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Financial Aspects of Macroeconomic Stability. The Case of Poland

Finansowe aspekty stabilności makroekonomicznej. Przykład Polski

Introduction

Macroeconomic stability is crucial from the viewpoint of every aspect of economic development. The dissimilar interests of particular sectors, as well as their mutual influence in the open economy of a country, all together make ensuring macroeconomic stability an extremely difficult task. The intense developments of financial markets are an additional threat to macroeconomic stability, as shown by the recent financial crises in many countries.

Research into the interdependence between the financial sector and macroeconomic stability implies two conclusions. On the one hand, financial markets support macroeconomic stability and favour economic growth. On the other, they are a cause of the instability of the real zone and, as a result, they lead to crisis situations.

The aim of this paper is to establish whether or not there is a long-term interdependence between the variables of the financial market and the macroeconomic stability of Poland. In the first phase of the research, an analysis of stationarity of variables using the ADF test was carried out. Subsequently, variables were chosen characterized by a lack of stationarity. Here, the Engle–Granger cointegration analysis was applied. In this research, data published by the National Bank of Poland, the Polish Financial Supervision Authority, the Warsaw Stock Exchange and the Central Statistical Office for the years 2006–2017 were used. The results confirm the existence of cointegration exclusively in the case of certain pairs of variables.

1. The financial sector vs. macroeconomic stability – a theoretical aspect

Macroeconomic stability can be defined as an appropriate configuration of macroeconomic indicators. The conditions of macroeconomic stability are indicated by: low, stable inflation, balanced budget and low public debt, low market interest rates, low unemployment, a stable foreign exchange rate [Gorynia, Łaźniewska, 2009, pp. 145–145] and the positive balance of exchange with foreign countries [Kupiec, Wierzbicka, 2017, p. 57].

Macroeconomic stability is a foundation of economic growth. Consequently, holding it is the main goal of public authorities. When financial markets, which bind particular economies together, keep developing faster and faster, the role played by financial and fiscal factors in holding macroeconomic stability grows [Weller, Zulfiqar, 2013, p. 1; Kotliński, Warżała, 2018, p. 59].

Since the inception of research, ideas concerning the direction of the financial sector's influence on macroeconomic stability, and economic growth as a result, have been diverse. The point of departure, while analysing the literature verifying the aforementioned interdependence, is the work of Schumpeter [1911]. In his opinion, services offered by financial markets, starting with the mobilization of savings, through to risk management and making transactions, stimulate technological innovations and speed up economic growth. The positive influence on economic growth is also shown by Goldsmith [1969] and McKinnon [1973] who base their analyses on data from before 1964. Similar results are presented in King and Levine [1993], who underline the role of financial services which enlarge the accumulation of capital and contribute to economic growth. Ahmed and Suardi [2009] emphasize the positive influence of the development of financial markets and their openness on the improvement of macroeconomic stability as a result of diminishing the imbalance of production and consumption.

It is commonly recognized that keeping an economy stable is a factor which diminishes its vulnerability to shocks. The available literature indicates that the

development of financial markets supports this function. This is possible only up to a certain point, however. After crossing the line of a certain level of development, financial markets stop playing this role [Easterly et al., 2000]. Similar conclusions were reached by De Gregorio and Guidotti [1995], while analysing highly developed countries. The authors showed that, after reaching the border point of economic welfare, financial institutions, boosted by the need for profit, aim to enlarge their expansion at the expense of economy destabilization. In this way, the so-called "too big to fail" institutions are founded. They take risks, believing that, if a crash should occur, public authorities will not allow them to collapse.

The main role in influencing macroeconomic stability is played by the banking sector. Different shocks which affect a given economy flow through this sector in the fastest possible way. The banking sector can both muffle and enforce the shocks at hand by a credit policy which embraces credits allowed, capital import and interest rates [Caprio, Honohan, 2002, pp. 3–4]. In addition, a well-developed financial market favours macroeconomic stability by facilitating access to credit, which manifests itself in levelling both consumption and investment [Jalil et al., 2008, p. 6]. Moreover, the factor ensuring the favourable functioning and development of the banking sector is efficient financial supervision, which regulates crediting activity, above all [Włodarczyk, Ostrowska, 2017, p. 3].

A negative influence of the development of the financial market on macroeconomic stability may result from a growing inclination to risk on the part of the entrepreneurs, banks and financial go-betweens. This leads to a greater financial lever and, as result, to the variability of economic conditions [Shleifer, Vishny, 2010; Brunnermeier et al., 2012; Włodarczyk, 2017, p. 108]. It has also been argued that the development of financial markets in the EU countries once reached too high a level. This disrupted their economic situation, the result of which was a banking crisis that affected many EU countries [Creel et al., 2013, p. 20].

2. The significance of the financial sector in Polish economy

The Polish financial sector, like those in most European countries, is bank-oriented. The structure of assets in the financial sector points to this. The total value of assets at the end of 2017 was PLN 2,580.3 billion, out of which almost 70% of the assets belonged to banks. Apart from the biggest share, the assets of the banking sector in the whole period of this analysis are characterized by growing dynamics (Figure 1). In accordance with this, the relationship of the assets of the financial and banking sectors to GDP displays a growing tendency. In 2017, the assets of the financial sector reached 126% of GDP, while those of the banking sector amounted to 92%. Despite the high participation of the banking sector assets, the financial sector in Poland is the least bank-oriented in comparison to the other countries of East-Central Europe [*Raporty o rozwoju systemu finansowego w Polsce w latach 2005–2016*, NBP, p. 14].
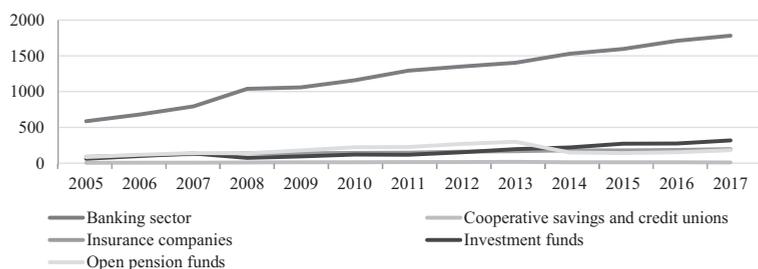
Figure 1. Assets of financial institutions in Poland in 2005–2017 (in billions PLN)

Source: Authors' own assessment based on data by PFSA and NBP.

The credit policy of banks, which may ambivalently affect macroeconomic stability, is a crucial aspect of the functioning of the financial market. The analysis of the dynamics of credits for particular sectors of the economy in Poland indicates that the biggest growing share in the structure of credits belongs to credits for the non-financial sector (households and companies). Credits for the financial and budget sectors have a low share and their level is unchangeable. The dynamics of credits for particular sectors of the economy in Poland keeps growing, but this growth is gradual and does not show any signs of the excessive over-crediting of subjects (Figure 2).
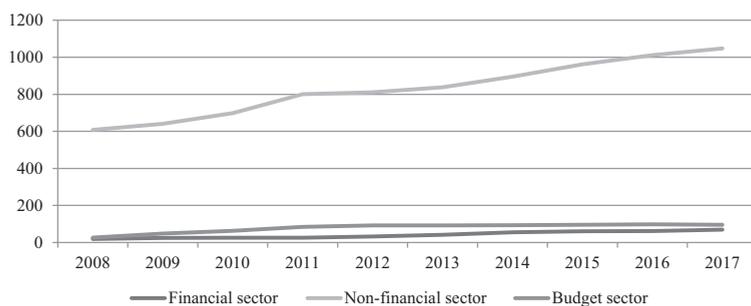

Figure 2. The dynamics of credits for particular sectors of the economy

Source: Authors' own assessment based on data by PFSA.

The analysis of the structure of credits and deposits in the non-financial sector shows their systematic growth. A major part of the credits and deposits are provided to households, but the relationships between these values undergo change. Before 2007, the number of household deposits exceeded the number of credits, but after the outbreak of the financial crisis, these relationships were reversed. This points to sources of financing the credits by banks other than deposits. After 2013, the relationships returned to the *status quo* from before the crisis. However, in the case of companies, the relationships between credits and deposits are kept on a similar level. In the period analysed here, the value of provided credits exceeds the value of deposits (Figure 3).
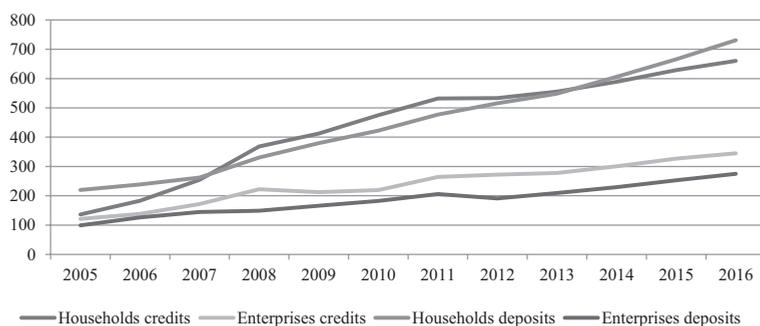
Figure 3. Dynamics of deposits and credits for the non-financial sector

Source: Authors' own assessment based on data by NBP.

Apart from the banking sector, the capital market was subject to analysis. In the analysed period, the number of stock-exchange companies kept growing, reaching 482 by the end of 2017. The capitalization of the share market in Poland, showing the value of publicly listed companies in the analysed years, undergoes fluctuations due to changes in the global market. The greatest collapse was noted in 2008, which appears to be natural from the viewpoint of the global economic situation. Before the crisis period, the growth of capitalization of the share market in relation to GDP exceeded the dynamics of capitalization in terms of values. In the period after the outbreak of the crisis, the situation is reversed. This may result from the bigger growth of GDP. Although the value of capitalization of the share market grows, GDP grows faster at the same time (Figure 4). The analysis of the Polish capital market indicates its high maturity when compared to similar markets in East-Central Europe.
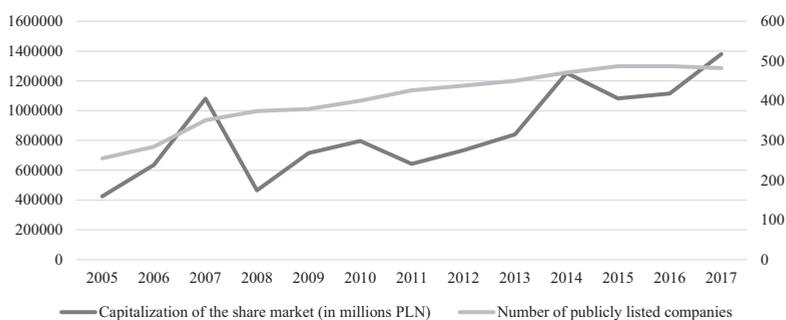
Figure 4. Capitalization of the share market (in millions PLN) and the number of publicly listed companies in Poland

Source: Authors' own assessment based on data by WSE.

As the literature shows, a more multipurpose indicator of the financial growth of an economy is the Financial Development (FD) index once proposed by the In-

ternational Monetary Fund.[1] Figure 5 shows this index in Poland compared to the other countries of East-Central Europe.
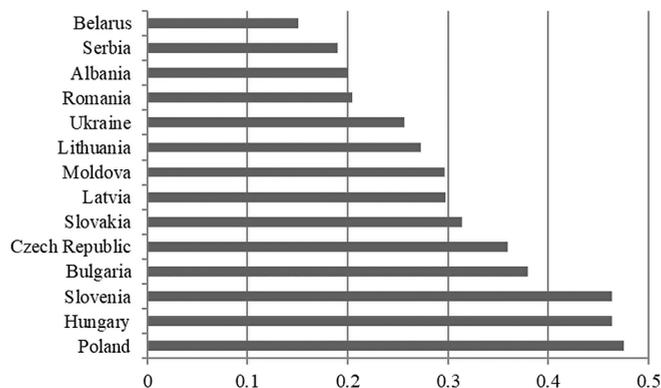

Figure 5. Countries of East-Central Europe according to the FD index

Source: Authors' own assessment based on Svirydzenka [2016].

The FD index has been proposed relatively recently, which is why it helps to carry out only a special analysis, while an analysis in time is not possible. The FD index for Poland is 0.48, which puts Poland at 39th place among all the countries subject to analysis, indicating an insufficient level of the development of the financial market in relation to the economy's size and to highly developed countries. Nonetheless, in relation to the other countries of East-Central Europe, Poland takes pride in having the most developed financial market in the region.

The foregoing analysis of the Polish financial sector shows that it is the most quickly developing sector among the countries of East-Central Europe. The situation of the financial market in Poland did not undergo sudden fluctuations during the recent financial crisis. After the outbreak of the financial crisis, this sector has been developing gradually, which indicates that there is no danger to the macroeconomic stability of the Polish economy.

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[1]   The FD index is an aggregate measure of the development of a financial market based on sub-indices which determine the quality of institutions and financial markets in three categories; development, access and efficiency. This indicator considers the condition of the banking sector, investment funds and other financial institutions as well as that of the capital market. The FD index covers 183 countries.

3. The methodology and results of empirical research

The aim of this research is to analyse long-term interdependencies between the variables of the financial market and macroeconomic stability.

Variables describing the development of the financial sector in Poland, due to the availability, completeness and non-stationarity of their time series, are presented in Table 1.

Table 1. Description of the variables accepted for the research defining the financial sector

Accepted symbol	Variable	Time range	Database
X_1	Dynamics of financial sector assets (%)	2008–2016	*Raporty o rozwoju system finansowego w Polsce w latach 2005–2016*, Narodowy Bank Polski
X_2	Dynamics of banking sector assets (%)	2008–2016	*Raporty o rozwoju system finansowego w Polsce w latach 2005–2016*, Narodowy Bank Polski
X_3	Loans dynamics for the non-financial sector (%)	2008–2016	*Raporty o sytuacji banków w latach 2008–2016*, Komisja Nadzoru Finansowego
X_4	The number of listed companies	2008–2016	www.gpw.pl

Source: Authors' own study.

The research omitted the previously analysed Financial Development index, because there are no time series for this index. In turn, the adopted variables describing Poland's macroeconomic stability are presented in Table 2.

Table 2. Description of variables accepted for research determining macroeconomic stability

Accepted symbol	Variable	Time range	Database
X_5	GDP dynamics (%)	2008–2016	Bank Danych Makroekonomicznych, Główny Urząd Statystyczny
X_6	Relationship of the current account of the balance of payments to GDP (%)	2008–2016	Bank Danych Makroekonomicznych, Główny Urząd Statystyczny
X_7	Registered unemployment rate (%)	2008–2016	Bank Danych Makroekonomicznych, Główny Urząd Statystyczny
X_8	Reference rate (%)	2008–2016	Bank Danych Makroekonomicznych, Główny Urząd Statystyczny

Source: Authors' own study.

In terms of the variables describing the development of the financial sector in Poland, due to the availability, completeness and non-stationarity of their time series, the following were used:

X_1 – dynamics of financial sector assets,
X_2 – dynamics of banking sector assets,
X_3 – dynamics of loans for the non-financial sector,
X_4 – number of listed companies.

The research omitted the previously analysed Financial Development index, because there are no time series for this index. In turn, as variables describing the macroeconomic stability of Poland, the following were adopted:

X_5 – GDP dynamics,

X_6 – relationship of the current account of the balance of payments to GDP (%),

X_7 – registered unemployment rate (%),

X_8 – reference rate (%).

No non-stationarity for the GDP deflator and public debt as variables characterizing macroeconomic stability and capitalization of the equity market has been demonstrated, therefore, they are not included in further studies.

In order to examine an existing long-term relationship between the variables, the cointegration analysis was used. A cointegration of two processes X_t and Y_t at rate d, b, i.e. $X_t, Y_t \sim CI(d, b)$, $d \geq b > 0$ occurs if [Osińska, 2007, p. 352]:

- they are integrated of the same order d,
- there is a linear combination of these processes $u_t = \alpha_1 X_t + \alpha_2 Y_t$, which is integrated of order d–b.

In other words, cointegration occurs if two time series are non-stationary, but stationarity is shown by their linear combination.

Testing the level of the integration of time lines occurs as a result of testing a unit root. In this research, an augmented unit root test ADF was used.

In the first stage, an augmented unit root test ADF for the levels of the analysed variables was used, which is shown in Table 3. A verification of this test was conducted based on p value. At the level of 0.05, a hypothesis of non-stationarity of variables should be assumed. The results of the test showed the non-stationarity of the analysed variables.

Table 3. ADF test for levels of variables

	With a variable		With a variable and a linear trend	
	Statistic value	p value	Statistic value	p value
X_1	-2.403	0.141	-1.821	0.695
X_2	-1.586	0.49	-2.671	0.249
X_3	-1.713	0.426	-2.173	0.504
X_4	-1.368	0.59	-0.109	0.995
X_5	-2.134	0.231	-1.449	0.847
X_6	-0.314	0.921	-3.161	0.093
X_7	-0.609	0.866	-1.384	0.866
X_8	-1.186	0.683	-3.144	0.096

Source: Authors' own analysis using GRETL.

The lack of stationarity of the levels of variables suggests further research should be conducted to establish their first differences (Table 4). The analysis of stationarity for the first differences showed the stationarity, which means that the analysed variables are integrated of order one, which is symbolically marked by I (1). The observed stationarity of variables serves as a basis for analysing cointegration relations.

Table 4. ADF test for first differences

	With a variable		With a variable and a linear trend	
	Statistic value	p value	Statistic value	p value
X_1	-2.457	0.126	-3.427	0.048
X_2	-5.912	0.000	-9.42	0.000
X_3	-4.801	0.000	-9.937	0.000
X_4	-1.9478	0.311	-5.197	0.000
X_5	-2.846	0.05	-3.469	0.042
X_6	-4.984	0.000	-4.846	0.000
X_7	-2.426	0.135	-6.471	0.000
X_8	-4.661	0.000	-4.355	0.003

Source: Authors' own analysis using GRETL.

Particular pairs of variables were subject to further analysis using the Engle–Granger method. Testing cointegration was conducted in a GRETL application for variables characterizing the level of development and activity of the financial market as well as for variables characterizing macroeconomic stability. From among the variables, only the ones characterized by non-stationarity were selected. These finally include:

X_1 – dynamics of assets of the financial sector,
X_2 – dynamics of assets of the banking sector,
X_3 – dynamics of credits for the non-financial sector,
X_4 – number of stock-exchange companies,
X_5 – dynamics of GDP,
X_6 – relationship of the current account of the balance of payments to GDP (%),
X_7 – rate of registered unemployment (%),
X_8 – reference rate (%).

The non-stationarity for the GDP deflator or public debt as variables characterizing macroeconomic stability or for the capitalization of the share market was not shown, since these are not considered in further research.

The cointegration analysis was conducted by estimating the model for each pair of variables OLSM. Subsequently, the significance of their coefficients was determined.

The estimated coefficients of cointegration equations are characterized by 0.05 significance, which should be graded in a positive way. Determination coefficients, however, are characterized by a low level of explanation for the phenomena under analysis. On the basis of conducted tests, it can be stated that there is cointegration between twelve out of sixteen analysed pairs of variables, as shown in Table 5. Thus, it can be assumed that there is a stable long-term relationship between these pairs of variables. Moreover, it is indicated in the literature that statistic DW values greater than the determination coefficient R^2 confirm the correctness of cointegration equations [Osińska, 2007, p. 359], which was observed in the estimated equations. Furthermore, the foregoing cointegration equations may be used for the subsequent estimation of models, e.g. by error correction.

Table 5. Results of estimated values of cointegration equations for the analysed variables

Variable y_t	Variable x_t	coefficient	Standard error	t of a student	p value	R^2	DW
X_5	X_1	0.2637	0.1048	2.516	0.031	0.39	2.34
X_5	X_2	0.1983	0.0831	2.387	0.038	0.36	2.17
X_5	X_3	0.1527	0.0422	3.62	0.005	0.57	2.24
X_5	X_4	-0.0003	0.000	-2.819	0.018	0.44	1.99
X_6	X_2	-69396.9	24581.6	-2.823	0.018	0.44	0.63
X_6	X_3	-42501.4	15217.1	-2.793	0.019	0.44	0.54
X_6	X_4	82.9213	33.0315	2.510	0.031	0.39	1.26
X_7	X_4	-0.0210	0.0097	-2.151	0.05	0.32	0.6
X_8	X_1	13.806	5.324	2.59	0.03	0.4	0.83
X_8	X_2	10.788	4.12	2.62	0.03	0.41	0.93
X_8	X_3	7.17	2.389	3.001	0.013	0.47	0.69
X_8	X_4	-0.02	0.004	-3.66	0.001	0.57	1.27

Source: Authors' own analysis using GRETL.

Conclusions

The results of testing variables describing the financial market and the macroeconomic stability of Poland enable certain conclusions to be formulated. Only some of the proposed variables could be subject to cointegration analysis examining a stable long-term relationship. Those variables met the criterion of non-stationarity and were integrated of order one I (1). The employed Engle–Granger procedure showed the occurrence of a cointegration relationship in the case of GDP dynamics and reference rate as well as the dynamics of assets of the financial and banking sectors, credits for the non-financial sector and the number of publicly listed companies. Regarding the rate of registered unemployment, a cointegration relation with the number of publicly listed companies was observed. Moreover, a cointegration relationship of the current account to GDP with all the variables, except for the dynamics of financial assets, exists. These variables are in a stable long-term relation in the analysed period.

The analysis carried out in this paper does not fully reflect the relationship between the financial sector and the macroeconomic stability of the Polish economy. The results indicate exclusively certain long-term relationships between the variables, but do not show the influence of the financial sector on Poland's macroeconomic stability. This article is an introduction to further research on the influence of the financial sector on the macroeconomic stability of the Polish economy.

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Finansowe aspekty stabilności makroekonomicznej. Przykład Polski

Celem artykułu było określenie, czy między zmiennymi rynku finansowego a zmiennymi charakteryzującymi stabilność makroekonomiczną Polski występuje długookresowa zależność. W pierwszym etapie badań przeprowadzono analizę stacjonarności zmiennych testem ADF, następnie do dalszych badań wybrano zmienne charakteryzujące się niestacjonarnością i zastosowano analizę kointegracji metodą Engle'a–Grangera. W badaniach wykorzystano dane publikowane przez Narodowy Bank Polski, Komisję Nadzoru Finansowego oraz Główny Urząd Statystyczny dla lat 2006–2017. Wyniki badań potwierdziły istnienie kointegracji w przypadku niektórych zmiennych.

Financial Aspects of Macroeconomic Stability. The Case of Poland

The purpose of the article was to determine whether there is a long-term relationship between the variables of the financial market and the variables characterizing Poland's macroeconomic stability. In the first stage of the research, the stationarity analysis of the variables was carried out using the ADF test, then, for the further stage of research, variables characterized by non-stationarity were selected and an Engle–Granger cointegration analysis was used. The research used data published by the National Bank of Poland, the Polish Financial Supervision Authority and the Central Statistical Office for the years 2006–2017. The results of the research confirm the existence of cointegration in some variables.