

*Dorota Skąła\**

## **BANK PERFORMANCE AND LOCAL ECONOMIC CONDITIONS. ARE POLISH COOPERATIVE BANKS VULNERABLE TO REGIONAL DOWNTURNS?**

### **1. INTRODUCTION**

The serious problems experienced in 2014 by some Polish credit unions ('SKOK') raise questions about the stability of the Polish small financial institutions sector. Credit unions, which are not banks and not subject to Polish banking law, are likely to experience further distress due to their undercapitalisation (KNF 2014a). On the other hand, the Polish cooperative banking sector is very robust, with strong profitability, a solid client base and high capital adequacy ratios (KNF 2014b).

Polish cooperative banks are relatively small and strongly linked to their local environments. This has positive implications for their lean structures, capacity to adapt to changing conditions and in-depth client knowledge. On the other hand, their activities are heavily concentrated on lending to local clients and a deterioration in their core regions may strongly affect their performance. Despite the strong macroeconomic indicators reported at a national level in Poland, significant regional differences emerge. The aim of our paper is to assess whether cooperative banks are vulnerable to changes in their local economies. As far as we know, this is the first empirical analysis that links cooperative bank performance

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\* Dorota Skąła is an Assistant Professor at the Department of Finance, WNEiZ, University of Szczecin.

and growth to regional economic conditions. If such a relation exists, it has strong policy implications. National supervisors should account not only of scenarios of general macroeconomic turndowns, but should take into consideration regional downturns that may affect probabilities of default by cooperative banks. The structure of the paper is as follows: we start with a brief literature review, which is followed by a description of our methodology and data. We then present estimation results and discussion, and conclude.

## **2. LITERATURE REVIEW**

The financial crisis of 2007–2009 has stimulated a discussion of ideal banking models and some authors underline the importance of simple, small-scale banking (Vallascas and Keasey, 2012). Poland represents the largest banking sector in Central Europe, but it is strongly dominated by a few large commercial banks. The five largest banks represented 46% of total Polish banking sector assets at the end of 2013 (KNF, 2015). As a result, the Polish cooperative sector with just under 7% of total assets is rarely studied, especially in empirical analyses, including individual bank data. This is also possibly due to problems with accessing financial data, as – in contrast to Western European counterparts – Polish cooperative banks are not included in commercial bank data products, such as Bankscope<sup>1</sup>. Miklaszewska and Kil (2014) provide a description of recent developments in average profitability of Polish cooperative banks, while Szambelańczyk (2006) provides the most comprehensive study of the Polish cooperative banking sector.

Among international samples, Fiordelisi and Mare (2014) perform a comprehensive study on c. 2,500 cooperative banks from five EU countries encompassing the period 1998–2009, and find a positive effect of competition on bank stability. Market power has a negative effect on bank soundness, which also persists during the financial crisis. On the other hand, they find that homogeneity in the cooperative banking sector enhances bank soundness. Expansion into non-traditional banking activities, such as non-interest income activities, could lead to higher insolvency risk.

An analysis of Italian cooperative banks between 1997 and 2009 performed by Fiordelisi and Mare (2013) emphasises that more efficient banks have a higher probability of survival. More skilful managers who succeed in minimising costs, maximising revenues and maximising profits increase banks' survival time. In addition, traditional financial ratios may be used to predict bank distress in the cooperative sector. Thus, profitability has strong implications for future defaults

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<sup>1</sup> Bankscope only includes 3 Polish cooperative banks, including BGZ (which is in fact a commercial bank), BPS (an associating bank) and one other cooperative bank.

and the analysis that follows in our paper allows more light to be shed on the fragility of the cooperative sector in Poland.

Hesse and Cihak (2007) provide evidence that cooperative banks had lower insolvency risk than commercial and savings banks in the 1994–2004 period for 29 OECD countries. This is mainly due to the lower volatility of returns of cooperative banks, which offsets their lower capitalisation and profitability. They also find that larger banks are more stable in general. Cooperative banks' stability is positively related to higher diversity in their activities, in contrast to commercial banks, where diversity is already high so further increases in diversification lead to lower stability. They also find that cooperative banks undercharge for loans, compared to commercial banks.

Goddard et al. (2008a) analyses the effects of diversification in activities of US credit unions and finds two primary effects. On one hand, returns from non-interest activities are higher, but on the other hand more diversified credit unions have lower returns than more specialised institutions. The second effect seems to dominate, especially for smaller credit unions that do not have the expertise or scale to benefit from non-core products. The largest institutions may, however, benefit from diversification. In addition, he finds that larger credit unions have higher returns, both adjusted and unadjusted for risk. In addition, the volatility of these returns is lower. Higher capital rates are positively related to risk-adjusted profitability. Goddard et al. (2008b) indicate that individual credit unions' policies are more important in explaining performance diversification than sector effects. De Jonghe (2010) finds that banks with higher non-interest income have more risk. Small and better capitalised banks are better able to face adverse economic conditions.

Closely related to our paper is an analysis by Furlong and Krainer (2007), who study the link between commercial banks and the economic conditions of markets on which they operate. They find a significant relation between regional economic shocks and bank performance. In addition, they find that shocks tend to bring out dispersions in bank performance, due to the differing degrees of exposure to local economies that these banks experience. In a related study of community banks, Yeager (2004) finds that economic shocks in the form of unemployment rate changes do not significantly affect the performance of banks located in the areas where such shifts take place. We verify whether the regional economic environment affects the performance and growth of Polish cooperative banks, which may allow policy conclusions to be drawn for the national supervisors. The issue is also important for cooperative banks themselves, as according to a study by Miklaszewska and Kil (2014) cooperative banks believe that their greatest vulnerability lies in credit risk and originates from possible macroeconomic deterioration.

### 3. METHODOLOGY AND DATA

The main aim of this paper is to study the relationship between cooperative bank performance and growth, and the local macroeconomic environment in which these banks operate. Our bank sample includes 365 cooperative banks, associated under one associating bank, so the group is homogenous with regards to ‘internal’ reporting and supervising standards, as well as intra-group funding possibilities<sup>2</sup>. The sample includes data for the period between 2008–2012<sup>3</sup>. We match the bank dataset with Polish Statistical Office (GUS) data on regions (*Local Data Bank*). The activities of Polish cooperative banks are concentrated in their core regions and they were initially only allowed to carry out transactions with clients from the districts (‘poviats’) where those banks were headquartered. Current regulations allow larger banks to broaden their activities to regions (‘voivodships’) and the largest banks to extend nationwide (Act on cooperative banks, their association and associating banks 2000). However, we assume that poviats are the main areas of activity for cooperative banks and they are most affected by economic developments in their local communities.

In order to assess the relation between bank profitability and local macroeconomic environment, we calculate the following equation:

$$\begin{aligned} \text{Bank profitability}_{i,t,j} = & \alpha + \beta_1 \text{Local macroeconomic environment}_{j,t} + \\ & + \beta_2 \text{Bank control variables}_{i,t} + v_i + \varepsilon_{i,t} \end{aligned} \quad (1)$$

Equation 1 is a static panel data approach, with fixed effects of  $v_i$  that are unchanged for every bank and may represent such unobserved bank characteristics as corporate culture, client services etc.  $\varepsilon$  is the random error. Subscript  $i$  represents bank,  $t$  – the year and  $j$  – the poviat.

The dependent variable is bank profitability, represented by a few measures. The main profitability measure is return on assets, ROA, which is the relation of bank net income to total assets. However, net income does not always fully reflect underlying bank profitability, due to the phenomenon of income smoothing (see e.g. Bouvatier et al. 2014). Within income smoothing, banks use loan loss provisions to smooth their bottom line by making higher reserves when income is strong and diminishing provisions when earnings suffer. Thus we also use the ratio of operating income to assets (OROA), which includes pre-provisioning income instead of net income. The third profitability ratio is net interest margin (NIM),

<sup>2</sup> Our dataset covers around two thirds of the total cooperative bank population in Poland. We believe this is fairly representative of the whole sector.

<sup>3</sup> The anonymised bank data was received from Bank Polskiej Spółdzielczości. The author is very grateful to BPS for help in compiling the dataset.

which is the ratio of net interest income to total assets. The cost-income ratio indicates the ability of a bank to maintain a lean cost structure and may also be related to local macroeconomic conditions. In more challenging environments, banks may have to invest more heavily in credit risk assessment systems and attract higher quality and better paid staff. Last but not least, we study future profitability perspectives for banks, which we proxy through bank growth (*Asset growth*). Banks experiencing obstacles in their expansion rates are less likely to bring significant benefits in the form of strong profitability in the future.

*Local macroeconomic environment* is symbolised by the level of registered year-end unemployment in poviats. Alternatively, we also use unemployment growth to verify how changes in economic conditions affect the performance and growth of cooperative banks. In cross-country comparisons, the main macroeconomic proxy is usually the level of GDP per capita or GDP growth. However, no such indicators are available for poviats. Changes in unemployment reflect a worsening or improvement of economic perspectives for the local population and SMEs, both of which form the bulk of cooperative bank clientele.

*Bank control variables* include a few conventionally used indicators that reflect the business model of a bank. They consist of bank size (natural logarithm of total assets), the share of fees in total operating income, the share of loans in total assets and deposits to assets ratios. We do not use any winsorising or centile exclusions, as there are no significant outliers in the sample. The only cut-off point is the 1 and 99 centile exclusion applied to the variable *Asset growth*, to exclude large mergers or acquisitions. Descriptive statistics of the main variables are displayed in Table 1, while Table 2 shows the correlation results.

All three profitability ratios are positively correlated, so higher net interest margins and pre-provisioning income translate to higher net income, despite the existence of income smoothing. The relation between ROA and bank asset growth is also positive, indicating that banks with a stronger expansion potential attain higher returns. Banks with a lean cost structure achieve better return on assets, but also have a higher interest margin and a more dynamic rate of growth.

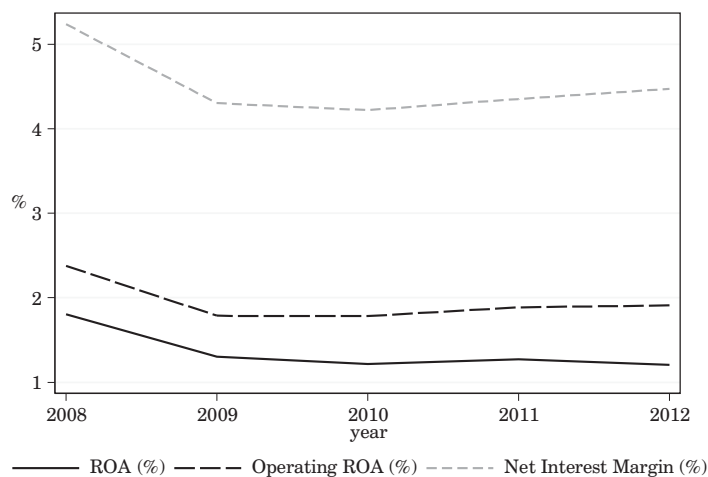
We illustrate the main trends in profitability and growth of the banks in our sample between 2008–2012 in Figures 1–5. Average profitability of the cooperative sector is shown in Figure 1. A sharp decrease in net interest margin experienced in 2009 led to a drop in overall profitability in the same period. Although margins and pre-provisioning profitability picked up in 2010, this has not fully translated to an increase in ROA by the end of 2012. A partial explanation of this is presented in Figure 2, which shows the average bank size and level of average unemployment in the period studied.

**Table 1. Descriptive statistics of main variables**

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	2143	1.382	0.641	-5.238	4.590
OROA	2097	1.952	0.728	-0.523	9.205
NIM	2143	4.543	0.896	2.356	8.442
Cost income	2508	64.242	9.436	34.205	100.393
Asset growth	1782	10.621	9.465	-38.198	81.079
Loans/assets	2151	87.337	12.887	16.634	97.977
Deposits/assets	2116	83.556	6.100	0.000	94.609
Fee share	2500	25.396	6.628	-2.548	58.865
Size	2151	18.112	0.847	16.191	21.528
Unemployment	2202	13.855	5.104	1.900	33.800

*Notes:* ROA is the relation of net income to total assets in year  $t$ , OROA is the relation of pre-provisioning income to total assets in year  $t$ , NIM is the relation of net interest income to total assets in year  $t$ , Cost income is the relation of non-operating expenses to operating revenues in year  $t$ , Asset growth is the rate of growth of total assets between year  $t-1$  and  $t$ , Unemployment is the year-end rate of registered unemployment in poviat  $j$ , Loans/assets are total loans to total assets in year  $t$ , Deposits/assets are total deposits to total assets in year  $t$ , Fee share is the share of net fees in total operating income, Size is the natural logarithm of total assets.

**Figure 1. Average bank profitability: ROA, operating ROA and NIM between 2008–2012**



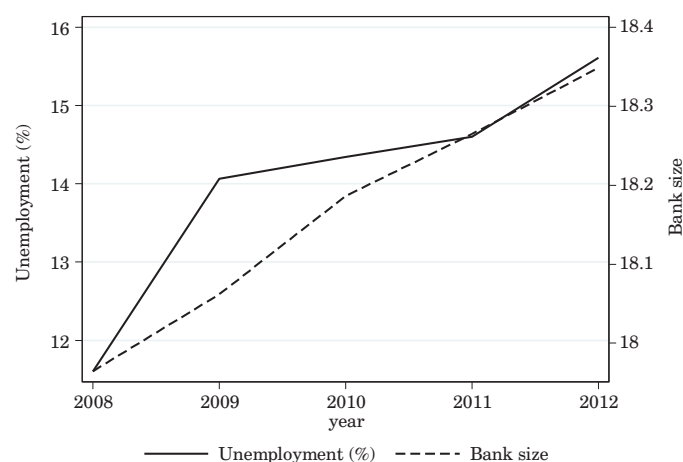
Notes: own calculations

Table 2. Correlation table for the main variables

	ROA	OROA	NIM	Cost income	Asset growth	Loans/assets	Deposits/assets	Fee share	Size	Unemployment
ROA	1									
OROA	0.7563*	1								
NIM	0.5043*	0.5950*	1							
Cost income	-0.6006*	-0.7499*	-0.1309*	1						
Asset growth	0.0703*	0.0467	-0.1418*	-0.1997*	1					
Loans/assets	0.1158*	0.0916*	0.0259	-0.1455*	0.0257	1				
Deposits/assets	-0.4596*	-0.5144*	-0.4958*	0.2947*	0.1532*	-0.0446	1			
Fee share	-0.2589*	-0.3661*	-0.2761*	0.4683*	-0.0538	-0.1508*	0.1618*	1		
Size	-0.3478*	-0.3059*	-0.5504*	0.0435	0.1663*	-0.0719*	0.6476*	-0.0058	1	
Unemployment	-0.0023	-0.0133	0.0578	0.0705*	-0.0957*	0.1118*	-0.0707*	0.1680*	-0.1031*	1

Notes: ROA is the relation of net income to total assets in year  $t$ , OROA is the relation of pre-provisioning income to total assets in year  $t$ , NIM is the relation of net interest income to total assets in year  $t$ , Cost income is the relation of non-operating expenses to operating revenues in year  $t$ , Asset growth is the rate of growth of total assets between year  $t-1$  and  $t$ , Unemployment is the year-end rate of registered unemployment in poviat  $j$ , Loans/assets are total loans to total assets in year  $t$ , Deposits/assets are total deposits to total assets in year  $t$ , Fee share is the share of net fees in total operating income, Size is the natural logarithm of total assets. \* corresponds to a significance level of 0.1.

**Figure 2. Average unemployment in poviats and bank size between 2008–2012**



Notes: own calculations

The consistent growth in unemployment levels that started with a steep rise in 2009 has not been accompanied by stagnation in bank growth in the cooperative sector. Despite weak labour market conditions, cooperative banks have continuously expanded their activities. In addition, ROA and NIM levels remain very high in relation to commercial bank standards, even if average unemployment levels seem to have hindered profitability growth within the cooperative sector.

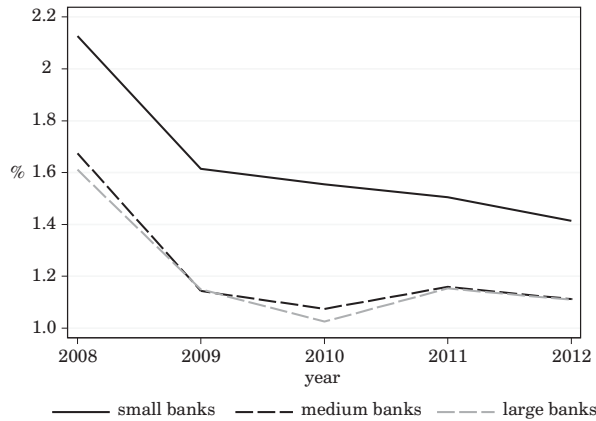
In order to assess the effect of macroeconomic changes on bank profitability and growth in more detail, we introduce three subsamples of banks, divided by size. Banks with an average size (per total period) under the 33 percentile are classified as small, between 33 and 66 percentile as medium and above 66 percentile as large. Figure 3 displays the differences in average performance between the subsamples.

Small banks consistently displayed the highest profitability throughout the sample period, massively exceeding average ROA of medium and large banks by approx. 0.3–0.4 p.p. This may be partly due to the elevated net interest margin attained by small banks, shown in Figure 4.

The level of NIM seems to be strongly related to bank size, which is visible in the correlation results in both Table 2 and Figure 4. The business model of the largest cooperative banks is much closer to that of commercial banks and their interest margins also converge. Last but not least, it is possible that small banks function in different macroeconomic environments than large institutions. In order to illustrate this, we display the average unemployment levels for the three subgroups in Figure 5.

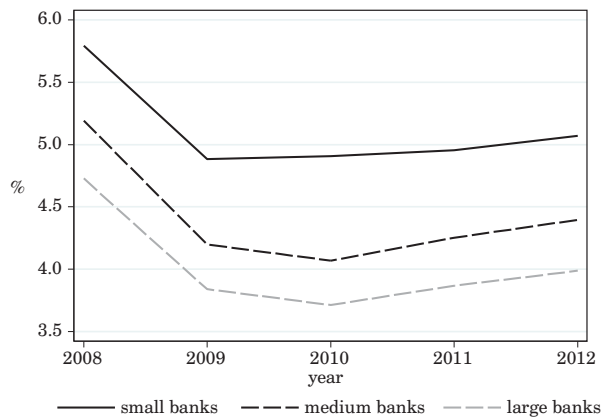


**Figure 3. Average ROA in subgroups of small, medium and large banks, between 2008–2012**



Notes: own calculations

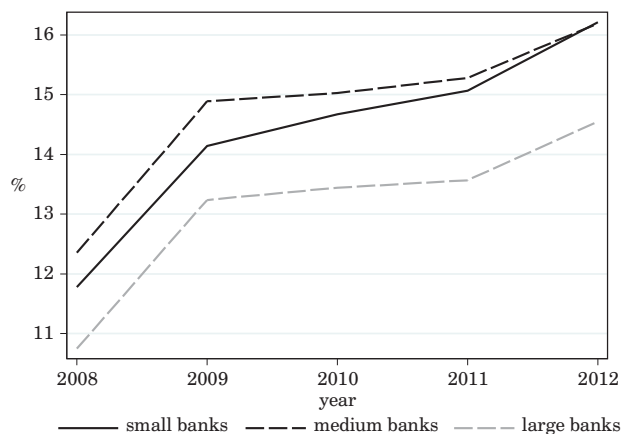
**Figure 4. Average NIM in subgroups of small, medium and large banks, between 2008–2012**



Notes: own calculations

Large banks are based in the areas with the lowest unemployment levels, in comparison to medium and small banks, so their operating environment should enhance their profitability levels and growth ratios. Correlation results and the analysis of means seem to contradict this conclusion, as it is the smallest banks that report the highest average profitability. These differences indicate that it is important to include subgroup estimations in our analyses, in addition to the total sample treatment.

**Figure 5. Average unemployment rate in poviats for small, medium and large banks between 2008–2012**



Notes: own calculations

#### 4. EMPIRICAL RESULTS

Results of estimation of equation 1 are presented in Table 3. These results confirm that cooperative bank performance is strongly linked to the economic situation of the poviats where banks are headquartered. Higher unemployment is related to lower interest margins and lower pre-provisioning results, which translate into decreased profitability at the net income level. All coefficients for these profitability ratios are negative and strongly significant, an effect which persists even after including or excluding some control variables (not shown).

Costs are higher in banks situated in regions with labour market problems and this may stem from the higher expense of seeking out less risky customers and performing a more meticulous credit risk assessment, in terms of systems and high quality staff. Higher unemployment limits the expansion opportunities for cooperative banks, visible in the negative relation between asset growth and unemployment.

Coefficients of the control variables confirm the tentative results based on the mean analysis and correlations. There is a negative relation between bank size and profitability, expressed as the net interest margin and operating or regular ROA. On the other hand, the relation between size and cost efficiency is statistically insignificant, indicating that smaller banks are not necessarily better cost controllers. In addition, larger banks have better growth possibilities and they manage to expand their activities, which is visible through the positive relation between size and asset growth.

**Table 3. Bank profitability and growth versus local economic environment between 2008–2012**

	ROA	OROA	NIM	Cost income	Asset growth
	-1	-2	-3	-4	-5
Unemployment	-0.0489***	-0.0393***	-0.0400***	0.5409***	-1.3333***
	[0.008]	[0.008]	[0.006]	[0.077]	[0.157]
Loans/assets	0.0021	-0.0009	-0.0001	0.0187	-0.0256
	[0.001]	[0.001]	[0.001]	[0.013]	[0.026]
Deposits/assets	-0.0134*	-0.0162***	-0.0349***	0.0961	1.2380***
	[0.007]	[0.006]	[0.005]	[0.062]	[0.126]
Fee share	-0.0533***	-0.0830***	-0.1395***	0.7573***	0.2000**
	[0.005]	[0.004]	[0.003]	[0.042]	[0.085]
Size	-1.0064***	-0.9484***	-2.0499***	-0.383	6.3779***
	[0.101]	[0.091]	[0.072]	[0.914]	[1.863]
Constant	22.6200***	23.2873***	48.8062***	34.6714**	-193.0554***
	[1.700]	[1.537]	[1.217]	[15.433]	[31.458]
No_of_obs	1726	1708	1726	1726	1726
No of banks	365	364	365	365	365
R-Squared	0.2627	0.3532	0.7224	0.2683	0.1394

*Notes:* ROA is the relation of net income to total assets in year  $t$ , OROA is the relation of pre-provisioning income to total assets in year  $t$ , NIM is the relation of net interest income to total assets in year  $t$ , Cost income is the relation of non-operating expenses to operating revenues in year  $t$ , Asset growth is the rate of growth of total assets between year  $t-1$  and  $t$ , Unemployment is the year-end rate of registered unemployment in poviat  $j$ , Loans/assets are total loans to total assets in year  $t$ , Deposits/assets are total deposits to total assets in year  $t$ , Fee share is the share of net fees in total operating income, Size is the natural logarithm of total assets. \*, \*\* and \*\*\* correspond to significance levels of 0.1, 0.05 and 0.01 respectively. Standard errors are given in brackets.

Cooperative bank profitability is linked to its funding structure: a higher share of deposits in assets implies weaker results. This is due to the cost of attracting the savings necessary to expand loan activities. On the other hand, banks with higher deposits grow more rapidly and may see their profitability increase in the future. The share of loans in total assets does not determine profits or bank expansion.

As the share of loans and share of deposits may be interrelated, we exclude the share of deposits from the estimation and results for loan to assets ratios remain unchanged (not shown). In order to assess the adjustment of profitability in reaction to changes in local unemployment levels, we re-estimate Equation 1 and replace unemployment levels with annual unemployment growth. The results

are shown in Table 4. The main results are sustained, with the same signs and statistical significance of coefficients of similar magnitude.

Results from the main estimation indicate that cooperative banks are sensitive to changes in the local economic environment. At the same time, profitability depends on bank size, so there is a possibility that differently sized banks react differently to economic developments in their local environment. In order to study this in more detail, we re-estimate equation 1 on the three subsamples defined in the previous section. The results for the main profitability indicators ROA, OROA and NIM are shown in Table 5, while cost income and asset growth are depicted in Table 6.

**Table 4. Bank profitability and growth versus local economic environment between 2008–2012 (including unemployment growth)**

	ROA	OROA	NIM	Cost income	Asset growth
	-1	-2	-3	-4	-5
Unemployment growth	-0.3586***	-0.3772***	-0.3786***	5.4249***	-10.9037***
	[0.071]	[0.064]	[0.051]	[0.641]	[1.318]
Loans/assets	0.0021	-0.001	-0.0001	0.0181	-0.0242
	[0.001]	[0.001]	[0.001]	[0.013]	[0.026]
Deposits/assets	-0.009	-0.0140**	-0.0322***	0.0626	1.3461***
	[0.007]	[0.006]	[0.005]	[0.061]	[0.125]
Fee share	-0.0499***	-0.0778***	-0.1343***	0.6791***	0.3236***
	[0.005]	[0.004]	[0.003]	[0.044]	[0.090]
Size	-1.2922***	-1.1506***	-2.2593***	2.3565***	-1.096
	[0.077]	[0.070]	[0.055]	[0.696]	[1.431]
Constant	26.6874***	26.1162***	51.7064***	-2.9378	-87.7368***
	[1.408]	[1.265]	[1.001]	[12.650]	[26.023]
No. of obs.	1726	1708	1726	1726	1726
No. of banks	365	364	365	365	365
R-Squared	0.2585	0.3572	0.7249	0.2798	0.1372

*Notes:* ROA is the relation of net income to total assets in year  $t$ , OROA is the relation of pre-provisioning income to total assets in year  $t$ , NIM is the relation of net interest income to total assets in year  $t$ , Cost income is the relation of non-operating expenses to operating revenues in year  $t$ , Asset growth is the rate of growth of total assets between year  $t-1$  and  $t$ , Unemployment growth is the rate of growth in year-end rate of registered unemployment in poviats  $j$ , Loans/assets are total loans to total assets in year  $t$ , Deposits/assets are total deposits to total assets in year  $t$ , Fee share is the share of net fees in total operating income, Size is the natural logarithm of total assets. \*, \*\* and \*\*\* correspond to significance levels of 0.1, 0.05 and 0.01 respectively. Standard errors are given in brackets.

**Table 5. Bank profitability measures versus local macroeconomic environment – estimation results on subsamples of small, medium-size and large banks, between 2008–2012**

	ROA small banks	ROA medium banks	ROA large banks	OROA small banks	OROA medium banks	OROA large banks	NIM small banks	NIM medium banks	NIM large banks
	-1	-2	-3	-4	-5	-6	-7	-8	-9
Unemploy- ment	-0.0416*** [0.014]	-0.0359** [0.015]	-0.0425*** [0.016]	-0.0244* [0.014]	-0.0274* [0.014]	-0.0406*** [0.012]	-0.0397*** [0.012]	-0.0284*** [0.010]	-0.0286*** [0.010]
Loans/assets	0.0023 [0.002]	0.0031 [0.002]	0.0005 [0.003]	0.0012 [0.002]	-0.0021 [0.002]	-0.0014 [0.002]	-0.0002 [0.002]	0.0001 [0.002]	0.0001 [0.002]
Deposits/ assets	0.0082 [0.010]	-0.0274* [0.014]	-0.0154 [0.013]	-0.0007 [0.010]	-0.0112 [0.014]	-0.0190* [0.010]	-0.0317*** [0.009]	-0.0373*** [0.010]	-0.0229*** [0.008]
Fee share	-0.0462*** [0.008]	-0.0553*** [0.008]	-0.0595*** [0.008]	-0.0726*** [0.008]	-0.0846*** [0.008]	-0.0939*** [0.006]	-0.1298*** [0.007]	-0.1516*** [0.006]	-0.1415*** [0.005]
Size	-1.4583*** [0.198]	-1.0476*** [0.186]	-0.9409*** [0.157]	-1.4835*** [0.195]	-0.9580*** [0.177]	-0.8556*** [0.120]	-2.1926*** [0.172]	-2.2805*** [0.124]	-1.9809*** [0.095]
Constant	27.7454*** [2.983]	24.2456*** [3.176]	22.5191*** [2.970]	30.0116*** [2.947]	22.9353*** [3.004]	22.7874*** [2.265]	49.2988*** [2.591]	53.3211*** [2.109]	47.7617*** [1.803]
No_of_obs	562	575	589	552	571	585	562	575	589
No_of_banks	121	120	124	121	120	124	121	120	124
R-Squared	0.3062	0.2459	0.258	0.3293	0.313	0.4627	0.6451	0.7657	0.7717

Notes: ROA is the relation of net income to total assets in year  $t$ , OROA is the relation of pre-provisioning income to total assets in year  $t$ , NIM is the relation of net interest income to total assets in year  $t$ , Cost income is the relation of non-operating expenses to operating revenues in year  $t$ , Asset growth is the rate of growth of total assets between year  $t-1$  and  $t$ , Unemployment is the year-end rate of registered unemployment in poviat  $j$ , Loans/assets are total loans to total assets in year  $t$ , Deposits/assets are total deposits to total assets in year  $t$ , Fee share is the share of net fees in total operating income, Size is the natural logarithm of total assets, Small banks are banks with average size (per total period) under the 33 percentile, Medium banks with average size between 33 and 66 percentile, Large banks with average size of above 66 percentile. \*, \*\* and \*\*\* correspond to significance levels of 0.1, 0.05 and 0.01 respectively. Standard errors are given in brackets.

**Table 6. Bank growth and cost-income ratio versus local macroeconomic environment – estimation results on subsamples of small, medium and large banks, between 2008–2012**

	Cost income	Cost income	Cost income	Asset growth	Asset growth	Asset growth
	small banks	medium banks	large banks	small banks	medium banks	large banks
	-1	-2	-3	-4	-5	-6
Unemployment	0.3172**	0.3802***	0.6827***	-1.1836***	-1.2779***	-1.7552***
	[0.134]	[0.132]	[0.141]	[0.268]	[0.283]	[0.279]
Loans/assets	0.005	0.0232	0.0185	-0.0092	-0.0681	0.0053
	[0.022]	[0.021]	[0.024]	[0.045]	[0.044]	[0.047]
Deposits/ assets	0.0242	-0.0609	0.0438	1.0923***	1.3589***	1.1205***
	[0.101]	[0.125]	[0.118]	[0.202]	[0.267]	[0.234]
Fee share	0.5822***	0.8118***	0.9057***	0.4829***	0.1159	0.0216
	[0.074]	[0.072]	[0.072]	[0.148]	[0.153]	[0.143]
Size	3.8734**	1.7765	-2.252	12.2612***	6.3625*	3.7582
	[1.919]	[1.607]	[1.388]	[3.846]	[3.438]	[2.748]
Constant	-25.6122	10.4267	69.2944***	-282.5379***	-199.4159***	-134.8289***
	[28.864]	[27.401]	[26.257]	[57.850]	[58.595]	[51.993]
No_of_obs	562	575	589	562	575	589
No of banks	121	120	124	121	120	124
R-Squared	0.1621	0.2864	0.3755	0.178	0.1213	0.164

*Notes:* ROA is the relation of net income to total assets in year  $t$ , OROA is the relation of pre-provisioning income to total assets in year  $t$ , NIM is the relation of net interest income to total assets in year  $t$ , Cost income is the relation of non-operating expenses to operating revenues in year  $t$ , Asset growth is the rate of growth of total assets between year  $t-1$  and  $t$ , Unemployment is the year-end rate of registered unemployment in poviat  $j$ , Loans/assets are total loans to total assets in year  $t$ , Deposits/assets are total deposits to total assets in year  $t$ , Fee share is the share of net fees in total operating income, Size is the natural logarithm of total assets, Small banks are banks with average size (per total period) under the 33 percentile, Medium banks with average size between 33 and 66 percentile, Large banks with average size of above 66 percentile. \*, \*\* and \*\*\* correspond to significance levels of 0.1, 0.05 and 0.01 respectively. Standard errors are given in brackets.

The results presented in Table 5 outline some differences in the relation between profitability and local macroeconomic environment, depending on the size of the bank. In terms of ROA, all bank samples are found to display similar sensitivity to unemployment. In all three cases, higher local unemployment translates to lower

overall profitability. Pre-provisioning profit results indicate that large banks are most vulnerable to employment problems, while the relation between operating profit and unemployment within the small and medium-sized banks group is less statistically significant and smaller. Taken together with the total net income result, this may indicate that small banks are negatively affected by unemployment hikes at the level of loan loss provisions. Increasing employment problems surface through difficulties with credit quality and are visible only after accounting for provisions. Conversely, small banks suffer most at the level of net interest margin, even though all three groups are affected.

Large banks display the strongest link between unemployment and cost efficiency in economic terms. Being headquartered in a region with lower employment rates affects cost income ratios much more in this subsample than in the small bank subsample. Where asset growth is concerned, large banks are mostly troubled by unemployment. Small banks with more supple structures are nevertheless possibly better able to adapt to changing labour market conditions and sustain growth. On the other hand, large banks may also experience some obstacles to further expansion, as due to their size they are more vulnerable to competition from universal banks. Large cooperative financial institutions may lose some of their competitive advantages that are mostly visible on small markets – profound client know-how, more meticulous credit risk assessments and knowledge of local economic perspectives.

Last but not least, we study the reaction of cooperative banks to changes in unemployment levels that could be defined as a local economic ‘downturn’ or ‘revival’. In order to identify such situations, we use changes in unemployment levels, where annual variations surpass 1 p.p. Increases in unemployment of above 1 p.p. are regarded as ‘downturns’, decreases by over 1 p.p. are ‘revivals’ and both are symbolised by dummy variables for the year the change took place. Thus, the estimated equations take the following forms:

$$\begin{aligned} \text{Bank profitability}_{i,t,j} = & \alpha + \beta_1 \text{Local macroeconomic environment}_{j,t} + \\ & + \beta_2 \text{Bank control variables}_{i,t} + \beta_2 \text{Downturn} + v_i + \varepsilon_{i,t} \end{aligned} \quad (2)$$

$$\begin{aligned} \text{Bank profitability}_{i,t,j} = & \alpha + \beta_1 \text{Local macroeconomic environment}_{j,t} + \\ & + \beta_2 \text{Bank control variables}_{i,t} + \beta_2 \text{Revival} + v_i + \varepsilon_{i,t} \end{aligned} \quad (3)$$

The results of estimating Equations (2) and (3) are presented in Table 7. The analysis of coefficients of the profitability variables shows that an increase in local unemployment rates by at least 1 p.p. has a negative impact on net interest margin and operating results. Bank profitability suffers due to lower margins and lower fees. Although the coefficient for ROA is also negative, it lacks statistical significance. According to the income smoothing theory, banks may be able to smooth out weaker operating earnings through less abundant loan loss provisions and soften the blow at the net income level.

**Table 7. Bank performance and growth versus regional economic revivals and downturns between 2008–2012**

	ROA	ROA	OROA	OROA	NIM	NIM	Cost income	Cost income	Asset growth	Asset growth
	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
Unemployment	-0.0410*** [0.010]	-0.0285*** [0.009]	-0.0250*** [0.009]	-0.0210** [0.009]	-0.0229*** [0.007]	-0.0204*** [0.007]	0.3555*** [0.086]	0.3459*** [0.085]	-1.1556*** [0.176]	-1.0801*** [0.174]
Loans/assets	0.0022 [0.001]	0.0021 [0.001]	-0.0009 [0.001]	-0.001 [0.001]	-0.0001 [0.001]	-0.0001 [0.001]	0.0186 [0.013]	0.0181 [0.013]	-0.0243 [0.026]	-0.0238 [0.026]
Deposits/assets	-0.0133* [0.007]	-0.0148** [0.007]	-0.0162*** [0.006]	-0.0176*** [0.006]	-0.0346*** [0.005]	-0.0360*** [0.005]	0.0952 [0.062]	0.1089* [0.062]	1.2250*** [0.126]	1.2031*** [0.126]
Fee share	-0.0527*** [0.005]	-0.0492*** [0.005]	-0.0812*** [0.004]	-0.0795*** [0.004]	-0.1373*** [0.003]	-0.1358*** [0.003]	0.7315*** [0.042]	0.7201*** [0.043]	0.2349*** [0.086]	0.2655*** [0.087]
Size	-1.0673*** [0.103]	-0.9732*** [0.100]	-1.0485*** [0.093]	-0.9236*** [0.090]	-2.1682*** [0.074]	-2.0249*** [0.071]	0.9037 [0.934]	-0.6487 [0.909]	5.0750*** [1.907]	7.1952*** [1.853]
Downturn	-0.031 [0.026]		-0.0679*** [0.023]		-0.0814*** [0.018]		0.9188*** [0.233]		-1.1260** [0.475]	
Revival		0.1560*** [0.036]		0.1346*** [0.033]		0.1441*** [0.026]		-1.4612*** [0.329]		2.3466*** [0.671]
Constant	23.6063*** [1.734]	21.7104*** [1.701]	24.8767*** [1.564]	22.5874*** [1.537]	50.6653*** [1.235]	48.0460*** [1.214]	14.3015 [15.669]	42.3987*** [15.450]	-171.3627*** [31.976]	-210.7348*** [31.500]
N	1726	1726	1708	1708	1726	1726	1726	1726	1726	1726
No of banks	365	365	364	364	365	365	365	365	365	365
R-squared	0.2618	0.2709	0.3558	0.3597	0.7251	0.7274	0.2741	0.2763	0.1443	0.1484

Notes: ROA is the relation of net income to total assets in year  $t$ , OROA is the relation of pre-provisioning income to total assets in year  $t$ , NIM is the relation of net interest income to total assets in year  $t$ , Cost income is the relation of non-operating expenses to operating revenues in year  $t$ , Asset growth is the rate of growth of total assets between year  $t-1$  and  $t$ , Unemployment is the year-end rate of registered unemployment in poviat  $j$ , Loans/assets are total loans to total assets in year  $t$ , Deposits/assets are total deposits to total assets in year  $t$ , Fee share is the share of net fees in total operating income, Size is the natural logarithm of total assets. \*, \*\* and \*\*\* correspond to significance levels of 0.1, 0.05 and 0.01 respectively. Standard errors are given in brackets.



Detetioration of the local economy also increases cost income ratios, as cost control is more challenging when all bank resources are used to maintain the client base and safeguard asset quality. Hikes in local unemployment are strongly negatively related to asset growth. On one hand, when the economy is stagnating, local businesses delay investments and are not seeking to expand their debt financing. On the other hand, expanding lending under pressure from a weakening labour market may result in credit risk problems later, so banks are not willing to grow under such circumstances either. As a result, not only does their current performance suffer, but also their perspectives for future profitability weaken.

When local labour markets recover, this is rapidly translated into improved cooperative bank performance. There is a significant hike in profitability ratios, both at the net interest and operating profit level, as well as on the net income side. Banks located in areas where economic upturns take place also have a leaner cost structure and their growth is visibly greater.

## **5. CONCLUSIONS**

In our paper, we have analysed the relation between performance and growth of cooperative banks and the regional macroeconomic situation between 2008–2012. We have demonstrated that these financial institutions are right to be concerned about possible macroeconomic deteriorations (Miklaszewska and Kil 2014). Performance and growth of cooperative banks are strongly linked to regional economies, proxied by the unemployment rate. Banks headquartered in poviats with smaller labour market problems are able to report higher interest margins, healthier earnings and leaner cost structures. In addition, their growth is also more robust and thus they are able to feed into future profitability. Regional downturns and revivals are rapidly translated into bank results, with hikes in unemployment paired with weaker earnings of banks from the region. We have also demonstrated that despite homogeneity in business models, the supervisory context and funding possibilities, there is heterogeneity in the relation between local economic conditions and performance. As a result, the stability of the – generally robust – Polish cooperative sector should be considered alongside changes in the regional economies in which these banks operate. Unfavourable developments in local poviats, not necessarily visible in national macroeconomic indicators, could adversely affect the stability of individual institutions. In times of diminished public confidence in the banking sector, this should be given particular consideration, to avoid bankruptcies of cooperative institutions that play a crucial role in local communities.

### Abstract

The aim of this paper is to analyse the vulnerability of Polish cooperative banks to changes in macroeconomic environments within the poviats where those banks operate. We find that the profitability, cost income and growth of cooperative banks are strongly related to local conditions. Banks headquartered in poviats with lower unemployment are able to report healthier earnings and leaner cost structures, and face better growth prospects. Deteriorations and revivals in poviats are reflected in bank performance and growth, demonstrating the sensitivity of these banks to local developments not necessarily mirrored in national economic indicators. In addition, despite homogeneity within the cooperative banking sector, we demonstrate differences in the relation of performance and economic situation between subgroups of small, medium-sized and large banks.

**Key words:** cooperative banks, bank performance

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