



Level of the impact on capital adequacy ratio when banks announce the adoption of Basel III - The difference-in-differences method's approach

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Abstract

This study yields empirical results from 23 commercial banks divided into two groups: a group of 12 commercial banks exclusively applying Basel II and a group of 11 commercial banks that announced the implementation of the Basel III management framework. The analysis covers the period from 2020 to the second quarter of 2024, employing the difference-in-differences regression method. The findings indicate no significant difference in the impact on the capital adequacy ratio between commercial banks announcing Basel III implementation and those that continued applying Basel II. Based on these empirical results, the study identifies specific characteristics of the research sample and proposes appropriate measures within the context of current roadmap encouraging Basel III adoption among commercial banks in Vietnam.

Keywords: capital adequacy ratio, Basel III, difference-in-differences, Vietnam.

JEL classification: C23, G21, G28, G32, O16.

1. Introduction

Before the collapse of Lehman Brothers in 2008, the need to strengthen Basel II had become increasingly critical and urgent. Excessive leverage and insufficient liquidity, combined with poor risk management and governance, led to severe consequences of the global economic downturn and the subsequent financial crisis (BCBS, 2015). Conflicts of interest in counterparty risk assessments by credit rating agencies, model risk in credit risk estimation, and the proliferation of complex financial products such as derivatives further amplified systemic vulnerabilities. Capital requirements were not considered countercyclical. All of these shortcomings paved the way for the development of Basel III.

In 2010, Basel III was officially adopted, with a phased implementation plan starting in 2013 (BCBS, 2010). By May 2023, the world continued to witness the consecutive collapses of several banks in the United States, including Silicon Valley Bank, First Signature Bank, and First Republic Bank. At the same time, in Vietnam, the so-called “zero-dong” banks - VNCB, OceanBank, and GPBank (all suffering from negative equity) - had still not been fully resolved. In addition, Saigonbank and DongA Bank were placed under special control. As a result, capital adequacy became even more critical. It attracted growing attention from stakeholders closely linked to the banking sector - including regulatory authorities (such as the State Bank of Vietnam), investors, and executives at commercial banks. Since its official announcement in 2010, the Basel III framework has been progressively implemented worldwide, introducing significant changes and revisions to capital adequacy and liquidity risk management standards compared to its predecessors (Le and Le, 2024).

While Vietnam continues to implement Basel II as part of its 2021-2025 bad-debt handling and credit institutions restructuring program, regulatory authorities have also encouraged capable banks to study and adopt Basel III. As a result, some commercial banks in Vietnam have publicly announced the implementation of Basel III-compliant risk management and capital adequacy frameworks. At the same time, the majority continued to operate under Basel II standards. The situation necessitates experimental research to assess differences in capital adequacy ratios between these two groups of banks and evaluate the impact of applying Basel II versus Basel III.

2. Research methodology

2.1. *Difference-in-differences method*

The difference-in-differences (DID) method is commonly used in natural experiments to assess the impact of a policy or event (Nguyen, 2013; Wooldridge, 2015). This method is applied to specific situations to introduce randomness in the allocation of subjects to the treatment group (affected by the policy change) and the control group (not affected by the policy change). The policy change does not affect the control group, but it directly impacts the treatment group. Implementing this method requires panel data that combines cross-sectional information across subjects with time-series data to track the impact over time. Specifically, the data is often divided into four sub-groups: the control group before the change, the control group after the change, the treatment group before the change, and the treatment group after the change. In other words, this method accounts for two differences: the time difference before and after policy implementation, and the cross-group difference between the treatment and control groups. The method's reliance on these two comparisons is why it is called the difference-in-differences (DID) method.

Let Y represent the outcome affected by the implementation of the Basel III policy (in this case, the capital adequacy ratio (CAR)); D is a dummy variable indicating whether the subject is affected by the policy or not (here, the policy refers to the implementation of the Basel III standard). $D = 1$ if the subject is affected by the policy. $D = 0$ if the subject is not affected by the policy.

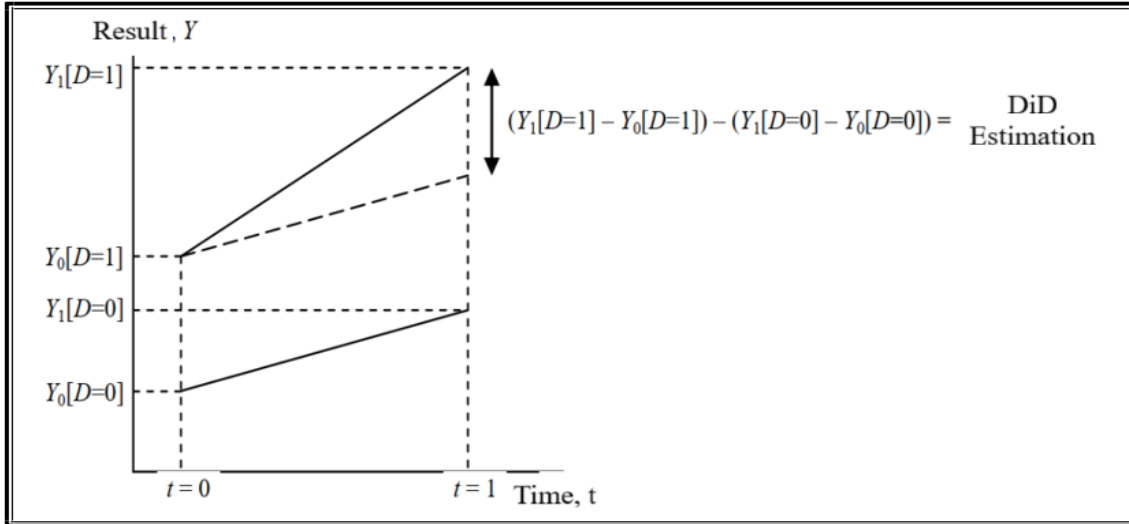
Let Y_0 represent the outcome before the implementation of Basel III, and let Y_1 represent the outcome after the implementation of Basel III. For the group affected by the implementation of Basel III, the outcome changes from $Y_0[D = 1]$ to $Y_1[D = 1]$. For the group not affected by Basel III, the outcome changes from $Y_0[D = 0]$ to $Y_1[D = 0]$.

Over time, the outcome of the control group (here, the CAR) changes from $Y_0[D = 0]$ to $Y_1[D = 0]$. Since the control group is not affected by the implementation of Basel III, the difference $Y_1[D = 0] - Y_0[D = 0]$ can be interpreted as the change in CAR due to the time trend. The DID approach relies on the assumption that the change in CAR over time for both the affected and control groups would be the same without the Basel III policy.

If Basel III had not been applied, the change in CAR for the treated group would be calculated as $Y_1[D = 0] - Y_0[D = 0]$. Alternatively, the CAR for the affected group at time $t = 1$ would be expressed as $Y_0[D = 1] + (Y_1[D = 0] - Y_0[D = 0])$.

Due to the policy, the income of the group affected at time $t = 1$ is actually $Y_1[D = 1]$. At this point, the effect of the public policy is $Y_1[D = 1] - \{Y_0[D = 1] + (Y_1[D = 0] - Y_0[D = 0])\} = (Y_1[D = 1] - Y_0[D = 1]) - (Y_1[D = 0] - Y_0[D = 0])$.

FIGURE 1: Graph illustrating the difference-in-differences method



Source: Nguyen (2013).

2.2. Capital adequacy ratio

The capital adequacy ratio (CAR) is the ratio of regulatory capital to risk-weighted assets. The greater the amount of risk-weighted assets, the more capital is needed, and vice versa (BCBS, 2017). This ratio must be at least 8% (Casu *et al.*, 2021). The CAR is expressed as a percentage and is determined by the following formula:

$$CAR = \frac{\text{Core capital} + \text{Supplementary capital}}{RWA + 12.5 \times (KOR + KMR)}$$

where RWA is the total assets weighted by credit risk; KOR is the required capital for operational risk; KMR is the required capital for market risk. Table 1 describes some information about the differences in the capital adequacy ratio when banks apply Basel II and Basel III.

TABLE 1: Comparison of capital ratio regulations between Basel II and Basel III

Accord	Common equity capital			Tier 1 capital		Total capital	
	Minimum	Capital conservation buffer	Total common equity capital	Minimum	Total	Minimum	Total
Basel II	2%			4%		8%	
Basel III	4.5%	2.5%	7%	6%	8.5%	8%	10.5%

Source: Hoang and Hoang (2018).

2.3. Model specification and variable measurement

To measure the difference in the level of impact between banks that announced Basel III implementation and those that only applied Basel II, this study uses a multivariate linear regression model with the difference-in-differences method. To ensure robustness, the Propensity Score Matching (PSM) model is used to recheck the results.

The general model is as follows: *Capital adequacy ratio = Fixed coefficient for each group + Fixed coefficient for time + Regression coefficient corresponding to Σ Control variables + Regression coefficient corresponding to the variable representing the impact of implementing Basel III + Error term.*

From the general model, we have three econometric models described as follows:

$$CAR_{igt} = \gamma01_g + \gamma01_t + \zeta_{11}CAR_{igt-1} + \zeta_{12}SIZE_{i,t} + \zeta_{13}ROA_{i,t} + \zeta_{14}LEV_{i,t} + \zeta_{15}LIQ_{i,t} + BAS_{gt}\delta01 + \phi_{igt} \quad (1)$$

$$CAR_{igt} = \gamma02_g + \gamma02_t + \zeta_{21}CAR_{igt-1} + \zeta_{22}SIZE_{i,t} + \zeta_{23}ROE_{i,t} + \zeta_{24}LEV_{i,t} + \zeta_{25}LIQ_{i,t} + BAS_{gt}\delta02 + \varphi0_{igt} \quad (2)$$

$$CAR_{igt} = \gamma03_g + \gamma03_t + \zeta_{31}CAR_{igt-1} + \zeta_{32}SIZE_{i,t} + \zeta_{33}CIR_{i,t} + \zeta_{34}LEV_{i,t} + \zeta_{35}LIQ_{i,t} + BAS_{gt}\delta03 + \psi_{igt} \quad (3)$$

where $\gamma01_g$, $\gamma02_g$, and $\gamma03_g$ denote the fixed coefficients for each group g ; $\gamma01_t$, $\gamma02_t$, and $\gamma03_t$ denote the fixed coefficients for time; BAS_{gt} is the dummy variable that indicates the effects of implementing Basel III for group g at time t , where $D = 1$ if the bank has implemented Basel III and $D = 0$ if it has only applied Basel II; $\delta01$, $\delta02$, and $\delta03$ are the key coefficients in the DID model that measure the impact of Basel III on banks that have adopted it compared to those that only apply Basel II; ζ_{kj} , with $k = 1,3$ and $j = 1,5$, are the estimated coefficients for the lagged 1-year capital adequacy ratio, bank size, profitability, capital structure (leverage), and liquidity ability variables, respectively.

Table 2 explains the variables in the above models.

TABLE 2: Variables in the model

Symbol	Measurement	Expected sign	References
Dependent variable			
Capital adequacy ratio (CAR)	Regulatory capital ÷ Risk-weighted assets		

Symbol	Measurement	Expected sign	References
Independent Variables			
Lag effect of capital adequacy ratio (LAGCAR)	Regulatory capital ÷ Risk-weighted assets of previous year compared to current year	+	Kanga <i>et al.</i> (2020), Duqi and Al-Tamimi (2018), Klein <i>et al.</i> (2021), Moudud-UI-Huq <i>et al.</i> (2022)
Bank size (SIZE)	Log(Total assets)	-	Duqi and Al-Tamimi (2018), Klein <i>et al.</i> (2021), Moudud-UI-Huq <i>et al.</i> (2022)
Return on assets (ROA)	Net profit after tax ÷ Total assets	+/-	Pham and Nguyen (2019), Moudud-UI-Huq <i>et al.</i> (2022)
Return on equity (ROE)	Net profit after tax ÷ Total equity	+	Le <i>et al.</i> (2021), Kanga <i>et al.</i> (2020)
Cost-to-income ratio (CIR)	Operating expenses ÷ Operating income	-	Shehzad <i>et al.</i> (2010), Klein <i>et al.</i> (2021)
Leverage (LEV)	Total liabilities ÷ Total equity	-	Klein <i>et al.</i> (2021), Moudud-UI-Huq <i>et al.</i> (2022)
Liquidity ratio (LIQ)	Cash and equivalents ÷ Total assets	-	Klein <i>et al.</i> (2021)

Source: Compiled by the authors.

2.4. Research data

This study uses panel data collected semiannually from 2020 to June 2024. The data are collected from the FiinPro data system, financial reports, annual reports, and publicly disclosed information from commercial banks via the media.

TABLE 3: Sample selection of commercial banks that announced the implementation of the Basel III Framework and commercial banks that only applied Basel II during the period from Q2-2020 to Q2-2024

No	Commercial banks implementing Basel III	No	Commercial banks applying only Basel II
1	ABB	1	BAB
2	ACB	2	BVB
3	LPB	3	BIDV
4	MSB	4	EIB
5	NAB	5	HDB
6	OCB	6	KLB
7	SEA	7	MBB
8	TCB	8	PGB
9	TPB	9	SGB
10	VIB	10	SHB
11	VPB	11	VCB
		12	VietinBank

Source: Compiled by the authors.

Table 4 presents the descriptive statistics for the research data.

TABLE 4: Descriptive statistics

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
CAR	207	0.1182353	0.0228606	0.0839	0.1932
LAGCAR	184	0.1178435	0.0232192	0.0839	0.1932
ROA	207	0.0034013	0.0022591	-0.00202	0.01
ROE	207	0.0366099	0.0220169	-0.01338	0.088
CIR	207	0.4248482	0.1556242	0.20312	1.28581
SIZE	207	5.431901	0.4832157	4.31322	6.40159
LEV	207	10.77272	3.599216	4.61515	20.07479
LIQ	207	0.1559278	0.05684	0.05418	0.41621
BAS	207	0.2657005	0.4427763	0	1

Source: Authors' calculations.

Correlation matrix analysis shows that, overall, the independent variables are correlated.

3. Results and discussion

Table 5 presents the results of a difference-in-differences regression examining the impact of Basel III on the capital adequacy ratio (CAR) across two groups of banks: those that announced their intention to implement Basel III and those that continued to use Basel II. The regression results indicate that the BAS variable has no significant effect on the capital adequacy ratio (CAR), as the estimated coefficients in the three models containing the variables ROA, ROE, and CIR are not statistically significant.

TABLE 5: Regression results for the group of commercial banks that announced the implementation of Basel III and the group that only applied Basel II

		Variable					
Time variable		TIME1					
Commercial banks applying only Basel II		BAS = 0					
Commercial banks implementing Basel III		BAS = 1					
Observations		184					
		Basel II		Basel III			
Group		12					
Time							
Minimum		122		125			
Maximum		122		125			
CAR	Coefficient	Standard deviation	t	P> t	95% confidence interval		
ROA							
ATET							
BAS (1 vs 0)	0.0016053	0.0031825	0.50	0.619	-0.0049948	0.0082055	
ROE							
ATET							
BAS (1 vs 0)	0.0006527	0.0031781	0.21	0.839	-0.0059383	0.0072436	
CIR							
ATET							
BAS (1 vs 0)	-0.0005905	0.0031461	-0.19	0.853	-0.0071152	0.0059343	

Note: The ATET estimate is adjusted for dependent variables, panel effects, and time effects.

TABLE 6: Granger test estimation results for three models

Model (1)

	Coefficient	Standard deviation	t	P> t	95% confidence interval	
LAGCAR	0.137	0.089	1.55	0.14	-0.046	0.321
SIZE	0.001	0.032	0.03	0.97	-0.064	0.067
ROA	0.082	0.771	0.11	0.92	-1.516	1.681
LIQ	0.078	0.029	2.64	0.02	0.017	0.139
LEV	-0.003	0.001	3.02	0.01	-0.005	-0.001
TIME						
123	-0.003	0.004	0.73	0.47	-0.011	0.005
124	0.008	0.008	1.03	0.31	-0.008	0.025
125	0.000	0.005	0.03	0.98	-0.010	0.010
126	0.005	0.005	1.02	0.32	-0.005	0.015
127	0.001	0.004	0.16	0.87	-0.008	0.010
128	0.002	0.005	0.41	0.69	-0.009	0.013
129	0.000	0.006	0.03	0.97	-0.012	0.013
_LEAD3	0.007	0.010	0.69	0.5	-0.014	0.028
_LEAD2	0.009	0.008	1.09	0.29	-0.008	0.026
_LAG0	0.010	0.007	1.43	0.17	-0.004	0.024
_LAG1	0.002	0.006	0.37	0.72	-0.010	0.015
_LAG2	0.005	0.007	0.67	0.51	-0.010	0.020
_LAG3	0.007	0.007	0.92	0.37	-0.008	0.021
_LAG4	0.006	0.008	0.83	0.42	-0.009	0.022
_CONS	0.109	0.167	0.65	0.52	-0.237	0.455
sigma_u	0.012					
sigma_e	0.010					
rho	0.585	(fraction of variance due to u_i)				

Model (2)

	Coefficient	Standard deviation	t	P> t 	95% confidence interval	
LAGCAR	0.135	0.090	1.50	0.147	-0.052	0.323
SIZE	0.004	0.035	0.12	0.905	-0.068	0.076
ROE	-0.047	0.104	0.45	0.656	-0.262	0.168
LIQ	0.078	0.030	2.63	0.015	0.016	0.140
LEV	-0.003	0.001	3.20	0.004	-0.005	-0.001
TIME						
123	-0.003	0.004	0.64	0.528	-0.011	0.006
124	0.008	0.007	1.06	0.299	-0.008	0.023
125	0.001	0.005	0.15	0.883	-0.009	0.011
126	0.005	0.005	0.99	0.331	-0.005	0.015
127	0.001	0.004	0.13	0.896	-0.009	0.010
128	0.002	0.005	0.33	0.747	-0.009	0.013
129	0.000	0.006	0.01	0.995	-0.013	0.013
_LEAD3	0.008	0.011	0.74	0.468	-0.014	0.030
_LEAD2	0.009	0.008	1.12	0.273	-0.008	0.027
_LAG0	0.009	0.006	1.47	0.155	-0.004	0.022
_LAG1	0.001	0.005	0.25	0.802	-0.010	0.012
_LAG2	0.004	0.007	0.60	0.557	-0.010	0.018
_LAG3	0.006	0.007	0.85	0.404	-0.008	0.020
_LAG4	0.005	0.007	0.78	0.445	-0.009	0.020
_CONS	0.096	0.181	0.53	0.602	-0.280	0.472
sigma_u	0.012					
sigma_e	0.010					
rho	0.590	(fraction of variance due to u_i)				

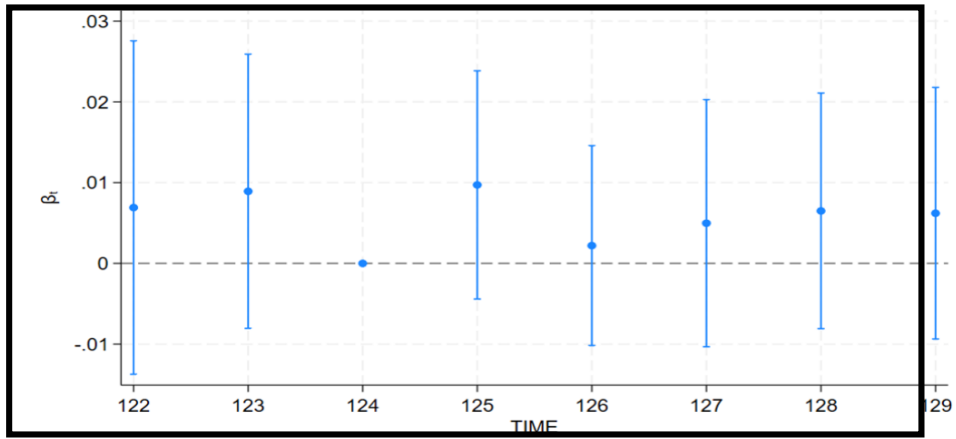
Model (3)

	Coefficient	Standard deviation	t	P> t	95% confidence interval	
LAGCAR	0.130	0.091	1.44	0.165	-0.058	0.318
SIZE	0.014	0.034	0.43	0.674	-0.056	0.085
CIR	0.024	0.016	1.53	0.141	-0.009	0.058
LIQ	0.078	0.033	2.36	0.028	0.009	0.147
LEV	-0.003	0.001	-3.40	0.003	-0.005	-0.001
TIME						
123	-0.001	0.004	-0.23	0.824	-0.008	0.007
124	0.009	0.007	1.16	0.258	-0.007	0.024
125	0.003	0.005	0.59	0.564	-0.007	0.012
126	0.004	0.004	0.95	0.353	-0.005	0.013
127	0.000	0.004	0.11	0.915	-0.008	0.009
128	0.002	0.005	0.31	0.76	-0.009	0.013
129	0.001	0.006	0.13	0.899	-0.012	0.013
_LEAD3	0.009	0.010	0.93	0.364	-0.011	0.029
_LEAD2	0.010	0.008	1.30	0.207	-0.006	0.026
_LAG0	0.008	0.006	1.40	0.176	-0.004	0.019
_LAG1	0.001	0.005	0.14	0.891	-0.011	0.012
_LAG2	0.004	0.007	0.58	0.569	-0.011	0.019
_LAG3	0.006	0.007	0.81	0.425	-0.009	0.021
_LAG4	0.005	0.007	0.77	0.448	-0.009	0.019
_CONS	0.029	0.184	0.16	0.876	-0.353	0.411
sigma_u	0.014					
sigma_e	0.009					
rho	0.6759	(fraction of variance due to u_i)				

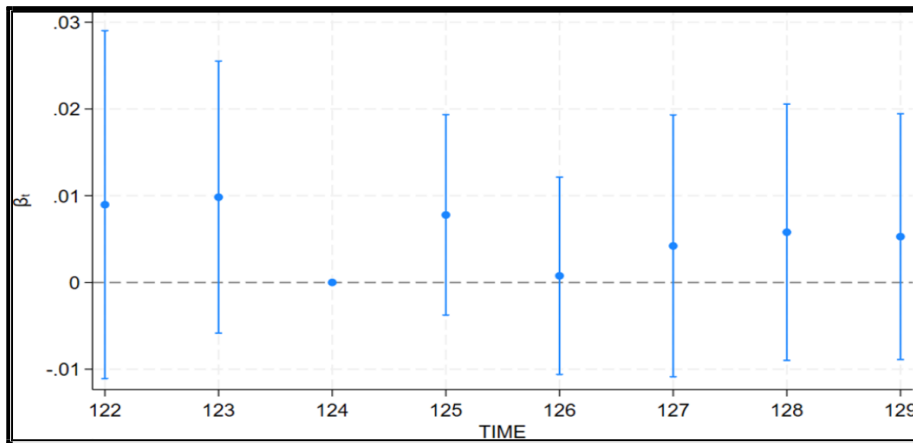
Source: Authors' calculations.

FIGURE 2: Time effects with 95% confidence interval

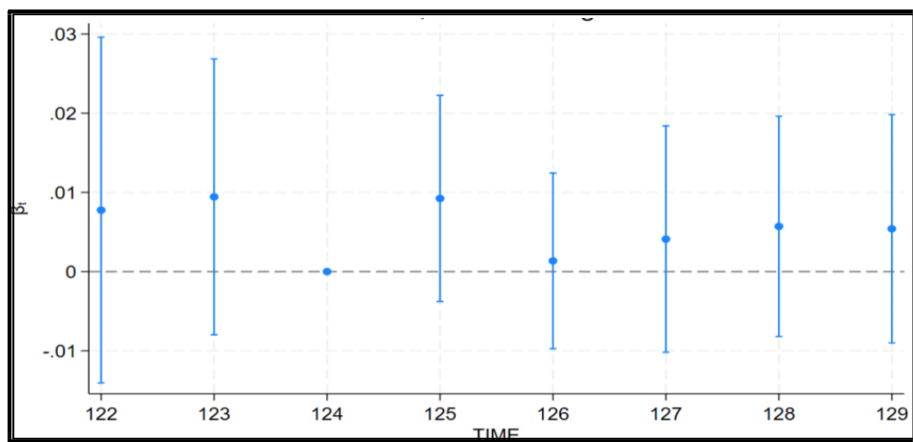
Model (1)



Model (2)



Model (3)



Source: Authors' calculations (Stata export).

Figure 2 includes the horizontal axis (TIME) representing time points (from 122 to 129) and the vertical axis (β_t) showing the values of the coefficient (effect size) at the corresponding time points, which may represent the effect of a factor or variable in the model. The standard error (confidence intervals - CI) is significant:

The vertical lines around each data point represent the 95% confidence interval (95% CI) for the estimated value at that time point. If the confidence interval includes the value 0, then the coefficient at that time point is statistically insignificant (the hypothesis that $\beta_t = 0$ cannot be rejected). As shown in the figure, the β_t coefficients from time points 122 to 129 fluctuate around 0. At time points 122, 123, 127, and 128, the confidence intervals are very wide, indicating a high level of uncertainty in the estimates. Other time points (e.g., 125, 126) have narrower confidence intervals but still include 0, suggesting that there is no strong evidence that the effect is different from 0 at these times. Therefore, at most time points, β_t is not statistically significant (the confidence intervals include 0). The effect is unstable over time, with some points showing substantial uncertainty. Based on the graph, there is no statistical evidence to suggest a clear difference between the time points, as all confidence intervals include 0. The effect fluctuates around 0 but shows no statistically significant change over time.

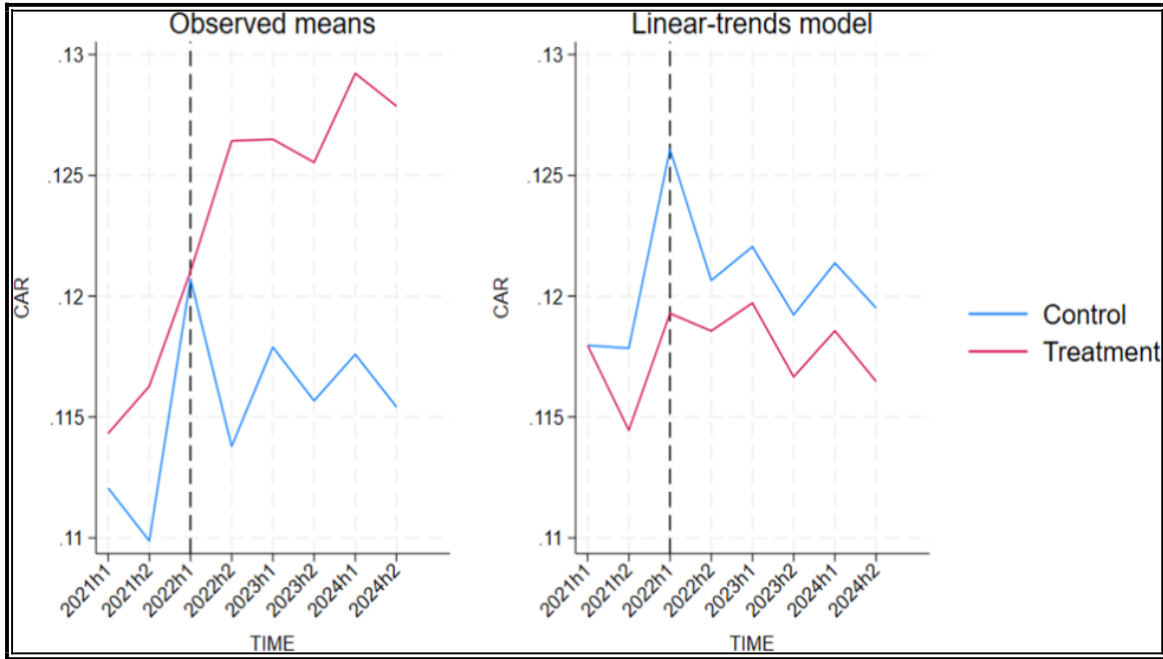
TABLE 7: Results of the parallel trend test

Parallel-trends test (pretreatment time period)	
H ₀ : Linear trends are parallel	
ROA	
F(1, 22)	0.48
Prob > F	0.4964
ROE	
F(1, 22)	0.53
Prob > F	0.4757
CIR	
F(1, 22)	0.87
Prob > F	0.36

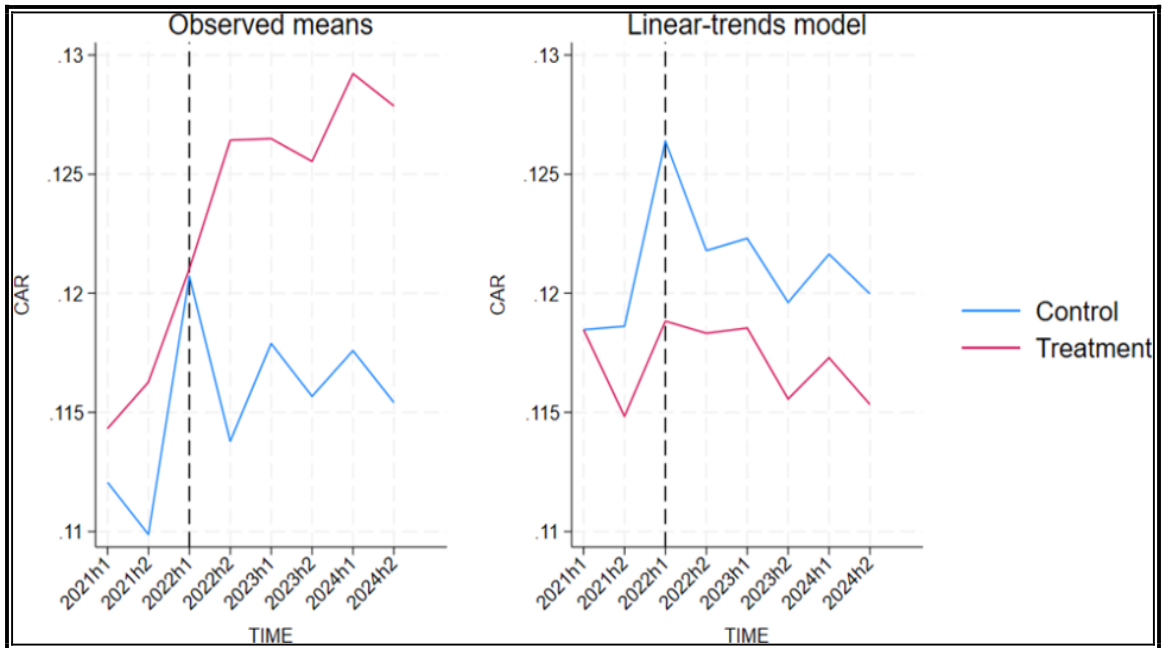
Source: Authors' calculations (Stata export).

FIGURE 3: Graph testing the parallel trend assumption

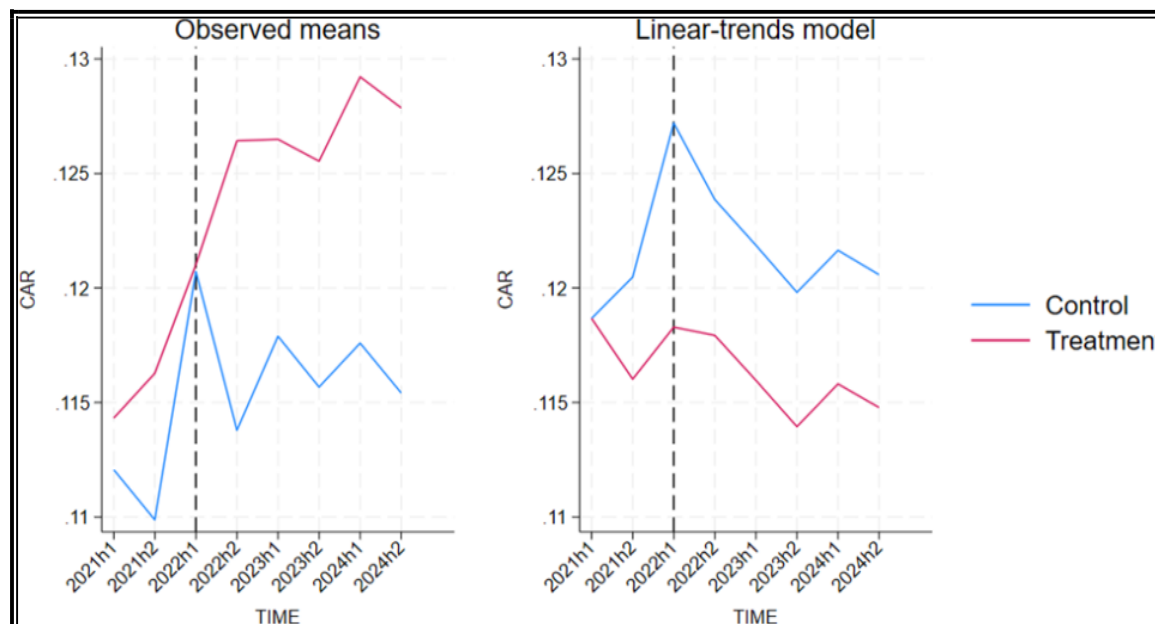
Model (1)



Model (2)



Model (3)



Source: Authors' calculations (Stata export).

The null hypothesis (H_0): The coefficient of the linear trend between the two groups (control and treatment) is the same during the period before the declaration of Basel III implementation, indicating a parallel linear trend (no significant difference between the groups). The p-values (Prob > F) for models (1), (2), and (3) are 0.4964, 0.4757, and 0.36, respectively (as shown in Table 7). Since all values exceed the 5% significance level, there is no basis to reject the null hypothesis (H_0). This non-rejection of the null hypothesis means there is no statistical evidence that the linear trend between the two groups (control and treatment) before the intervention differs. Therefore, the parallel trend assumption holds during the pre-Basel III implementation period. This condition is an essential requirement for applying methods like difference-in-Differences, as it ensures that any differences observed after the policy's implementation can be attributed to the policy's impact, rather than pre-existing differences between the groups.

The Granger causality test is employed to examine the predictive effect before the Basel III announcement. The null hypothesis (H_0) assumes no significant impact preceding the declaration of Basel III. The p-values (Prob > F) for models (1), (2), and (3) are 0.4802, 0.4678, and 0.3907, respectively (as shown in Table 8), all of which are greater than the 5% significance level. Therefore, there is no basis to reject the null hypothesis (H_0). This non-rejection of the null hypothesis indicates that there is no statistical evidence of an effect before the Basel III declaration. Thus, the test results show no evidence of a prediction effect

before the Basel III declaration. This absence of a prediction effect supports the validity of the difference-in-differences method, as the differences observed after the Basel III declaration can be attributed to the declaration itself, rather than to any pre-declaration prediction effect.

TABLE 8: Results of the Granger causality test

Granger causality test	
H ₀ : No effect in anticipation of treatment	
ROA	
F(2, 22)	0.76
Prob > F	0.4802
ROE	
F(2, 22)	0.79
Prob > F	0.4678
CIR	
F(2, 22)	0.98
Prob > F	0.3907

Source: Authors' calculations.

The Propensity Score Matching (PSM) regression method is employed to test the model's findings on the difference in the impact levels of commercial banks that declared the implementation of Basel III, compared to those that implemented only Basel II, on the capital adequacy ratio. The results in Table 9 also indicate that there is no significant difference between the commercial banks that declared implementing Basel III and those that implemented only Basel II regarding the capital adequacy ratio, as the capital adequacy ratio and its lagged value are not statistically significant.

TABLE 9: Results of the model robustness test for testing the difference in impact levels between the group of commercial banks that announced the implementation of Basel III and the group of commercial banks that only applied Basel II on the capital adequacy ratio

Model (1)

Observations	184
LR chi2(6)	34.73
Prob > chi2	0
Log likelihood	-94.864822
Pseudo R2	0.1547

BAS	Coefficient	Standard deviation	t	P> t	95% confidence interval	
CAR	1.244	19.644	0.060	0.949	-37.257	39.746
LAGCAR	-7.912	18.704	-0.420	0.672	-44.571	28.747
SIZE	1.110	0.507	2.190	0.028	0.117	2.103
ROA	86.266	97.400	0.890	0.376	-104.634	277.165
LIQ	7.786	4.016	1.940	0.053	-0.085	15.656
LEV	-0.329	0.106	-3.100	0.002	-0.536	-0.121
_CONS	-4.402	4.044	-1.090	0.276	-12.327	3.523

Model (2)

Observations	184					
LR chi2(6)	34.48					
Prob > chi2	0					
Log likelihood	-94.990072					
Pseudo R2	0.1536					
BAS	Coefficient	Standard deviation	t	P> t	95% confidence interval	
CAR	0.972	19.897	0.050	0.961	-38.026	39.969
LAGCAR	-7.792	18.836	-0.410	0.679	-44.709	29.125
SIZE	1.134	0.508	2.230	0.026	0.138	2.129
ROE	7.206	9.853	0.730	0.465	-12.106	26.518
LIQ	7.488	3.986	1.880	0.060	-0.325	15.300
LEV	-0.356	0.103	-3.440	0.001	-0.558	-0.153
_CONS	-4.149	4.059	-1.020	0.307	-12.104	3.807

Model (3)

Observations	184					
LR chi2(6)	34.39					
Prob > chi2	0					
Log likelihood	-95.032463					
Pseudo R2	0.1532					
BAS	Coefficient	Standard deviation	t	P> t	95% confidence interval	
CAR	0.924	20.118	0.050	0.963	-38.507	40.355
LAGCAR	-8.782	18.934	-0.460	0.643	-45.891	28.327
SIZE	1.049	0.572	1.830	0.067	-0.072	2.171
CIR	-1.200	1.818	-0.660	0.509	-4.763	2.363
LIQ	7.379	3.959	1.860	0.062	-0.379	15.138
LEV	-0.344	0.103	-3.350	0.001	-0.546	-0.143
_CONS	-2.892	4.666	-0.620	0.535	-12.037	6.254

Source: Authors' calculations.

The explanation for this result is that commercial banks in the Basel III implementation group had only reached the preliminary stage of adopting the risk management framework, rather than fully executing the rigorous capital adequacy calculation in accordance with Basel III standards. This conclusion is supported by the fact that only the Bank for Investment and Development of Vietnam (BIDV) has publicly disclosed the components used to calculate the capital adequacy ratio under Basel III. Moreover, other banks in the Basel III implementation group, such as OCB, ACB, and VIB, prioritized implementing the liquidity risk management process (ILAP - Internal Liquidity Adequacy Process). The results of this study are reflected in the research by Jaiwani and Gopalkrishnan (2023).

By conducting a panel data regression on data from 16 private and 12 public commercial banks from 2016 to 2022, the study by Jaiwani and Gopalkrishnan (2023) found that Basel III had a positive impact on the capital adequacy ratio of public sector banks but an opposite effect on private sector banks. Furthermore, Jaiwani and Gopalkrishnan (2023) emphasized that the implementation of Basel III did not resolve the differences between public and private sector banks. Therefore, they recommended not applying Basel III uniformly to all types of commercial banks. Instead, policymakers should take into account the structural differences between public- and private-sector commercial banks when applying Basel III regulations. From the author's perspective, the proposal by Jaiwani and Gopalkrishnan (2023) aligns with the direction that should be taken when implementing Basel III in Vietnam's commercial banking system. This alignment is because, aside from the fact that Vietnamese commercial banks have not yet thoroughly and rigorously implemented capital adequacy measurements under Basel III, the capital structure - including the equity capital - of each commercial bank varies and is influenced by differing constraints on capital use and management. As a result, applying Basel III to Vietnamese commercial banks requires a roadmap that aligns with each bank's capital capacity and its specific capital structure.

4. Conclusions and recommendations

An empirical study on 23 commercial banks, divided into two groups - one consisting of 12 banks that only applied Basel II and another with 11 banks that publicly announced the implementation of the Basel III framework during the period from 2020 to the second quarter of 2024 - was conducted using the difference-in-differences regression method. The results indicated that there was no significant difference in the impact on the capital adequacy ratio between banks that announced Basel III implementation and those that did not (only applying Basel II). This outcome can be attributed to the fact that Vietnamese commercial banks have not rigorously and consistently implemented the capital adequacy ratio in accordance with Basel III standards. Therefore, commercial banks need to ensure that their

announcements of Basel III adoption are accompanied by substantive and practical implementation. At the same time, it is essential to provide timely, transparent, and publicly available information to enhance the effectiveness of capital adequacy supervision for evaluation and measurement purposes. In addition, the application of Basel III to commercial banks in Vietnam should follow a roadmap that aligns with each bank's capital capacity and structural characteristics.

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Article history

Received on February 18, 2025

Revised on March 6, 2025

Accepted on March 7, 2025