for the following sections of the services sector: accommodation and food service activities (section I), information and communication (section J), professional, scientific and technical activities (section M), human health and social work activities (section Q). Furthermore, for section P (education), a moderate and positive

Table 2. Assessment of lead/lag regarding the banking business tendency survey indicator—PIKBANK—in relation to the general business confidence indicator (GBCI_l) for the sections and selected divisions of the services sector based on cross-correlation analysis in the period 2003 Q1–2020 Q1

Variables	Pearson's correlation coefficient	Lag (+) / Lead (–)	Significance
GBCI_H_l_c	0.3129	0	***
GBCI_I_l_c	0.5746	0	***
GBCI_J_l_c	0.6434	0	***
GBCI_K_l_c	0.7069	–1	***
GBCI_K64_l_c	0.6669	0	***
GBCI_K65_l_c	0.5909	–2	***
GBCI_L_l_c	0.2323	–4	*
GBCI_M_l_c	0.5124	0	***
GBCI_N_l_c	–0.3076	4	**
GBCI_P_l_c	0.3332	–1	***
GBCI_Q_l_c	0.4371	–4	***
GBCI_R_l_c	–0.2555	4	**
GBCI_S_l_c	–0.3264	4	***

Source: Own calculations based on data from the Department of Market Research and Services at the Poznań University of Economics and Business, as well as Statistics Poland.

Table 3. Assessment of lead/lag regarding the banking business tendency survey indicator—PIKBANK—in relation to the general business confidence indicator (GBCI_a) for the sections and selected divisions of the services sector based on cross-correlation analysis in the period 2003 Q1–2020 Q1

Variables	Pearson's correlation coefficient	Lag (+) / Lead (–)	Significance
GBCI_H_a_c	0.3049	0	**
GBCI_I_a_c	0.5475	0	***
GBCI_J_a_c	0.5978	0	***
GBCI_K_a_c	0.7067	–1	***
GBCI_K64_a_c	0.6696	–1	***
GBCI_K65_a_c	0.5774	–1	***
GBCI_L_a_c	0.2388	–4	**
GBCI_M_a_c	0.5244	–1	***
GBCI_N_a_c	–0.3218	4	***
GBCI_P_a_c	0.4216	–1	***
GBCI_Q_a_c	0.4813	–4	***
GBCI_R_a_c	–0.2159	3	*
GBCI_S_a_c	–0.3656	4	***

Source: Own calculations based on the data from the Department of Market Research and Services at the Poznań University of Economics and Business, as well as Statistics Poland.
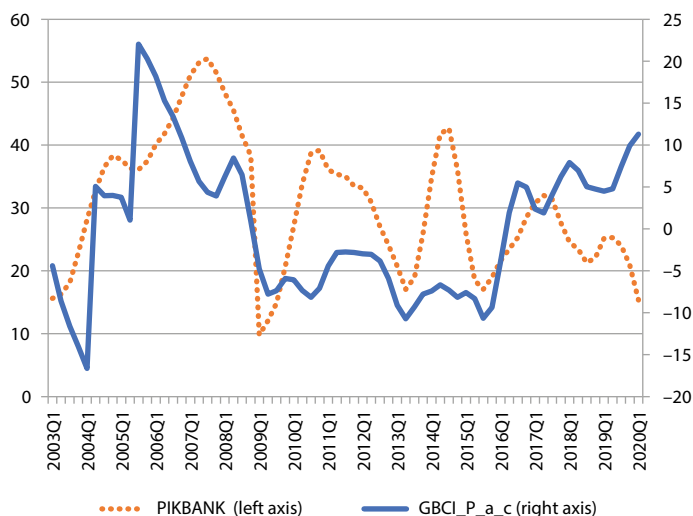
**Figure 1. Cyclical component of the synthetic indicator—
PIKBANK_c—and the general business climate indicator
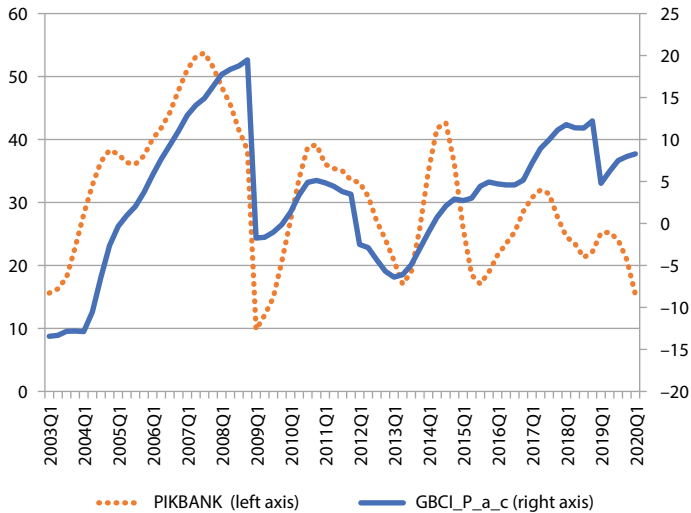in section P in the period 2003 Q1–2020 Q1**
Source: Own elaboration based on the data from the Department of Market
Research and Services at the Poznań University of Economics and Business,
as well as Statistics Poland.

relationship was found with PIKBANK in the case of the general business confidence indicator obtained with the use of the first formula (GBCI_P_a_c).

For the other five sections of the services sector (sections H, L, N, R and S), the relationship with PIKBANK is weak (Pearson's correlation coefficient was between 0.200 and 0.400), regardless of the formula used to calculate quarterly values of the general business confidence indicator (Tables 2 and 3).

In the case of three sections included in the service sectors (section N—arts, entertainment and recreation, section R—other services activities, and section S—administrative and support service activities), a negative and weak relationship was found with PIKBANK.

PIKBANK can be classified as a leading indicator in relation to the general business confidence indicator in the case of 4 sections of the services sector: section K—financial and insurance activities, section Q—human health and social work activities, section P—education, and section L—real estate activities, as well as and division 65—insurance, reinsurance and pension funding, except for compulsory social security. The same conclusion on the classification of PIKBANK as a leading indicator, in relation the abovementioned sections, can be made regardless of the formula used to calculate the quarterly values of the general business confidence indicator.

**Figure 2. Cyclical component of the synthetic indicator—
PIKBANK_c—and the general business climate indicator
in section M in the period 2003 Q1–2020 Q1**
Source: Own elaboration based on the data from the Department of Market
Research and Services at the Poznań University of Economics and Business,
as well as Statistics Poland.

In the case of section M, and division 64 of the services sector, the results depend on the formula used to calculate the quarterly values of the general business confidence indicator. PIKBANK was found to be a leading indicator in relation to the general business confidence indicator, for which quarterly values were calculated as the average of monthly data for each quarter (Table 3). In the case of another formula, when the value from the last month of each quarter was taken as a quarterly value of the general business confidence indicator, PIKBANK could be classified as a coincident indicator (Table 2).

Moreover, PIKBANK was found to be a coincident indicator for the general business confidence indicator (regardless of the formula used to calculate the quarterly values) concerning such sections as: section H—transportation and storage, section I—accommodation and food service activities and section J—information and communication.

In the case of 3 sections of the services sector, PIKBANK was found to be a lagged indicator in relation to the general business confidence indicator. The abovementioned three sections (sections N, R and S) were distinguished among the others with the negative values of Pearson's correlation coefficients.

Conclusions

The role of the banking sector in each economy is crucial. Banking business tendency survey indicators were found useful in forecasting models estimated for the main macro-economic indicators and the main indicators of the banking market (Garczarczyk, Mocek, Białowąs, & Skikiewicz, 2008).

The results of the analyses presented in this paper allow to conclude that the PIKBANK synthetic indicator from the business tendency survey conducted in the banking sector can be classified as a leading or coincident indicator in relation to the general business confidence indicator (GBCI) for eight of eleven sections of the services sector.

Regardless of the formula applied to transform monthly data for the synthetic indicator in the services sector, the results of cross-correlation analysis were very similar and changed only in some cases.

In the case of 9 sections of the services sector, the length of lead or lag concerning PIKBANK, in relation to the general business confidence indicator (GBCI), was the same regardless of the formula used to calculate quarterly values of the general business confidence indicator.

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