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Effect of Interest Rate Changes and Dividend Announcements on Stock Returns: Evidence from a Frontier Economy

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Abstract

This paper is motivated from previous work in the area of bank interest rate and dividend policy, and we went further to figure out whether there is any association between interest rate changes and the stock market's reaction to dividend announcements. To conduct this research paper, we used 61 Bangladeshi banks out of 66 banks (excluding central bank) from the period from 2010-2021. After using three different types of estimations (OLS, two stage least squared and GMM) we found that when savings interest rate and dividend increase stock market react positively and our result show that stock market react negatively when savings interest rate and dividend decrease. On the other hand, our results show that when loan interest rate and dividend increase stock market react more negatively and if loan interest rate and dividend decrease stock market react more positively.

Keywords: Bangladesh, bank interest rate, savings, loan, dividend, stock market.

1. Introduction

Unlike most advanced economies, the interest rate in Bangladesh has been stable for a long time. The consistency in interest rates improves the bank's ability to pay dividends (Claessens et al., 2018). Lowering interest rates makes banks reluctant to quickly cut deposit rates, especially for ordinary depositors. Furthermore, the borrower's contractual repricing and competition behavior with other financing alternatives enforce banks usually to pass lower rates on to new loans. Hence, when the interest rate falls, the policy rate that passes to other markets will be imperfect and in turn, affect the firm's ability to pay dividends (Claessens et al., 2018). Working on interest rate prior research, this paper fills the gab in the literature by investigating whether interest rate affect the reaction of the stock market to dividend announcements. As claimed by (Allen and Michaely, 2003), The term policy suggests some regularity and predictability in defining its pattern and scale, rejecting the notion of unpredictability and arbitrariness.

Different theories were used in the literature to explain dividends policy (e.g. irrelevance hypothesis, bird-in-hand theory, information signaling theory, transaction cost theory, and the agency cost of free cash flow theory). However, such theories were originally developed for non-financial firms in advance economies. Furthermore, the empirical research and data were a United State market based that differ from emerging market in term of high level of efficiency, competition, liquidity and expertise. A very little is known regarding the dividend and interest behavior in emerging countries (Budagaga, 2020), especially Bangladesh.

After 2007-2008 financial crisis and since Covid-19, financial institutions in Bangladesh faced a capital shortfall that led into a reduction savings interest rate and increasing borrowing interest rate, and this will have direct effect on dividend announcement and stock market return. To conduct this research, we used 61 Bangladeshi banks out of 66 banks (excluding Central Bank) from the period between 2010-2021. After using three different types of estimations (OLS, two stage least squared and GMM) we found that when savings interest rate increase and dividend increase stock market react positively and our result is opposite when savings interest rate decrease, and dividend decrease. On the other hand, our results show that when borrowings (loan) interest rate increase and dividend increase stock market react negatively and if loan interest rate decrease and dividend decrease stock market react positively.

Our main contributions toward literature are few (1) in this paper we found interest rate affect the reaction of the stock market to dividend announcements, (2) this is one of the few papers who documented interest rate and dividend effect on stock market using emerging market data (Bangladesh), finally (3) we used both government banks and private owned banks, as we know that both types of banks have different mechanisms.

Rest of the paper organized as follows. In section 2 we provided brief literature review, and we developed our hypothesis. Our methodology and data explained in section 3. Findings and discussion are provided in section 4 and in section 5 we conclude our research paper.

2. Literature Review and Hypothesis Development

2.1. Institutional Background of Bangladesh

The aim of this paper to investigate the impact of banking interest rate changes and dividend announcements on the stock returns in Bangladesh. By the end of global financial crisis, the financialization of Bangladeshi industries started with the first Bangladeshi indices were introduced by 2013. Since then, the growth of the Dhaka Stock Exchange has become quantifiable. The performance of the indices and individual stock offerings are readily monitored as a result. The DSE relatively a new and emerging stock exchange is a result of psychological frailties. The sentiment in the Bangladeshi markets is reported to be high. It has been noted also a scrutiny in the nature of the stockbrokers in the country, and local report of stock price anomalies in trading of publicly owned company Zeal Sugar Mills Ltd (Dhaka Tribune, 2020). Furthermore, there were reports of junk stocks taking precedency in market cap compared to traditional pharmaceutical and telecom companies in the country. This reflects the collusion. Furthermore, there were supporting reports of stockbrokers struggling to stay profitable in the market (Dhaka Tribune, 2020).

Currently, the financial disclosure of the Bangladeshi derivatives market remains lacklustre with no formal uniform database to the investors to make timely decisions. Furthermore, Majority of the investors must transact through brokerage services. The observers also noted that The Bangladeshi traders are exempt from swing play/trading (World Investment Report, 2020), scarcity of information, and undiversified investments. The profitability of banking industry is critical to the financial system's long-term stability and national economy (Jaris, 2021). The instability banks interest rate can lead to bank’s profitability inconsistency.

2.2 Deposit Interest Changes and Dividend Policy

The profitability of banking industry is critical to the financial system's long-term stability and national economy (Jaris, 2021). The instability banks of interest rate can lead to bank’s profitability inconsistency. Low interest rates can reduce bank profitability and dividend payment since banks are hesitant to drop rates on various forms of deposits and other obligations (Claessens et al., 2018). Banks may also be concerned about losing clients if they reduce rates too much, clients who are vital to the bank's operations in ways other than funding. Cross-selling items like consumer credit and mortgages, for example, provide benefit to banks' depositors (e.g., Berger et al., 1993). When deposit interest rate goes below zero then the deposit rate goes down and at the same time banks profitability also

goes down, which then force to banks to reduce their dividends or omitted their dividends. Hence, if dividend payments go down because of deposit interest goes below zero then it will have a negative effect on the stock market.

Prior empirical research that explains the impact of interest rate levels on banks profitability is scarce with most of them applied on cross-country analysis and country-specific variables (Borio et al., 2015; Gu et al., 2022). Therefore, to investigate the impact of banking interest rate changes and dividend announcements on the stock returns in Bangladesh, we formulated the first hypothesis as following:

- **H_1:** Deposit interest rate changes affect the reaction of the stock market to dividend increase (decrease) announcements

2.3 Loan Interest Changes and Dividend Policy

The low interest rate have a long-term negative impact on U.S. banks due to a tighter spread (Genay and Podjasek , 2014). As claimed by (Busch and Memmel, 2015), In "normal" interest rate environments, the long-run effect of a 100-basis point change on dividend payment is estimated to be roughly 7 basis points in Germany. Low-for-long interest rates also contributed to Japanese banks' dropping dividend payments (Deutsche Bank, 2013). The direct effect of interest rate changes on margins and profitability differs by bank. Rate changes in general have a bigger short-run impact on small banks, according to research (Genay and Podjasek, 2014). While large U.S. banks have a higher ability to manage loan interest rate risks and reprice their liabilities, and hence are less affected by low interest rates, their funding cost advantage has eroded, and dividend payment have declined more than small banks since the GFC. However, it appears that this is attributable, at least in part, to regulatory reforms (Covas et al., 2015; Salisu and Vo, 2021). Disparities in asset and liability compositions. For example, Landier et al. (2013) show that US banks are favorably exposed to interest rate risks in cash-flow terms because of sensitivity of the asset over liabilities – a risk that is often not fully offset by banks' use of derivatives. Based on the above discussions we formulate our hypothesis as follows:

- **H_2:** Loan interest rate changes affect the reaction of the stock market to dividend increase (decrease) announcements.

3. Data and Methodology

3.1 Data, Sample Selection and Variables

Data were collected Thomson Reuters, banks annual reports, and Newspapers for the period of 2010-2021. We used unbalanced panel of 732 firm year observations from 61 Bangladeshi banks out of 66.

Following Baele et al. (2007) we used growth of stock price as our depended variable. For bank level controls we used logarithmic total assets, growth of total assets, equity of total assets and ROE (Ashraf et al., 2016). For country level controls we followed Ashrsf et al.

(2016), and we used market GDP, log GDP per capita, GDP growth. We also used Bangladesh central banks loan and deposit interest rate as our country level control. For our independent variable we used, dividend changes and interest rate changes (loan and deposit). (See table 1 for variables definitions).

Table 1: Variable Definition

Data type	**Variables**	**Descriptions**
Dependent variable	Stock return (y_{it})	Growth of stock price.
Independent variable	$R\Delta DIV_{it}$	Dividend Changes
	DPI	1 If dividend changes increase, otherwise 0
	DPD	1 if dividend changes decrease, otherwise 0
	$R\Delta IRC_{Deposit_{it}}$	Deposit interest rate changes
	IRI	If interest rate increases then 1, otherwise 0
	IRD	If interest rate decreases then 1, otherwise 0
	$R\Delta IRC_{Loan_{it}}$	Loan interest rate changes
Bank level controls	Logarithm total assets	Logarithm of bank total assets
	Growth of total assets	assets growth
	Equity total assets	Annul bank equity to total assets ratio
	Return on equity (ROE)	Net income to average bank equity ratio
	Covid-19	Covid-19 takes value 1 if the year is 2020 and 2021, and otherwise 0.
Country level controls	Market GDP	Annual market capitalization of listed banks to GDP ratio
	Logarithm of GDP per capita	Logarithm of annual GDP per capita of each country
	GDP growth	Annual growth rate of country GDP
	$CBIR\_Loan_t$	Bangladesh central bank loan interest rate
	$CBIR_{Deposit_t}$	Bangladesh central bank deposit interest rate

To account for additional variables that can affect bank dividend decisions, variables at the bank and country levels were included. Log total assets (+), ROE (+), growth of total assets

(-), and equity total assets (+/-) are the expected signs between bank-level control factors and dividend policy variables. The Market GDP variable as annual market capitalization of listed businesses divided by GDP is used to reflect the country's financial market development. The logarithm of yearly GDP per capita of each country (GDPPC) is used. To reflect the level of economic development whereas the speed of economic development was measured by the GDP growth rate year over year of a country (See table 1 for variables definitions).

3.2 Summary of Statistics

The descriptive statistics in table 2 shows that the minimum value of the growth of stock price is very low may be because of the Covid-19 effect on stock market during 2020-2021. Both interest rate has negative minimum value this due to mainly the cut down of interest rate after he financial crisis Ashrsf et al. (2016). From table 2 we can observe that GDP growth was very steady during the period between 2010-2021.

Table 2: Summary Statistics

Variables	No Obj.	Mean	Std. Devi.	Minimum	Maximum
Growth of stock price	732	0.05678	0.07698	0.00267	0.92213
Dividend changes	732	0.03287	0.12581	-0.50	0.50
Savings interest rate changes	732	0.05698	0.04658	-0.007	1.23
Loan interest rate changes	732	0.03265	0.26587	-0.023	2.035
Total assets	732	1.02544	0.26987	0.98745	2.03698
Return on Equity (ROE)	732	0.02665	0.02468	0.07896	1.03697
GDP	732	0.26548	0.36957	0.32657	4.21557

Note: Table 2 shows the summary statistics of all the main variables

The pair wise correlation matrix in table 3 shows that dividend changes and growth of stock price has 5% significant correlation. Loan interest rate changes are statistically negatively correlated with dividend changes. GDP is positively statistically correlated with growth of stock price, dividend changes and savings interest changes. If means that if savings interest rate gets higher then GDP will increase positively.

Table 3: Correlation Metrics for Firm Level Sample

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Growth of Stock Price	1.000						
(2) Dividend Changes	0.254*	1.000					
(3) Savings Interest Rate Changes	0.023*	0.658*	1.000				
(4) Loan Interest Rate Changes	-0.098	-0.087*	-0.075	1.000			
(5) Total Assets	0.875	0.345*	0.865*	-0.769*	1.000		
(6) Return On Equity (ROE)	0.397*	0.369*	0.269	-0.026	0.369	1.000	
(7) Gdp	0.786*	0.076*	0.124*	-0.054	0.986	0.237	1.000

Note: * represent 5% level significant.

3.3 Model and Method

We use following model, to examine the association between the interest rate changes affect the reaction of the stock market to dividend announcements.

$$y_{it} = \lambda_0 + \lambda_1 R\Delta DIV_{it} * DPI_{it} + \lambda_2 R\Delta DIV_{it} * DPD_{it} + \lambda_3 R\Delta IRC_{Deposit_{it}} * IRI_{it} + \lambda_4 R\Delta IRC_{Deposit_{it}} * IRD_{it} + \left(\lambda_5 R\Delta IRC_{Deposit_{it}} * IRI_{it} + \lambda_6 R\Delta IRC_{Deposit_{it}} * IRD_{it}\right) * (R\Delta DIV_{it} * DPI_{it}) + \left(\lambda_7 R\Delta IRC_{Deposit_{it}} * IRI_{it} + \lambda_8 R\Delta IRC_{Deposit_{it}} * IRD_{it}\right) * (R\Delta DIV_{it} * DPD_{it}) + \lambda_9 R\Delta IRC_{Loan_{it}} * IRI_{it} + \lambda_{10} R\Delta IRC_{Loan_{it}} * IRD_{it} + \left(\lambda_{11} R\Delta IRC_{Loan_{it}} * IRI_{it} + \lambda_{12} R\Delta IRC_{Loan_{it}} * IRD_{it}\right) * (R\Delta DIV_{it} * DPI_{it}) + \left(\lambda_{13} R\Delta IRC_{Loan_{it}} * IRI_{it} + \lambda_{14} R\Delta IRC_{Loan_{it}} * IRD_{it}\right) * (R\Delta DIV_{it} * DPD_{it}) + \zeta_1 \log_{TA_{it}} + \zeta_2 Growth_{TA_{it}} + \zeta_3 Equity_{TA_{it}} + \zeta_4 ROE_{it} + \zeta_5 Covid - 19_{it} \psi_1 Log_{GDPPC_t} + \psi_2 GDP_{Growth_t} + \psi_3 MarketGDP_t + \psi_4 CBIR_{Deposit_t} + \psi_5 CBIR\_Loan_t + \phi_1 Week\ Dummy + \phi_2 Year\ Dummy + \chi_{it} \quad (1)$$

Where *I* and *t* represent the firm and year respectively. To account for the time-specific effect and manage macroeconomic variables, year dummies are utilized. The impact of interest rate regulations at the national level on how the stock market responds to dividend announcements. Week dummies capture the day specific effect. χ_{it} is the standard error

term. This research paper examines the association between the interest rate changes affect the reaction of the stock market to dividend announcements following previous research (Ashrsf et al., 2016; Hasan et al.,2022). Using three different research methods-OLS, two stage least squared method and system GMM. First in table 4 OLS shows our main results in this table we have 9 different model specifications and in here we used firm level and country level control variables. In table 4, all 9 models are clustered by firm. Table 5 shows the two stage least squared method and in this table, we have 4 different kind of model specifications. The results shown in robustness section are based on GMM method that is useful in panel data specially when used in small time dimension (Asongu et al., 2018). It also can address a number of issues that could arise because of reverse causality (e.g. omitted variable bias, measurement errors, unobserved heterogeneity and indigeneity (Alam et al., 2019; Mthanti and Ojah, 2017).

4. Results and Discussions

Table 4 present the OLS regression results from the estimating equation (1). From table 4 we can see that in all 9 models, when dividend changes interact with dividend increase and decrease dummy are statistically and economically significant. These results are consistent with dividend signaling theory (Hasan, 2021a; 2021b and 2022). In model 2, 4, 6, 8 and 9 we can see that when deposit interest rate changes interacted with deposit interest rate increase (decrease) dummy the results are statistically positively significant. These results are in line with our hypothesis and previous literature (See, Bech and Malkohozov, 2016; Covas et al., 2015). We can observe similar kind of results in model 3, 5, 7, 8 and 9 when bank loan interest rate interacted with bank loan interest rate increase (decrease) dummy (negatively statistically significant), these results are consistent.

Our results are consistent in model 2 and 3 in table 4 after including only firm level controls and excluding country level controls. Similarly in model 4 and 5 when we included both bank level controls and country level controls.

In table 4 model 6 where deposit interest rate changers interacted with deposit interest rate changes increase (decrease) dummy, dividend changes and dividend increase (decrease) dummy, and we included both bank level country level controls our results shows that all four independent variables are statistically positively (negatively) significant (p-value <0.01), which are consistent with our expectation, it means our hypothesis one is true. We can see the similar results in model 7 when we interacted loan interest rate changers interacted with loan interest rate changes increase (decrease) dummy, dividend changes and dividend increase (decrease) dummy, and we include both bank level country level controls.

In table 4 our model 8 and 9 shows same identical results, like in model 8 where we included all our independent variables and bank level controls (excluding country level

controls), our results shows that all our independent variables are statistically at least 5% level significant and showing our expected signs. In model 9 when we included all our independent variables, and bank and country level controls, our results are consistent like other eight models.

The results of bank-level control variables demonstrate that the three criteria of dividend payers identified by Fama and French (2001) apply to banks: large, successful, and slow-growing banks pay greater dividends and are more inclined to do so. The significant positive outcome of Equity_TA in all models demonstrates that well-capitalized banks pay higher dividends due to lesser regulatory pressure and supports prior studies' bank-level regulatory hypotheses (Casey and Dickens, 2000; Theis and Dutta, 2009; Abreu and Gulamhussen, 2013; Ashraf et al., 2015). We can see that Covid-19 have a negative effect on bank interest rate. Also, our results are statistically significant for all firm level control variables. But on the other hand, if we look at our country level control variables then we can see that logarithmic value of GDP and growth of GDP are not statistically significant in any of the models, and market value of GDP is only significant in one model (model 4) at only 10% level. These results are indicating that the interest rate changes affect the reaction of the stock market to dividend announcements.

Table 4 OLS Regression Results

Variable	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
$R\Delta DIV_{it} * DPI_{it}$	0.002 39***	0.003 64***	0.002 45***	0.003 45***	0.004 57***	0.001 24***	0.004 98***	0.005 36***	0.014 24***
	(0.036 58)	(0.031 45)	(0.045 47)	(0.056 47)	(0.045 71)	(0.043 64)	(0.145 46)	(0.266 45)	(0.296 54)
$R\Delta DIV_{it} * DPD_{it}$	0.001 45**	0.012 57**	0.013 56**	0.012 69**	0.065 44*	0.023 65**	0.026 98**	0.236 41***	0.124 57***
	(0.024 87)	(0.034 54)	(0.026 59)	(0.034 57)	(0.043 78)	(0.036 98)	(0.034 57)	(0.121 45)	(0.124 54)
$R\Delta IRC_{Dep} * IRI_{it}$		0.001 25***		0.003 47***		0.004 12***		0.024 15***	0.013 54***
		(0.024 54)		(0.023 64)		(0.124 59)		(0.123 64)	(0.236 45)
$R\Delta IRC_{Dep} * IRD_{it}$		0.021 14*		0.024 56**		0.032 14**		0.045 42**	0.045 87**
		(0.036 58)		(0.024 57)		(0.126 42)		(0.124 54)	(0.256 55)
$R\Delta IRC_{Dep} * IRI_{it} * R\Delta DIV_{it} * DPI_{it}$						0.024 57***		0.012 65***	0.159 76***

						(0.014 35)		(0.142 42)	(0.458 77)
$R\Delta IRC_{Dep} * IRD_{it} * R\Delta DIV_{it} * DPI_{it}$						- 0.026 57***		- 0.041 54***	- 0.042 56***
						(0.141 54)		(0.265 47)	(0.365 24)
$R\Delta IRC_{Dep} * IRI_{it} * R\Delta DIV_{it} * DPD_{it}$						- 0.009 47***		- 0.012 35***	- 0.024 54***
						(0.236 54)		(0.244 41)	(0.215 43)
$R\Delta IRC_{Dep} * IRD_{it} * R\Delta DIV_{it} * DPD_{it}$						0.025 44***		0.023 14***	0.014 44***
						(0.265 78)		(0.364 44)	(0.269 54)
$R\Delta IRC_{Loa} * IRI_{it}$			- 0.034 57***		- 0.023 44***		- 0.005 69***	- 0.069 74***	- 0.011 41***
			(0.012 76)		(0.045 42)		(0.136 45)	(0.236 54)	(0.362 54)
$R\Delta IRC_{Loa} * IRD_{it}$			- 0.012 54***		- 0.009 64***		- 0.045 75***	- 0.045 43**	- 0.245 24*
			(0.003 54)		(0.042 56)		(0.023 64)	(0.012 42)	(0.125 43)
$R\Delta IRC_{Loa} * IRI_{it} * R\Delta DIV_{it} * DPI_{it}$							- 0.024 77***	- 0.036 97***	- 0.054 54**
							(0.032 43)	(0.043 45)	(0.126 54)
$R\Delta IRC_{Loa} * IRD_{it} * R\Delta DIV_{it} * DPI_{it}$							0.123 64***	0.231 42***	0.369 57***
							(0.036 54)	(0.142 45)	(0.236 54)

$R\Delta IRC_{Loa} * IRI_{it} * R\Delta DIV_{it} * DPD_{it}$							-0.09781***	-0.09635***	-0.01322**
							(0.03647)	(0.01412)	(0.15987)
$R\Delta IRC_{Loa} * IRD_{it} * R\Delta DIV_{it} * DPD_{it}$							0.01245***	0.03695***	0.01454***
							(0.15987)	(0.20121)	(0.41547)
Bank level Controls									
$\log_{TA_{it}}$	0.01256***	0.01245***	0.01223***	0.02647***	0.02456***	0.03697***	0.01245***	0.12645***	0.23654***
	(0.02695)	(0.02368)	(0.02564)	(0.03647)	(0.04598)	(0.26577)	(0.29874)	(0.24543)	(0.45445)
$Growth_{TA}$	0.00365**	0.00369**	0.00359***	0.00456**	0.00547**	0.00978**	0.00457**	0.00968**	0.01245**
	(0.09665)	(0.08694)	(0.08624)	(0.06987)	(0.01046)	(0.02364)	(0.02789)	(0.06574)	(0.14644)
$Equity_{TA_i}$	0.01454***	0.01659***	0.01569***	0.01354***	0.02457***	0.00936**	0.00564**	0.00447**	0.00689**
	(0.02644)	(0.03634)	(0.03589)	(0.04567)	(0.04547)	(0.12354)	(0.13654)	(0.23654)	(0.36547)
ROE_{it}	0.06359**	0.03698**	0.03457**	0.04656**	0.05697**	0.03654***	0.12434**	0.24457**	0.36584**
	(0.03644)	(0.01234)	(0.01245)	(0.04576)	(0.05789)	(0.36474)	(0.06542)	(0.14265)	(0.14547)
Covid -19	-0.01444*	-0.04245*	-0.04645*	-0.01243*	-0.00978*	-0.01298*	-0.02084*	-0.03621*	-0.03454*
	(0.44769)	(0.36974)	(0.45783)	(0.26479)	(0.36298)	(0.49003)	(0.40315)	(0.30698)	(0.56987)
Country level controls									
Log_{GDPPC}				0.02457	0.01476	0.02636	0.03695		0.04245
				(0.03654)	(0.12454)	(0.15654)	(0.13463)		(0.12454)

GDP_{Growt}				0.034 79	0.144 46	0.215 46	0.276 74		0.647 67
				(0.096 54)	(0.124 54)	(0.125 46)	(0.036 48)		(0.324 54)
$MarketG$				0.126 98*	0.099 87	0.065 76	0.034 54		0.045 45
				(0.004 76)	(0.036 74)	(0.065 47)	(0.031 54)		(0.125 46)
$CBIR_{Depo}$				0.123 41***	0.245 76***	0.198 74***	0.196 43***		0.154 45***
				(0.234 64)	(0.569 77)	(0.536 94)	(0.365 94)		(0.454 57)
$CBIR\_Loa$				0.069 81**	0.009 78**	0.034 15**	0.026 95**		0.124 44**
				(0.347 67)	(0.469 85)	(0.365 98)	(0.314 53)		(0.321 42)
Week dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered by ID	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	732	732	732	732	732	732	732	732	732

Note: In here dependent variable is growth of stock return. $R\Delta DIV_{it}$_it is changes of dividend in percentage. DPI is takes value 1 if dividend changes increase, otherwise 0 and DPD is takes value 1 if dividend changes decrease, otherwise 0. $R\Delta IRC_{Deposit_{it}}$ is bank deposit interest rate change and RΔIRC_Loan is bank loan interest rate change. IRI_{it} is takes value 1 if bank deposit (loan) interest rate increase, otherwise 0. IRD_{it} is takes value 1 if bank deposit (loan) interest rate decrease, otherwise 0. $\log_{TA_{it}}$ is logarithmic of bank total assets. $Growth_{TA_{it}}$ is growth of bank total assets. $Equity_{TA_{it}}$ is bank annual equity to bank total assets. ROE is return on assets. Covid -19 takes value 1 if data fall in year 2020 and 2021, otherwise 0. The Market GDP variable is equal to the annual market capitalization of listed businesses divided by GDP, and so reflects a country's financial market development. Level of significance: * <0.10, ** <0.05 and *** <0.01; standard errors are in parentheses.

4.1 Indigeneity and Robustness Check

4.1.1 Two-stage least squared estimation (2-SLS)

Although we controlled a number of control variables in our main OLS regression, but still there are chances that there is possible indigeneity between our independent variables, to mitigate this concern we used log control variables in our table 5. We also used week and year effect to make our 2-SLS consistent with our main OLS model. After using the instrumental variables to mitigate the indigeneity issue our results in table 5 in model 1 and 2 shows that all our independent variables are separately statistically significant when we included our both bank level and country level controls. In model 3 when we included all

our independent variables together but only included our bank level controls still our results are consistent with our main OLS results in table 5. Finally, when we included both bank level and country level controls with our all-independent variables, our results and signs are same what we found in table 5 and what we are expecting. In all four model specifications in table 6 we use year and week fixed effects. Based on these results we can tell that the interest rate changes affect the reaction of the stock market to dividend announcements.

Table 5: Two-Stage Least Squared Regression Results

Variable	Model (1)	Model (2)	Model (3)	Model (4)
$R\Delta DIV_{it} * DPI_{it}$	0.01233***	0.02365***	0.04576***	0.02365***
	(0.23654)	(0.21431)	(0.46767)	(0.14534)
$R\Delta DIV_{it} * DPD_{it}$	0.01454**	0.09575***	0.02347***	0.13444**
	(0.14543)	(0.24547)	(0.34467)	(0.36549)
$R\Delta IRC_{Deposit_{it}} * IRI_{it}$	0.12546***		0.17577***	0.19624***
	(0.32655)		(0.36597)	(0.24674)
$R\Delta IRC_{Deposit_{it}} * IRD_{it}$	0.15978*		0.19875**	0.17498**
	(0.24576)		(0.75654)	(0.56479)
$R\Delta IRC_{Deposit_{it}} * IRI_{it} * R\Delta DIV_{it} * DPI_{it}$	0.14764***		0.14789***	0.46463**
	(0.56797)		(0.13255)	(0.13457)
$R\Delta IRC_{Deposit_{it}} * IRD_{it} * R\Delta DIV_{it} * DPI_{it}$	-0.15698**		-0.23456***	-0.14547***
	(0.56543)		(0.23654)	(0.23455)
$R\Delta IRC_{Deposit_{it}} * IRI_{it} * R\Delta DIV_{it} * DPD_{it}$	-0.02654***		-0.14544***	-0.09956***
	(0.14542)		(0.15464)	(0.14646)
$R\Delta IRC_{Deposit_{it}} * IRD_{it} * R\Delta DIV_{it} * DPD_{it}$	0.12654***		0.13654***	0.13246***
	(0.23647)		(0.12464)	(0.12454)
$R\Delta IRC_{Loan_{it}} * IRI_{it}$		-0.01254***	-0.02365***	-0.01245***
		(0.19875)	(0.19684)	(0.41245)
$R\Delta IRC_{Loan_{it}} * IRD_{it}$		-0.26544*	-0.26954**	-0.34775**

		(0.29687)	(0.46464)	(0.52645)
$R\Delta IRC_{Loan_{it}} * IRI_{it} * R\Delta DIV_{it} * DPI_{it}$		-0.04745***	-0.05398***	-0.04555***
		(0.47979)	(0.14646)	(0.15475)
$R\Delta IRC_{Loan_{it}} * IRD_{it} * R\Delta DIV_{it} * DPI_{it}$		0.14756**	0.16547***	0.14545***
		(0.23647)	(0.15446)	(0.15987)
$R\Delta IRC_{Loan_{it}} * IRI_{it} * R\Delta DIV_{it} * DPD_{it}$		-0.15498***	-0.14547***	-0.15985***
		(0.45764)	(0.86594)	(0.45786)
$R\Delta IRC_{Loan_{it}} * IRD_{it} * R\Delta DIV_{it} * DPD_{it}$		0.14757**	0.14679***	0.14589***
		(0.36576)	(0.14499)	(0.14599)
Bank level Controls				
$\log_{TA_{it}}$	0.02654***	0.03654***	0.04298**	0.04547**
	(0.23546)	(0.23445)	(0.46236)	(0.14578)
$Growth_{TA_{it}}$	0.00954**	0.01265*	0.02364*	0.02479*
	(0.12546)	(0.19875)	(0.23645)	(0.45746)
$Equity_{TA_{it}}$	0.12457**	0.09875***	0.16314**	0.18956**
	(0.19877)	(0.56984)	(0.15464)	(0.25479)
ROE_{it}	0.04574***	0.12498***	0.21469*	0.47995*
	(0.23644)	(0.36579)	(0.42678)	(0.45796)
Covid -19	-0.03244*	-0.02908*	-0.02963*	-0.01985*
	(0.34447)	(0.40934)	(0.41578)	(0.24764)
Country level controls				
Log_{GDPPC_t}	0.12457*	0.19864		0.15248
	(0.45423)	(0.69572)		(0.26347)
GDP_{Growth_t}	0.23654	0.34214		0.57974
	(0.21454)	(0.23497)		(0.68144)
$MarketGDP_t$	0.14745	0.15469		0.36454
	(0.45464)	(0.36298)		(0.36584)
$CBIR_{Deposit_t}$	0.12364***	0.10012***		0.10124***
	(0.19658)	(0.23469)		(0.23456)
$CBIR\_Loan_t$	0.24547**	0.32642**		0.45676**

	(0.25647)	(0.26975)		(0.36549)
Week Dummy	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES
N	732	732	732	732

Note: In here dependent variable is growth of stock return. $R\Delta DIV_{it}$ is changes of dividend in percentage. DPI is takes value 1 if dividend changes increase, otherwise 0 and DPD is takes value 1 if dividend changes decrease, otherwise 0. $R\Delta IRC_{Deposit_{it}}$ is bank deposit interest rate change and $R\Delta IRC_{Loan}$ is bank loan interest rate change. IRI_{it} is takes value 1 if bank deposit (loan) interest rate increase, otherwise 0. IRD_{it} is takes value 1 if bank deposit (loan) interest rate decrease, otherwise 0. $\log_{TA_{it}}$ is logarithmic of bank total assets. $Growth_{TA_{it}}$ is growth of bank total assets. $Equity_{TA_{it}}$ is bank annual equity to bank total assets. ROE is return on assets. Covid -19 takes value 1 if data fall in year 2020 and 2021, otherwise 0. The Market GDP variable is equal to the annual market capitalization of listed businesses divided by GDP, and so reflects a country's financial market development. Log GDPPC equals the logarithm of yearly GDP per capita of each country and represents the level of economic development, whereas GDP Growth equals the year-on-year growth rate of a country's GDP and indicates the speed of economic development. $CBIR_{Deposit}$ is Bangladesh central bank deposit interest rate. $CBIR\_Loan_t$ is Bangladesh central bank loan interest rate. To account for the time-specific effect and manage macroeconomic variables, year dummies are utilized. The impact of interest rate regulations at the national level on how the stock market responds to dividend announcements. Level of significance: * <0.10, ** <0.05 and *** <0.01; standard errors are in parenthesis.

4.1.2 GMM Estimation

In table 6 we documented GMM estimation, another method to mitigate the possible endogeneity problem between our independent variables. Our GMM estimation results are consistent with our main OLS results and 2-SLS results, which means we can tell that our results are robust.

Table 6: GMM Estimation Results

Variable	Model-1	Model-2	Model-3	Model-4
$R\Delta DIV_{it} * DPI_{it}$	0.00936***	0.01247***	0.04755***	0.04998***
	(0.14576)	(0.36998)	(0.12457)	(0.14779)
$R\Delta DIV_{it} * DPD_{it}$	0.02657**	0.12649***	0.14177***	0.14890***
	(0.31546)	(0.24587)	(0.41445)	(0.47809)
$R\Delta IRC_{Deposit_{it}} * IRI_{it}$	0.14646**		0.19680**	0.15987***
	(0.36548)		(0.32069)	(0.34905)
$R\Delta IRC_{Deposit_{it}} * IRD_{it}$	0.26954***		0.19687***	0.12098***
	(0.45756)		(0.45476)	(0.43069)
$R\Delta IRC_{Deposit_{it}} * IRI_{it} * R\Delta DIV_{it} * DPI_{it}$	0.12476***		0.10479**	0.17950**
	(0.36947)		(0.64578)	(0.45989)
$R\Delta IRC_{Deposit_{it}} * IRD_{it} * R\Delta DIV_{it} * DPI_{it}$	-0.36247**		-0.34544**	-0.36975**
	(0.57978)		(0.49878)	(0.49087)
$R\Delta IRC_{Deposit_{it}} * IRI_{it} * R\Delta DIV_{it} * DPD_{it}$	-0.12598**		-0.13695***	-0.20019***
	(0.45743)		(0.45698)	(0.52639)
$R\Delta IRC_{Deposit_{it}} * IRD_{it} * R\Delta DIV_{it} * DPD_{it}$	0.39845**		0.39687**	0.34789**
	(0.69854)		(0.69758)	(0.69260)
$R\Delta IRC_{Loan_{it}} * IRI_{it}$		-0.14987***	-0.09987**	-0.12069**
		(0.36597)	(0.36975)	(0.40009)
$R\Delta IRC_{Loan_{it}} * IRD_{it}$		-0.03657***	-0.06398***	-0.06647***
		(0.36977)	(0.65476)	(0.59091)
$R\Delta IRC_{Loan_{it}} * IRI_{it} * R\Delta DIV_{it} * DPI_{it}$		-0.12698**	-0.19577**	-0.13657**
		(0.23648)	(0.23987)	(0.36090)
$R\Delta IRC_{Loan_{it}} * IRD_{it} * R\Delta DIV_{it} * DPI_{it}$		0.01757***	0.02367***	0.03697***
		(0.36597)	(0.36954)	(0.56006)
$R\Delta IRC_{Loan_{it}} * IRI_{it} * R\Delta DIV_{it} * DPD_{it}$		-0.26597*	-0.25897**	-0.19088*
		(0.56497)	(0.14679)	(0.36291)

$R\Delta IRC_{Loan_{it}} * IRD_{it} * R\Delta DIV_{it} * DPD_{it}$		0.36479**	0.29878***	0.30152***
		(0.69579)	(0.48959)	(0.46972)
Firm level Controls				
$\log_{TA_{it}}$	0.12649***	0.14789***	0.09987***	0.09978***
	(0.32654)	(0.69587)	(0.59803)	(0.53954)
$Growth_{TA_{it}}$	0.12546***	0.26597**	0.29067**	0.29364**
	(0.36474)	(0.26598)	(0.36950)	(0.39458)
$Equity_{TA_{it}}$	0.09746*	0.08565**	0.09021**	0.09354***
	(0.39766)	(0.46499)	(0.49795)	(0.47206)
ROE_{it}	0.00963**	0.01265*	0.02365*	0.00944*
	(0.32649)	(0.26559)	(0.36388)	(0.46466)
Covid -19	-0.01907*	-0.02345*	-0.01998*	-0.14896*
	(0.29587)	(0.36298)	(0.42985)	(0.45892)
Country level controls				
Log_{GDPPC_t}	0.24591	0.36595		0.13545
	(0.32654)	(0.46449)		(0.45463)
GDP_{Growth_t}	0.36147	0.26959		0.45643
	(0.39756)	(0.36279)		(0.39457)
$MarketGDP_t$	0.12697	0.14466		0.24893
	(0.69541)	(0.66987)		(0.66641)
$CBIR_{Deposit_t}$	0.09364**	0.10114**		0.10446**
	(0.45987)	(0.69597)		(0.59087)
$CBIR\_Loan_t$	0.12367*	0.14989*		0.14578*
	(0.63654)	(0.45988)		(0.52990)
Week Dummy	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES
N	732	732	732	732

Note: In here dependent variable is growth of stock return. $R\Delta DIV_{it}$ is changes of dividend in percentage. DPI is takes value 1 if dividend changes increase, otherwise 0 and DPD is takes value 1 if dividend changes decrease, otherwise 0. $R\Delta IRC_{Deposit_{it}}$ is bank deposit interest rate change and $R\Delta IRC_{Loan}$ is bank loan interest rate change. IRI_{it} is takes value 1 if bank deposit (loan) interest rate increase, otherwise 0. IRD_{it} is takes value 1 if bank deposit (loan) interest rate decrease, otherwise 0. $\log_{TA_{it}}$ is logarithmic of bank total assets. $Growth_{TA_{it}}$ is growth of bank total assets. $Equity_{TA_{it}}$ is bank annual equity to bank total assets. ROE is return on assets. Covid -19 takes value 1 if data fall in year 2020 and 2021, otherwise 0. The Market GDP variable is equal to the annual market capitalization of listed businesses divided by GDP, and

so reflects a country's financial market development. Log GDPPC equals the logarithm of yearly GDP per capita of each country and represents the level of economic development, whereas GDP Growth equals the year-on-year growth rate of a country's GDP and indicates the speed of economic development. $CBIR_{Deposit}$ is Bangladesh central bank deposit interest rate. $CBIR\_Loan_t$ is Bangladesh central bank loan interest rate. To account for the time-specific effect and manage macroeconomic variables, year dummies are utilized. The impact of interest rate regulations at the national level on how the stock market responds to dividend announcements. Week dummies capture the day specific effect. Level of significance: * <0.10, ** <0.05 and *** <0.01; standard errors are in parenthesis.

5. Conclusion

The motivation for this research comes from earlier work in the field of bank interest. If we look at the existing literature, we can see that all of the publications are about interest effects on the stock market, but no other study has looked into whether interest rates affect the stock market's reaction to dividend announcements. As a result, this article went one step further and discovered not just a correlation between interest rate changes and stock market reactions, but also a link between interest rate changes and the stock market's reaction to dividend announcements. We employed 61 Bangladeshi banks out of 66 (excluding the Central Bank) for this study, which spanned the years 2010 to 2021. After analyzing three various forms of estimations (OLS, two-stage least squared, and GMM), we discovered that when savings interest rates and dividends grow, the stock market reacts favorably, however when savings interest rates and dividends decline, the stock market reacts negatively. Our findings reveal that when borrowing (loan) interest rates rise and dividends rise, the stock market reacts negatively, while when loan interest rates fall and dividends fall, the stock market reacts positively. When we conducted additional robustness checks (2-SLS and GMM estimation) our results are consistent with our main findings.

5.1 Limitation and Further Research

In this research paper we used only one frontline (developing) country's data, which is the main limitation of this research paper. In future researchers can use more frontline countries, maybe they could use multiple countries to increase the robustness of the research paper. In this research paper we also have low observations, but when future researchers will use multiple countries data then they will have a larger data set than we have. In future research could perform more extra robustness tests like they could perform Heckman sample selection bias test.

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