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Performance Comparison of Cooperative Banks in the EU, USA and Canada

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***Abstract*—**This paper compares different types of profitability measures of cooperative banks from two developed regions: the European Union and the United States of America together with Canada. We created balanced dataset of more than 200 cooperative banks covering 2011-2016 period. We made series of tests and run Random Effects estimation on panel data. We found that American and Canadian cooperatives are more profitable in terms of return on assets (ROA) and return on equity (ROE). There is no significant difference in net interest margin (NIM). Our results show that the North American cooperative banks accommodated better to the current market environment.

***Keywords*—**Cooperative banking, panel data, profitability measures, random effects.

I. Introduction

COOPERATIVE banking emerged with industrial revolution in German speaking countries. Ideas of founding fathers of cooperative banking movement was to promote thrift and accessibility to financial services to middle and lower strata of society which did not have access to commercial banking services at that time. One of the key obstacles of spreading the access to the banking services to common people was high information asymmetry and lack of data about common people. Thanks to the proximity of individual cooperative members, cooperative banks can capitalize superior information and impose inexpensive but effective sanctions on defaulters [1]. The idea of cooperative banking spread quickly among European nations, nevertheless slightly different organizational, institutional and functional setup evolved over time in individual European countries. For detailed overview of European cooperative banking systems, please see [2] or [3].

Cooperative banking came to American continent much later. The first cooperative banks in the USA and Canada emerged in the beginning of the 20th century. Cooperative banking in these two countries takes form of credit unions (or caisses populaires in French speaking regions).

The main difference between traditional commercial bank and cooperative bank is that commercial bank is owned by shareholders (individuals can hold different amount of voting rights based on number of shares owned) and they exist in order to generate profit for their owners. Cooperative banks on the other hand are owned by their clients (called members). Every member has the same voting power on general meeting – basic cooperative principle is "one member – one vote". Moreover, cooperative banks are often called "double bottom line institutions" because their main goal is not only profit but typically it is also financial health of given community.

Share of cooperative banks on total banking market differs significantly in Europe: in some countries cooperative financial structures are missing completely, in some countries cooperative banks are among the biggest financial institutions on the market (France, Finland, Netherlands). Share of client deposits in cooperative banks in Europe is around 25% [4]. Moreover, this share has been slowly increasing since the Great Recession [4]. There are more than 110 million of credit union members in the United States and more than 10 million members in Canada [5]. The penetration rate to total economically active population is around 50% [5]. Therefore, save and sound cooperative banking system is crucial for health of both European and North American economies.

The aim of this paper is to compare three different profitability measures: ROA, ROE and NIM in the regions of the European Union and United States + Canada in order to see which environment is more supportive for cooperative banking business.

The structure of the rest of the paper is following. Literature review summing up influential papers focused on profitability of (cooperative) banking systems is presented in Section II. Data selection process is provided in Section III. Our methodological approach is explained in Section IV. Section V is focused on regression analysis results. Conclusion and further research opportunities are presented in Section VI.

II. Literature Review

We focus mainly on empirical perspective of (cooperative) banking profitability and its comparison in this literature review section.

Let us start with comparison of commercial banks performance in both regions because empirical literature in this field is richer compared to focus on cooperative banks. Schildbach [6] shows that profits of commercial banks in the European Union and in the United States were comparable in years prior to the Great Recession. Afterwards, US banks' revenues overcame pre-crisis levels whereas European banks never really recovered from the crisis in 2008 and subsequent European sovereign debt crisis. Author sees the banks in the US and in Europe in 2013 (last year covered by the study) ARE still both literally and virtually "ocean apart".

Matejašák et al. [7] show that new regulatory requirements for both European and American commercial banks have desired effects on bank behavior – banks tend to be close to

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the minimum regulatory threshold and increase their capital adequacy ratios in the beginning of 21st century. Posner and Véron [8] on the other hand criticized European banking regulation for aiming only to secure full market integration within EU borders but not to manage globalization in financial services.

Buch and Golder [9] show that German banking market was much better integrated to international capital flows compared to large regional disparities of market shares of foreign banks in the United States. This has important implication for studies of cooperative banking in the US as well. Individual American credit unions tend to operate mostly only on regional level and therefore the level of their competition may differ significantly based on their home region.

Let us focus on determinants of profitability. Profits of American commercial banks between 1995 and 2007 have negative correlation with the capital ratio [10]. Authors see reasoning in over-cautious behavior and ignoring potentially profitable trades. Same study [10] also states that economies of scale are not realized. We also find evidence [11] that abnormal profits tend to be reduced by competition pressures for US banks. Nevertheless this effect is not immediate [11].

Kuc and Teplý [12] run dynamic panel data model (System Generalized Method of Moments) on the set of 283 cooperative banks from 15 European countries and find positive correlation between loans to deposit ratio and profitability. On the other hand, higher share of liquid assets and also higher share of client loans is negatively affecting profitability of European cooperative banks. Market concentration seems to have no effect on bank profitability according to [12]. The same result was estimated by Beckmann [13]. Furthermore, [12] found statistically significant effect of GDP growth and inflation rate on profitability. On the other hand, [13] and [14] show positive effect of GDP growth on European cooperative banking profitability. Partially contradicting results can be explained by different estimation methods, selection of cooperative banks as well as different time focus of individual studies.

III. Data Selection

BankScope database by Bureau van Dijk serves as the main data source of cooperative banking data for our research in this paper. Furthermore, we use real GDP growth rate variable in our model in order to account for different phase of economic cycle in individual countries. Real GDP growth rate is taken from the World Bank's World Development Indicators database.

We use unconsolidated bank statements in our dataset in order to be able to better catch development of individual cooperative banks, not the whole groups. Consolidated bank statements are used only in case that no unconsolidated statements are available in the database. This setup avoids bouble counting issue for cooperative banks which provide both unconsolidated and consolidated financial statements. Same setup regarding unconsolidated and consolidated banking statements is used by Hesse and Čihák [15].

Only cooperative banks which had their financial statements available for the whole estimation period (2011-2016) are included in the data sample. We also include only banks which were active during whole estimation period and which have available all the necessary data for our analysis in order to have balanced dataset. We include all the cooperative banks satisfying abovementioned conditions with the exception of some cooperative banks from Germany and Italy where BankScope database provides financial statements of several hundred cooperative banks. In order not to have vast majority of banks in the dataset only from these two countries, we randomly deleted some of them. This helps to have more representative distribution of cooperative banks by country of their domicile.

Altogether, our dataset contains data of 203 cooperative banks which is equal to 1,015 observations. 29 cooperative banks in the data sample are from the United States + Canada region and 174 of them are from the European Unions. More than 50 banks are from Germany, 42 banks are from Italy and 41 banks are from France. Altogether, we have data from cooperative banks from 10 European countries. There is no representative of cooperative bank from the new EU countries (post 2000 enlargement). The reason is data availability. BankScope is more focused on more developed Western European market and moreover, cooperative banking structures in Eastern European countries were often dismantled by local communist regimes. There are also countries in our dataset with only one cooperative bank (Finland and the Netherlands). The reason is that cooperative banking model in these countries evolved in a way that the cooperative financial institutions merged into only one legal body. For more information please see [2] or [3]. The number of banks in the dataset divided by countries and regions is provided in Table I.

TABLE I
Number of Cooperative Banks in Dataset by Country and Region

Country Name	Bank Count	Country Name	Bank Count
Austria	24	United States	12
Belgium	2	Canada	17
Germany	52	Total USA+ CA	29
Denmark	6		
Spain	3		
Finland	1		
France	41		
Italy	42		
Netherlands	1		
Portugal	2		
Total EU	**174**		
Database Total: 203			

We estimate equations with three different profitability measures as dependent variables in order to compare cooperative banks from our regions of interest. We use following profitability measures: ROA, ROE and NIM. All of these measures tell something slightly different and therefore, use of multiple dependent variables brings broader picture to the comparison of European and American cooperative banks.

The selection of dependent variables is based on the best

practices from existing empirical literature; see [10], [12], [13], [15]. We include following variables: natural logarithm of bank assets to control for institution size, share of client loans to total balance sheet size to capture extent of traditional lending business of cooperative banks, ratio of equity to total assets to account for buffer to bankruptcy, real GDP growth to capture different phase of economic cycle in countries of our interest and finally, dummy for cooperative banks from the North American region to be able to compare them with European banks.

IV. Methodology

Similar to the most of the papers from the Literature Review section, we use panel data. We estimate following regression equation:

$$PROFIT_{ijt} = \alpha + \beta_1 \ln(As)_{ijt} + \beta_2 LOANS_{ijt} + \beta_3 EQUITY_{ijt} + \beta_4 GDP_{jt} + \beta_5 US_j + \varepsilon_{ijt}, \quad (1)$$

where *PROFIT* stands for selected profitability measure (ROA, ROE or NIM) for cooperative bank *i* from country *j* in year *t*, α is intercept, ln(*As*) is a natural logarithm of bank assets, *LOANS* stands for ratio of client loans to total balance sheet size, *EQUITY* is a ratio of equity to total assets, *GDP* stands for real GDP growth, *US* is a dummy variable for banks from the North American region and finally ε stands for error term.

We run Breusch-Pagan Lagrange multiplier test which shows that Random Effects Estimation is more efficient compared to Ordinary Least Squares (OLS) estimation. Next, we run Hausman test which prefers use of Random Effects estimation over Fixed Effects estimation.

In order to control for different models of cooperative banks across countries, we run cluster-robust standard errors to avoid problems with wrong estimate precision. This setup is suggested in [16].

We provide correlation matrix of variables used in Table II. We can see that there is significant positive correlation between ROA and ROE which should be no surprise since both these profitability measures use the same nominator. Interesting is high negative correlation between size of cooperative bank (ln(As)) and its NIM which means that the bigger the cooperative bank is, the lesser interest margin it is able to receive. Or it may be explained by the fact that the smaller cooperative banks deal with riskier business than their bigger peers. Otherwise, we see no strong correlation in between variables used in the regression equations. This means that problems connected with multicollinearity will not impact our estimation.

V. Data Analysis

Prior to commenting on the results of regression analysis, we perform descriptive statistics of the data used. Evolution of dependent variables (averages) by regions is presented in Figs. 1-3. We can see that profitability in terms of both ROA and ROE was higher in USA+CAN for the whole observation period. ROA of European cooperatives seems to be closing the gap to their North American counterparts but the difference in ROE is kept rather constant. There is no significant difference in NIM in both regions and moreover, there is clear downward trend present on both sides of the Atlantic Ocean as well. Furthermore, we provide minimum, median and maximum value of all the variables used divided by region of interest in Table III. It can be seen that the North American cooperative banks are on average larger, higher portion of their balance sheet size comprises of client loans which can be considered as typical cooperative banking business. European cooperative banks are on the other hand slightly more capitalized.

TABLE II
Correlation Matrix

	ROA	ROE	NIM	ln(As)	LOANS	EQUITY	GDP	US
ROA	1							
ROE	0.61	1						
NIM	0.02	-0.01	1					
ln(As)	0.12	0.08	-0.61	1				
LOANS	0.08	0.05	0.27	-0.01	1			
EQUITY	0.18	0.06	0.22	-0.15	0.03	1		
GDP	0.12	0.08	0.02	0.08	0.04	-0.10	1	
US	0.13	0.16	0.07	0.04	0.16	-0.13	0.33	1

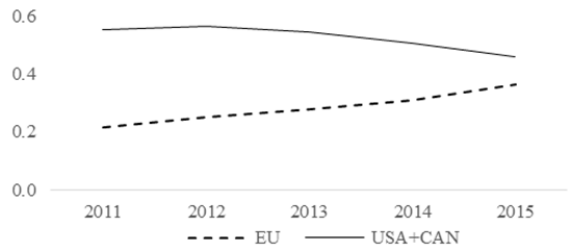

Fig. 1 Development of ROA

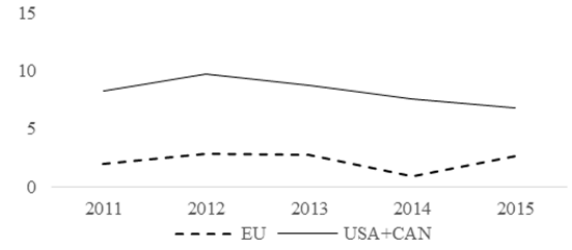

Fig. 2 Development of ROE

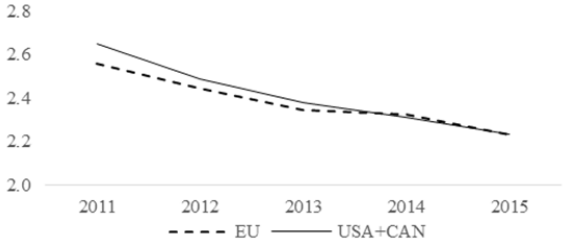

Fig. 3 Development of NIM

Altogether, we estimate three different regressions (difference is in profitability measure). Regression results are

provided in Tables IV-VI. Table IV provides regression results with ROA as dependent variable. Results show that bigger cooperative banks are more profitable in terms of ROA. Share of loans on balance sheet seems to have no effect on ROA, share of equity has positive effect (on 10% significance level), higher GDP growth supports profitability of assets and finally, cooperative banks in USA + Canada region have significantly higher ROA.

TABLE III
DESCRIPTIVE STATISTICS

Variable	Region	Min	Median	Max
ROA [%]	EU	-9.59	0.30	6.82
	USA+CAN	-0.05	0.48	1.39
ROE [%]	EU	-280.95	3.52	46.72
	USA+CAN	-1.04	7.55	45.88
NIM [%]	EU	0.43	2.33	11.03
	USA+CAN	0.17	2.58	4.35
ln(As)	EU	16.20	20.89	28.26
	USA+CAN	19.07	21.36	24.26
LOANS	EU	0.00	0.62	0.90
	USA+CAN	0.00	0.79	0.91
EQUITY	EU	0.01	0.09	0.36
	USA+CAN	0.01	0.07	0.95
GDP [%]	EU	-4.03	0.68	3.66
	USA+CAN	0.67	2.32	3.14

TABLE IV
ROA REGRESSION RESULTS

Variable	Cons	Std. Err	Sig.
ln(As)	0.0005	0.0001	***
LOANS	0.0021	0.0021	
EQUITY	0.0325	0.0183	*
GDP	0.0004	0.0001	***
US	0.0021	0.0008	**
cons	-0.0123	0.0040	***
Nr. Obs.		1015	
Wald test		0.00	
R sq.		0.08	

TABLE V
ROE REGRESSION RESULTS

Variable	Cons	Std. Err	Sig.
ln(As)	0.006	0.0025	**
LOANS	0.0243	0.0455	
EQUITY	0.2816	0.4248	
GDP	0.0029	0.0032	
US	0.0573	0.0172	***
cons	-0.1483	0.1090	
Nr. Obs.		1015	
Wald test		0.00	
R sq.		0.04	

Moving on to results of ROE regression (Table V): we see once again that the bigger the bank is, the higher is its profitability. Share of loans on total balance sheet seems to have no effect also on this profitability measure, share of equity and GDP growth also seem to be insignificant for ROE. Cooperative banks from the USA and Canada have significantly higher profitability in terms of ROE as shows *US* dummy variable.

Finally, NIM regression results are provided in Table VI. Size of a cooperative has negative effect on interest margin. This is confirmation of information provided in correlation matrix (Table II). The more client loans are on the balance sheet, the higher is NIM. None of *EQUITY*, *GDP* and *US* variables has statistical significance. Therefore, we cannot say whether cooperative banks in the USA and Canada have higher interest margin than European ones.

TABLE VI
NIM REGRESSION RESULTS

Variable	Cons	Std. Err	Sig.
ln(As)	-0.0026	0.0004	***
LOANS	0.0134	0.0043	***
EQUITY	0.0035	0.0039	
GDP	-0.0001	0.0002	
US	0.0011	0.0024	
cons	0.0661	0.0089	***
Nr. Obs.		1015	
Wald test		0.00	
R sq.		0.45	

Summing up the information provided in Tables IV-VI, we can say that North American cooperative banks are more profitable than their European peers in terms of ROA and ROE. There is no statistically significant difference in terms of NIM. Size of institution has positive effect on ROA and ROE profitability but negative on NIM. Explanation may be that the smaller institutions are more likely to take riskier business than bigger ones. Furthermore, higher GDP growth seems to have positive impact on ROA.

VI. CONCLUSION

This paper investigates differences of profitability among cooperative banks from European Union and from North American region. We created balanced dataset of more than 200 cooperative banks from 10 European countries, USA and Canada. Our dataset covers 2011-2015 period. We use Random Effects estimation as the main method for our analysis. We find that financial cooperatives in USA and Canada are significantly more profitable than their European peers in terms of ROA and ROE. There is no significant difference in NIM of both regions. Moreover, there is clear trend of decreasing NIM in our time period. Our results show that Canadian and American cooperative banks accommodated better to the market environment of post Lehman Brothers failure.

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REFERENCES

[1] T. W. Guinane, “Cooperatives as Information Machines: German Rural Credit Cooperatives, 1883-1914”, The Journal of Economic History, Volume 61, Issue 2, pp. 366-389, June 2001.

[2] R. Ayadi et al., "Investigating Diversity in the Banking Sector in Europe: Key Developments, Performance and Role of Cooperative Banks," Centre for European Policy Studies, Brussels, 2010.
[3] E. Liikanen et al. "High-level Expert Group on reforming the structure of the EU banking sector", European Commission, Brussels, 2012.
[4] E. Castelló, C. Trias, A. Arribas, " Europe's cooperative banking models (Revised edition)", European Economic and Social Committee, Brussel, 2018.
[5] "World Council of Credit Unions 2017 Statistical Report", World Council of Credit Unions, Washington D.C., November 2018.
[6] J. Schildbach, "Bank performance in the US and Europe - An ocean apart", Deutsche BankAG, DB Research, Frankfurt am Main, September 2013.
[7] M. Matejašák, P. Teplý, J. Černohorský, "The impact of regulation of banks in the US and the EU -15 countries", Ekonomie a Management (Economics and Management). Issue 3, pp. 58-68, 2019.
[8] E. Posner, N. Véron, "The EU and financial regulation: power without purpose?", Journal of European Public Policy, Volume 17, 2010 - Issue 3: Europe and the Management of Globalization, March 2010.
[9] C. L. Buch, S. M. Golder, "Foreign versus domestic banks in Germany and the US: a tale of two markets?", Journal of Multinational Financial Management, Volume 11, Issues 4–5, pp. 341-361, December 2001.
[10] S. Hoffmann, P. Rodrigo, "Determinants of the Profitability of the US Banking Industry", Repositorio de la Universidad Pontificia Comillas, 2015.
[11] D. K. Chronopoulos, H. Liu, F. J. McMillan, J. O. S. Willson, "The dynamics of US bank profitability", The European Journal of Finance, Volume 21, 2015 - Issue 5, pp. 426-443, September 2013.
[12] M. Kuc, P. Teplý, "A Financial Performance Comparison of Czech Credit Unions and European Cooperative Banks", Prague Economic Papers, University of Economics, Prague, vol. 2018(6), pp. 723-742, 2018.
[13] R. Beckmann, "Profitability of Western European Banking Systems: Panel Evidence on Structural and Cyclical Determinants", Deutsche Bundesbank. Discussion Paper No. 2007/17, 2007.
[14] G. Iannotta et al., "Ownership Structure, Risk and Performance in the European Banking Industry", Journal of Banking and Finance, 31(7), pp. 2127–2149, 2006.
[15] H. Hesse and M. Čihák, "Cooperative Banks and Financial Stability," *IMF WP*, no. 07/02, Washington D.C.: IMF, 2007.
[16] B. R. Moulton, "Random Group Effects and the Precision of Regression Estimates," *Journal of Econometrics*, vol. 32, no. 3, pp. 385-397, 1986.