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Bank stability and dividend policy

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Abstract: Relying on a US bank sample, we document the *double-edged sword* of dividends on the bank's riskiness. Paying dividends exposes banks to stricter market discipline, then decreases the risk-taking behaviors of bank management compared with non-payers, consistent with the *Dividend-Stability Channel*. However, among banks that pay dividends, excessive dividends makes them riskier, consistent with the *Dividend-Fragility Channel*. Our results remain unchanged due to a battery of robustness testings.

Subjects: Corporate Finance; Banking; Credit & Credit Institutions

Keywords: banks; dividends; payout policy; risk
JEL Classifications: Codes: G21; G28; G34; G38

1. Introduction

In the aftermath of the crisis that started in 2007, the bank's payout policy receives greater attention with the adoption of regulations and supervisory programs[1] by bank regulators with the purpose of limiting dividend payments or other types of distribution when banks are under stress. The anecdote suggests some banks that were recipients of the Troubled Asset Relief Program (TARP) in 2008 and are in critical situations of distress continue to pay dividends well into the depth of the crisis. This shift of the relative value of stakeholders' claims within banks in time of stress violates the priority of debt over equity (Acharya et al., 2016); hence, negatively affect bank default risk, and the broader financial and economic stability (Laeven & Levine, 2009).

In this study, we address whether dividends affect bank's risk. Dividend policies are recognized in the literature as a means to convey private information not previously known to outsiders, as a costly signal with the purpose of changing perception in the markets, or as a way to attenuate the conflicts from incomplete contracts. However, dividends could serve as a means to transfer the wealth from bondholders (and potential taxpayers) to shareholders (Tran & Ashraf, 2018). These

ABOUT THE AUTHOR

Dung Viet Tran is a lecturer of Finance at the faculty of Banking of Banking University Ho Chi Minh city (BUH). He obtained his PhD from University Grenoble Alpes (France), and has been a visiting scholar at the University of Alberta, University Laval (Canada), University of New Orleans (US), University of Kent (UK) among others. He has taught derivatives, risk management, andquantitative methods classes at both MSc and undergraduate levels. His research covers a variety of topics related to financial institutions and empirical corporate finance, including capital structure, dividend policy, bank risk taking behaviors, earnings management, systemic risk among others.

PUBLIC INTEREST STATEMENT

Banks play a critical role in our economy, acting as a channel through which interruptions in itssmooth activities may induce adverse fluctuations in the real economy. In this study, we examinethe impacts of the dividend policy on bank stability, and document the double-edged sword ofdividends on bank riskiness.

characteristics of dividends result in high heterogeneity in the shape of banks, risk-taking incentives, and consequently the risk profile of banks.[2]

On the one hand, one may argue that dividends lower bank risk. The agency theory indicates that paying dividends decreases the agency costs derived from the disconnect between ownership and control (Easterbrook, 1984). Managers want to retain free cash flow (FCF) and invest it in projects that increase managerial benefits like compensation, power or reputation. Shareholders want managers to pay out FCF because projects that increase managerial benefits may often be spent on value-decreasing projects (Chae et al., 2009; Lang & Litzenberger, 1989), affecting the performance and default risk of banks. Paying dividends also forces banks to borrow more frequently from the capital markets, inducing a greater scrutiny of bank management by outsiders, and consequently decreasing managerial risk-taking. We call this channel the *Dividends-Stability Channel*.

On the other hand, paying dividends negatively impacts the capacity to strengthen bank capital buffer. This erodes secured capital assets, leaves riskier assets on banks' balance sheets, and thus decreases bank stability (Kanas (2013)). Additionally, an increase in dividends tends to decrease bank stability through the positive impact of risk on the value of deposit insurance, which encourages further risk-taking (Onali, 2014). This induces consequently a negative impact of dividends on bank stability. We call this channel the *Dividends-Fragility Channel*.

In this paper, we examine the effects of dividends on bank stability using a US bank sample. Following the literature (e.g., Tran et al. (2019)), we use ZSCORE as our primary measure of banks' risk-taking behavior. First, when comparing the risk profile between dividend-paying banks and non-payers, we find that ZSCORE is about 22.3% higher for dividend-paying banks, compared to non-dividend-paying banks. This suggests that dividend-paying banks are less risky than non-payers, consistent with our *Dividend-Stability Channel*. However, when focusing only on dividend-paying bank sample, we find that the higher the dividends, the lower the bank's stability, consistent with our *Dividend-Fragility Channel*.

This evidence shows the complex characteristics of dividends that may result in high heterogeneity in the shape banks' risk-taking incentives, and consequently the risk profile of banks, suggesting that the interplay between dividends and bank risk is not simply monotonic as documented in prior literature. Then, our partition our sample banks each time into six subgroups. The first subgroup (DIV_Q0) includes all non-dividend-payers. We then divide dividend-payers into quintiles based on the size of dividends (DIV_Q1, DIV_Q2, DIV_Q3, DIV_Q4, DIV_Q5) with DIV_Q1 the lowest dividend-payers and DIV_Q5 the highest dividend-payers. We re-run our analysis. We document that the relationship between dividends and bank risk is inverted U-shaped. Indeed, the coefficient for non-dividend-payers (DIV_Q0) is lowest (15.969). With the payment of dividends, the coefficients on indicators increase, and reach their maximum with the coefficient on DIV_Q3 before decreasing with higher amount of dividends.

To ensure the robustness of our findings, we provide a battery of sensitivity tests, such as using the propensity-scores matching, alternative sampling, measures of risk and dividends, and different econometric techniques. We still find similar results.

This study contributes to the literature in several ways. To the best of our limited knowledge, this is one of the *first* investigations of the effects of dividend policy on the riskiness within the banking industry. Our study provides contributions to the literature by documenting the evidence of the *double-edged sword* of dividend policy on the bank riskiness. Put it differently, paying dividends helps banks to become more stable compared with non-payers; however, among banks that pay dividends, an excessive payment induces more risk-taking behaviors in banks. Unlike previous research, our study focuses on a specific and strongly regulated industry and uses a large and homogeneous sample over a long period. Hence, thanks to the more homogeneous characteristics and a less biased sample selection, we believe our study provides stronger evidence of the impact of the dividend policy on bank stability.

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Section 2 describes the data and variables. We report our main results in Section 3. A range of robustness tests is shown in Section 4. We investigate the impact of the crisis in Section 5. Section 6 concludes the study.

2. Data and variables definition

2.1. Sample banks

We retrieve the US bank data from the quarterly Y-9 C reports of the FED. Our period of study covers the periods from 2001 to 2015. All bank-quarter observations with missing or incomplete data are removed. All financial ratios are winsorized at 1% level on the top and bottom of their distribution to dampen the effects of outliers.

2.2. Measures of bank risk

As a proxy for bank stability, we rely on ZSCORE measure. High-ZSCORE banks are more stable than low-ZSCORE banks. In robustness tests, we employ several alternative bank risk measures, and find similar findings.

2.3. Control variables

To alleviate the potential omitted variable bias, we control for various bank-specific variables, as well as time-fixed effects. We include bank size (*SIZE*), capital ratio (*CAPITAL*), bank performance (*DUMMY LOSS*, and *EARNINGS*), and asset growth (*GROWTH*). We also control for loan ratio (LOAN), deposit ratio (DEPOSIT), the diversification (NII). See Table 1 for definitions. Table 2 reports a summary descriptive of these variables.

3. The effects of dividend policy to bank stability

3.1. Baseline results

The empirical specifications we estimate is as follows:

Table 1. Variables definitions

Variable	Definition
ZSCORE	Z-score is calculated as $\frac{CAP+\mu_{ROA}}{\sigma_{ROA}}$; a larger value implies lower overall bank risk; means of ROA and Equity/GTA as well as the standard deviation of ROA are computed over the previous 12 quarters (t − 11 to t)
DUM_PAYER	A dummy that takes a value of 1 if the bank pays dividend at time t and 0 otherwise.
DPO	Ratio of dividend over net income
SIZE	The natural logarithm of gross total assets
CAPITAL	Book value of equity over gross total assets
EARNINGS	Income before taxes, provisions recognized in income over gross total assets
GROWTH	Growth rate of gross total assets
LOAN	Total loans over the quarter
DEPOSIT	The ratio of deposits over gross total assets
NII	Non-interest incomes over the net operating incomes
NPL	Nonperforming assets over the quarter, scaled by total loans at the beginning of the quarter
ALW	Loan loss allowance as a percentage of lagged total loans

This table presents definitions of all variables used in the analysis.

Table 2. ***Summary statistics.*** **this table reports summary statistics for the main sample of U.S. bank**

Variables	Mean	St. Dev	Skewness	Kurtosis	P25	P50	P75
DUM_PAYER	0.582	0.493	−0.33	1.110	0	1	1
SIZE	13.69	1.345	1.792	6.849	12.78	13.39	14.11
CAPITAL	0.092	0.030	1.178	6.036	0.072	0.088	0.105
DUMMY LOSS	0.086	0.281	2.935	9.619	0	0	0
EARNINGS	0.015	0.009	−0.04	6.796	0.010	0.015	0.019
GROWTH	0.019	0.044	1.627	8.687	−0.00	0.013	0.035
Z-SCORE (LN)	3.337	1.145	−1.03	4.103	2.775	3.555	4.136

$$RISK_{it} = \alpha + DIV_{it-1} + \gamma_{it-1} + \theta_t + \varepsilon_{it} \quad (1)$$

where $RISK_{it}$ are different measures of bank risk. We use ZSCORE as our main proxy for bank risk, and re-perform our analysis with alternative measures. We use different proxies for our variable of interest – bank dividend policy. γ_{it} is the vector of control variables that are described above. All variables are lagged one quarter to control for potential endogeneity due to the intra-period reverse causality. We also lag further periods in unreported tests and find similar results. We include time-fixed effects, θ_t, to control for time effects, which can affect the bank risk. ε_{it} is the error term. Since bank risk is likely to be correlated within a bank over time, standard errors used to assess significance are corrected for heteroscedasticity and bank-level clustering.

Our main results are reported in Table 3, Panel A. We first begin with DUM_PAYER which is equal to 1 if bank *i* pays dividends at time *t*, and 0 otherwise (Model (1)). Controlling for bank characteristics and time-fixed effects, we find that the coefficient on DUM_PAYER significantly positive at the 1% level. Economically, this result indicates that ZSCORE of dividend-paying banks are on average 9.816 larger than ZSCORE of non-payers. Based on the average ZSCORE of non-payers of 33.802, this coefficient is economically important since it implies that ZSCORE is about 22.3% higher for dividend-paying banks, compared to non-dividend-paying banks. This suggests that dividend-paying banks are less risky than non-payers, consistent with our *Dividend-Stability Channel*.

In Model (2), we re-run our analysis within a dividend-paying bank sample by replacing DUM_PAYER by DPO, the ratio of dividends over net income. Interestingly, we find that the coefficient estimate for the DPO is negative and statistically significant at the 1% level. The result is also economically material – moving DPO from 0 to 0.540 (the mean of DPO), with other independent variables held at their means, decreases ZSCORE by about 4.417 (from 52.160 to 47.742),[3] or about 8.5%. This suggests that among dividend-paying banks, the higher the dividends, the lower the bank's stability, consistent with our *Dividend-Fragility Channel*.

These findings show the complex characteristics of dividends that may result in high heterogeneity in the shape of banks, risk-taking incentives, and consequently the risk profile of banks. This suggests that the interplay between dividends and bank risk is not simply monotonic as documented in prior literature. We then partition our sample banks each time into six subgroups. The first subgroup (DIV_Q0) includes all non-dividend-payers. We then divide dividend-payers into quintiles based on the size of dividends (DIV_Q1, DIV_Q2, DIV_Q3, DIV_Q4, DIV_Q5) with DIV_Q1 the lowest dividend-payers and DIV_Q5 the highest dividend-payers. Figure 1 reports the evolution of ZSCORE by dividend subgroups over the quarters. Figure 2 shows ZSCORE for six dividend

Table 3. Baseline multivariate analysis

Panel A: The Baseline Model

	Dependent variable = ZSCORE			
	(1)	(2)	(3)	(4)
DUM_PAYER	9.816***			
	(1.075)			
DPO		−8.180***		
		(0.671)		
DIV_Q0			15.969***	8.278***
			(1.129)	(0.974)
DIV_Q1			23.811***	13.166***
			(1.626)	(1.245)
DIV_Q2			33.859***	17.025***
			(1.551)	(1.226)
DIV_Q3			34.595***	16.059***
			(1.566)	(1.244)
DIV_Q4			28.197***	12.658***
			(1.378)	(1.094)
DIV_Q5			16.461***	7.644***
			(1.140)	(0.932)
SIZE	3.911***	5.072***	3.800***	3.699
	(0.638)	(0.759)	(0.600)	(2.522)
CAPITAL	247.211***	303.185***	264.637***	143.251***
	(26.986)	(35.250)	(26.073)	(31.892)
EARNINGS	379.562***	−38.319	209.134***	284.069***
	(64.691)	(106.933)	(62.507)	(39.647)
GROWTH	39.464***	26.843***	37.589***	25.343***
	(5.935)	(7.691)	(5.623)	(3.855)

(*Continued*)

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Table3. (*Continued*)

LOAN RATIO	−22.147***	−21.128***	−19.724***	11.892
	(5.337)	(6.768)	(5.107)	(8.230)
DEPOSIT RATIO	34.055***	34.922***	31.417***	−12.827*
	(5.996)	(7.897)	(5.712)	(7.311)
NII	−40.195***	−49.693***	−39.534***	−18.731***
	(5.069)	(6.713)	(4.792)	(4.705)
Constant	−37.979***	−36.184***	−51.767***	−24.335
	(10.826)	(13.867)	(10.580)	(35.335)
BFE	No	No	No	Yes
QFE	Yes	Yes	Yes	Yes
Obs	37,975	23,595	37,975	37,975
Adj. R2	0.219	0.144	0.251	0.256

Panel B: Significance of the difference between coefficients on DIV_Q$_i$'s

	DIV_Q1	DIV_Q2	DIV_Q3	DIV_Q4	DIV_Q5
DIV_Q0	−7.842***	−17.89***	−18.626***	−12.228***	−0.492
DIV_Q1		−10.048***	−10.784***	−4.386**	7.35***
DIV_Q2			−0.736	5.662***	17.398***
DIV_Q3				6.398***	18.134***
DIV_Q4					11.736***

Panel C: Difference between actual ZSCORE and predicted ZSCORE

	If non-payers					If DIV_Q3	
	Dividend-paying sample	DIV_Q1	DIV_Q3	DIV_Q5		DIV_Q1	DIV_Q5
	(1)	(2)	(3)	(4)		(5)	(6)
Mean of difference	10.885***	8.270***	19.638***	0.807**		−11.298***	−17.520***

This table reports regression estimates of the relation between bank risk and dividend paying status. ***, **, * indicate significance at the 1%, 5%, and 10% level respectively. Standard errors are clustered at the bank level. Numbers in parentheses are t-statistics.

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subgroups. We replace the DPO with these six indicator variables and re-run our analysis. The results in Model (3) show that the relation between dividends and bank risk is inverted U-shaped. Indeed, the coefficient for non-dividend-payers (DIV_Q0) is lowest (15.969). With the payment of dividends, the coefficients on indicators increase, and reach their maximum with the coefficient on DIV_Q3 before decreasing with higher number of dividends.

Figure 1. Evolution of ZSCORE by dividend subgroups over the quarters.

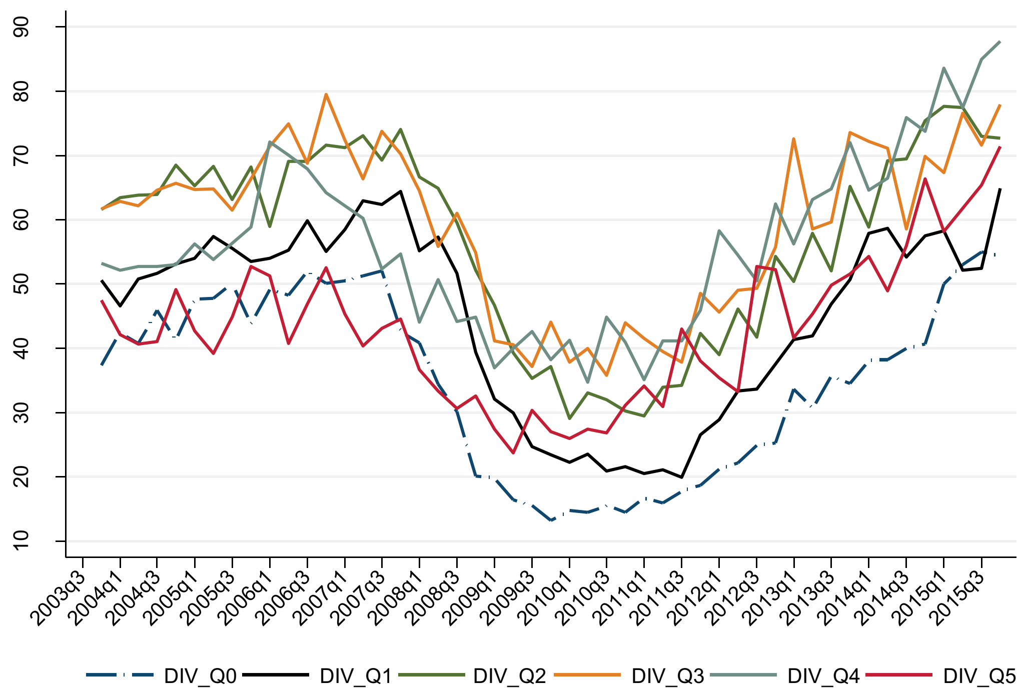
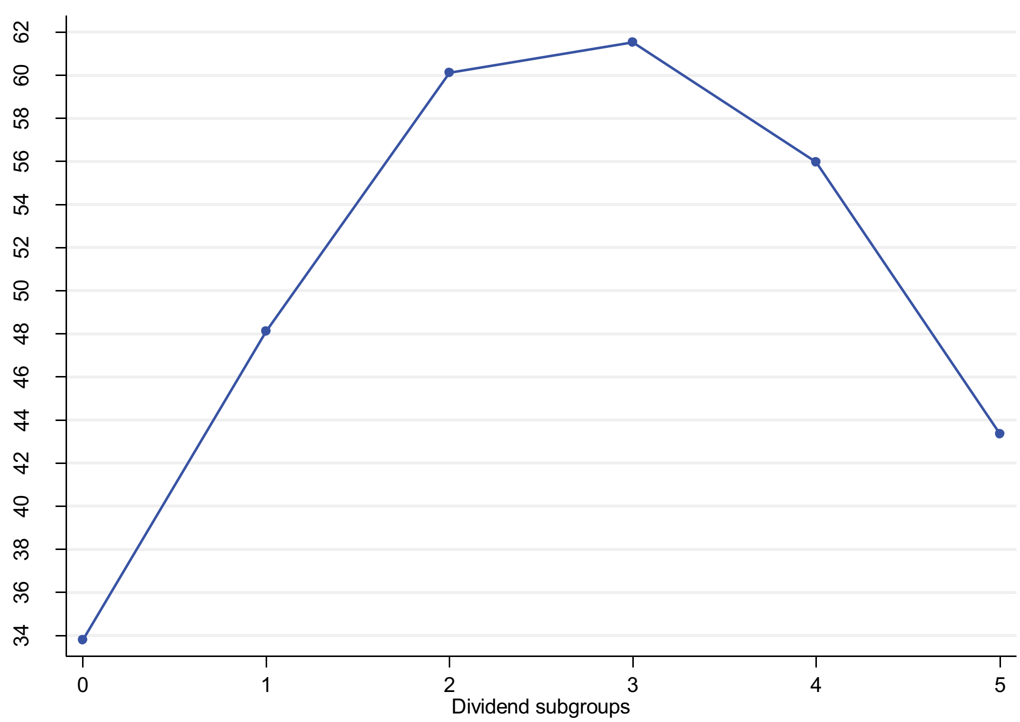


Figure 2. ZSCORE for six dividend subgroups.



Panel B reports the difference between the coefficients of indicator variables. Except for the insignificant differences of the coefficients between (DIV_Q0 and DIV_Q5), and (DIV_Q2 and DIV_Q3), all other differences are significant at the 1% level, suggesting that the inverted U-shaped relation is statistically significant. For example, the difference between the coefficients on DIV_Q0 and DIV_Q1 is −7.842, suggesting that ZSCORE of dividend-payers belonging to the lowest quintile is 23.20% higher than non-payers, based on the average ZSCORE of non-payers of 33.802.

Having established the relationship between dividends and bank's risk, we further examine how the risk profile of dividend-paying banks should become were they a non-payer bank. To this end, we start by performing the Equation (1) with only non-payers' sample. We next apply each individual dividend-paying bank characteristics to the resulting regression model, and then obtain the predicted ZSCORE for each dividend-paying bank. Finally, we take the difference between each bank's actual ZSCORE and its predicted ZSCORE. As reported in Panel C, the mean of difference is 10.885, and statistically significant at the 1% level. The evidence suggests dividend-paying banks would become riskier if they were the same bank but non-payer.

We re-perform these investigations but with (selected) dividend subgroups. The results in columns (2)-(4), Panel C are consistent with our findings. For example, banks in the first dividend subgroup (DIV_Q1) would become riskier if they were the same banks but non-payer (ZSCORE would decrease on average by 8.270).

Within the same spirit, we go further by investigating how the risk-profiles of dividend-paying banks changes if they were the same bank but pay medium amounts of dividends (i.e. DIV_Q3). The results are shown that in columns (5)-(6), Panel C. For example, banks in the highest dividend subgroups (DIV_Q5) would be less risky if they were the same banks but pay fewer dividends (ZSCORE would increase on average by 17.520).

Regardless of control variables which are all statistically significant, large, well-capitalized and highly profitable banks are less risky than other banks, whereas banks with large portfolios of loans and with high degree of diversification toward non-interest generating activities are riskier than other banks. The results also document that banks with high levels of deposits and with high growth opportunities are less risky. In unreported tests, we re-run all analyses including additional control variables (such as non-performing loans, earnings volatility, dummy of negative earnings), and bank fixed-effects to ensure that our findings are not driven by correlated omitted variables. Since ZSCORE is computed over 12 quarters, we also perform our analysis with a lag of 12 quarters instead of one. In all specifications, our findings remain unchanged.

3.2. Is the dividends-risk relation driven by bank characteristics?

One may argue that the documented inverted U-shaped relation may not be driven by dividends, but by bank characteristics. For example, non-dividend-payers are usually considered as growth firms, then riskier than other firms. We address this concern by partitioning sample banks for each period of time into quintiles based on a given bank characteristic, and then tabulate the mean and median of ZSCORE for six dividend subgroups within these quintiles. The idea is that if the inverted U-shaped relation is driven by a given characteristic, it should be relatively weak among banks with the same characteristic.

The results are tabulated in Table 4. We observe that the inverted U-shaped relation is not driven by bank characteristics. For example, in Panel A, in every quintile of bank's size, we always note the upward trend of ZSCORE until DIV_Q2 or DIV_Q3, and then the downward trend for higher dividend indicator subgroups.

Following Hoberg et al. (2014), we go further by tabulating the mean and median of ZSCORE for six dividend subgroups within quintiles of propensity to pay dividends. To obtain propensity that

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Table 4. Mean and median of ZSCORE for six dividend subgroups within quintiles formed by key banks characteristics

Panel A: Mean of ZSCORE							
Mean of ZSCORE							
		DIV_Q0	DIV_Q1	DIV_Q2	DIV_Q3	DIV_Q4	DIV_Q5
Rank by SIZE							
	1 (low)	25.031	49.335	51.520	50.220	48.947	40.021
	2	33.710	47.586	55.866	53.590	49.889	44.685
	3	37.339	46.629	57.580	56.169	50.778	42.646
	4	34.194	47.761	59.164	61.345	54.738	43.039
	5 (high)	33.490	47.868	65.952	71.506	63.690	40.776
Rank by EQUITY							
	1 (low)	18.682	40.692	43.632	41.354	39.991	27.891
	2	31.756	44.766	53.162	55.550	50.671	35.231
	3	37.924	49.345	63.037	63.839	56.546	43.161
	4	40.221	49.563	64.127	67.789	61.334	47.024
	5 (high)	49.041	55.768	69.022	68.264	65.522	57.622
Rank by EARNINGS							
	1 (low)	26.433	41.256	44.733	47.888	42.977	33.754
	2	37.652	45.406	51.756	53.129	53.608	42.487
	3	43.478	54.042	63.614	63.830	61.311	47.999
	4	46.688	52.835	65.821	68.650	59.770	49.808
	5 (high)	38.961	43.414	62.448	62.699	55.409	43.558
Rank by GROWTH							
	1 (low)	40.566	50.670	63.553	65.161	61.063	46.811
	2	40.210	51.150	64.357	67.267	60.612	44.974
	3	41.792	50.858	62.108	63.969	57.261	43.652
	4	38.691	52.310	61.602	58.847	52.327	43.372

(*Continued*)

Table4. (*Continued*)

	5 (high)	36.455	48.908	56.175	57.213	52.819	38.647
Rank by LOAN RATIO							
	1 (low)	37.581	48.926	60.215	63.312	59.668	48.421
	2	32.757	48.151	60.028	65.065	58.240	44.852
	3	34.858	46.803	63.590	64.631	57.090	43.981
	4	31.555	48.778	62.124	58.840	56.189	43.087
	5 (high)	32.491	47.764	53.736	52.592	44.062	33.617
Rank by DEPOSITS RATIO							
	1 (low)	28.120	46.650	56.493	61.709	48.630	38.026
	2	30.853	46.649	55.514	59.989	55.814	38.952
	3	32.533	47.036	58.729	62.893	56.436	43.449
	4	33.107	47.378	60.895	58.391	51.564	42.128
	5 (high)	31.852	49.020	60.759	58.139	52.497	41.800
Rank by NONINTEREST INCOMES RATIO							
	1 (low)	34.353	51.283	60.266	56.411	52.581	44.112
	2	38.771	54.603	66.238	60.404	58.839	46.891
	3	38.474	48.495	59.645	60.901	54.619	45.603
	4	35.864	51.871	60.180	65.391	61.388	45.018
	5 (high)	25.318	39.386	55.910	61.495	50.009	34.659
Panel B: Median of ZSCORE							
Mean of ZSCORE							
		DIV_Q0	DIV_Q1	DIV_Q2	DIV_Q3	DIV_Q4	DIV_Q5
Rank by SIZE							
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Rank by NONINTEREST INCOMES RATIO							
	1 (low)	34.353	51.283	60.266	56.411	52.581	44.112
	2	38.771	54.603	66.238	60.404	58.839	46.891
	3	38.474	48.495	59.645	60.901	54.619	45.603
	4	35.864	51.871	60.180	65.391	61.388	45.018
	5 (high)	25.318	39.386	55.910	61.495	50.009	34.659

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Table 5. Mean and median of ZSCORE for six dividend subgroups within quintiles formed by propensity to pay dividends

Panel A:

DEPOSITS RATIO	STOCK OWN	SIZE	EQUITY	EARNINGS	GROWTH RATIO	EARNINGS VOLATILITY	Constant	Pseudo R2	LR
0.753***	0.879***	0.256***	4.185***	27.357***	0.400**	−35.106***	−4.387***	0.108	4612.48***
(0.073)	(0.103)	(0.008)	(0.286)	(0.936)	(0.181)	(1.095)	(0.129)		

Panel B:

		Mean of ZSCORE					
		DIV_Q0	DIV_Q1	DIV_Q2	DIV_Q3	DIV_Q4	DIV_Q5
Rank by PROPENSITY TO PAY DIVIDENDS							
	1 (low)	27.225	37.887	39.584	40.676	39.182	32.427
	2	38.355	48.103	54.697	52.877	48.935	39.222
	3	44.659	51.308	60.539	59.434	54.900	45.713
	4	51.824	53.457	71.128	67.930	56.880	47.763
	5 (high)	48.048	53.526	67.504	76.421	68.255	47.636
		Median of ZSCORE					
		DIV_Q0	DIV_Q1	DIV_Q2	DIV_Q3	DIV_Q4	DIV_Q5
Rank by PROPENSITY TO PAY DIVIDENDS							
	1 (low)	20.818	31.478	32.225	33.649	32.253	27.044
	2	29.482	39.905	47.042	42.907	41.873	32.960
	3	37.062	44.176	53.336	50.703	47.342	38.274
	4	42.955	46.352	61.808	59.083	46.601	36.482
	5 (high)	37.402	38.709	56.500	66.760	60.906	34.811

Table 6. Baseline multivariate analysis with PSM

Panel A:

	1:1 matching without replacement			1:1 matching with replacement			Nearest neighbor N = 2			Nearest neighbor N = 3		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
DUM_PAYER	9.658***			7.091***			8.546***			8.898***		
	(1.156)			(1.316)			(1.224)			(1.181)		
DPO		−6.546***			−4.521***			−4.644***			−4.985***	
		(0.780)			(0.928)			(0.964)			(0.908)	
DIV_Q0			15.957***			10.485***			12.012***			12.458***
			(1.405)			(1.566)			(1.467)			(1.397)
DIV_Q1			24.074***			15.378***			18.028***			18.759***
			(1.809)			(2.229)			(1.969)			(1.886)
DIV_Q2			33.142***			22.636***			26.940***			28.020***
			(1.844)			(2.388)			(2.108)			(1.947)
DIV_Q3			32.085***			24.187***			26.453***			26.987***
			(1.864)			(2.400)			(2.114)			(2.013)
DIV_Q4			27.121***			19.731***			22.361***			23.662***
			(1.763)			(1.968)			(1.793)			(1.723)
DIV_Q5			19.384***			14.726***			17.535***			17.643***
			(1.549)			(1.737)			(1.680)			(1.649)
Constant	−4.264	−19.761	−23.719*	−7.677	−18.426	−22.493*	−8.878	−18.490	−24.704*	−1.569	−13.963	−17.306
	(12.719)	(15.770)	(12.560)	(13.361)	(18.806)	(13.464)	(12.862)	(17.408)	(12.884)	(12.540)	(16.658)	(12.477)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
QFE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Observations		15,813	8,656	15,813	5,240	2,777	5,240	8,085	4,146	8,085
9,917	5,051	9,917										
Adj R2	0.195	0.144	0.220	0.214	0.155	0.231	0.211	0.146	0.229	0.210	0.147	0.229

Panel B:

	DIV_Q1	DIV_Q2	DIV_Q3	DIV_Q4	DIV_Q5
Whole sample					
DIV_Q0	−7.842***	−17.89***	−18.626***	−12.228***	−0.492
DIV_Q1		−10.048***	−10.784***	−4.386**	7.35***
DIV_Q2			−0.736	5.662***	17.398***
DIV_Q3				6.398***	18.134***
DIV_Q4					11.736***
1:1 matching without replacement					

(Continued)

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Table6. (*Continued*)

DIV_Q0	−4.893***	−12.151***	−13.702***	−9.246***	−4.241***
DIV_Q1		−7.258***	−8.809***	−4.353	0.652**
DIV_Q2			−1.551	2.905***	7.91***
DIV_Q3				4.456***	9.461***
DIV_Q4					5.005***
1:1 matching with replacement					
DIV_Q0	−8.117**	−17.185***	−16.128***	−11.164***	−3.427***
DIV_Q1		−9.068***	−8.011***	−3.047**	4.69
DIV_Q2			1.057	6.021	13.758***
DIV_Q3				4.964**	12.701***
DIV_Q4					7.737***
Nearest neighbor N = 2					
DIV_Q0	−6.016***	−14.928***	−14.441***	−10.349***	−5.523***
DIV_Q1		−8.912***	−8.425***	−4.333**	0.493
DIV_Q2			0.487	4.579**	9.405***
DIV_Q3				4.092**	8.918***
DIV_Q4					4.826***
Nearest neighbor N = 3					
DIV_Q0	−6.301***	−15.562***	−14.529***	−11.204***	−5.185***
DIV_Q1		−9.261***	−8.228***	−4.903**	1.116
DIV_Q2			1.033	4.358**	10.377***
DIV_Q3				3.325*	9.344***
DIV_Q4					6.019***

a bank pays dividends, we first run a logit regression with the dependent variable being the log of the odds of dividend payment, with independent variables including size (SIZE), capital ratio (EQUITY), earnings ratio (EARNINGS), growth ratio (GROWTH RATIO), earnings volatility (EARNINGS VOLATITLITY). Acharya et al. (2016) argue that the value-maximized dividend policy of banks with high franchise value is to pay none; thus, we include the deposits ratio (DEPOSITS RATIO) as proxy of bank franchise value in the logit model. We also include the dummy of the negative earnings loss (DUM_LOSS) of DeAngelo et al. (1992), and time fixed-effects. The results of the logit regression are shown in Panel A, Table 5. We then compute the predicted propensity to pay dividends, and similarly calculate ZSCORE for six dividend subgroups within quintiles of this predicted propensity in Panel B. We obtain qualitatively similar findings. This means that the inverted U-shaped relation is not driven by bank characteristics.

3.3. Self-selection concerns

One might argue that our findings are biased due to the self-selection problem. To alleviate this concern, we use a matching approach controlling for the selection based on observable bank and risk characteristics. Our data is appropriate to the matching technique since we dispose of a large sample of potential untreatment group (the non-payers), compared to the treatment group (the dividend-paying banks), which improves the odds of identifying close matches for the dividend-paying banks among the non-payers' banks ().

The matching procedure used in this study is the propensity score matching (PSM) system. To conduct PSM, we divide our sample into two groups: dividend-paying (treated) and non-payer (untreated) banks. Next, we measure the propensity of undergoing treatment (i.e. the probability of paying dividends) by using a logit model for both treated and untreated samples.[4] We match each dividend-paying bank with one or more non-payer banks sharing similar characteristics as reflected in their propensity scores.[5] We first use one-to-one matching without replacement, which requires each non-payer bank to be used exactly once. We also use one-to-one matching with replacement, which allows each non-payer bank to be used more than once. We also match each dividend-paying bank with the two (N = 2) and three (N = 3) non-payer banks with the closest propensity scores. After getting our PSM samples, we re-perform all our above analyses.

Table 6 shows the results. In Panel A, we still find similar results with different specifications of PSM. To preserve space, the coefficients of the control variables are not included. Except for 1:1 matching without replacement, we observe that the magnitudes of coefficients of our variables of interest from PSM specifications are weaker than in our baseline model.

In Panel B, we present the difference between the coefficients of indicator variables (DIV_Q0, DIV_Q1, DIV_Q2, DIV_Q3, DIV_Q4, DIV_Q5). For easy comparison, we include the results from the whole sample. The findings are qualitatively similar, except for the difference between the coefficients of DIV_Q0 and DIV_Q5 that become statistically negative in all PSM specifications. These findings allow to dissipate the competing explanation that our results above spuriously reflect heterogeneities in the characteristics of dividend-paying banks and non-dividend-paying banks.

In brief, our findings suggest a two-sided story of the impact of dividends on the bank risk. Bank risk is not monotonically related to dividends. Paying dividends makes banks less risky compared with non-payers, consistent with the *Dividend-Stability Channel*; however, excessive dividends make banks riskier, consistent with the *Dividend-Fragility Channel*. Our results also suggest that the inferences based on monotonic relations between dividends and risk, as in prior research, may be misleading.

4. Additional results and robustness tests

In this section, we perform a range of tests to ensure the robustness of our findings. Even if we perform all these three models (i.e. with dummy of dividend payer, with continuous variables of dividends, and with dividend indicator subgroups), we only tabulate the results for the regressions

Table 7. Alternative samples

Panel A:

	GTA<$1B	$1B<GTA<$5B	GTA>$5B	Average	Annual data	Balance data
	(1)	(2)	(3)	(4)	(5)	(6)
DIV_Q0	15.846***	11.692***	3.059	159.489***	20.292***	14.037***
	(1.208)	(1.898)	(4.640)	(13.689)	(3.290)	(2.899)
DIV_Q1	24.492***	17.265***	25.193***	172.730***	60.907***	22.409***
	(1.972)	(2.631)	(5.322)	(14.375)	(5.253)	(4.154)
DIV_Q2	31.106***	30.309***	37.500***	187.035***	77.599***	27.798***
	(1.905)	(2.727)	(5.352)	(14.457)	(5.232)	(3.566)
DIV_Q3	29.730***	33.404***	40.012***	200.573***	83.700***	34.703***
	(1.708)	(3.108)	(4.266)	(14.537)	(5.453)	(3.881)
DIV_Q4	25.017***	26.627***	31.935***	178.219***	71.814***	29.541***
	(1.606)	(2.569)	(3.882)	(14.428)	(5.116)	(3.102)
DIV_Q5	16.922***	11.575***	13.548***	150.879***	33.350***	13.724***
	(1.363)	(2.173)	(3.539)	(14.603)	(4.326)	(2.739)
Constant	−129.042***	3.998	39.852	−196.261***	−31.476	−7.842
	(24.878)	(38.265)	(37.744)	(18.017)	(28.424)	(21.935)
QFE	Yes	Yes	Yes	Yes	Yes	Yes
Adj R2	0.250	0.272	0.320	0.314	0.129	0.242

Panel B:

	Quantile Q = 0.25	Quantile Q = 0.5	Quantile Q = 0.75	Newey-West	Fama-MacBeth	Two-way cluster
	(1)	(2)	(3)	(4)	(5)	(6)
DIV_Q0	4.139***	8.548***	14.552***	16.820***	17.287***	16.820***
	(0.852)	(1.141)	(1.755)	(0.658)	(3.520)	(2.486)
DIV_Q1	10.412***	16.433***	24.715***	28.241***	25.006***	28.241***
	(0.915)	(1.225)	(1.884)	(0.965)	(3.701)	(2.538)
DIV_Q2	16.423***	25.889***	36.589***	38.459***	34.229***	38.459***
	(0.911)	(1.220)	(1.875)	(0.998)	(3.542)	(2.499)
DIV_Q3	16.979***	26.332***	37.888***	39.710***	36.504***	39.710***
	(0.911)	(1.220)	(1.876)	(0.986)	(3.006)	(2.342)
DIV_Q4	14.114***	21.111***	29.191***	32.884***	31.957***	32.884***
	(0.913)	(1.223)	(1.880)	(0.881)	(2.512)	(2.217)
DIV_Q5	7.836***	10.168***	14.294***	20.678***	20.837***	20.678***
	(0.916)	(1.227)	(1.887)	(0.778)	(2.007)	(1.816)
Adj R2	0.1478	0.1653	0.1824	0.174	0.223	0.174

This table reports regression estimates of the relation between bank risks and dividend paying status for alternative samples. All financial variables are winsorized at 1% level on top and bottom of the distribution. ***, **, * indicate significance at the 1%, 5%, and 10% level respectively. Standard errors are clustered at the bank level. Numbers in parentheses are t-statistics.

of dividend indicators on bank risk, because we believe that this regression is more informative, and already includes the characteristics of those two other regressions.

Table 8. Alternative measures of dividends and risks

Panel A: Alternative Measures of Dividends

	LTDIV 12 quarters	REPURCHASE	REPURCHASE NON DIVIDEND
	(1)	(2)	(3)
DIV_Q0	−2.718***	−9.284***	−11.912***
	(0.897)	(1.052)	(1.057)
DIV_Q1	9.546***	10.485***	13.940***
	(2.361)	(2.122)	(3.091)
DIV_Q2	19.873***	10.886***	19.082***
	(2.153)	(1.542)	(3.089)
DIV_Q3	23.691***	12.825***	16.816***
	(2.213)	(1.694)	(2.457)
DIV_Q4	17.809***	14.248***	17.681***
	(2.116)	(2.020)	(3.413)
DIV_Q5	2.124	6.463***	12.183***
	(1.743)	(1.881)	(3.435)
Constant	−14.540	−24.327**	−27.203**
	(11.193)	(10.951)	(11.034)
QFE	Yes	Yes	Yes
Adj. R2	0.239	0.232	0.226

Panel B: Alternative Measures of Risks

	NPL	ALW	SD_ROA
	(1)	(2)	(3)
DIV_Q0	0.003***	0.002***	0.002***
	(0.001)	(0.000)	(0.001)
DIV_Q1	0.008***	0.004***	0.005***
	(0.001)	(0.000)	(0.001)
DIV_Q2	0.009***	0.005***	0.006***
	(0.001)	(0.000)	(0.001)
DIV_Q3	0.010***	0.005***	0.006***
	(0.001)	(0.000)	(0.001)
DIV_Q4	0.009***	0.005***	0.006***
	(0.001)	(0.000)	(0.001)
DIV_Q5	0.007***	0.005***	0.005***
	(0.001)	(0.000)	(0.001)
Constant	−0.027***	−0.016***	−0.010***
	(0.004)	(0.002)	(0.003)
QFE	Yes	Yes	Yes
Adj R2	0.342	0.228	0.250

This table reports regression estimates of the relation between bank risks and dividend with alternative measures. ***, **, * indicate significance at the 1%, 5%, and 10% level respectively. Standard errors are clustered at the bank level. Numbers in parentheses are t-statistics.

4.1. Alternative sampling and estimation techniques

We examine the impact of our sampling on the interplay between dividends and bank risk in Table 7, Panel A. First, we perform our baseline model across a range of bank sizes to assess whether our findings are concentrated on a particular bank size range. We divide bank sizes into three groups: (i) Small banks with gross total assets under \$1B, (ii) Medium banks with total assets between \$1B and \$5B and (iii) large banks with total assets above \$5B. Models (1)–(3) document that dividend payment makes banks safer, and that this effect is more pronounced with smaller banks. Paying dividends do not affect the riskiness of large banks (i.e. GTA>\$5B).

We perform an average analysis in Model (4), annual data in Model (5), and the balanced data in Model (6) by excluding banks that partially exist during the period studied. We still have similar findings.

In Panel B, we perform different estimation techniques. We start with quantile regressions (Models (1)-(3)) to assess whether the interplay between dividends and risks differs across quantiles of risks. We also perform Newey–West (Model (4)), Fama–MacBeth (Model (5)) and two-way cluster procedures (Model (6)). In all specifications, our findings remain unchanged.

4.2. Alternative measures of dividends

The results are shown in Table 8, Panel A. First, we focus on the subsamples of banks that pay and do not pay dividends for at least 12 consecutive quarters. We then partition our sample banks each time into six subgroups. The results in Model (1) show that paying dividends makes banks safer; however, this positive effect is mitigated with the increasing amount of dividends, and becomes insignificant with the highest dividend subgroup (DIV_Q5). Interestingly, we note that do not pay dividends (DIV_Q0) makes banks riskier, which is in contrast with the above findings. Potential explanation is that for banks that do not pay dividends, managers may retain more FCF and invest them in value-decreasing projects (Chae et al., 2009; Lang & Litzenberger, 1989), which in turn make banks riskier. Another possibility is that banks that do not pay dividends are usually young banks with high growth opportunities, thus have more earnings volatility than others.[6]

In Model (2), we replace our dividend subgroup indicators with repurchase indicators and re-perform Equation (1). Since repurchases could include banks that pay dividends, we are concerned that the effects of dividend paying could outweigh those of repurchases. Therefore, in Model (3), we focus only on the subsample of banks that repurchase but do not pay dividends. In both cases, we obtain similar results. We observe that banks that do repurchases become safer; however, this positive effect is mitigated after a certain threshold. Similarly, we find that banks that do not repurchase are riskier.

4.2.1. Alternative measures of risk

Table 8, Panel B shows the results with alternative proxies to measure risk. We first begin with credit risks such as the ratio of non-performing loans (NPL), the loan loss allowances (ALW). We also use the volatility of returns (SD_ROA). The results in Models (1)-(3) are consistent with the above findings.

5. Conclusions

The present study provides the first investigation of how dividend policy affects bank risks in the US BHCs. The study documents the double-edged sword of dividends on the bank riskiness. Paying dividends makes banks less risky compared with non-payers, which is consistent with the Dividend-Stability Channel; however, among dividend paying banks, excessive dividends makes banks riskier, consistent with the Dividend-Fragility Channel. The findings are robust under different specifications. The results are of important interest to bank regulators.

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Notes

1. That are the capital conservation buffer of Basel III and the Comprehensive Capital Analysis and Review (CCAR) of FED.
2. This characteristic of dividends is related to suboptimal dividends literature, and wider, the risk-taking literature, when the extreme situation of the conflicts of interest between shareholders and debtholders happens with the payout of all available assets to shareholders, rendering debtholders' claims worthless (Black & Black, Fischer, 1976).
3. 52.16 is the mean of ZSCORE of dividend-paying bank subsample.
4. We detail the first-stage in Section 3.2., and the results are shown in Table 5, Panel A.
5. We retain only untreated observations whose propensity scores fall inside the interval defined for the treated group. We impose a tolerance level of 0.5% on the maximum propensity score distance allowed (caliper), to minimize the risk of bad matches.
6. In unreported tests, we measure the persistence of dividend-paying status over 8 and 20 quarters, and still obtain the similar results as with 12 quarters.

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No potential conflict of interest was reported by the author(s).

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