The Impact of IFRS 9 on the Link Between Lending and the Capital Ratio in Publicly Traded Banks in Poland

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ABSTRACT

This paper aims to determine the role of the expected credit loss approach as defined in IFRS 9 in the effects of capital ratio on loans growth in publicly traded banks in Poland. To resolve this problem, we apply semi-annual data of individual banks in 2012–2018. Using several estimation techniques, we find that in the period of implementation of the expected credit loss approach, the links between loans growth and the capital ratio were enhanced. In particular, lending growth is more sensitive to levels of the capital ratio. These results are important with respect to the goal of bank financial stability and have implications for the conduct of macroprudential policy.

1. INTRODUCTION

Bank lending depends on many factors, including the demand side and supply side of the loans market. Each of them comprises determinants that are internal to the bank – including activity size, business model, capitalization, and external to the bank – covering regulations constraining the activity of the bank. Bank capital is a quantitative supply-side determinant of lending. Insufficient levels of capital ratios are a basic constraint on the bank investment activity and, in particular, on the bank lending activity.

Theory and empirical research shows that the link between bank lending and the capital ratio is diversified (Borio & Zhu, 2012; Berrospide & Edge, 2010; Beatty & Liao, 2011; Kim & Sohn,

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2017; Olszak et al., 2019) and strongly dependent on the level of capital buffers of the bank. These capital buffers constitute excess capital over the amount required by the external regulatory requirements and internal capital assessment by the bank. Banks with large capital buffers are insensitive to losses, and therefore they do not reduce their lending activity, even during turbulent periods. That is why the link between loans growth and the capital ratio should be negative. In contrast, banks with thin capital buffers will be prone to losses depleting capital and, in effect, will be forced to change the structure of their assets by reducing the lending activity.

After the global financial crisis (henceforth GFC) of 2007/8, regulatory and supervisory authorities introduced many standards aimed at increasing the capital levels of banks, whereby banks should be stimulated to keep profits in upturns, to be used in downturns. These new standards include the International Financial Reporting Standard 9 (IFRS 9). Regulators expected that this standard, at least in the early implementation period, would worsen the capitalization of banks by reducing the amount of capital buffers available for the lending activity, particularly considering the new restrictive capital standards (such as leverage ratio, fixed capital buffer, cyclical capital buffer, buffers for systemically significant institutions) (European Systemic Risk Board, 2017, 2019a, 2019b; Basel Committee on Banking Supervision, 2017). Previous research shows that increased restrictiveness of capital regulations is associated with a capital crunch (Peek & Rosengren, 1995; Beatty & Liao, 2011; Kim & Sohn, 2017), which is associated with decreased lending activity due to a reduction in available capital buffers, i.e., excess capital over the regulatory requirements, which is accessible in bank management for capital allocation and capital absorption process.

The aim of this paper is to determine the effect of IFRS 9 on the link between the lending activity and the capital ratio of publicly traded commercial banks in Poland. Considering the fact that IFRS 9 decreased the amount of available capital buffers, we hypothesize that IFRS 9 has increased the sensitivity of loans growth to the capital ratio. We also expect that the implementation of IFRS 9 in 2018 had a negative effect on loans growth.

In this paper, we use individual data of publicly traded banks operating in Poland in 2013–2018 and apply several estimation techniques (generalized least squares, ordinary least squares) usually employed in the analysis of cross-section and time-series data. In our analysis, we also use hand-collected data from annual and financial reports of banks covered in the study. These data are used to construct indices measuring the intensity of steps taken to prepare for the introduction of IFRS 9. The results show an economically significant effect of IRFS 9 on the link between loans growth and the capital ratio.

This rest of the paper is structured as follows. Section 2 covers the review of the literature and presents hypotheses. Section 3 describes the model, methodology and data used in the study. Section 4 interprets the research results. The last section concludes.

2. LITERATURE REVIEW AND HYPOTHESES

Empirical research on the role of capital standards in the bank lending activity has been conducted for over 30 years. Preliminary research in the 1990s focused mostly on the economic effect of capital ratio, as defined in Basel I, on loans growth (Jackson et al., 1999). Its basic goal was to determine whether an external standard affecting the banking sector produces any outcomes for the real economy. This research concludes that bank capital was of huge importance in the bank lending activity, especially in the period of implementation of the new capital adequacy standards.

More recent papers focus on the heterogeneity of effects of the capital ratio on loans growth. These papers analyse several factors including: monetary policy (Kishan & Opiela, 2006); level of the capital ratio (and buffer capital) (Carlson et al., 2013); bank size (Kishan & Opiela, 2000;

Olszak et al., 2019); timeliness (and potential delay) of loan-loss provisioning (Beatty & Liao, 2011); excess control rights (Lepetit et al., 2015); liquidity of the bank (Kim & Sohn, 2017; Thornton & Tommaso, 2019); macroeconomic environment (Beatty & Liao, 2011; Olszak et al., 2019).

Kim and Sohn (2017) analyse the effect of liquidity on the link between loans growth and the capital ratio of commercial banks in the United States. They show that more liquid banks exhibit stronger positive links between loans growth and the capital ratio. In the same vein, Thornton and Tommaso (2019), in a study covering 521 banks from 21 European countries, show that the effects of capital ratio on lending depend on liquidity. The more liquid the bank is, the stronger the effect of capital ratio on loans growth rate during a crisis.

Lepetit et al. (2015) analyze capital ratio adjustments in 17 European countries in 2002–2010. They show that if control and cash flow rights are identical, banks issue equity without cutting lending in order to boost capital ratios. In contrast, when control rights exceed cash flow rights, banks downsize by reducing lending rather than issue equity. As they suggest, such a finding is mostly prevalent in countries with weak shareholder protection or for family-controlled banks.

Roulet (2018) analyses the impact of the new Basel III capital and liquidity regulation on bank lending following the 2008 financial crisis in commercial banks in Europe. As the paper shows, capital ratios have significant and negative impacts on the expansion of large European banks' retail and other lending activity in the context of deleveraging and "credit crunch". However, the effect is heterogeneous and depends on liquidity indicators, which have positive but perverse effects on bank lending growth.

Altunbas et al. (2016) examine the link between bank capital and earning assets in five European countries in 1989–2012 using panel cointegration techniques. They find that higher bank capital is associated with a higher volume of earning assets, including bank loans. However, they additionally find some evidence that bank capitalization would impact negatively on the growth of bank lending at capital-to-asset ratios above 15%. Similarly, Karmakar and Mok (2015) evaluate the relationship between capital ratios and business lending of commercial banks in the United States in 1996–2010. They find a moderate positive relationship between capital ratios and business lending. As in other papers (Carlson et al., 2013), they show that this relationship is stronger in low-capital-ratio banks. The same inference is made by Fang et al. (2020) for developing countries and by Catalán et al. (2020) for banks in Indonesia. Košak et al. (2015) show a significant effect of Tier 1 capital ratio on lending in 91 countries in 2000–2010.

There is only one paper focusing on the role of accounting standards for the assessment of impairment in lending activity and the links between bank lending and the capital ratio. The study by Alexandre and Clavier (2017) investigates the effects of IAS 39 on both lending and the links between lending and the capital ratio in a sample of 243 banks in 11 European countries in 2002–2008. This paper tests the hypothesis that the adoption of the IAS/IFRS results in an increase in the amount of credit offered by banks with liquidity constraints. Their results are only partly consistent with this hypothesis and depend on the measure of the constraint (liquidity measure versus capital ratio), the bank size, and the enforcement regime. They also show that the adoption (both voluntary and mandatory) of the IAS/IFRS leads to an increase in credit supply only for small and constrained banks. This research shows that in the sample of banks covered by the study, the capital ratio did not exert a significant effect on loans growth. Neither did the IFRS 39 change the link between loans growth and the capital ratio as this link was negative in the period of analysis. Such a result is, however, not surprising, considering the period of analysis associated with buoyant prosperity in the market. In good times, a bank finds it easy to get access to external sources of funding and the quality of credit portfolio improves.

To summarize, the literature shows that the capital ratio is a constraint on bank lending if the association between loans growth and the capital ratio is positive (Beatty & Liao, 2011; Olszak et al., 2019). If the link is negative, the bank is not capital-constrained. However, the research

highlights the diversity of the links between lending and the capital ratio. This diversity may be explained, intern alia, with regulations, business cycle and bank size. In this paper, we focus on a specific example of regulatory determinants, which is the IFRS 9 accounting standard. In particular, we ask how the IFRS 9 implementation in Poland affected the link between loans growth rate and the capital ratio.

In line with the expectations of experts, i.e., the regulators and supervisors of banks (European Systemic Risk Board, 2017, 2019a, 2019b; Basel Committee on Banking Supervision, 2017), IFRS 9 creates a constraint on bank lending through the reduction of the available capital funds needed to increase lending. More specifically, the expected credit loss model (ECL) is associated with such a reduction in 2018. Therefore, we hypothesize that:

IFRS 9 implementation in 2018 is associated with an increased effect of the capital ratio on lending (hypothesis H1).

However, this effect of IFRS 9 in 2018 may be conditioned by the steps taken by bank management to prepare for the adoption of the standard. In particular, banks which took more steps to better absorb the increased loan losses as defined in the standard could have been less affected by the IFRS 9 implementation. However, this effect may also be reversed if the banks which were preparing for that for longer suffered from capital shortages (in particular, due to internal capital shortages that were difficult to identify). We therefore expect that banks which were preparing longer for the implementation of IRFS 9 suffered from insufficient capital buffers.

3. METHODOLOGY AND DATA

3.1. Model

The first econometric models that define the relationship between the loan growth rate and the capital ratio were developed in the 1990s – mainly for the analysis of the US banking sector (Olszak, 2015, p. 337). Studies from recent years are inspired by these models (Berrospide & Edge, 2010; Beatty & Liao, 2011; Carlson et al., 2013; Kim & Sohn, 2017; Olszak et al., 2018) and these studies were considered when the authors created the necessary model to achieve the purpose of this article. However, unlike previous studies, the econometric model used here additionally includes interactions between qualitative variables (determining the application of the IFRS9 regulation) and the capital ratio:

$$\Delta \text{Loan}_{i,t} = \alpha_o + \alpha_1 * \text{CAR}_{i,t-1} + \alpha_2 * \text{NIM}_{i,t-1} + \alpha_3 * \text{DEP}_{i,t-1} + \alpha_4 * \text{MFUND}_{i,t-1} + $$
$$+ \alpha_5 * \text{size}_{i,t-1} + \alpha_6 * \text{IAS9} + \alpha_7 * \text{CAR}_{i,t-1} * \text{IFRS9} + \alpha_8 * \text{MR}_{i,t-1} + \alpha_9 * \text{GDPG}_{i,t-1} + $$
$$\alpha_{10} * \text{UNEMPL}_{i,t} + \varepsilon_t + \vartheta_{i,t} \quad (1)$$

where:
$\Delta \text{Loan}_{i,t} = \ln(\text{Loan}_{i,t}) - \ln(\text{Loan}_{i,t-1})$ – a variable that determines the rate of credit growth;
$\text{CAR}_{(t-1)}$ – capital adequacy ratio;
$\text{NIM}_{(t-1)}$ – net interest margin ratio expressed as the quotient of the interest margin and loans, which determines the effectiveness of the bank's lending activities;
$\text{DEP}_{(t-1)}$ – the share of non-financial sector deposits in the bank's balance sheet, which measures access to stable sources of financing for the bank's lending activities;
$\text{MFUND}_{(t-1)}$ – the ratio calculated as the share of the bank's liabilities to entities other than depositors from the non-financial sector in the balance sheet total, which determines access to wholesale and fewer sources of financing the bank's lending activity;

$\text{Size}_{(t-1)}$ – calculated as the natural logarithm of assets. Size(t-1) measures the scale of the bank's operations;

IFRS9   – dummy variable determining whether IFRS 9 was introduced in a given period in the bank;

$\text{CAR}_{(t-1)}$ * IFRS9 – the interaction between the capital ratio and IFRS9, which measures the impact of the capital ratio on banks' lending activity after the implementation of the IFRS9 standard at a bank. The regression coefficient for this variable determines whether the implementation of IFRS9 will change the economic relationship between credit activity and the capital ratio;

$\text{MR}_{(t-1)}$ – market interest rate – WIBOR6M. This rate determines the impact of market interest rates on lending activity;

$\text{GDPG}_{(t-1)}$ – real GDP growth rate, which measures the impact of the business cycle on credit activity;

$\text{UNEMPL}_{(t-1)}$ – unemployment rate, which identifies the impact of the demand side of the economy on the bank lending activity.

In order to avoid the problem of incorrect selection of the estimation technique, the study used various methods appropriate to the panel data, i.e., the least squares method, the random effects method and the weighted least squares method. In all estimated models, a single delay of the explanatory variables was used in order to reduce the endogeneity problem.

3.2. Data Description

The study used data of individual listed banks from the semi-annual financial statements (i.e. the balance sheet and profit and loss account) available on the websites of these banks. The analysis covers 12 listed banks[2] from the period 2013–2018. Most of the banks are identified as systemically important institutions, with assets accounting for 77.2% of the assets of the commercial banking sector.

In order to determine the impact of the application of IFRS 9, it is necessary to construct an index that measures the application of IFRS 9 in individual banks. The index used in a study was an index which has had been zero since the implementation of the standard in January 2018, in line with regulatory requirements and accepted international standards aimed at ensuring financial stability in macroprudential terms. We define this variable as IFRS9_1. Considering the fact that all banks applying the International Financial Reporting Standards in their reporting were obliged to implement IFRS9 from January 1, 2018, this variable assumes the value of one in each of the banks in the first and second half of 2018.

The second qualitative aspect of this study was the identification of the banks that informed in their financial statements about preparations for the implementation of this standard. Such preparatory work could have weakened the impact of the capital ratio on the loan growth rate during its implementation in 2018, which could have been the result of banks accumulating additional capital buffers. Two variants of this potential "intensity" of the preparatory work will be considered in the study. First, does the bank inform in its annual and semi-annual financial statements about the preparatory work in at least 2014? Second, does the bank inform about these works at least in 2015? The variable measuring the process of such preparations is the zero-one variable, assuming the value of one for the period in which preparations for implementation of the standard were mentioned in the report for the given reporting period. Thus, in the further part of the study, two such variables will be used, PP1 (variable equal to 1 when the bank mentions preparations for the use of IFRS 9 at least in 2014 (i.e., in 2014 or 2013) and 0 otherwise and PP2

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[2] Alior Bank S.A., Bank Handlowy w Warszawie S.A., BNP Paribas Bank Polska S.A., Bank Ochrony Środowiska S.A., Getin Noble Bank S.A., Idea Bank S.A., ING Bank Śląski S.A., mBank S.A., Bank Millennium S.A., Pekao Bank Polski S.A., PKO BP S.A., Santander Bank Polska S.A.

(variable equal to 1 when the bank mentions preparations for the application of IFRS 9 at least in 2015 (i.e. in 2015 or 2014 or 2013 and 0 otherwise). In the case of PP1, five banks were identified in the sample, and in the case of variable PP2, ten banks. It should be noted that almost all banks mentioned this in 2016 and 2017, and therefore introducing such a criterion as "intensity" of preparations would not identify banks that significantly stand out in this respect.

Table 1 presents descriptive statistics of the variables used in the study. The average loan growth rate is 4.04% with a standard deviation of 8.71%. The minimum value is (–23.39%) – this is the value for Getin Noble Bank. The average value of the loan growth rate in the analysed period for Getin Noble Bank itself is (–3.2%). The average value of the capital ratio is 15.46% with a standard deviation of 2.72%, which indicates the stability of this ratio. The minimum value of the capital adequacy ratio was 2.7% for Idea Bank. Both Getin Noble Bank and Idea Bank experienced financial problems in the analysed period, which is reflected in the indicators.

Table 1
Descriptive statistics of the variables used in the study

	$\Delta Loan_{i,t}$	CAR	DEP	MFUND	size	NIM	MR	UNEMPL	GDPG
Average	4.045	15.460	67.250	22.080	25.010	2.790	1.982	8.982	3.918
Median	2.963	15.160	69.190	20.270	24.980	2.670	1.810	8.700	3.700
Std Dev	8.719	2.727	9.554	8.560	0.810	0.772	0.348	2.478	0.859
Min.	–23.390	2.700	33.550	8.939	22.720	1.342	1.770	5.800	2.200
Max.	47.890	23.370	80.830	53.520	26.500	4.755	2.710	13.400	5.400
No of observations	132	122	131	131	131	131	132	132	132

Source: own study based on data from banks' financial statements and Eurostat; $CAR_{(t-1)}$ – capital adequacy ratio; $NIM_{(t-1)}$ – net interest margin ratio; $DEP_{(t-1)}$ – share of non-financial sector deposits in the bank's balance sheet; $MFUND_{(t-1)}$ – ratio calculated as the share of the bank's liabilities to entities other than depositors from the non-financial sector in the balance sheet total; $size_{(t-1)}$ – calculated as the natural logarithm of assets; $MR_{(t-1)}$ – market interest rate – WIBOR6M; $GDPG_{(t-1)}$ – real GDP growth rate; $UNEMPL_{(t-1)}$ – unemployment rate.

Table 2
Correlation matrix

	$\Delta Loan_{i,t}$	CAR	DEP	MFUND	size	NIM	WIBOR6M	UNEMPL	GDPG
	1								
CAR	0.14	1							
DEP	0.01	–0.29*	1						
MFUND	–0.05	0.19*	–0.97*	1					
size	0.20*	0.34*	0.14	–0.25*	1				
NIM	0.22*	–0.08	0.29*	–0.42*	0.14	1			
WIBOR6M	0.01	–0.24*	–0.08	0.07	–0.09	0.04	1		
UNEMPL	0.15	–0.31*	–0.09	0.09	–0.12	–0.04	0.77*	1	
GDPG	–0.12	0.27*	0.08	–0.08	0.1	0.05	–0.69*	–0.87*	1

Source: own study based on data from banks' financial statements and Eurostat; $CAR_{(t-1)}$ – capital adequacy ratio; $NIM_{(t-1)}$ – net interest margin ratio; $DEP_{(t-1)}$ – share of non-financial sector deposits in the bank's balance sheet; $MFUND_{(t-1)}$ – ratio calculated as the share of the bank's liabilities to entities other than depositors from the non-financial sector in the balance sheet total; $size_{(t-1)}$ – calculated as the natural logarithm of assets; $MR_{(t-1)}$ – market interest rate – WIBOR6M; $GDPG_{(t-1)}$ – real GDP growth rate; $UNEMPL_{(t-1)}$ – unemployment rate; * – statistical significance.

Table 2 presents the correlations of the analysed variables. The loan growth rate is most strongly correlated with the NIM variable, size and the capital ratio. It is worth noting that the correlation between the loan growth rate and the capital ratio is positive, which initially

indicates that only banks with a higher level of this ratio grant more loans. This is in line with the expectation that better capitalized banks provide more funding to the non-financial sector.

There is also a negative correlation with the ratio of the bank's liabilities to entities other than depositors from the non-financial sector in the balance sheet total. The loan growth rate is also correlated with market variables – a positive correlation with the unemployment rate and a negative correlation with the real GDP growth rate. There is no correlation between the loan growth rate and the share of deposits from the non-financial sector in the bank's balance sheet total.

4. RESEARCH RESULTS

In Table 3, we include baseline research results, without interaction terms. We present three models, one without macroeconomic determinants and the other two applying such determinants. As can be seen from the regressions, the link between the capital ratio and loans growth was positive, but not significant statistically. However, in economic terms, a positive association suggests that banks aiming at increased lending need to have higher levels of the capital ratio. Such a result is in line with other research (Beatty & Liao, 2011; Carlson et al., 2013; Kim & Sohn, 2017; Olszak et al., 2019).

Liquidity of banks, proxied with DEP (funds obtained from non-financial borrowers) and MFUND (funds accessed on the interbank market), is negatively associated with loans growth and mostly insignificantly in statistical terms. Such a result implies that banks with better access to stable funding delivered by non-financial depositors were not increasing their lending. This result suggests that potentially banks were not forced to deal with liquidity shortages in the period of analysis.

As can be seen from the table, bank size did not exert a significant effect on the loans growth rate. A negative regression coefficient for SIZE, however, implies that large banks tend to extend less credit, in line with previous research (Kim & Sohn, 2017; Olszak et al., 2019).

Profitability of the lending activity proxied with the net interest margin ratio (NIM) was positively linked with the loans growth rate, implying that increased efficiency of lending is associated with more credit extension. The interbank market rate is insignificantly –and in an ambiguous way – associated with the loans growth rate in the period of analysis. In that period, banks operated in an environment of very low interest rates. This implies that generally, they were extending loans not due to the level of rates in the interbank market, but rather because of non-interest related incentives covering, e.g., relationship banking or other qualitative aspects of bank lending (Claessens et al., 2018).

The unemployment rate exerted a positive and statistically significant effect on loans growth. Such a result is in contrast with theoretical expectations, suggesting that increased unemployment results in a weakened loans growth rate. There are several explanations for such effects, including, inter alia, a worsened financial condition of borrowers and increased credit risk, weakened incentives for banks to extend loans due to increased levels of non-performing loans, etc. However, in our period of research, average unemployment was relatively low (around 8%), meaning that conditions in the real economy were not necessarily playing a decisive role in the loan extension by banks. This result corroborates the effect of lagged GDPG which is positive, but statistically insignificant. A positive association between GDPG and loans growth is, however, in line with, e.g., Beatty et al. (2015) and Gómez et al., (2020).

Table 3
Baseline result – determinants of loans growth rate

	GLS	GLS	Weighted OLS
	2	5	6
$CAR_{(t-1)}$	0.001	0.002	0.003***
	(0.002)	(0.002)	(0.002)
$DEP_{(t-1)}$	−0.743	−0.831	−0.106
	(0.512)	(0.538)	(0.349)
$MFUND_{(t-1)}$	−0.944	−1.078*	−0.169
	(0.596)	(0.622)	(0.387)
$size_{(t-1)}$	−0.020	−0.020	−0.007
	(0.014)	(0.015)	(0.007)
$NIM_{(t-1)}$	0.016	0.012	0.0265***
	(0.016)	(0.017)	(0.010)
$WIBOR6M_{(t-1)}$		−4.180	0.017
		(0.034)	(0.023)
UNEMPL		1.274*	0.830*
		(0.736)	(0.470)
$GDPG_{(t-1)}$		2.456	1.083
		(1.704)	(1.084)
R^2			0.188
Sum of squared residuals	0.744	0.719	112.893
adjusted R^2			0.128
Test F p-value			0.003
No of observations	118	118	118
Variance between	0.001	0.001	
Variance within	0.006	0.006	
mean theta	0.283	0.343	
corr(y,yhat)^2	0.117	0.146	

Source: The authors' analysis with the use of data from individual banks' financial statements (bank-specific data) and EUORSTAT (macroeconomic variables).

Table 4 presents the effect of implementation of IFRS 9 on loans growth only (models 1 and 3) and the effect of IFRS 9 on the link between loans growth and the capital ratio (models 2 and 4). The regression coefficients for IFRS 9 in models 1 and 3 are not statically significant, meaning that IFRS 9 did not exert an economic and statistical effect on the loans growth rate of publicly traded banks in Poland. However, the positive and statistically significant coefficient for the interaction term between the capital ratio and IFRS9 suggests that only banks with a higher capital ratio in the group were able to extend more loans in the implementation period. Such a results is in line with the hypothesis of capital crunch (Beatty & Liao, 2011; Carlson et al., 2013).

Table 4
The effect of implementation of IFRS 9 on the link between lending and capital ratio

	GLS	GLS	GLS	GLS
	1	2	3	4
$CAR_{(t-1)}$	0.001	0.001	0.003	0.002
	(0.002)	(0.002)	(0.002)	(0.002)
$DEP_{(t-1)}$	−0.795	−0.992*	−0.835	−1.021*
	(0.541)	(0.567)	(0.540)	(0.565)
$MFUND_{(t-1)}$	−1.002	−1.232*	−1.085*	−1.309**
	(0.624)	(0.650)	(0.625)	(0.648)
$size_{(t-1)}$	−0.021	−0.025	−0.020	−0.023
	(0.015)	(0.017)	(0.014)	(0.017)
$NIM_{(t-1)}$	0.015	0.011	0.012	0.008
	(0.017)	(0.018)	(0.016)	(0.017)
$WIBOR6M_{(t-1)}$			−0.005	−0.021
			(0.041)	(0.041)
UNEMPL			1.349*	1.392*
			(0.799)	(0.781)
$GDPG_{(t-1)}$			2.235	1.18
			(1.927)	(1.948)
IFRS9	−0.005	−0.035	0.008	−0.010
	(0.019)	(0.024)	(0.031)	(0.031)
IFRS9xCAR$_{(t-1)}$		**0.004****		**0.004****
		(0.002)		(0.002)
R^2				
Sum of squared residuals	0.744	0.724	0.719	0.698
adjusted R^2				
Test F p-value				
No of observations	118	118	118	118
Variance between	0.001	0.001	0.001	0.001
Variance within	0.006	0.006	0.006	0.006
mean theta	0.341	0.417	0.340	0.416
corr(y,yhat)^2	0.116	0.141	0.146	0.171

Source: The authors' analysis with the use of data from individual banks' financial statements (bank-specific data) and EUORSTAT (macroeconomic variables).

4.2. The Role of "Intensity Of Steps" Taken to Prepare for the Implementation of IFRS

The results for the role of the intensity of steps to get prepared for the implementation of IFRS 9 are presented in Table 5. We differentiate between banks that started this process no later than in 2014 and denote them as PP1 banks (columns 1–5) and banks that started this process no later than in 2015 and mark them as PP2 banks (columns 9–10).

As can be seen from this table, banks that took more steps (in terms of earlier information about the expected implementation of IFRS 9 in financial reporting) did not exhibit a statistically significant change in the loans growth rate. However, there is a significant difference between PP1 and PP2 banks in terms of the average loans growth rate. PP1 banks exhibited on average reduced loans growth as all coefficients for PP1 are negative (see columns 2–5). In contrast, PP2 banks tended to extend more loans as the coefficients for PP2 are positive (see columns 7–10).

Looking now at the loans growth rate in the year of implementation of IFRS 9, i.e. 2018, we find that PP2 banks extended more loans than other banks because the regression coefficient for PP2xIFRS9 is positive and statistically significant (see model 9 in Table 5) and equals 0.00688. The banks which started to inform about the implementation later exhibited reduced average loans growth in the year of implementation of IFRS 9 as the statistically negative coefficient for IFRS9 dummy equals -0.0064. The PP1 banks exhibit a similar pattern of the loans growth rate, but the results are not statistically significant.

The results on the link between the loans growth rate and the capital ratio in the period of implementation of IFRS 9 show that lending of PP1 banks is more capital-constrained than lending of other banks as the regression coefficient for a triple interaction of PP1*IFRS9*CAR$_{(t-1)}$ is positive and statistically significant, equalling 0.0087. We also note a similar pattern of effects for PP2 banks. However, in this group, the estimated coefficients are not statistically significant.

Table 5
The effect of IFRS 9 on the link between lending and capital ratio – the role of the intensity of steps taken to implement IFRS 9

	1	2	3	4	5	6	7	8	9	10
$CAR_{(t-1)}$	0.0012	0.0008	0.0007	0.0007	0.0010	0.0012	0.0008	0.0010	0.0009	0.0016
	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0016)	(0.0015)	(0.0015)
IFRS9	−0.005	−0.035	−0.035	−0.0701	−0.006	−0.005	−0.035	−0.036	−0.064**	−0.048
	(0.0187)	(0.0235)	(0.0235)	(0.0467)	(0.0583)	(0.0187)	(0.0235)	(0.0237)	(0.0276)	(0.0316)
IFRS9xCAR$_{(t-1)}$		0.0039**	0.0040**	0.0040**	−0.003		0.0039**	0.0039**	0.0039**	0.0015
		(0.0018)	(0.0018)	(0.0018)	(0.0043)		(0.0018)	(0.0018)	(0.0018)	(0.0025)
PP1			−0.011	−0.021	−0.021					
			(0.0421)	(0.0438)	(0.0321)					
PP1 x **IFRS9**				0.0414	−0.038					
				(0.0476)	(0.0635)					
PP1x IFRS9xCAR$_{(t-1)}$					0.0087*					
					(0.0047)					
PP2								0.0187	0.0043	0.0089
								(0.0235)	(0.0248)	(0.0174)
PP2x **IFRS9**									0.0688*	0.0229
									(0.0354)	(0.0481)
PP2x **IFRS9xCAR**$_{(t-1)}$										0.0053
										(0.0038)
Sum squared residuals	0.7441	0.7235	0.7272	0.7255	0.6913	0.7441	0.7235	0.7087	0.6905	0.6685
No of observations	118	118	118	118	118	118	118	118	118	118
Variance between	0.0008	0.0011	0.0016	0.0016	0.0004	0.0008	0.0011	0.0008	0.0008	0
Variance within	0.0061	0.0058	0.0058	0.0058	0.0057	0.0061	0.0058	0.0058	0.0056	0.0055
mean theta	0.34061	0.4171	0.4843	0.4853	0.2544	0.3406	0.4171	0.3579	0.3717	0
corr(y,yhat)^2	0.1161	0.141	0.1372	0.1401	0.1787	0.1161	0.141	0.1583	0.1802	0.2058

Source: The authors' analysis with the use of data from individual banks' financial statements (bank-specific data) and EUORSTAT (macroeconomic variables). This is a shortened presentation of the results obtained with equation Eq. (1) with the use of bank-specific variables only. The estimations are conducted with the random effects technique. IFRS9 is a dummy equal to 1 in the period of implementation of IFRS 9. PP1 – a dummy variable taking the value of 1 for banks that started informing about IFRS 9 in their financial reports at least in 2014 (i.e. in 2013 and 2014) and 0 otherwise. PP2 – a dummy variable taking the value of 1 for banks that started informing about IFRS 9 in their financial reports at least in 2015 (i.e. in 2013, 2014 and 2015) and 0 otherwise.

5. CONCLUSIONS

This paper focuses on the role of the IFRS 9 standard on the loans growth rate and the link between lending and the capital ratio in publicly traded banks in Poland. We use hand-collected individual bank level data from financial statements covering the period of 2012–2018. The analysis with the random effects estimator shows that, on average, in 2018 loans growth was reduced. However, the reduction was not statistically significant.

The implementation of IFRS 9 enhanced the link between loans growth and the capital ratio, thus suggesting that these accounting standards were related with a capital crunch. Our results show that in the year of implementation of IFRS 9, the link between lending and the capital ratio was positive. In effect, only those banks which exhibited higher levels of the capital ratio were able to extend more new loans.

We also find that banks which took more steps to inform in their reporting about the expected introduction on of IFRS 9 extended more loans than other banks.

The results on the link between the loans growth rate and the capital ratio in the period of implementation of IFRS 9 also show that lending of banks which started to include information about the new accounting standard in their financial reporting exhibited a stronger effect of the capital ratio on lending.

The research contributes to the literature because it is the first paper to test the role of IFRS 9 on loans growth and on the link between loans growth and the capital ratio. As this paper shows, the implementation of IFRS 9 did exert a significant effect on the role of the capital ratio for lending in the first year of implementation. This research thus reveals that only better capitalized banks may extend new loans when new regulation on the non-performing loans assessment is introduced.

Our study has several shortcomings. First, it refers only to publicly traded banks, and does not consider other commercial banks or cooperative banks. Second, it is a one-country study. Third, it does not consider other aspects of bank activity, like profitability or risk-taking. Future research should be extended to cover other types of banks, to use a cross-country sample, and to cover other areas of bank activity.

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