

Does the credit cycle exist? Policy recommendations based on empirical analyses of the Polish banking sector

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Abstract

Macroprudential policy gained significance after the 2007 crisis, increasing the importance of financial cycle analyses. In this study, the authors investigate the empirical features of the credit cycle in Poland, broken down by individual banks. The results point out a decrease in the amplitude of cyclical fluctuations. Furthermore the empirical findings indicate a differentiation of credit cycles in individual banks, suggesting that a microprudential policy towards one bank (or a group of banks) could bring similar effects to macroprudential policy. The results indicate the need to supplement the macroprudential policy analysis with disaggregated data for individual banks.

Keywords: credit cycle, macroprudential policy, banking sector, HP filtering, lead/lag analysis

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1. Introduction

Macroprudential policy gathered momentum after the 2008 Global Financial Crisis, recognising the underestimated risk within the financial sector and the need for a comprehensive approach to minimise the probability of future crises. Its main objectives are to prevent systemic risks, regulate banks, and maintain the stability of the financial system, thereby minimising the social costs caused by distorted decisions. Macroprudential policy enhances the system's resilience by addressing these issues and promoting financial balance.

The policy focuses on mitigating systemic risks and fostering economic stability. It also aims to have a countercyclical impact on credit availability, reducing the likelihood of financial crises and minimising fluctuations in GDP. Both the systemic risk-focused and cyclical fluctuations-smoothing approaches share the goal of curbing procyclical effects originating from banks. This focus on the financial cycle is crucial as banks tend to naturally act in line with economic cycles, which can lead to heightened volatility and social costs. Hence, the imperative of macroprudential policy is to smooth out fluctuations within the financial cycle. It is worth noting that macroprudential policy strives to protect banks from the impact of financial cycles and vice versa. However, its effects are not symmetrical. While it can mitigate boom risks, it is a challenge to stimulate lending recovery during downturns.

The financial cycle lacks a formal definition, but it can be characterised as the outcome of self-reinforcing interactions among perceptions of value, risk attitudes, and financing constraints. These interactions result in cyclical effects on financial institutions, influencing the economy and potentially leading to imbalances and financial difficulties. Researchers have identified indicators closely associated with financial crises and overall financial conditions to analyse cyclical fluctuations within the financial system. Standard variables examined include credit aggregates, real estate prices, stock prices, volatility, risk premium, default rates, non-performing loans (NPLs), asset prices, and leverage ratios. The groundwork laid by Hyman Minsky's "Wall Street paradigm" several decades ago significantly contributed to understanding the connection between credit fluctuations and the business cycle (see also Claessens, Kose, Terrones 2012).

Empirical analyses conducted so far have been predominantly focused on aggregated credit, uncovering variations in the duration and amplitude of the extracted cyclical component across different countries. Advanced economies generally exhibit longer and less volatile credit cycles than developing economies. Furthermore, the relationship between the credit cycle and business cycle varies across regions. However, to the best of our knowledge, no analysis has been conducted on the credit cycle at a disaggregated level, indicating a significant research gap. If empirical research confirms the existence of individual bank-specific credit cycles, it would have implications for macroprudential policy.

The main objective of this article is to analyse the credit cycle in the Polish banking system by evaluating the lending activities of individual banks. Standard filtering methods are used to extract cyclical components from each time series to understand the cyclical patterns better. Additionally, the study conducts lead-lag analysis to explore the relationship between the total credit cycle and individual bank cycles.

The empirical analyses fully concentrate on the Polish banks, which exemplifies a sector characterised by diverse ownership structures and business models. This characteristic extends to the broader Central and Eastern European (CEE) banking sectors, encompassing countries such as Bulgaria,

Croatia, Czechia, Slovakia, Latvia, Estonia, Lithuania, Romania, Slovenia, Hungary, and Poland. These countries share similar ratios of banking sector assets to GDP and corporate credit to GDP, with a notable presence of foreign capital within their banking sectors. Compared to the Eurozone, the CEE region exhibits lower asset and corporate credit ratios to GDP, while foreign investor participation is significantly higher.

The paper is structured as follows: Chapter 2 provides a literature overview, while Chapter 3 describes the main research problem. Chapter 4 presents information about the construction of the analysed dataset of time series that describes the activities within the Polish banking sector, along with the empirical results. Finally, Chapter 5 formulates conclusions drawn from the findings and offers recommendations for macroprudential policy.

2. Literature overview

Macroprudential policy is a relatively young discipline of knowledge, especially compared to the well-established views on the role and scope of monetary policy. Interest in macroprudential policy increased sharply after the Global Financial Crisis of 2007–2008. In 2014, searching for the term “macroprudential policy” on Google yielded about 400,000 results. Today, the same query generates twelve times as many.

The Global Financial Crisis of 2007–2008 demonstrated that financial sector risk had been underestimated (as exemplified by the preceding credit boom). Microprudential policy proved insufficient to prevent the crisis, and the belief that risk is best managed by institutions (with shareholders responsible for their own investments) was shown to be unfounded. Paradoxically, sound monetary policy, which had ensured stable prices and production, may have contributed to the underestimation of risk; see Hahm et al. (2012). In response to the crisis, it was widely recognised that a broader perspective was needed to minimise the risk of future crises. This perspective would consider the financial cycle (which is not visible at the micro level and not considered in monetary policy) and interactions between financial institutions. It was, therefore, necessary to look not at individual financial institutions, as is the focus of microprudential supervision, but at the financial system as a whole; see BoE (2009). While 2007 was a major catalyst for the development of macroprudential awareness, it is worth noting that the first mentions of macroprudential policy can be found in the reports of the meetings of the Cook Committee in 1979, and the IMF first used the term in 1978; see IMF (2011).

The final objective of macroprudential policy is to prevent the emergence of systemic risk; see Viñals et al. (2010). This can be achieved by controlling the social costs of decisions made by financial institutions that are subject to a common distortion. Regulation of the banking sector is necessary due to the risk of bank failure, excessive concentration and information asymmetry. The objective of macroprudential policy is to preserve the conditions for the stability of the financial system, which is defined as the state in which the financial system (including intermediaries, markets, and their infrastructure) can withstand distortions and address growing financial imbalances; see ESRB (2014).

Although the goal of macroprudential policy is traditionally defined as preventing the emergence of systemic risk, it has also been argued that it should have a broader goal of smoothing out GDP fluctuations and reducing the output gap; see Chmielewski and Sławiński (2010). This is because the macroprudential policy has a countercyclical effect on the supply of credit to the economy, which can

help to prevent financial crises and promote economic stability. The transmission of this policy to economic growth occurs through a credit channel that reinforces the traditional effects of interest rate changes.

Indeed, both approaches to the macroprudential policy – the narrower, systemic risk-focused approach and broader, cyclical fluctuations-smoothing approach – pursue a similar objective: stabilising the economic situation by limiting the procyclical effects caused by banks.

However, regardless of the definition and approach to macroprudential policy, the financial cycle is at the heart of its focus. This is because, according to the financial instability hypothesis, banks have a natural propensity to act procyclically; see Minsky (1992). Without regulatory interference, banks would naturally pursue policies that could increase volatility (boom-bust cycle) with inevitable social costs. Therefore, even if one believes that politics should only prevent situations that generate high social costs (Tucker 2015), it is inherently necessary to smooth out fluctuations in the financial cycle.

The macroprudential policy aims to protect banks from financial cycles and financial cycles from banks (Borio 2014). However, it is essential to note that macroprudential policy is asymmetrical in its effects. It can limit the risk of booms, but it is challenging to stimulate lending recovery (Cerutti, Claessens, Laeven 2017). This means that the financial cycle can be smoothed by limiting its upward phase, but there is little scope to limit the downward phase.

A descriptive, theoretical definition of the financial cycle was proposed by Borio (2012). He argues that the financial cycle results from self-reinforcing interactions between perceptions of value and risk, attitudes towards risk, and financing constraints. These interactions can have cyclical effects in the form of solid increases and decreases in the activity of financial system institutions, mainly banks. This, in turn, can have a procyclical impact on the economic situation and cause macroeconomic imbalances and severe financial problems for entities. Other authors also describe the features of the cycle, e.g. Claessens, Kose and Terrones (2012), Drehmann, Borio and Tsatsaronis (2012), and Palley (2011). To conduct empirical analysis, it is necessary to consider a set of variables that could provide information about cyclical fluctuations in the financial system in a parsimonious and exhaustive manner. The selection of indicators should be based on the occurrence of financial crises and their links with the economic situation. The literature provides research on the cyclical properties of such indicators as stock prices, volatility, risk premium, default rates, non-performing loans (NPLs), asset prices, leverage ratios and others; see English et al. (2005), Ng (2011), Hatzius et al. (2011). Drehmann, Borio and Tsatsaronis (2012) suggested that the credit aggregate and real-estate prices were the best choices for studying the empirical properties of the financial cycle. Borio (2012) similarly claims that the dynamics of credit granted and real-estate price represent the most informative indicators of the financial cycle, as they provide crucial information. Therefore, analyses of credit cycles dominate the literature on the subject.

There is another important argument for analysing credit cycles. Decades ago, Minsky (1982) developed the “Wall Street paradigm”, which provides a theoretical basis for understanding the fluctuations in investments and the business cycle strongly related to changes in activity within the financial system. Minsky argued that production in an economic system is conditioned by exchange and the allocation of goods and factors of production. He noted that financing is essential for economic entities to acquire factors of production and that credit is the primary source of funding. According to Minsky’s analysis of the American economy, credit fluctuations can significantly impact economic activity and the business cycle. Minsky’s work provided a theoretical background for research into

the nature of the credit cycle, which became a leading direction in financial cycle analysis. Early research on the credit cycle focused on the credit aggregate for the banking sector as a whole and found significant variation in cycle period and amplitude across countries; see Schularick and Taylor (2012), Jordá, Schularick and Taylor (2011), Dell'Arriccia et al. (2012), Aikman, Haldane and Nelson (2015). For example, the credit cycle in advanced economies is characterised by a more extended period and a smaller amplitude than in developing economies. Additionally, the credit cycle for large and advanced economies with developed financial systems appears more synchronised with the business cycle than in developing economies; see Lenart and Pipień (2018). Aghabarari and Rostom (2020) found that credit cycles set for Middle East and North African countries have different characteristics than those in large and advanced economies. They also found no empirical evidence of a relationship between the credit cycle and the business cycle in these regions. This suggests that previous analyses of the empirical properties of the credit cycle have not led to meaningful conclusions in the form of well-established and universal features of this cycle, as was the case with business cycle analyses many decades ago; see Burns and Mitchell (1946). The impact of macroprudential policy on the credit cycle, including the diverse responses, has been studied by Saini, Ahmad and Bekiros (2021). This study found that cyclical fluctuations in lending can vary significantly across banks, credit types and sectors of the economy. This suggests that the dominant view of banks as homogeneous entities is no longer accurate, and the macroprudential policy should be tailored to the specific characteristics of individual banks. In particular, if future research concludes that banks have their own mini-credit cycles, this would have consequences for macroprudential policy. A look at individual institutions must accompany the hitherto uniform approach.

The Polish banking sector is an example of an industry where a dozen or so institutions with strong diversification in ownership structure or business models play an essential role. It is also an approximation of the banking sectors in Central and Eastern Europe, which include Bulgaria, Croatia, Czechia, Slovakia, Latvia, Estonia, Lithuania, Romania, Slovenia, Hungary, and Poland. The countries in this region have a similar ratio of banking sector assets to GDP, ratio of corporate credit to GDP, as well as a relatively high share of foreign capital in the banking sector. The ratio of assets and corporate credit to GDP in the region is also several times lower than in the Eurozone, while the involvement of foreign investors is much higher (NBP 2022).

3. Description of the research problem

The objective of this article is to analyse the credit cycle of individual banks in the Polish system. We aim to break down the credit cycle to understand the empirical features of credit dynamics and verify hypotheses about their patterns. We have two primary research questions:

1. What is the relationship between the credit cycles of individual banks and the credit cycle extracted for aggregated data?
2. Is there a dominant institution in the Polish banking sector influencing fluctuations in the aggregated credit cycle?

Answering these questions is important for macroprudential policy. If the credit cycles of individual banks are not related to the aggregate credit cycle, then the current approach to conducting macroprudential policy could be modified.

4. Empirical analysis

4.1. Description of the data and econometric strategy

Our estimates of credit cycle position rely on data provided by a panel of commercial banks operating in Poland. Quarterly reports on lending are publicly accessible for banks listed on the Warsaw Stock Exchange. We collected data from interim non-consolidated reports unified under the category “due from non-financial customers” by Notoria-Serwis.

To ensure accurate analysis, we relied on empirical methods that require a reasonably long time series. Although the series don't have to span the same period for each bank, differences in the time dimension of the sample could distort the results. As a result, we used a balanced panel of banks for our baseline analysis. The sample starts in 2001 Q4 when data for the largest bank became available and ends in 2023 Q2, which was the last available observation when we wrote the article. Our sample consisted of data from 8 banks, covering an average of 58% of aggregate credit over the period.

Two adjustments were necessary for the data. Firstly, auxiliary regressions were used to remove the effects of mergers and acquisitions (M&As). For each bank, we estimated the parameters of an autoregressive model for a log-difference of lending, with seasonal and M&A dummy variables. Then, if statistically significant, we removed the estimated effects of M&As (as reflected in the M&A dummy variables). Secondly, we used log-linear interpolation to impute missing observations. However, this applied to only 6% of observations.

We used NBP statistics of loans to non-financial institutions, excluding the central government, as a measure of aggregate bank lending. These loans should correspond to bank-level data from Notoria Serwis.

We determined the cyclical components, constructed credit cycle clocks, and performed lead-lag analysis. Additionally, we marked cycle phases (recession, recovery, expansion and contraction) and presented credit cycle clocks, similar to the commonly used strategy for empirical analysis of business cycles. We extract cyclical components for each analysed time series according to the standard filtering procedures and provide the lead-lag analysis with the aggregated credit cycle. All cyclical components presented in the paper were obtained by applying the HP filter proposed by Hodrick and Prescott (1997). There is vast empirical literature initiated by Drehman et al. (2012), indicating that the credit cycle has a period substantially longer than the business cycle. Formal statistical procedures for determining the cycle length were elaborated for monthly data by Lenart and Pipień (2018). They confirmed longer periods of credit fluctuations and also showed strong heterogeneity of empirical properties of credit cycles across countries. Consequently, the application of the HP filter in the empirical part of this paper requires a non-standard approach to the determination of the smoothing parameter. We perform sensitivity analysis, extracting cyclical components using the HP filter with three different smoothing parameter values corresponding to the cycle of periods 5, 10 and 15 years, respectively. Finally the cyclical analyses presented in this paper covers the period from 2003 Q2 to 2023 Q2.

4.2. Results

The chart in Figure 1 displays the cyclical components for the entire banking sector (black line) and the cyclical components of each individual analysed bank (grey lines). The percentage scale indicates

the deviation from the long-term trend. A value of 1 represents a 100% upward deviation, while -1 represents a 100% downward deviation. The analysed period can be divided into two stages, before and after 2008/2009. Before 2008, one may observe cyclical fluctuations with strong amplitudes, while after 2008, these fluctuations decreased. However, for the whole analysed period, it is clear that the cyclical components for each analysed bank vary in length, amplitude, and phase shift. This demonstrates that the cyclical components designated for the entire sector can result from cyclical fluctuations of various natures. Figure 1 includes the cyclical component obtained for PKO BP – bank 102 (black dotted line), which shows the most similarity to the cyclical fluctuations observed for the whole sector. The credit cycles corresponding to the other banks used in the analysis do not appear to be perfectly synchronised with the sector's fluctuations.

In order to showcase the differences in credit cycles of individual institutions, we have presented two additional charts – Figure 2. Figure 2 shows isolated cyclical components and credit cycle clocks for exemplary cases of banks 102, 103, and 154. These indicate differences in cyclical fluctuations in credit when compared to the aggregated cycle. The credit cycle corresponding to bank 102 is very similar to the one corresponding to the entire sector. However, in our sample, we have found banks with cyclical fluctuations in credit that are very different in terms of length, amplitude, and phase shift – banks 103 and 154 being such examples. Consequently, credit cycle clocks appear different for these analysed banks and have differentiated readability. The credit cycle clock obtained for the entire sector results from aggregating cyclical fluctuations of a highly differentiated nature.

In Table 3, we can see the cycle phase markup for the entire sector and for each of the analysed banks. Following the standard approach for business cycle analysis, we assigned a cycle phase to each quarter in the sample: recession, recovery, expansion and contraction. However, we found that there is no quarter in which all banks and the entire sector are in the same phase. For instance, during the third and fourth quarters of 2006 and the first quarter of 2007, we were very close to a sectoral expansion, but bank 154 was still in the recession phase. Until 2008, the majority of analysed banks displayed somewhat synchronised cyclical behaviour, which was similar to that of the whole sector. However, from 2009, cyclical fluctuations became more diverse, leading to more diverse cycle phases.

A detailed analysis of the degree of synchronisation of bank credit cycles with credit cycles for the entire sector is included in Table 2. We present correlation coefficients between the current value of the cyclical component of a credit category and a given bank (in rows) with the lagging or leading value of the cyclical component of a credit category determined for the entire system. In total, the lead-lag effect was assumed to be six years, i.e. the farthest lag reaches the same quarter three years prior (column “-12” in the Tables), and the farthest lead reaches the same quarter in three years (column “12” in the Tables). Shades of blue indicate a positive correlation between the analysed components, and shades of red indicate the strength of a negative correlation. In the last column, we included the average correlations for each analysed bank, calculated across the entire lead-lag window. Additionally, in Table 2 we provide information regarding the statistical significance of each analysed sample correlation.

Among all the banks, bank 154 shows the weakest synchronisation with the system-wide cycle. The average correlation in the lead-lag window for this bank does not exceed 0.06, and the correlation coefficient between its contemporaneous cyclical component and the aggregate is zero. However, there are no other institutions that are ahead of or lagging behind the system-wide cycle apart from bank 154. For banks 102, 114, and 116, the credit cycles are most strongly correlated with the credit cycle

for the sector as a whole, with bank 102 having the highest average correlation in the entire lead-lag window. This indicates the leading role of bank 102 in creating cyclical fluctuations at the aggregated level for the whole system. The reason for this could be attributed to the share of bank 102 in the total credit portfolio for the entire Polish banking system and in individual categories. Meanwhile, smaller banks show cyclical fluctuations with high variation and non-synchronous course relative to the cycle of the entire sector.

5. Discussion and conclusions

The results indicate a differentiation of credit cycles across banks. The relatively small banking system in Poland, in relation to GDP, experiences fluctuations that vary in nature across individual banks. Over time the financial system's development has led to a decrease in the amplitude of fluctuations, which were quite material in 2001–2008, but have diminished since then. This effect is present in the overall credit aggregate and the analysis of individual banks.

The differentiation of the cycle among banks and the smoothing effect over time can be attributed to various factors, including the evolution of bank regulations (such as amendments to the CRD Directive), ownership changes in the sector, or the implementation of restructuring processes by individual banks. Furthermore, characteristics such as cycle period, change points (peaks and troughs), amplitude, and temporal dependence of cyclical components exhibit significant diversity.

The findings presented in this study have implications for macroprudential policy. The substantial heterogeneity in cyclical fluctuations within the credit dynamics of individual institutions should be considered when making decisions that affect the entire banking sector. To maintain system stability, macroprudential policy needs to account for the considerable diversity among banks.

Given the empirically observed differentiation of cyclical fluctuations, it is necessary to reconsider the monitoring approaches used. Typically macroprudential decision-making relies on tracking the cyclical component over time for the total amount of credit granted in relation to GDP (Borio, Drehmann 2009). However, the results indicate the need for a more comprehensive examination of credit cycles at different levels of aggregation, supplementing aggregate monitoring with data on individual entities.

Furthermore, microprudential policy measures targeting one bank (or a group of banks) could be as effective as macroprudential policies intended for the entire sector. While this approach can help smooth aggregated cyclical fluctuation, it carries certain risks. By focusing on one bank (or a group of banks) that determines the credit cycle of the entire sector, the state of other institutions may need to be noticed. If there are banks with different characteristics of the credit cycle compared to this bank (this group of banks), a policy exclusively tailored to the most significant entity (entities) may prove inadequate for those other institutions operating in different phases of the cycle. This mismatch could not only result in macroprudential policy ill-fitted to certain banks, but could also harm the stability of the financial system. Adopting a "leader-oriented" approach carries the risk of overlooking smaller banks in analyses. Consequently, macroprudential policy should be "tailor-made" for each bank, ensuring a customised approach.

This approach becomes particularly relevant in a low-interest rate environment, as macroprudential policy measures may negatively impact low margins. In such circumstances, neglecting the perspective

of a single bank could lead to profitability issues for that institution due to the use of macroprudential policy instruments.

The heterogeneity of banks has been identified in other studies as well. For instance, Altunbas, Binici and Gambacorta (2017) found that smaller banks with lower capitalisation, less liquidity and a high share of wholesale funding exhibit more pronounced reactions to macroprudential policy measures. These characteristics indicate that banks taking greater risks are more sensitive to macroprudential policy. These findings align with intuition, since less capitalised banks are inherently closer to capital requirements, making minor changes in these requirements more impactful. Similarly, banks with lower liquidity face greater challenges, and those more reliant on wholesale financing are perceived as riskier and have limited access to such funding, especially after the 2007–2008 crisis. The macroprudential policy may further restrict this access.

Moreover, Davis, Karim and Noel (2020) support the notion of differentiated responses among banks to macroprudential policy. They argue that the response depends on the size of the bank, with large banks experiencing smaller net interest margins (NIM) due to operating in a more competitive environment. Davis, Karim and Noel (2002) even assume that macroprudential policy predominantly affects large banks and that specific policy instruments, such as LTV, have different impacts on small and large banks.

Therefore these findings are only partially consistent with previous studies, but do confirm the thesis of the potentially varied impact of macroprudential policy on individual entities.

Svensson (2018) points out that even microprudential policy can have systemic consequences in banking sectors dominated by large institutions, as in the case of Sweden or Canada. This observation emphasises the significance of the impact of prudential policy on individual institutions and aligns with the results of our study. In the case of the Polish banking sector microprudential policy aimed at one bank (or a group of banks) may have systemic effects that should be addressed through macroprudential policy.

The heterogeneity of banks has been observed in various analyses. This study reveals that banks in Poland have their own distinct credit cycles, often independent of each other. The previous studies mentioned also highlight the heterogeneity stemming from different banks' responses to impulses. It will also be necessary to assess whether the different phases of the credit cycle among banks result from their specific characteristics, such as size, specialisation, capital equipment, etc.

Furthermore, it is worth investigating whether the relatively small and uncorrelated cyclical component resulting from individual bank cycles is unique to the Polish banking sector or a more widespread phenomenon. Svensson's (2018) research suggests that similar behaviour may be observed in banking sectors of other countries, where dominant institutions prevail. Therefore, conducting comprehensive international comparisons, contingent upon access to detailed data on individual banks could address the aforementioned reservations about implementing macroprudential policy.

Further research should also focus on the reasons for the diversification of the financial cycle in individual banks. These studies should provide an answer to the question why, at the same moment in the economic cycle, some banks prefer a certain type of loans, and other banks grant completely different loans. Banks' decisions may depend on various factors, e.g. the size, balance sheet structure, capital level, liquidity, risk assessment.

An interesting direction for further analysis is to check whether fluctuations in the dynamics of loans in individual banks, which make up the loan aggregate, have an impact on the real economy.

References

- Aghabari L., Rostom A. (2020), Are credit cycles different in the MENA countries compared to advanced countries?, *Topics in Middle Eastern and African Economies, Proceedings of Middle East Economic Association*, 22(1), http://meea.sites.luc.edu/volume22/PDFs/Aghabari_Rostom_Credit%20Cycles_%202020%20fin.pdf.
- Aikman D., Haldane A.G., Nelson B.D. (2015), Curbing the credit cycle, *The Economic Journal*, 125(585), 1072–1109, <http://www.jstor.org/stable/24737539>.
- Altunbas Y., Binici M., Gambacorta L. (2017), *Macroprudential policy and bank risk*, BIS Working Papers, 646, Bank for International Settlements, <https://www.bis.org/publ/work646.pdf>.
- BoE (2009), *The role of macroprudential policy*, A Discussion Paper, November, Bank of England, <https://www.bankofengland.co.uk/-/media/boe/files/paper/2009/the-role-of-macroprudential-policy.pdf>.
- Borio C. (2012), *The financial cycle and macroeconomics: What have we learnt?*, BIS Working Papers, 395, <https://www.bis.org/publ/work395.pdf>.
- Borio C. (2014), *Macroprudential frameworks: (too) great expectations?*, <https://www.bis.org/speeches/sp140813.htm>.
- Borio C., Drehmann M. (2009), Assessing the risk of banking crises – revisited, *BIS Quarterly Review*, March, 29–46, http://www.bis.org/publ/qtrpdf/r_qt0903e.pdf.
- Burns A.F., Mitchell W.C. (1946), *Measuring Business Cycles*, National Bureau of Economic Research.
- Cerutti E., Claessens S., Laeven L. (2017), The use and effectiveness of macroprudential policies: New evidence, *Journal of Financial Stability*, 28, 203–224.
- Chmielewski T., Sławiński A. (2010), Wykorzystywanie instrumentów nadzorczych w polityce makrostabilnościowej, *Zarządzanie Publiczne*, 13(3), 49–66.
- Claessens S., Kose M.A., Terrones M.E. (2012), How do business and financial cycles interact?, *Journal of International Economics*, 87(1), 178–190.
- Davis E.P., Karim D., Noel D. (2020), *Macroprudential policy, monetary policy and the bank interest rate margin*, NIESR Discussion Paper, 515, <https://www.niesr.ac.uk/wp-content/uploads/2021/10/DP-515-5.pdf>.
- Dell’Arriccia G., Igan D., Laeven L., Tong H. (2012), *Policies for macrofinancial stability: How to deal with credit booms*, IMF Staff Discussion Note, June, SDN/12/06, <https://www.imf.org/external/pubs/ft/sdn/2012/sdn1206.pdf>.
- Drehmann M., Borio C., Tsatsaronis K. (2012), *Characterising the financial cycle: Don’t lose sight of the medium term!*, BIS Working Papers, 380, Bank for International Settlements, <https://www.bis.org/publ/work380.pdf>.
- English W., Tsatsaronis K., Zoli E. (2005), *Assessing the predictive power of measures of financial conditions for macroeconomic variables*, BIS Papers, 22, 228–252, <https://www.bis.org/publ/bppdf/bispap22n.pdf>.
- ESRB (2014), *The ESRB Handbook on Operationalising Macro-prudential Policy in the Banking Sector*, https://www.esrb.europa.eu/pub/pdf/other/esrb.handbook_mp180115.en.pdf.
- Hahn J.-H., Mishkin F.S., Shin H.S., Shin K. (2012), *Macroprudential policies in open emerging economies*, NBER Working Paper, 17780, https://papers.ssrn.com/sol3/Delivery.cfm/nber_w17780.pdf.
- Hatzius J., Hooper P., Mishkin F., Schoenholtz K., Watson M. (2010), *Financial conditions indexes: a fresh look after the financial crisis*, NBER Working Papers, 16150, <http://www.nber.org/papers/w16150.pdf>.
- Hodrick R.J., Prescott E.C. (1997), Postwar U.S. business cycles: an empirical investigation, *Journal of Money, Credit and Banking*, 29(1), 1–16.

- IMF (2011), *Macroprudential Policy: An Organizing Framework*, International Monetary Fund, March, <http://www.imf.org/external/np/pp/eng/2011/031411a.pdf>.
- Jordá O., Schularick M., Taylor A.M. (2011), *When credit bites back: leverage, business cycles and crises*, Federal Reserve Bank of San Francisco Working Paper Series, 2011-27, <https://www.frbsf.org/economic-research/wp-content/uploads/sites/4/wp11-27bk.pdf>.
- Lenart Ł., Pipień M. (2018), Cyclical properties of the credit and production in selected European countries – a comparison of deterministic and stochastic approach, *Acta Physica Polonica*, A 133, 1371–1387.
- Minsky H.P. (1982), *Can “It” Happen Again? Essays on Instability and Finance*, Routledge.
- Minsky H.P. (1992), *The financial instability hypothesis*, Working Paper, 74, Levy Economics Institute, <http://www.levyinstitute.org/pubs/wp74.pdf>.
- NBP (2022), *Rozwój systemu finansowego w Polsce w 2021 r.*, Narodowy Bank Polski, <https://www.nbp.pl/systemfinansowy/rozwoj2021.pdf>.
- Ng T. (2011), The predictive content of financial cycle measures for output fluctuations, *BIS Quarterly Review*, June, 53–65, https://www.bis.org/publ/qtrpdf/r_qt1106g.pdf.
- Palley T.I. (2011), A theory of Minsky super-cycles and financial crises, *Contributions to Political Economy*, 30(1), June, 31–46.
- Saini S., Ahmad W., Bekiros S. (2021), Understanding the credit cycle and business cycle dynamics in India, *International Review of Economics and Finance*, 76, 988–1006.
- Schularick M., Taylor A.M. (2012), Credit booms gone bust: monetary policy, leverage cycles, and financial crises, 1870–2008, *American Economic Review*, 102(2), 1029–1061.
- Svensson L.E.O. (2018), Monetary policy and macroprudential policy: different and separate?, *Canadian Journal of Economics*, 51(3), 802–827.
- Tucker P. (2015), *Microprudential versus macroprudential supervision: functions that make sense only as part of an overall regime for financial stability*, Boston Federal Reserve Conference, 2–3 October, <https://www.bostonfed.org/macprudential2015/papers/Tucker.pdf>.
- Viñals J., Fiechter J., Pazarbasioglu C., Kodres L., Narain A., Moretti M. (2015) *Shaping the New Financial System*, IMF Staff Position Note, 3 October, SPN/10/15, <https://www.elibrary.imf.org/downloadpdf/book/9781616352295/ch02.xml>.

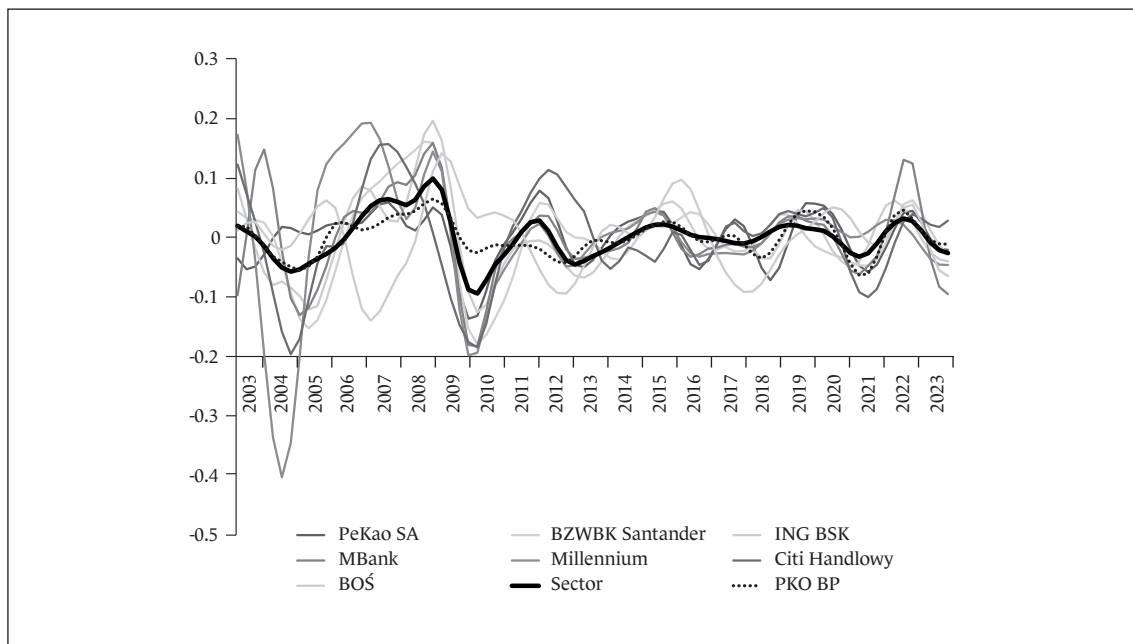
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Appendix

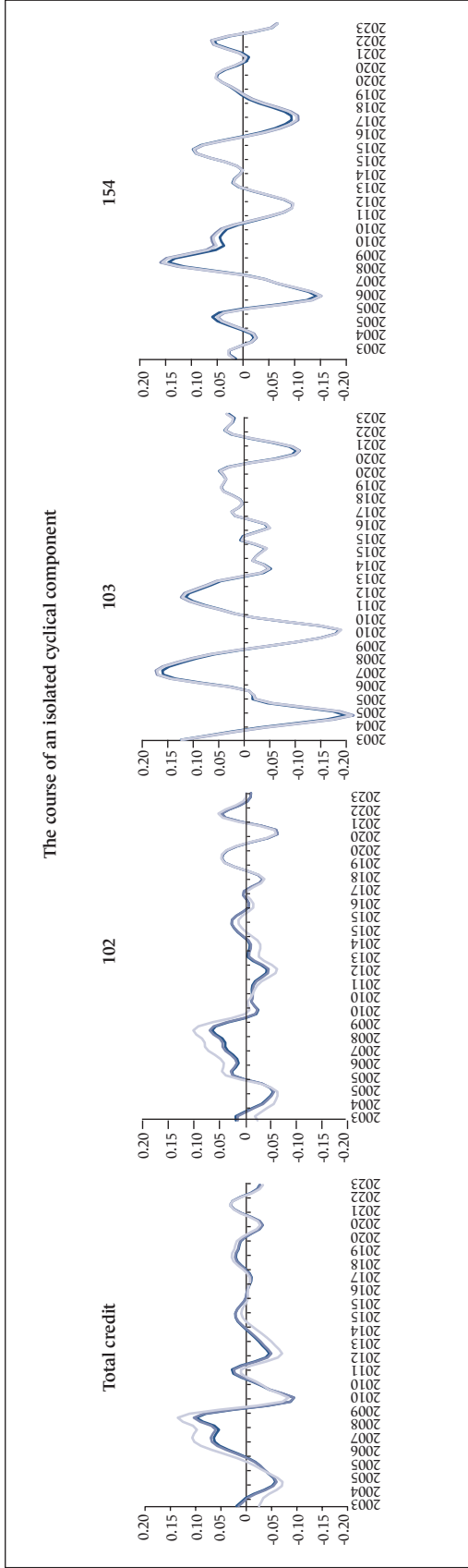
Figure 1

The cyclical components for the total credits



Source: own calculations.

Figure 2
Analysis of the cyclicity of credit aggregates for the entire sector and some selected banks



Note: we analyse three different smoothing parameter values corresponding to the cycle of periods 5, 10 and 15 years, respectively.

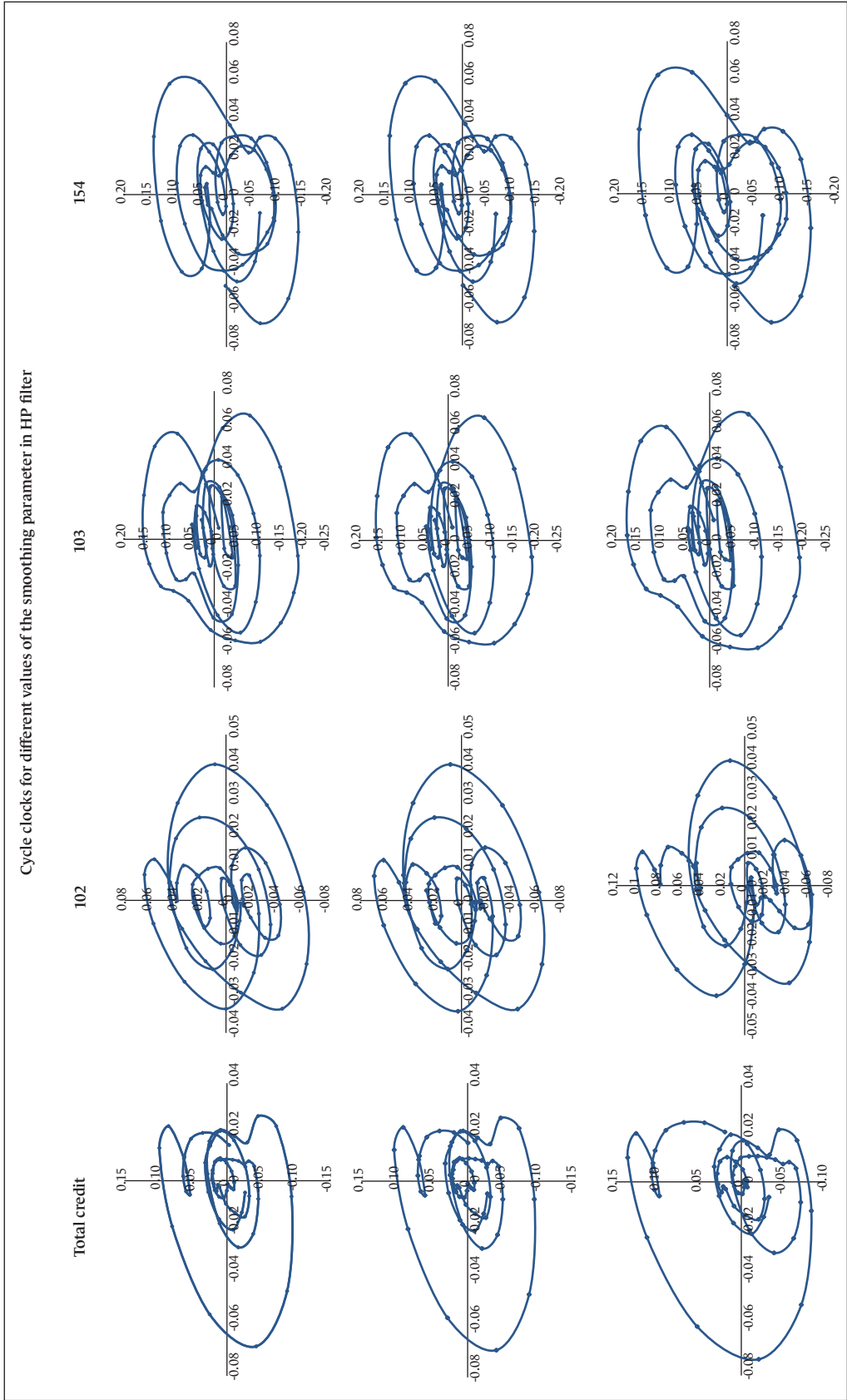


Figure 2, cont'd

Source: own calculations.

Table 1

List of analysed institutions with the scope of analysed data

Code	Name of the institution	Time span of the analysed series
102	PKO BP	Full range of data for credit aggregates: Q1 2001 – Q2 2023
103	Citi Handlowy	
105	ING BSK	
109	BZWBK/Santander	
114	mBank	
116	Millennium	
124	PeKaO SA	
154	BOS	

Table 2
Lead-lag analysis of cyclical components of the total credit of a given bank with the cyclical component of the total credit of the entire sector

0	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	Mean
102	-0.37	-0.27	-0.18	-0.10	0.00	0.11	0.24	0.37	0.50	0.62	0.74	0.83	0.88	0.89	0.85	0.79	0.73	0.67	0.61	0.54	0.47	0.40	0.34	0.27	0.20	0.41
124	-0.10	-0.03	0.02	0.05	0.10	0.16	0.23	0.30	0.37	0.46	0.56	0.65	0.67	0.58	0.40	0.18	-0.01	-0.15	-0.24	-0.27	-0.25	-0.18	-0.08	0.05	0.17	0.15
109	-0.27	-0.23	-0.20	-0.17	-0.13	-0.07	0.03	0.16	0.33	0.52	0.71	0.85	0.90	0.86	0.74	0.58	0.40	0.24	0.07	-0.07	-0.20	-0.29	-0.34	-0.35	-0.33	0.15
105	-0.47	-0.38	-0.29	-0.21	-0.14	-0.08	0.00	0.12	0.28	0.48	0.69	0.85	0.93	0.92	0.84	0.73	0.61	0.50	0.41	0.34	0.27	0.21	0.16	0.12	0.09	0.28
114	-0.20	-0.15	-0.12	-0.10	-0.06	0.02	0.14	0.29	0.46	0.64	0.80	0.92	0.96	0.91	0.78	0.63	0.49	0.39	0.31	0.24	0.17	0.13	0.13	0.17	0.22	0.33
116	-0.30	-0.19	-0.06	0.07	0.21	0.35	0.49	0.62	0.71	0.79	0.86	0.91	0.91	0.83	0.71	0.57	0.44	0.34	0.26	0.19	0.11	0.04	-0.02	-0.07	-0.12	0.35
103	-0.38	-0.41	-0.41	-0.36	-0.27	-0.15	-0.02	0.12	0.26	0.38	0.45	0.48	0.45	0.36	0.21	0.04	-0.13	-0.27	-0.38	-0.45	-0.47	-0.42	-0.31	-0.16	0.02	-0.07
154	-0.01	-0.03	-0.10	-0.19	-0.28	-0.35	-0.39	-0.41	-0.40	-0.34	-0.25	-0.13	0.00	0.11	0.20	0.28	0.37	0.45	0.52	0.55	0.54	0.48	0.39	0.28	0.18	0.06
102	***	**					*	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	**	*		-
124							*	**	***	***	***	***	***	***	***			*	*	**	*					-
109	**	*							**	***	***	***	***	***	***	***	***	*	***	***		**	**	***	**	-
105	***	***	**						**	***	***	***	***	***	***	***	***	***	***	***	**					-
114								**	***	***	***	***	***	***	***	***	***	***	**	*						-
116	**						***	***	***	***	***	***	***	***	***	***	***	**	*							-
103	***	***	***	***	**				*	***	***	***	***	***	***	***	***	**	***	***	***	***	**			-
154							***	***	***	**	*					**	***	***	***	***	***	***	***	**		-

Note: stars ***, ** and * denote significance at 0.01, 0.05 and 0.1 respectively.
Source: own calculations.

Table 3
Cycle phase markup for the entire sector and for each analysed bank

	Sect	102	124	109	105	114	116	103	154	Sect	102	124	109	105	114	116	103	154
2003-06-30	RCV	RCV	REC	REC	REC	RCV	REC	CON	EXP	RCV	REC	RCV	REC	RCV	RCV	RCV	REC	EXP
2003-09-30	RCV	RCV	REC	REC	REC	RCV	REC	CON	EXP	RCV	REC	EXP	REC	RCV	RCV	RCV	REC	EXP
2003-12-31	RCV	REC	RCV	RCV	REC	EXP	REC	REC	EXP	RCV	REC	EXP	REC	RCV	RCV	RCV	RCV	CON
2004-03-31	REC	REC	RCV	RCV	REC	EXP	REC	REC	REC	RCV	RCV	EXP	RCV	RCV	RCV	RCV	RCV	CON
2004-06-30	REC	REC	RCV	REC	REC	CON	REC	REC	REC	RCV	RCV	EXP	RCV	RCV	RCV	RCV	REC	REC
2004-09-30	REC	RCV	RCV	REC	RCV	REC	REC	REC	REC	RCV	RCV	EXP	RCV	EXP	RCV	RCV	REC	EXP
2004-12-31	RCV	RCV	RCV	REC	RCV	REC	RCV	REC	RCV	RCV	RCV	EXP	EXP	RCV	RCV	RCV	REC	EXP
2005-03-31	RCV	RCV	RCV	REC	RCV	REC	RCV	RCV	RCV	RCV	RCV	CON	EXP	EXP	REC	REC	RCV	EXP
2005-06-30	RCV	RCV	EXP	REC	REC	RCV	RCV	RCV	EXP	REC	RCV	CON	EXP	EXP	REC	REC	EXP	EXP
2005-09-30	RCV	RCV	EXP	EXP	RCV	RCV	EXP	RCV	EXP	REC	REC	REC	EXP	CON	REC	REC	CON	EXP
2005-12-31	RCV	EXP	EXP	RCV	RCV	RCV	EXP	RCV	EXP	REC	REC	REC	EXP	CON	REC	REC	REC	CON
2006-03-31	EXP	EXP	EXP	RCV	RCV	EXP	EXP	RCV	CON	REC	REC	REC	CON	REC	RCV	REC	REC	CON
2006-06-30	EXP	EXP	EXP	EXP	EXP	EXP	EXP	RCV	REC	RCV	RCV	RCV	CON	REC	RCV	RCV	RCV	REC
2006-09-30	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	REC	RCV	RCV	RCV	REC	REC	RCV	RCV	RCV	REC
2006-12-31	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	REC	RCV	RCV	EXP	REC	RCV	RCV	RCV	EXP	REC
2007-03-31	EXP	EXP	EXP	EXP	EXP	EXP	EXP	EXP	REC	RCV	RCV	EXP	REC	RCV	RCV	RCV	EXP	REC
2007-06-30	EXP	EXP	EXP	EXP	CON	EXP	CON	EXP	RCV	RCV	REC	CON	RCV	REC	RCV	RCV	CON	REC
2007-09-30	EXP	EXP	EXP	EXP	CON	EXP	CON	EXP	RCV	RCV	REC	REC	RCV	REC	RCV	RCV	CON	RCV
2007-12-31	CON	EXP	CON	EXP	EXP	EXP	CON	CON	RCV	EXP	REC	REC	RCV	REC	RCV	RCV	EXP	RCV
2008-03-31	CON	EXP	CON	EXP	EXP	CON	CON	CON	RCV	EXP	RCV	REC	EXP	RCV	RCV	EXP	EXP	RCV
2008-06-30	EXP	EXP	CON	EXP	EXP	EXP	EXP	CON	EXP	RCV	RCV	RCV	EXP	RCV	EXP	EXP	EXP	RCV
2008-09-30	EXP	EXP	EXP	EXP	EXP	EXP	EXP	CON	EXP	RCV	RCV	RCV	CON	EXP	EXP	EXP	EXP	RCV
2008-12-31	EXP	EXP	EXP	CON	EXP	EXP	EXP	CON	EXP	EXP	EXP	EXP	CON	EXP	EXP	EXP	CON	RCV
2009-03-31	CON	CON	CON	CON	CON	CON	CON	REC	EXP	EXP	EXP	EXP	REC	CON	CON	EXP	CON	EXP
2009-06-30	CON	CON	CON	CON	CON	CON	CON	REC	CON	EXP	EXP	EXP	REC	CON	CON	EXP	CON	EXP
2009-09-30	CON	CON	REC	REC	CON	REC	REC	REC	CON	CON	CON	CON	REC	REC	EXP	CON	EXP	EXP

Table 3, cont'd

	Sect	102	124	109	105	114	116	103	154		Sect	102	124	109	105	114	116	103	154
2009-12-31	REC	CON	REC	REC	REC	REC	REC	REC	CON	2020-03-31	CON	CON	CON	REC	REC	CON	CON	CON	EXP
2010-03-31	REC	CON	RCV	REC	REC	REC	REC	REC	CON	2020-06-30	REC	REC	CON	REC	REC	REC	CON	REC	CON
2010-06-30	RCV	EXP	RCV	RCV	RCV	RCV	RCV	RCV	EXP	2020-09-30	REC	REC	EXP	REC	REC	REC	CON	REC	CON
2010-09-30	RCV	CON	RCV	RCV	RCV	RCV	RCV	RCV	EXP	2020-12-31	REC	REC	EXP	REC	RCV	REC	CON	REC	CON
2010-12-31	RCV	CON	RCV	RCV	RCV	EXP	RCV	RCV	CON	2021-03-31	RCV	RCV	CON	RCV	RCV	RCV	EXP	REC	REC
2011-03-31	RCV	REC	EXP	RCV	EXP	EXP	RCV	EXP	CON	2021-06-30	RCV	RCV	CON	RCV	EXP	RCV	EXP	RCV	REC
2011-06-30	EXP	REC	EXP	RCV	EXP	EXP	RCV	EXP	CON	2021-09-30	EXP	EXP	CON	RCV	EXP	EXP	EXP	RCV	EXP
2011-09-30	EXP	REC	EXP	EXP	CON	EXP	RCV	EXP	REC	2021-12-31	EXP	EXP	REC	EXP	EXP	EXP	CON	RCV	EXP
2011-12-31	CON	REC	EXP	EXP	REC	EXP	RCV	EXP	REC	2022-03-31	EXP	EXP	REC	EXP	CON	EXP	CON	EXP	EXP
2012-03-31	REC	REC	CON	CON	REC	CON	REC	EXP	REC	2022-06-30	CON	CON	REC	EXP	CON	CON	CON	EXP	EXP
2012-06-30	REC	REC	CON	CON	REC	REC	REC	CON	REC	2022-09-30	CON	CON	REC	CON	REC	CON	REC	CON	CON
2012-09-30	REC	REC	REC	REC	REC	REC	REC	CON	REC	2022-12-31	REC	CON	REC	CON	REC	REC	REC	CON	REC
2012-12-31	REC	RCV	REC	REC	REC	REC	REC	CON	RCV	2023-03-31	REC	CON	REC	CON	REC	REC	REC	CON	REC
2013-03-31	RCV	RCV	REC	REC	REC	REC	RCV	CON	RCV	2023-06-30	REC	EXP	REC	REC	REC	REC	REC	EXP	REC
2013-06-30	RCV	RCV	RCV	REC	RCV	RCV	RCV	CON	RCV										

Note: REC, RCV, EXP and CON exhibit phases of recession, recovery, expansion and contraction, respectively.

Source: own calculations.

Czy cykl kredytowy istnieje? Analizy empiryczne polskiego sektora bankowego i rekomendacje dla polityki makroostrożnościowej

Streszczenie

Polityka makroostrożnościowa jest stosunkowo młodą dyscypliną wiedzy, szczególnie na tle ustabilizowanych poglądów dotyczących roli i zakresu działania polityki pieniężnej. Zainteresowanie nią znacznie wzrosło po wybuchu kryzysu finansowego w 2007 r., gdy konieczne stało się spojrzenie na system finansowy jako całość, uwzględniające cykl finansowy i interakcje między instytucjami finansowymi, zamiast skupiania się na pojedynczych podmiotach.

Celami polityki makroostrożnościowej są: zapobieganie powstawaniu ryzyka systemowego, wygładzanie cyklu finansowego i pośrednio redukcja wahań PKB. Pomimo istotnej roli wahań cyklicznych obserwowanych w systemie finansowym literatura nie wypracowała formalnej definicji tego rodzaju fluktuacji. Przyjmuje się, że cykl finansowy jest skutkiem istnienia interakcji pomiędzy percepcją wartości i ryzyka, skłonnością do ryzyka i ograniczeniami w dostępie do finansowania. Interakcje te mogą mieć cykliczne efekty w postaci silnych wzrostów i spadków aktywności instytucji finansowych. Może to z kolei oddziaływać procyklicznie na koniunkturę i powodować nierównowagę makroekonomiczną oraz problemy finansowe podmiotów.

Głównym kierunkiem w analizach cyklu finansowego stały się badania nad naturą cyklu kredytowego. Opublikowane na przełomie lat 80. i 90. XX w. prace Hymana Minsky'ego stanowiły podbudowę teoretyczną zjawiska cykliczności w kredycie. Pierwotnie analizy cech cyklu kredytowego i jego interakcji z cyklem koniunkturalnym dotyczyły kredytu jako agregatu. W badaniach zwracano uwagę na znaczne zróżnicowanie okresu cyklu i amplitudy w różnych krajach. W gospodarkach rozwiniętych cykl kredytowy miał dłuższy okres i mniejszą amplitudę niż w gospodarkach rozwijających się. W przypadku dużych gospodarek z rozwiniętym systemem finansowym cykl kredytowy jest też silniej zsynchronizowany z cyklem koniunkturalnym niż w przypadku gospodarek rozwijających się. Dotychczasowe analizy empirycznych własności cyklu kredytowego nie doprowadziły do konkluzji w postaci określenia ugruntowanych i uniwersalnych cech tego cyklu, tak jak stało się w przypadku analiz cykli koniunkturalnych wiele dekad temu.

Naturalnym krokiem wydaje się podjęcie analiz cykli kredytowych w ujęciu zdezagregowanym. Celem niniejszego artykułu jest uzyskanie informacji o empirycznych cechach cyklu kredytowego w podziale na poszczególne banki działające w Polsce. Wyniki mogą dostarczyć informacji ważnych dla prowadzenia polityki makroostrożnościowej, skoncentrowanej na wygładzaniu cyklu kredytowego na poziomie zagregowanym. W przypadku małych sektorów bankowych, gdzie istotną rolę odgrywa niewielka liczba instytucji, cykl kredytowy może mieć bowiem charakter cyklu pozornego, jako agregat luźno związanych ze sobą fluktuacji cyklicznych, generowanych przez poszczególne banki.

Zaprezentowane w niniejszym artykule rezultaty wskazują na zróżnicowanie cykli kredytowych w polskich bankach. Nasz relatywnie mały system bankowy (w stosunku do PKB) podlega fluktuacjom,

na które składają się wahania aktywności poszczególnych banków mające różną naturę. W miarę rozwoju systemu finansowego amplituda wahań maleje, a ostatnio uległa wygaszeniu.

Heterogeniczność fluktuacji cyklicznych w dynamice kredytów poszczególnych instytucji nie może być pomijana w decyzjach dotyczących całego sektora bankowego. Polityka makroostrożnościowa powinna uwzględniać to zróżnicowanie podmiotów sektora bankowego.

Słowa kluczowe: cykl kredytowy, polityka makroostrożnościowa, sektor bankowy, filtr HP, analiza wyprzedzeń/opóźnień