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Elections and bank non-performing loans: Evidence from developed countries

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Abstract: The existing literature has not examined how elections affect bank non-performing loans and its determinants even though banks are often the largest borrowers to fund election campaigns in many countries. This study investigates the determinants of bank non-performing loans (NPL) during election years in 35 developed countries. The fixed effect regression methodology was used to estimate the determinants of bank non-performing loans during election years. It was found that the banking sector experienced high NPLs during election years. Efficient banks operating in robust legal environments have higher non-performing loans during election years. It was also found that capital adequacy ratio, real GDP growth, loan-to-GDP ratio, cost-to-income ratio, political stability, and absence of terrorism are significant determinants of bank non-performing loans. The findings imply that election matters for the persistence of bank non-performing loans in developed countries.

Keywords: non-performing loan; bank performance; election; banks; credit risk; efficiency; capital adequacy ratio; GDP growth; political stability.

JEL Classification: G21, G28.

1. Introduction

Rising non-performing loans (NPLs) are a major cause of bank failure, and it is a significant obstacle to the development of the banking sector. Prior studies show that NPLs have a signaling effect because they convey valuable information about incurred losses and the quality of banks' loan portfolios (Ahamed, 2017; Laryea et al., 2016). Although bank supervisors want fewer NPLs and possibly a single-digit NPL ratio in the banking sector, in reality, the level of NPLs in banks has increased significantly over the years, especially in Europe[1]—due to the COVID-19 pandemic, the Russia-Ukraine war and rising inflation (Kasinger et al, 2021). Elections are also known to introduce shocks in the business environment. The literature shows that elections affect business activities, initial public offerings (IPOs), stock markets, corporate investment, and labor spending (Amore & Corina, 2021; Clarke, 2013; Kayser, 2006; Çolak et al., 2017). However, the effect of elections on the banking sector has not been examined extensively. The existing literature has not examined how elections affect bank NPL and its determinants, even though banks are often the largest borrowers to fund election campaigns in many countries.

This study investigates the determinants of NPLs during an election year, focusing on the impact of the election year on NPLs while controlling for bank-specific factors and the quality of legal institutions, political stability, and other factors. Understanding how elections affect bank NPLs is vital because bank lending to politicians may give rise to credit risk, which is the risk that borrowed loans for election campaigns may not be repaid to banks. If the borrower wins the election, banks often respond by writing off the loan or restructuring the loan for delayed repayment of interest and principal in exchange for the

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[1] https://blogs.lse.ac.uk/europpblog/2019/03/27/why-non-performing-loans-are-still-putting-the-european-banking-union-at-risk/

borrower's political patronage to support the bank's business interests in the country. Banks can also write off the debt of borrowers affiliated with the ruling party with the expectation that the ruling party will, in return for the kindness shown by the bank, create a favorable business environment for the bank. Such loan write-offs have negative implications for the stability of the banking sector. Furthermore, even if banks do not give loans to fund election campaigns, banks may still experience non-performing loans that arise from election uncertainties. The above arguments demonstrate the potential effect of the election on bank non-performing loans and its overall effect on the banking sector.

I argue that the 'election year' is a type of country risk that banks will take into account if they believe that a change in the current government following general elections may affect their ability to recover loans from politically connected debtors, thereby leading to an increase in credit risk and rising non-performing loans. Despite the importance of elections on bank credit risk, the existing literature has not examined the behavior of non-performing loans in the banking sector during an election year. I examine this issue in this study. In the empirical analysis, I analyze data from 35 developed countries.

The study reveals that the banking sector experiences high NPLs during an election year. Efficient banks operating in countries with solid legal environments have higher NPLs during an election year. It was also found that capital adequacy ratio, real GDP growth, loan-to-GDP ratio, cost-to-income ratio, political stability, and absence of terrorism are significant determinants of non-performing loans.

This study makes three contributions to the NPL literature. First, it contributes to the literature examining non-performing loan behavior under various contexts and economic conditions (see. Podpiera and Ötker, 2010; Zhang et al., 2016; Vithessonthi, 2016; Kauko, 2012). These studies show that the level of non-performing loans in banks is influenced by economic factors and other unique conditions faced by banks. Second, this study contributes to the literature investigating institutional factors' influence on non-performing loans (e.g., Beck et al., 2015; Ghosh, 2015; Bardhan & Mukherjee, 2016). By controlling for the election year effect, political stability, and legal system quality, this study presents new insights to understand how unique political and legal institutions across countries influence the size of non-performing loans during an election year. Third, this study examines the behavior of non-performing loans in the banking sector of developed economies with regular elections that are transparent and free from structural barriers. This presents a natural setting to test the effect of election-year on non-performing loans in this study.

The remainder of the paper is organized as follows. Section 2 provides an overview of the relevant literature. Section 3 presents the data and methodology. Section 4 presents the empirical results. Section 5 presents the conclusion of the study.

2. Literature Review

Many studies examine the bank-specific and external determinants of bank NPLs (Louzis et al., 2012; Klein, 2013; Nkusu, 2011; Fofack, 2005). For instance, Beck et al. (2015) examined the macroeconomic determinants of NPLs across 75 countries and found that the following variables were significant determinants of NPLs: real gross domestic product growth rate, share prices, the exchange rate, and the lending interest rate. Ozili (2020) investigates the behavior of NPLs in European systemic and non-systemic banks and finds that more profitable banks witness higher NPLs regardless of whether systemic or non-systemic. Systemic banks have fewer NPLs during economic booms and periods of increased lending, while non-systemic banks experience higher NPLs during increased lending. Also, the NPLs of non-systemic banks are negatively associated with regulatory capital ratios.

Ghosh (2015) investigates banks in the United States and shows that greater capitalization, liquidity risk, poor credit quality, more significant cost inefficiency, and banking industry size are major factors that increase NPLs, while greater bank

profitability lowers NPLs. Ghosh (2015) also shows that higher real GDP, accurate personal income growth rates, and housing price index change reduce NPLs, while inflation, unemployment, and higher public debt significantly increase NPLs. Bardhan and Mukherjee (2016) examine the role of bank-specific determinants in explaining the dynamics of NPLs in Indian banks during the post-liberalization period from 1995 to 2011. They find that, although there was a significant time persistence of NPLs in the Indian banking system, larger banks were more prone to loan default than smaller banks. Al-Khazali and Mirzaei (2017) examine whether oil price shocks have any impact on bank NPLs and find that a rise in oil prices leads to a decrease in NPLs, and oil price shocks have an asymmetric effect on bank problem loans, with adverse oil price movements having a more significant impact than positive oil price movements.

A few studies examined NPLs under several contexts and certain events, but none have considered the effect of the election event on bank NPLs. For instance, Podpiera and Ötker (2010) investigated the determinants of credit default swaps during the initial phase of the global financial crisis in selected European Large Complex Financial Institutions (LCFIs) from 2004 to 2008. They use a dynamic panel data estimator and find that the LCFIs' business models, earnings potential, and economic uncertainty are among the most significant determinants of credit risk. Zhang et al. (2016) examine the impact of NPLs on bank behavior in China. They examine 60 city commercial banks, 16 state-owned and joint-stock banks, and 11 rural commercial banks during the 2006 to 2012 period and find that higher non-performing loans increase riskier lending, causing further deterioration in loan quality for Chinese commercial banks and leading to financial system instability. Osei-Assibey and Asenso (2015) investigate the influence of the central bank's regulatory capital on several indicators of bank performance, including NPLs, over the 2002 to 2012 period. They find that banks create more loans when they have excess capital over the minimum requirement, and the loans subsequently lead to high NPLs. Vithessonthi (2016) investigates the link between bank credit growth and NPLs in Japan which was experiencing deflation during the 1993 to 2013 period. Vithessonthi (2016) shows that bank credit growth is positively correlated with NPLs prior to the global financial crisis of 2007 but negatively correlates with NPLs afterwards. In addition, credit growth and NPLs do not affect bank profitability. Overall, their findings suggest that although an increase in credit supply increases the level of NPLs, it does not lead to higher profitability.

Furthermore, Kauko (2012) investigates the interrelationship between trade current account deficits and the number of NPLs before the global financial crisis and finds that the rapid credit growth from 2000 to 2005 combined with a current account deficit was a significant determinant of NPLs for the EU countries. Barseghyan (2010) shows that the existence of NPLs and a delay in government bailout lead to a persistent decline in economic activity and output. The decline in economic output was caused by a fall in investment, an endogenous decline in productivity, and the number of firms in Japan. Cucinelli (2015) examines whether an increase in credit risk (measured as NPLs and loan loss provisions) during the financial crisis reduces banks' lending activity in Italy. The study analyze 488 listed and unlisted Italian banks during the 2007 to 2013 period. The results show that higher credit risk (i.e., non-performing loans and loan loss provisions) harms bank lending behavior. Ozili (2019) examines the size of NPLs contingent on the level of financial development and finds a positive association between the level of financial development and the size of bank NPLs. Bashir et al. (2017) examine the influence of banking system transparency and competition in reducing the level of NPLs for Chinese banks from 2000 to 2014. They find that high transparency in the Chinese banking system decreased NPLs but not in the case of government-owned banks, while higher competition increases NPLs.

Recent studies such as Ahiase et al. (2024) investigate the macro determinants of bank NPLs in 53 African countries. They find that the debt-to-GDP ratio, unemployment rate, regulatory quality, government effectiveness, and inflation are significant determinants

of NPLs in African countries. Mamoon et al. (2024) examine the effect of central bank independence and transparency on the occurrence of NPLs. They examine 39 countries and find that NPLs are fewer in countries where the central bank is free from political interference. They also find that NPLs are fewer in countries where the central bank is transparent. Rehman et al. (2024) investigated the effect of corruption control on NPLs in 81 banks in Pakistan, India, and Bangladesh from 2000 to 2019. They used the fixed effect model and found that control of corruption has a significant negative effect on NPLs. This indicates that solid control of corruption would decrease NPLs in Pakistan, India, and Bangladesh. Abdullah et al. (2024) examine the effect of NPLs on bank lending in six Association of Southeastern Asian Nations (ASEAN). They find that NPLs and loan Loss provisions negatively affect bank lending. This indicates that banks are cautious about increasing lending with high NPLs and loan loss provisions. Nguyen (2024) examined the effect of NPLs on bank profitability in Vietnam from 2005 to 2020. They find that bank profitability, bank size, and economic boom reduce NPLs while operating costs, loan loss provisions, and macro factors worsen bank NPLs. Ozili (2023) investigates the correlation between banking sector NPLs and the level of sustainable development. The author finds a significant positive correlation between banking sector NPLs and the level of sustainable development among European countries and in countries in the region of the Americas. Generally, the evidence for the determinants of NPLs is mixed in the literature. However, the existing literature has not examined the effect of the election on bank NPLs both at the bank level and country level.

3. Research Methodology

3.1. Data

Annual country-level data were collected for 35 developed countries, chosen from the United Nations list of developed countries.[2]Developed countries were used in the study because they have more regular elections than developing countries and transition economies. Also, developed economies do not experience coups (overthrows of government) or dictatorships that prevent elections, while all these are arguably more prevalent in some transition economies and developing countries.

Financial statement annual data for each country were obtained from the World bank database. The sample period is from 1998 to 2016 and is sufficient to cover at least six election cycles. Real gross domestic product (GDP) growth rate data were collected from the World Economic Forum archived in the World Bank database. In contrast, institutional data were collected from the World Governance Indicators database of the World Bank. Election data were obtained from public sources such as government websites, Wikipedia, and other public sources. These public sources are the most reliable source of information on elections. Finally, see Appendix 1 for the source of data and variable description.

3.2. Model

The baseline model used to estimate the determinants of non-performing loans during the election year is specified below. It is a modified version of the models used in previous NPL literature (see Louzis et al., 2012; Beck et al., 2015; Ozili, 2019; Ozili, 2020).

$$\text{NPL}_{i,t} = \beta_0 + \beta_1 \text{CI}_{i,t} + \beta_2 \text{CAP}_{i,t} + \beta_3 \text{CRISIS}_{i,t} + \beta_4 \Delta \text{GDP}_{i,t} + \beta_5 \text{PS}_{i,t} + \beta_6 \text{ELECT}_t + \beta_7 \text{LG}_{i,t} + e \tag{1}$$

where CI = ratio of total cost to total income in each country's banking sector. NPL = ratio of non-performing loans to gross loans in each country's banking sector. ELECT = a binary variable that equals one in an election year and zero in a non-election year. CRISIS = a

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[2] The UN List of developed countries can be found here: https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/WESP2019_BOOK-ANNEX-en.pdf

binary variable that equals one in a banking or financial crisis year and zero otherwise. ΔGDP = real domestic product growth rate of each country. PS = political stability and absence of terrorism index; the higher, the better. CAP = ratio of bank capital to total assets (%). LG = credit ratio provided to the private sector by banks as a share of GDP in each country. t = year. i = country.

The model above expressed non-performing loans as a function of its bank-specific and external determinants. The models are estimated using the panel fixed effect regression method based on the Hausman test, which showed that the fixed effect method is the preferred panel regression method. The choice of the fixed effect regression method is also because the fixed effect model allows us to control for all time-invariant omitted variables that are difficult to observe, and it reduces the potential sources of bias in the estimations in comparison to the random effect model, thereby giving us a less biased estimator.

3.3. Variable justification

For the explanatory variables, the ELECT variable is the primary variable of interest because it captures the election year in the developed countries in the sample. A positive sign for the ELECT coefficient is expected if the banking sector experiences higher non-performing loans during the election year. This is because business uncertainty during the election year can amplify banking sector credit risk, possibly giving rise to non-performing loans. Furthermore, banks that lend to election campaign borrowers may experience difficulty in compelling such borrowers to pay their debt, which could lead to loan defaults.

For the control variables, the CAP variable is introduced into the model to control for the role of bank capital in absorbing unexpected losses that arise from high non-performing loans. Banks that have a low capital ratio will avoid risky lending to prevent their capital from being depleted, while banks that have adequate capital can take more risks and engage in risky lending, which may lead to higher non-performing loans; thus, a positive relationship between bank capital ratio and non-performing loans is expected. This expectation is supported by Zhang et al. (2016) and Osei-Assibey and Asenso (2015). The cost-to-income ratio (CI) variable is introduced into the model to control for banks' efficiency in managing costs relative to income. This ratio is also considered to reflect the quality of bank management. Banking sectors with a lower efficiency ratio (i.e., high cost and low income) are considered inefficient and tend to have higher non-performing loans; thus, a positive relationship between CI and NPL is expected. This expectation is supported by Zhu et al. (2015), Karim et al. (2010) and Ozili (2018).

The CRISIS variable is obtained from the World Bank database containing data on countries that have experienced financial or banking crises. The CRISIS variable is introduced into the model to capture the years a country experienced financial (or banking) crises. Ideally, non-performing loans should be higher in a crisis year and lower in a non-crisis year (Ozili, 2018); thus, a positive relationship between NPL and CRISIS is expected. In the estimation procedure, the CRISIS variable is a binary variable that equals one in a banking or financial crisis year and zero otherwise. The real gross domestic product growth rate (ΔGDP) variable is introduced into the model to control the size of non-performing loans along the business cycle. Prior studies show that banks tend to have fewer non-performing loans in economic boom years because the level of employment is often high in good times which increases the ability of debtors to earn income and repay their debt, thus reducing the level of loan default. On the other hand, banks tend to have larger non-performing loans in recession years because the level of unemployment is often high in bad times; people would lose their source of income, which increases the probability of loan default and leads to higher non-performing loans (Beck et al., 2013; Klein, 2013; Ozili, 2020).

The total loan-to-GDP ratio (LG) is introduced into the model to reflect the extent to which the economy is driven by private credit. The LG ratio measures the amount of credit

banks provide to the private sector as a share of GDP. Banks in highly credit-driven economies tend to experience higher non-performing loans than banks in economies that are less driven by credit; thus, a positive relationship between NPL and LG is expected. Using the formula below, the LG ratio is derived mathematically by multiplying the credit-to-deposit ratio data with the bank deposit-to-GDP data in the World Bank database.

$$LOAN/GDP = (LOAN/BANK\ DEPOSIT) * (BANK\ DEPOSIT/GDP) \tag{2}$$

The PS variable is the political stability (PS) index. The PS variable is introduced into the model to capture the effect of political stability (or instability) on bank NPLs. Higher values of PS indicate more excellent political stability. A negative relationship between NPL and PS is expected because Ghosh (2016) shows that banks in politically unstable environments tend to perform poorly - they have low profitability and higher non-performing loans. The LAW variable measures legal system quality or the rule of law. The LAW variable is introduced into the model to capture the role of the rule of law in reducing NPLs in the banking sector. A negative relationship between NPL and LAW is expected because banks operating in countries with strong legal institutions can use the power of the courts to compel debtors to repay the loans owed to banks, thereby reducing bank NPLs. Table 1 presents a summary of the expected signs for the variables.

Table 1. Information about the variables

Variable	Expected/Predicted Sign	Description
NPL	Dependent Variable	Bank non-performing loans divided by gross loans
ELECT	(+)	Election year
CAP	(+)	Bank capital ratio
CI	(+)	Efficiency ratio
LG	(+)	Private credit supply to the economy as a percent of GDP
LAW	(-)	The rule of law/quality of legal system index
PS	(-)	Political stability and absence of terrorism index
ΔGDP	(-)	Annual change in real gross domestic product
CRISIS	(+)	Financial crisis years

4. Discussion of Results

4.1. Descriptive statistics and correlation analysis

Table 2 reports the summary of the descriptive statistics of the variables. The average bank capital ratio (CAP) is 7.18% of total assets. CAP is higher in the banking sectors of Iceland, Croatia, and Bulgaria and much lower in Belgium and Japan's banking sectors. The NPL ratio averages 5.18%, a double-digit ratio in Cyprus, Croatia, and Italy. The high double-digit NPLs indicate that the banking sector of these countries has low asset quality. Comparatively, NPLs are much lower in the banking sector of Canada, Luxembourg, and Australia. The bank efficiency ratio (CI) averages 59.61%. CI is higher in Germany, Greece, and Switzerland's banking sector and much lower in Ireland and the Netherlands. ΔGDP, on average, is about 2.42% and is lower in Greece and Italy and is higher in Lithuania and Latvia. The PS variable is higher in Luxembourg and New Zealand's banking sector and much lower in Spain and Romania. Overall, the result from the descriptive statistics suggests that the banking sector and the institutional environment vary across developed countries.

Table 2. Descriptive statistics (mean)

	Sample Countries	CAP	NPL	ELECT	ΔGDP	PS	LAW	CRISIS	CI	LG
1	Canada	4.64	0.88	0.31	2.35	1.07	11.35	0	59.26	105.55
2	United States	10.50	1.95	0.26	2.28	0.46	10.94	0.35	59.54	51.19
3	Japan	4.67	3.38	0.36	0.71	1.03	10.58	0.28	58.18	116.23
4	France	5.37	4.21	0.15	1.56	0.48	10.52	0.28	69.48	86.88
5	Germany	4.59	3.66	0.26	1.42	0.90	10.47	0.28	77.61	96.48
6	Italy	6.18	10.24	0.21	0.44	0.54	10.94	0.28	66.86	76.84
7	United Kingdom	6.50	2.33	0.21	2.03	0.47	10.35	0.35	61.75	-
8	Norway	6.67	1.21	0.21	1.76	1.29	10.29	0	54.25	88.56
9	Iceland	12.19	4.66	0.31	3.41	1.35	8.64	0.28	49.84	136.36
10	Switzerland	5.46	1.52	0.26	1.94	1.33	9.82	0.28	79.16	153.37
11	Sweden	4.95	1.10	0.26	2.54	1.21	10.35	0.28	62.84	110.81
12	Spain	6.87	3.47	0.31	2.05	0.02	10.52	0.28	56.13	127.55
13	Portugal	6.44	5.51	0.21	0.92	0.98	10.23	0.28	63.53	128.28
14	Netherland	4.48	2.51	0.31	1.77	1.09	10.17	0.28	64.28	114.77
15	Luxembourg	5.27	0.45	0.21	3.51	1.42	7.64	0.28	48.41	83.93
16	Ireland	6.98	7.88	0.11	5.37	1.15	9.82	0.28	36.41	104.95
17	Greece	7.46	14.83	0.26	0.50	0.23	10.52	0.28	74.62	79.34
18	Finland	6.52	0.54	0.16	1.90	1.45	10.06	0	51.20	72.87
19	Denmark	6.03	2.36	0.26	1.35	1.10	10.06	0.28	61.83	152.57
20	Belgium	4.35	2.86	0.26	1.69	0.83	10.17	0.28	63.76	61.51
21	Austria	6.14	2.65	0.21	1.76	1.16	10.17	0.28	61.81	90.91
22	Australia	5.80	0.97	0.36	3.19	0.98	10.05	0	51.36	105.79
23	New Zealand	6.52	1.15	0.31	2.81	1.33	10.23	0	59.88	122.01
24	Slovenia	8.50	7.21	0.16	2.37	1.03	13.05	0.28	57.63	54.62
25	Romania	8.20	14.76	0.21	3.32	0.18	14.52		56.13	22.80
26	Poland	8.16	8.89	0.21	3.75	0.71	14.41	0	62.24	37.27
27	Malta	8.09	7.32	0.21	3.71	1.26	6.88	0	49.04	101.74
28	Lithuania	10.24	9.21	0.32	4.07	0.75	12.94	0	65.08	34.13
29	Latvia	8.31	5.27	0.32	3.96	0.53	12.52	0.285	56.85	49.82
30	Hungary	8.60	6.98	0.21	2.34	0.84	13.94	0.28	67.83	43.94
31	Estonia	10.79	1.66	0.21	3.76	0.70	13.35	0	53.75	61.34
32	Cyprus	7.34	24.69	0.21	2.48	0.49	8.47	0	58.32	174.58
33	Czech Republic	6.15	8.22	0.21	2.55	0.93	13.70	0.21	54.36	42.94
34	Croatia	12.51	10.05	0.32	1.74	0.55	13.47	0.14	57.11	53.48
35	Bulgaria	11.37	9.74	0.21	3.19	0.27	14.11	0	54.30	41.68
	Total mean	7.18	5.18	0.25	2.42	0.86	11.01	0.19	59.61	87.14
	Total median	6.50	2.81	0.00	2.53	0.93	11.00	0.00	58.89	84.25
	Observations	601	606	665	665	595	595	476	594	616

Source: Author's calculations.

Table 3 reports the Pearson correlation coefficients and the associated t-statistics and *p*-values. The NPL coefficient is positive and weakly correlated with the ELECT variable (0.008). However, the correlation between NPL and ELECT is not significant. NPL is negative and significantly correlated with ΔGDP (-0.188***), indicating that bank NPLs are procyclical with fluctuations in the business cycle. The CRISIS coefficient is positive and significantly correlated with NPLs. This indicates that non-performing loans are higher in a financial crisis year. The PS coefficient is negatively correlated with NPLs. This indicates that banks in politically stable environments have fewer non-performing loans. The CI coefficient is positively correlated with NPLs. This indicates that non-performing loans are higher in inefficient banking sectors. The LG coefficient is also negatively correlated with NPLs. This indicates that non-performing loans are lower in highly credit-driven economies. Overall, the correlation of the variables is sufficiently low to be

concerned about multi-collinearity. Table 3 reports the Pearson correlation coefficients for the country variables.

Table 3. Correlation Matrix

Variables	CI	ΔGDP	LG	CRISIS	CAP	PS	LAW	ELECT	NPL
CI	1.000								

ΔGDP	0.001	1.000							
	(0.01)	-----							
LG	-0.155***	-0.370***	1.000						
	(-2.92)	(-7.39)	-----						
CRISIS	0.117**	-0.423***	0.290***	1.000					
	(2.18)	(-8.67)	(5.63)	-----					
CAP	-0.079	0.104**	-0.360***	-0.048	1.000				
	(-1.48)	(1.94)	(-7.17)	(-0.90)	-----				
PS	-0.120**	0.079	0.181***	-0.161***	-0.265***	1.000			
	(-2.24)	(1.48)	(3.41)	(-3.03)	(-5.10)	-----			
LAW	-0.069	-0.049	-0.269***	0.179***	0.253***	-0.383***	1.000		
	(-1.29)	(-0.92)	(-5.19)	(3.38)	(4.86)	(-7.70)	-----		
ELECT	-0.009	0.034	0.009	-0.005	-0.021	-0.055	0.012	1.000	
	(-0.17)	(0.64)	(0.17)	(-0.11)	(-0.38)	(-1.03)	(0.22)	-----	
NPL	0.103*	-0.188***	-0.147***	0.206***	0.341***	-0.352***	0.280***	0.008	1.000
	(1.93)	(-3.56)	(-2.75)	(3.90)	(6.73)	(-6.98)	(5.42)	(0.14)	-----

t-statistics are reported in parenthesis. ***, **, * indicate statistical significance at the 1%, 5% and 10% levels. *Source:* Author's calculations.

4.2. Regression results: Election year as a determinant of bank non-performing loans

The estimation result is reported in Table 4. The ELECT coefficient is positive and insignificant in all three estimations, implying that the election year did not significantly affect bank non-performing loans in developed economies. The CI coefficient is positively significant for the control variables in columns (2) and (3). This suggests that an inefficient banking sector has higher non-performing loans, which is consistent with the findings of Zhu et al. (2015), Karim et al. (2010), and Ozili (2018). The CAP coefficient is positively significant, as expected. This indicates that banks that have high capital ratios experience higher non-performing loans. This result is consistent with Zhang et al (2016) and Osei-Assibey and Asenso (2015). The ΔGDP and PS coefficients report the expected sign in the three estimations. The result indicates that non-performing loans are higher in recessionary years and politically unstable environments. The CRISIS coefficient is positively significant, as expected in columns 1 and 3, and is consistent with the apriori expectation that banks experience higher non-performing loans during financial (or banking) crisis years. As expected, the LG coefficient is positively significant in columns 1 and 2, indicating that banks in highly credit-driven economies have higher nonperforming loans.

Table 4. Determinants of bank non-performing loans

	(1)	(2)	(3)
	Panel Fixed effect	Panel GMM	Panel OLS
Variables	Coefficient	Coefficient	Coefficient
	(t-statistic)	(t-statistic)	(t-statistic)
C	2.955*	-	-
	(1.69)		
NPLt-1		0.009***	
		(66.89)	
ELECT	0.015	-0.050	0.188
	(0.05)	(-0.33)	(0.41)
CI	0.012	0.026**	0.039***
	(0.79)	(2.58)	(3.86)
CAP	0.377***	0.233***	0.546***
	(3.70)	(5.47)	(8.48)
CRISIS	1.101*	-3.152*	1.295**
	(1.87)	(-1.79)	(2.35)
ΔGDP	-0.375***	-0.407***	-0.206***
	(-5.04)	(-6.39)	(-3.12)
PS	-4.217***	-2.839***	-1.776***
	(-4.89)	(-4.04)	(-3.88)
LG	0.024***	0.059***	-0.005
	(2.70)	(3.64)	(-1.04)
R^2	67.91		24.81
Adjusted R^2	62.47		23.49
F-statistic	12.48		
Prob (F-statistic)	0.000		
J-statistic		11.65	
Prob(J-statistics)		0.705	
No of Observation (adjusted)	346	282	346

Model (1) is estimated using panel fixed effect regression (with country and year fixed effect). Model (2) is estimated using GMM first-difference regression (this includes difference fixed effect and period effect using the ordinary coefficient covariance method). Model (3) is estimated using ordinary OLS with no fixed effect. NPL = ratio of non-performing loans to gross loans: the lower, the better. ELECT = a binary variable that equals one in an election year and zero in a non-election year. CRISIS = a binary variable that equals one in a financial or banking crisis year and zero otherwise. ΔGDP = real domestic product growth rate; CI = cost to income ratio. CAP = ratio of total capital to total asset. PS = political stability/absence of terrorism index: the higher, the better. LG = credit ratio provided to the private sector by banks as a share of GDP. NPLt-1 = one-year lag of the non-performing loans ratio. ***, **, * denote 1%, 5% and 10% significance levels. *Source:* Author

4.3. Interaction analyses

4.3.1. Interaction analysis of NPL determinants during election year

This section tests the effect of the election year on each determinant of non-performing loans. The ELECT variable interacted with each NPL determinant to do this, as shown in Equation 2 below.

$$L_{i,t} = \beta_0 + \beta_1 CI_{i,t} + \beta_2 CAP_{i,t} + \beta_3 CRISIS_{i,t} + \beta_4 \Delta GDP_{i,t} + \beta_5 PS_{i,t} + \beta_6 ELECT_t + \beta_7 LG_{i,t} + \beta_8 ELECT_t \times CAP_{i,t} + \beta_9 ELECT_t \times CRISIS_{i,t} + \beta_{10} ELECT_t \times \Delta GDP_{i,t} + \beta_{11} ELECT_t \times PS_{i,t} + \beta_{12} ELECT_t \times LG_{i,t} + e \qquad (3)$$

The result is reported in Table 5. The ELECT*CI coefficient is negatively significant, indicating that inefficient banking sectors have fewer non-performing loans during an election year. Meanwhile, the ELECT*CAP, ELECT*LG, ELECT*GDP, ELECT*PS, and ELECT*CRISIS coefficients are all statistically insignificant.

Table 5. Interaction analysis of NPL determinants during an election year (Panel fixed effect regression estimation)

Variables	(1) Coefficient (t-statistic)	(2) Coefficient (t-statistic)	(3) Coefficient (t-statistic)	(4) Coefficient (t-statistic)	(5) Coefficient (t-statistic)	(6) Coefficient (t-statistic)	(7) Coefficient (t-statistic)	(8) Coefficient (t-statistic)
C	2.955*	2.931*	2.425	3.035*	3.174*	2.856	2.967*	2.635
	(1.69)	(1.67)	(1.39)	(1.73)	(1.79)	(1.61)	(1.69)	(1.44)
ELECT	0.015	-0.054	-4.031**	-0.777	-0.633	0.246	-0.008	2.164
	(0.05)	(-0.13)	(-2.59)	(-0.81)	(-0.85)	(0.32)	(-0.02)	(0.76)
CI	0.012	0.012	0.024	0.013*	0.012	0.013	0.012	0.024
	(0.79)	(0.78)	(1.51)	(1.92)	(0.79)	(0.80)	(0.79)	(1.46)
CAP	0.377***	0.379***	0.364***	0.353***	0.373***	0.379***	0.378***	0.348***
	(3.71)	(3.71)	(3.59)	(3.35)	(3.66)	(3.71)	(3.70)	(3.24)
CRISIS	1.101*	1.105*	1.052*	1.133*	1.058*	1.106*	1.074*	1.022
	(1.87)	(1.87)	(1.80)	(1.92)	(1.79)	(1.87)	(1.72)	(1.63)
ΔGDP	-0.375***	-0.382***	-0.387***	-0.377***	-0.371***	-0.374***	-0.374***	-0.403***
	(-5.04)	(-4.83)	(-5.25)	(-5.07)	(-4.99)	(-5.03)	(-5.03)	(-5.06)
PS	-4.216***	-4.195***	-4.294***	-4.200***	-4.271***	-4.147***	-4.220	-4.183***
	(-4.89)	(-4.84)	(-5.03)	(-4.87)	(-4.94)	(-4.66)	(-4.88)	(-4.70)
LG	0.024***	0.025***	0.025***	0.024***	0.023**	0.024***	0.024***	0.023**
	(2.71)	(2.72)	(2.78)	(2.74)	(2.47)	(2.71)	(2.69)	(2.55)
ELECT*ΔGDP		0.027						0.081
		(0.26)						(0.67)
ELECT*CI			-0.069***					-0.061***
			(-2.64)					(-2.17)
ELECT*CAP				0.117				0.093
				(0.88)				(0.62)
ELECT*LG					0.007			0.009
					(0.98)			(0.99)
ELECT*PS						-0.262		-0.374
						(-0.33)		(-0.44)
ELECT*CRISIS							0.106	0.096
							(0.13)	(0.10)
R²	67.91	67.92	68.64	67.99	68.01	67.91	67.91	68.80
Adjusted R²	62.47	62.35	63.21	62.44	62.46	62.35	62.34	62.76
F-statistic	12.48	12.20	12.62	12.25	12.26	12.20	12.19	11.38
Prob (F-statistic)	0.000	0.000	0.0000	0.000	0.000	0.000	0.000	0.000
No of Observations	346	346	346	346	346	346	346	346

The models in Table 5 are estimated using panel fixed effect regression (with country and year fixed effect). GMM estimations could not be run due to the near-perfect collinearity of the lag variables with the instrumental variables. NPL = ratio of non-performing loans to gross loans: the lower, the better. ELECT = a binary variable that equals one in an election year and zero in a non-election year. CI = cost to income ratio. CAP = ratio of total capital to total asset. CRISIS = a binary variable that equals one in a financial, banking, or economic crisis year and zero otherwise. ΔGDP = real domestic product growth rate. PS = political stability/absence of terrorism index: the higher, the better. LG = credit ratio provided to the private sector by banks as a share of GDP. ***, **, * denote 1%, 5% and 10% significance levels. *Source:* Author's calculations.

4.3.2. Effect of bloc membership on non-performing loans

In this section, I test whether bloc membership positively or negatively impacts non-performing loans in the election year. Some regional political blocs adopt a uniform mechanism to deal with non-performing loan problems in the banking sector of member

countries. I consider the case of member countries in the European Union, the G7 (also known as the most advanced economies), and the member countries of the Bank of International Settlement.[3] (BIS). I estimate the differences in banking sector non-performing loans during an election year for EU, non-EU, BIS, and G7 countries. Binary variables were used to capture bloc membership in the European Union (**EU**), non-European Union (**non-EU**), BIS member countries (BIS), and the G7 countries (**MDE**). The 'EU' binary variable is assigned a value of one if the developed country is a member of the European Union and zero otherwise. The 'non-EU' binary variable is assigned a value of one if the developed country is not a member of the European Union and zero otherwise. The 'MDE' binary variable is assigned a value of one if the developed country is a member of the G7 countries and zero otherwise. The 'BIS' binary variable is assigned a value of one if the developed country is a Bank of International Settlement member and zero otherwise. The estimation result in Table 5 is based on the model below.

$$\text{NPL}_{i,t} = \beta_0 + \beta_1 \text{ELECT}_t + \beta_2 \text{CI}_{i,t} + \beta_3 \text{CAP}_{i,t} + \beta_4 \text{CRISIS}_{i,t} + \beta_5 \Delta\text{GDP}_{i,t} + \beta_6 \text{PS}_{i,t} + \beta_7 \text{LG}_{i,t} + \beta_8 \text{EU}_i + \beta_9 \text{Non-EU}_i + \beta_{10} \text{MDE}_i + \beta_{11} \text{BIS}_i + \beta_{12} \text{ELECT}_t \times \text{EU}_i + \beta_{13} \text{ELECT}_t \times \text{Non-EU}_i + \beta_{14} \text{ELECT}_t \times \text{MDE}_i + \beta_{15} \text{ELECT}_t \times \text{BIS}_i + e \tag{4}$$

The estimation result is reported in Table 6. The EU coefficient is positively significant at the 1% level in column 1, which suggests that the EU banking sector generally experiences higher non-performing loans. On the other hand, the 'non-EU' and 'BIS' coefficients are negatively significant, which suggests that the non-EU banking sector and the banking sector of the BIS member countries generally have fewer non-performing loans. Furthermore, the ELECT*EU, ELECT*Non-EU, ELECT*MDE, and ELECT*BIS coefficients are not statistically significant. This suggests no significant differences in non-performing loans across the four blocs during an election year.

4.3.3. Effect of legal system quality on non-performing loans

This section tests the effect of legal system quality on each determinant of non-performing loans. Developed countries have better legal systems than developing countries. Banks in developed countries can use the power of the courts to compel debtors to repay their debt, reducing the level of non-performing loans. In the estimation, the ELECT and LAW variables interact with each NPL determinant. The result is reported in Table 7.

As can be observed, the LAW*ΔGDP coefficient is insignificant. Meanwhile, the LAW*CAP, LAW*LG, LAW*CI, LAW*PS, and LAW*CRISIS coefficients are significant, indicating that legal system quality significantly affects some NPL determinants. Similarly, the LAW*ELECT*CI coefficient is negatively significant, indicating that inefficient banks (i.e., banks with high cost relative to income) operating in robust legal environments have fewer non-performing loans during an election year. Meanwhile, the LAW*ELECT*CAP, LAW*ELECT*LG, LAW*ELECT*GDP, LAW*ELECT*PS, and LAW*ELECT*CRISIS coefficients are not statistically significant.

5. Conclusion

This study examined the determinants of bank non-performing loans during election year. The findings revealed that non-performing loans are higher in the banking sector of EU member countries, while NPLs are significantly lower in the banking sector of non-EU and BIS member countries. Regarding the election year effect, the findings reveal that efficient banking sectors have higher non-performing loans during election year. It was also found that efficient banks operating in robust legal environments have higher non-performing loans during election years. The main message of this paper is that the

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[3] The mission of the BIS is to promote monetary and financial stability in the financial system of member countries. These countries cooperate to deal with the non-performing loan problems in member countries, thereby promoting banking stability in member countries. BIS member countries are represented by their central bank.

'election year' is a significant country risk factor that banks should consider in their risk management decisions because uncertainty about election outcomes may affect the loan portfolio of banks, mainly when election campaigns are funded with loans from the banking sector. Such loans may not be repaid when due, leading to the bank's loan portfolio impairment.

Table 6. Bank non-performing loan determinants during election year in EU, non-EU, BIS, and G7 countries (Panel fixed effect regression estimation)

Variables	(1) Coefficient (t-statistic)	(2) Coefficient (t-statistic)	(3) Coefficient (t-statistic)	(4) Coefficient (t-statistic)	(5) Coefficient (t-statistic)	(6) Coefficient (t-statistic)	(7) Coefficient (t-statistic)	(8) Coefficient (t-statistic)
C	2.612*	4.605***	5.137***	9.023***	-2.672*	4.601***	5.155***	9.752***
	(1.69)	(3.18)	(3.42)	(4.71)	(-1.69)	(3.17)	(3.42)	(4.46)
ELECT	0.033	0.033	-0.061	-0.009	-0.145	0.077	-0.108	1.739
	(0.08)	(0.08)	(-0.14)	(-0.02)	(-0.15)	(0.16)	(-0.22)	(0.63)
CI	0.016	0.016	0.015	0.012	0.016	0.016	0.015	0.012
	(1.11)	(1.11)	(0.98)	(0.84)	(1.10)	(1.10)	(0.99)	(0.84)
CAP	0.358***	0.358***	0.344***	0.327***	0.357***	0.357***	0.343***	0.329***
	(4.51)	(4.51)	(4.15)	(4.06)	(4.51)	(4.51)	(4.15)	(4.08)
CRISIS	0.259	0.259	0.525	1.056*	0.258	0.258	0.529	1.073*
	(0.42)	(0.42)	(0.84)	(1.66)	(0.42)	(0.42)	(0.85)	(1.68)
ΔGDP	-0.356***	-0.356***	-0.373***	-0.358***	-0.357***	-0.357***	-0.373***	-0.364***
	(-4.49)	(-4.49)	(-4.50)	(-4.48)	(-4.48)	(-4.48)	(-4.48)	(-4.52)
PS	-2.548***	-2.548***	-2.706***	-2.560***	-2.544***	-2.544***	-2.715***	-2.550***
	(-5.36)	(-5.36)	(5.47)	(-5.35)	(-5.34)	(-5.34)	(-5.46)	(-5.32)
LG	-0.007	-0.007	-0.012***	-0.017***	-0.007	-0.007	-0.012**	-0.016***
	(-1.36)	(-1.36)	(-2.23)	(-3.08)	(-1.37)	(-1.37)	(-2.23)	(-3.11)
EU	1.994***				1.929***			
	(4.01)				(3.28)			
Non-EU		-1.994***				-1.929***		
		(-4.01)				(-3.28)		
MDE			-0.794				-0.855	
			(-1.55)				(-1.44)	
BIS				-3.783***				-3.496***
				(-3.45)				(-2.95)
ELECT*EU					0.222			
					(0.21)			
ELECT*Non-EU						-0.222		
						(-0.21)		
ELECT*MDE							0.220	
							(0.21)	
ELECT*BIS								-1.793
								(-0.64)
R²	39.60	39.60	37.08	38.86	39.61	39.61	37.09	38.93
Adjusted R²	36.08	36.08	33.41	35.29	35.89	35.89	33.1	35.18
F-statistic	11.25	11.25	10.11	10.90	10.66	10.66	9.580	10.36
Prob (F-statistic)	0.000	0.000	0.0000	0.000	0.000	0.000	0.000	0.000
No of Observations	346	346	346	346	346	346	346	346

The models in Table 6 are estimated using fixed effect regression (with country and year fixed effect). GMM estimations could not be run due to near-perfect collinearity of the lag variables with the instrumental variables. NPL = ratio of non-performing loans to gross loans: the lower, the better. ELECT = a binary variable that equals one in an election year and zero in a non-election year. CI = cost to income ratio. CAP = ratio of total capital to total asset. CRISIS = a binary variable that equals one in a financial, banking, or economic crisis year and zero otherwise. ΔGDP = real domestic product growth rate. PS = political stability/absence of terrorism index: the higher, the better. LG = credit ratio provided to the private sector by banks as a share of GDP. EU = a binary variable that equals one if the country is a member of the European Union and zero otherwise. Non-EU = a binary variable that equals one if the country is not a member of the European Union and zero otherwise. MDE = a binary variable that equals one if the country is a member of the G7 countries according to

the UN's classification. ***, **, * denote 1%, 5% and 10% significance levels. *Source:* Author's calculations

Table 7. Effect of legal system quality on the NPL determinants during election year

Variables	(1) Coefficient (t-statistic)	(2) Coefficient (t-statistic)	(3) Coefficient (t-statistic)	(4) Coefficient (t-statistic)	(5) Coefficient (t-statistic)	(6) Coefficient (t-statistic)	(7) Coefficient (t-statistic)	(8) Coefficient (t-statistic)
C	2.955*	-0.812	4.531	8.288**	2.888	-3.979	-0.198	25.151
	(1.69)	(-0.25)	(0.94)	(2.03)	(0.83)	(-1.18)	(-0.06)	(3.53)
ELECT	0.046	-0.026	3.114**	-0.344	-0.761	0.553	0.014	1.450
	(0.14)	(-0.06)	(2.47)	(-0.46)	(-1.01)	(0.68)	(0.04)	(0.86)
CI	0.014	0.014	-0.089	0.017	0.011	0.019	0.015	-0.142**
	(0.91)	(0.88)	(-1.28)	(1.09)	(0.72)	(1.19)	(0.94)	(-2.02)
CAP	0.407***	0.411***	0.404***	-0.550*	0.405***	0.452***	0.442***	-0.757**
	(3.91)	(3.91)	(3.93)	(-1.78)	(3.92)	(4.31)	(4.23)	(-2.29)
CRISIS	1.069*	1.095*	0.639*	1.497**	1.096*	0.797	-4.824*	-3.601
	(1.81)	(1.82)	(1.02)	(2.52)	(1.87)	(1.34)	(-1.80)	(-1.19)
ΔGDP	-0.369***	-0.319	-0.378***	-0.361***	-0.339***	-0.332***	-0.349***	-0.739**
	(-4.96)	(-1.17)	(-5.13)	(-4.93)	(-4.51)	(-4.40)	(-4.69)	(-2.53)
PS	-4.597***	-4.580***	-4.659***	-4.863***	-4.101***	0.563	-4.436***	-2.539
	(-5.09)	(-5.04)	(-5.21)	(-5.44)	(-4.38)	(0.24)	(-4.91)	(-0.99)
LG	0.025***	0.025***	0.027***	0.022**	-0.035	0.025***	0.029***	-0.076**
	(2.80)	(2.81)	(3.04)	(2.52)	(-1.15)	(2.76)	(3.15)	(-2.36)
LAW*ΔGDP		-0.005						0.032
		(-0.23)						(1.37)
LAW*CI			0.012*					0.017**
			(1.67)					(2.47)
LAW*CAP				0.096***				0.119***
				(3.25)				(3.74)
LAW*LG					0.006**			0.011***
					(1.98)			(3.30)
LAW*PS						-0.499***		-0.129
						(-2.30)		(-0.54)
LAW*CRISIS							0.511**	0.374
							(2.23)	(1.44)
LAW	0.324	0.340	-0.263	-0.546	-0.077	0.585**	0.216	-2.475***
	(1.38)	(1.37)	(-0.58)	(-1.54)	(-0.25)	(2.27)	(0.90)	(-3.55)
LAW*ELECT*ΔGDP		0.003						0.013
		(0.33)						(1.44)
LAW*ELECT*CI			-0.008**					-0.006***
			(-2.52)					(-2.78)
LAW*ELECT*CAP				0.005				0.015
				(0.61)				(1.59)
LAW*ELECT*LG					0.001			0.001
					(1.19)			(1.13)
LAW*ELECT*PS						-0.053		-0.029
						(-0.67)		(-0.37)
LAW*ELECT*CRISIS							0.032	0.067
							(0.46)	(0.82)
R²	68.11	68.13	69.03	69.28	68.70	68,76	68.67	72.34
Adjusted R²	62.58	62.34	63.40	63.71	63.02	63.09	62.98	66.15
F-statistic	12.31	11.78	12.28	12.43	12.09	12.13	12.07	11.71
Prob (F-statistic)	0.000	0.000	0.0000	0.000	0.000	0.000	0.000	0.000
No of Observations	346	346	346	346	346	346	346	346

The estimations in Table 7 are estimated using fixed effect regression (with country and year fixed effect). GMM estimations could not be run due to near-perfect collinearity of the lag variables with the instrumental variables. NPL = ratio of non-performing loans to gross loans: the lower, the better. ELECT = a binary variable that equals one in an election year and zero in a non-election year. CI = cost to income ratio. CAP = ratio of total bank capital to total asset. CRISIS = a binary variable that

equals one in a financial or banking year and zero otherwise. ΔGDP = real domestic product growth rate. PS = political stability/absence of terrorism index: the higher, the better; LAW = the rule of law index; the higher, the better; LG = ratio of credit provided to the private sector by banks as a share of GDP. ***, **, * denote 1%, 5% and 10% significance levels. *Source:* Author's calculations.

The findings have several implications. One implication of the findings is that political events, such as elections, can significantly affect banks' lending decisions. Two, bank supervisors should consider the 'election-year effect' in assessing industry-wide non-performing loans in the banking sector. One idea is to assess the growth of NPLs in the years before the election, during the election, and in the years after the election. Such assessment can help bank supervisors understand whether high non-performing loans in an election year are caused by loans granted to politicians for election campaigns, which banks write off, or whether the NPLs are caused by general business uncertainty surrounding an election event. Thirdly, legal solid institutions can help to reduce the negative effect of elections on non-performing loans; therefore, policy makers should develop policies that strengthen existing legal institutions with appropriate enforcement powers.

Future research could investigate other cross-country macro-events and political events that influence the level of non-performing loans in the banking sector of developed countries. Secondly, future research can investigate the effect of election on bank non-performing loans in developing and transition countries. Future studies should consider that most developing and transition countries may have irregular elections or experience political events (such as military takeovers) that may prevent elections.

Data Availability Statement: The data is available in the World Bank database. Data can be found at https://databank.worldbank.org/.

Appendix

Table A.1. Variable Description

Indicator Name	Short definition	Source
CI	Bank cost-to-income ratio (%)	Financial Soundness Indicators Database (fsi.imf.org), International Monetary Fund (IMF)
ΔGDP	Annual gross domestic product growth rate	World Bank national accounts data, and OECD National Accounts data files.
LG	Credit to the private sector by banks as a share of GDP.	Bankscope, Bureau van Dijk (BvD)
CAP	The ratio of total bank capital to total asset	
NPL	Bank non-performing loans to gross loans (%)	Financial Soundness Indicators Database (fsi.imf.org), International Monetary Fund (IMF)
PS	Political stability and absence of terrorism index	World Governance Indicator in the World Bank database
LAW	The rule of law/quality of legal system index	World Governance Indicator in the World Bank database
ELECT	Election year variable	Constructed by author
CRISIS	The financial crisis indicator	Global financial development indicator in the World Bank database

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