Have European banks maintained their payout policy during the crisis? The role of scrip dividends[*]

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Abstract: We analyse the trend among 79 banks from 20 European countries towards scrip dividends. Whereas banks do not seem to smooth cash dividends, they do smooth total dividends, which include both cash and scrip dividends. We also find that the new legal requirements (resulting from the Basel Accords and other country-level laws) have different implications on cash and scrip dividends. Whereas the need for better and more capital imposed by these rules has led banks to cut cash dividends, there is a positive relationship between the legal requirements on capital adequacy and scrip dividends.

Keywords:

Dividends; scrip dividends; capital stringency; payout; shareholder protection; European banks, Basel Agreements.

JEL codes: G21; G35

1. Introduction

In the aftermath of the Lehman Brothers collapse in 2007-2008, the Basel Committee on Banking Supervision imposed strict capital requirements on banks in order to avoid decapitalization problems (Bikker & Vervliet, 2018; Peltonen et al., 2019; Wosnitza, 2019). In line with this legal framework, banks are required to reach a minimum level of capital reserves in order to pass the stress test and, as a result, have been facing major difficulties distributing large dividend payouts (Acharya et al., 2011; Floyd et al., 2015). Nevertheless, a dramatic decline in dividend payout may have a negative impact on stock price due to the adverse signal effect. Since repurchase programmes are subject to legal restrictions (Wesson et al., 2018), banks have been forced to come up with new ways of remunerating shareholders. The scrip dividend is one such new way. Through these, the firm's cash reserves are converted into new shares and given to existing shareholders, rather than paying them a cash dividend.

The list of scrip dividend payers in recent times is long, and includes most large European banks: BBVA, Santander, Barclays, HSBC, Credit Suisse, etc. (Colvin, 2017). In fact, one in every eight large European companies used shares instead of cash payments during the 2012-

2017 period (Murphy, 2018). The case of Credit Suisse is particularly significant, since it is the third largest scrip payer in Europe. Another significant case is Banco Santander, which since 2009 has paid up to 22 scrip dividends, amounting to the equivalent of 25% of its current shareholding. Another Spanish bank, BBVA, recently reported that two dividends will be paid in cash and two in scrip (Markit, 2016). As a result of applying this policy, banks have thus killed two birds with one stone: on the one hand, they have kept payout policy at pre-crisis levels, maintaining shareholder remuneration and, on the other, they have bolstered their equity.

Running parallel to this, so-called "dividend smoothing" is one of the most robust findings to emerge from the empirical literature on dividends (Koussis & Makrominas, 2019). According to this finding, firms base their current dividend to a large extent on previous dividends (Fernau & Hirsch, 2019; Lintner, 1956). In this paper, we address both topics and analyse the trend among European banks towards script dividends in the light of dividend smoothing evidence. We address two complementary questions: 1) Has the financial crisis affected the dividend smoothing of banks? 2) How is the new legal framework to have arisen from the crisis related to banks' dividend policy? Our underlying intuition is that scrip dividends have been used to smooth out the distribution of profits *á la Lintner*, and to achieve a stable distribution rate, mitigating the negative impact of the financial crisis (Fama & French, 1998; Fama & French, 2001). Given the long-term consequences of financial turmoil, this decision is likely to be taken based not only on bank-level factors (such as previous dividends, earnings, etc.) but also within the framework of the Basel Accord and other legal requirements.

Our results show that scrip dividends have substantially modified European banks' payout policy in recent years. Whereas banks do not seem to be smoothing cash dividends, we find clear evidence that they are smoothing total dividends, which includes both cash and scrip dividends. We also find that the new legal requirements (resulting from the Basel Accords and other country-level laws) have different implications on cash and scrip dividends as well. Whereas the need for better and more capital imposed by these rules has led banks to cut cash dividends, there is a positive relationship between the legal requirements on capital adequacy and scrip dividends.

We make two contributions. First, we analyse banks' scrip dividends. Apart from a few papers dating back over 20 years (Lasfer, 1997a, 1997b), as far as we are aware there is no research on the recent trend towards scrip dividends. Second, we extend previous studies which

explore the effect of the financial crisis on banks' payout. Kanas (2013) analysed US bank dividends subject to domestic regulatory regime changes, and Hsiao and Tseng (2014) examined the relationship between capital requirement regulation stringency and banks' cash dividend payout. Koussis and Makrominas (2019) confirm that bank dividend smoothing persisted among European and US banks both during and following the crisis. We go a step further by introducing not only country-level but also international regulations and by taking into account the legal protection of shareholders' rights.

With this aim in mind, the paper is organised as follows: in the second section, we present a brief review and justification of the various viewpoints regarding banks' dividend policy and the institutional factors that may affect their dividend policy. In this section, we also introduce our hypotheses. In the third section, we present the empirical part of the paper, based on a sample of European banks for the period 2014-2018. In the next section, we analyse the results and, in the final section, we draw the conclusions to emerge from the study.

2. Theoretical background

2.1 European banks' payout smoothing and scrip dividends

The smoothing theory of dividends suggests that managers follow a long-term objective coefficient of dividend payout, namely a target payout ratio. The study by Lintner (1956) was pioneering in describing the dividend smoothing policy as a relation between current earnings and the previous year's dividends. In a survey of 28 US companies, the author concluded that "the relationship between current earnings and the existing dividend rate was very generally much the most important single factor determining the amount of any change in dividends decided upon".

More recent studies, such as Larkin et al. (2017), Al-Najjar and Kilincarslan (2017), Chemmanur et al. (2010), and Baker and De Ridder (2018), among others, have confirmed smoothing dividends for different periods and countries[1]. Dividends give out a very important signalling effect, such that a stable payout policy sends a signal to capital markets that is easily recognizable by investors (Tran & Ashraf, 2018). As stated by Forti and Schiozer (2015), banks need to signal their financial health through dividends during crises, which may have harmful

[1] Contrasting evidence has been provided by Basse et al. (2014), although their data-span stops before the financial crisis.

effects by intensifying pro-cyclicality. In times of financial crisis, this policy can prove even more relevant since managers try to avoid the dramatic impact of dividend cuts or omissions, given the negative signal this sends out to capital markets at such sensitive moments (Amihud & Li, 2006; Teixeira et al., 2020).

In a financial environment that sees a drop in profits coupled with high capital stringency, European banks use scrip dividends to maintain dividends. This policy emerges as a feasible strategy to preserve shareholder compensation whilst averting the negative consequences on capital legal requirements. Scrip dividends are share issuances made to remunerate shareholders rather than giving them cash dividends. Shareholders can choose to sell the subscription rights provided by the firm in exchange for liquidity and thereby obtain a normal dividend. The alternative option open to shareholders is to accept the subscription rights and to increase the number of shares they hold in the company. The controversy surrounding the scrip dividend system arises due to the lack of agreement concerning their nature, with the Stock Exchange Commissions of different European countries discussing whether they should be considered as dividends or single equity increases.

In turn, European banks have been able to use these scrip dividends to recapitalize as mandated by the new regulatory requirement, without the need to issue fresh equity. In this sense, scrip dividends seem to play a more prominent role during periods of financial instability by allowing shareholders to keep payments during moments of low earnings and high equity need. Thus, despite the difficulties banks are having in maintaining the large dividends paid out in the years before the 2007-2008 financial crisis, we still expect European banks to smooth dividends in order to meet a dividend target. Therefore, we propose the following hypothesis:

Hypothesis 1: Scrip dividends have increased the dividend smoothing of European banks during the years after the 2007-2008 financial crisis.

2.2 Dividends and institutional and legal factors

The dividend smoothing theory suggests that dividends basically depend on two firm-level variables: earnings and previous dividends. Although dividend smoothing is regarded as a robust finding, as evidenced by the meta-analysis of Fernau and Hirsch (2019), dividend policy also depends on other issues, which are related to the institutional structure, such as the

country's financial system, the legal and institutional environment, and industrial organization (Booth & Zhou, 2017; La Porta et al., 2000a; Teixeira et al., 2020).

Banks are likely to be affected by these factors given the specific characteristics of the financial sector (Hoque & Pour, 2018). Moreover, banks are assumed to operate in a more transparent sector, which should lead to more smoothing (Leary & Michaely, 2011). This may prove relevant for scrip dividends because the increasing legal capital requirements may make banks unable to comply with the dividend target, with scrip dividends emerging as an alternative form of shareholder remuneration.

Specifically, the Basel Accords were adopted to establish the minimum capital required to cover a bank's credit activities and the minimum liquidity required to stay afloat in the face of possible contingencies. Particularly, the Basel III regulation establishes a solvency ratio of 6% commencing in 2015, which increased up to 10% in 2018 (Bank for International Settlements, 2011). The ratio used is the so-called Tier1, such that high-quality equity must be proportional to the total risk-weighted assets. As shown by Oino (2018), this ratio has been a yardstick in the growth of European banks after the financial crisis. In this vein, as Basse et al. (2014) and Ashraf et al. (2016) suggest, a stricter capital legal requirement in European banks in the years after the last financial crisis may be an important constraint to maintain dividend payments at pre-crisis levels. These authors show that banks paid lower dividends where regulators imposed common equity based capital regulation and more stringent risk-based capital requirements. Following this argument, as a new way to remunerate shareholders and reinforce capital, scrip dividends would allow European banks to maintain their payout policy and fulfil the new legal capital requirements. Based on these arguments, we state the following hypothesis

Hypothesis 2: The negative influence of capital requirements on dividends should be lower (or even positive) for scrip dividends.

Another important legal factor, as La Porta et al. (2000a) propose, is the legal protection offered to shareholders in each country. These authors introduce two alternative hypotheses regarding the agency theory of dividends. The *outcome hypothesis* predicts that firms in countries with better shareholder rights pay more dividends in order to disgorge cash and decrease the free cash flow (Chang et al., 2018). The opposite argument is to consider the legal framework as a substitute, namely the *substitution hypothesis*, with dividends being a way to

make up for poor shareholder protection in order to keep open the option of raising external capital in the future. In a context of financial instability and legal rules which impose greater equity requirements, there is a risk of expropriating minority shareholder wealth through a drastic reduction in dividends. We posit that, in this situation, the outcome hypothesis should prevail, such that a more protective corporate governance framework should result in higher payments to shareholders. Accordingly, we set out the hypothesis:

Hypothesis 3: Bank payout is higher in countries with stronger shareholder rights.

3. Empirical design

3.1. Sample and method[2]

We study a sample of 79 listed banks from 20 European countries between 2014 and 2018, as shown in Table 1. Initially, we select the 118 European systemic entities supervised by the Single Supervisory Mechanism. After removing banks whose information on scrip dividends was ambiguous or not available, the use of a dynamic panel data estimation and lagged variables reduces the sample to 79 listed banks. Thus, our sample can be considered as sufficiently representative of the European bank landscape. The combination of cross-section and time series data gives a final sample of 395 observations, a sample size comparable to other studies on the banking sector (Almaqtari et al., 2019; Anderson et al., 2017; Echevarria-Icaza & Sosvilla-Rivero, 2018; Kusi & Opoku-Mensah, 2018; Loaba & Zahonogo, 2019; Lobão et al., 2019; Ofori-Sasu et al., 2019; Salih et al., 2019). Data regarding the balance sheet and market prices were obtained from the Thomson Reuters Eikon database. Scrip dividends were hand-collected after a careful scrutiny of European banks that increased capital during the study period. Information on country-level indicators of shareholder protection is taken from the studies of La Porta et al. (2000a), updated by Djankov et al. (2007). Information on the capital stringency index was obtained from Barth and Caprio (2013) and the World Bank databases (Kaufmann et al., 2011).

<<Insert Table 1>>

Our empirical study includes both a descriptive and an explanatory analysis to check whether European banks smooth dividends *à la Lintner*. Our database combines time series

[2] The data that support the findings of this study are available from the corresponding author upon reasonable request.

with cross-sectional data, thus creating unbalanced panel data. We estimate the model through the dynamic panel data method using the Generalized Method of Moments (GMM), which deals with the individual effects and endogeneity problems to arise from the use of dividends lagged as an independent variable (Arellano, 2003).

3.2. Model and variables

Aivazian et al. (2003) propose a model based on Lintner's in order to check dividend smoothing for a sample of US firms as follows:

$$DPS_{i,t} = \alpha + \beta_1 EPS_{i,t-1} + \beta_2 DPS_{i,t-1} + \varepsilon_{i,t} \quad [1]$$

where $DPS_{i,t}$ is the cash dividend per share, which depends on net earnings per share ($EPS_{i,t-1}$) and the dividend decision adopted in the previous year ($DPS_{i,t-1}$). We again apply the Lintner model using the variable $TDPS_{i,t}$ (total dividends per share), which includes not only cash dividends but also scrip dividends as the sum of cash dividends and scrip dividends (measured as the difference between stock price before and after the new issuance).

We also estimate model (2), in which we introduce the effect of the institutional framework and legal requirements on capital:

$$DIV_{i,t} = \alpha + \beta_1 DIV_{i,t-1} + \beta_2 TIER_{i,t-1} + \beta_3 CAPST + \beta_4 SR + \textit{Control variables} + \textit{Yeardummies} + \mu_{i,t} \quad [2]$$

where DIV is the cash dividends-to-assets ratio. Alternatively, we use the total dividend pay (TDIV) that includes cash and scrip dividends, and which is also divided by total assets. As independent variables we use TIER that represents the ratio of Tier1 capital as a percentage of total risk-weighted assets. CAPST is the Capital Stringency Index developed by Barth and Caprio (2013) which determines the nature of capital requirements and how capital is assessed and verified by banks and regulators. This index ranges from 0 to 11, where 11 represents the highest level of capital stringency. SR is the index of shareholders' rights in each country measured by La Porta et al. (1998) and updated by Djankov et al. (2007). As control variables, we use SIZE as a measure of bank size (calculated as the logarithm of total assets), ROA (return on assets), and the market-to-book ratio MB, measured as the market capitalization of the bank

divided by the book value of assets. TIER and control variables are lagged one period because the dividends paid in year t depend on the company's earnings and financial situation in the previous year. In the Appendix, we provide the definition and calculation of all the variables.

4. Results

In Table 2, we report the mean value, standard deviation, as well as the maximum and minimum values of the main variables. As expected, the mean value of TDIV (0.048) is higher than that of DIV (0.045), due to the importance of scrip dividends for European banks during this period. In Table 3, we report Pearson's correlation matrix.

<<Insert Tables 2 and 3>>

In Table 4, we present the results of the estimations of model 1 and compare our results to those of previous studies. In his pioneering study, Lintner (1956) obtained a 0.70 coefficient for lagged dividends, and a 0.15 coefficient for current earnings, with the adjusted-R^2 being 85%. More recently, Aivazian et al. (2003) obtained similar results for a sample of over 100,000 firm year observations of US firms during the period 1981 to 1999. They obtained a coefficient on lagged dividends of 0.62 and a coefficient of current earnings of 0.13 with an adjusted-R^2 of 82.4% using fixed effects panel data. We apply the same method as employed by Aivazian et al. (2003)[3] to our sample of EU banks during the period 2014-2018. Our coefficient of lagged dividends is -0.209, which differs substantially from that of previous research. In addition, we fail to find a significant coefficient of current earnings, with ours being 0.058. Our adjusted-R^2 is 15.6%, which is much lower than that of Lintner (1956) and Aivazian et al. (2003), and might be due to the problems which EU banks have in maintaining dividends during periods of financial turmoil. In the fourth row of Table 3, we replace cash dividends per share (DPS) by total dividends per share, i.e., the addition of cash and scrip dividends (TDPS). The results change dramatically and closely resemble previous evidence. First, the coefficient of lagged total dividends (TDPS) becomes positive and is close to benchmark studies. Second, the adjusted-R^2 rises to 73.85%. These results lend support to the hypothesis that EU banks continue to smooth dividends, but that this policy applies basically to total dividends, i.e. the combination of scrip and cash dividends.

[3] The selection of the fixed effects model is based on the (not tabulated) Hausman test.

<<Insert Table 4>>

In Table 5, we report the results of estimating model 2 through the GMM method. We include lagged dividends and current earnings, calculated as ratios scaled by total assets, since they are the most important factors for determining dividend policy as our model 1 suggests. In addition to lagged dividends, we introduce a number of variables related to our hypotheses. In columns 1, 2, and 3, we control for each of the legal environment issues. In columns 4, 5, and 6, we introduce the variables by pairs, and in column 7 we introduce the three variables simultaneously.

The coefficient of previous dividends (DIV_{t-1}) is negative and significant in all of the estimations, thus confirming the decrease in cash dividends among EU banks in the years after the 2007-2008 financial crisis. In Columns 1, 4, 5, and 7 of Table 5, we include the TIER1 ratio used by banks to fulfil the Basel agreements (TIER1). It can be seen that this variable has a negative and significant relationship with current dividends. This result might indicate that, given the need to increase reserves in order to reach the required level, banks have had to cut dividends and to use earnings as an internal source of funds.

In columns 2, 4, 6, and 7 of Table 5, we introduce CAPST, the index of capital stringency. The coefficient is negative and significant in all estimations. These results show that banks in EU countries with higher capital stringency pay lower dividends because of the more demanding capital legal requirements. In turn, the results reported in Table 5 concerning TIER and CAPST confirm our second hypothesis regarding the effect of the legal requirements on banks' dividend policy.

In columns 3, 5, 6, and 7, we include the index of shareholder rights (SR) calculated by La Porta et al. (2000b), and used more recently by Lepetit et al. (2018) and Chang et al. (2018). Contrary to our third hypothesis, the negative and significant coefficients of the SR variable lend support to the substitution hypothesis, such that dividends may act as a substitute mechanism to make up for poorer legal shareholder protection.

As far as the control variables are concerned, the market-to-book (MB) variable is positively and significantly related to cash dividends. This can be seen as evidence that dividends play a key role as signals of growth opportunities (Dempsey et al., 2020). The negative coefficient of the SIZE variable implies that dividends fell, particularly among the largest European banks in the years after the 2007-2008 financial crisis.

<<Insert Table 5>>

We run an analogous analysis for total (cash plus scrip) dividends with the dependent variable (TDIV). Results are reported in Table 6. These new estimates change dramatically compared to those for cash dividends reported in Table 5. The coefficient of lagged dividends ($TDIV_{t-1}$) now becomes positive, consistent with the smoothing theory and with the estimates of model 1 shown in Table 4. In turn, EU banks used scrip dividends to smooth total dividends during the study period. In addition, the coefficients of TIER1 and CAPST are no longer negative but positive and statistically significant. Consequently, stricter regulation concerning capital requirements is positively related to total dividends. These results suggest that scrip dividends play a dual role since, on top of shareholder remuneration, they are used to increase equity in order to comply with both the Basel Agreements and with national regulation. In contrast, the shareholders' rights variable (SR) is no longer significant, except in Column 7, in which the coefficient is positive, in line with the outcome hypothesis of dividends (and counter to the substitution hypothesis proved above).

The market-to-book (MB) variable is positively and significantly related to total dividends, confirming the role played by dividends as signalling mechanisms. In contrast to the results of cash dividends reported in Table 5, the coefficient of the variable (SIZE) is mainly positive (except in columns 4 and 7), which may indicate greater use of scrip dividends among the largest European banks.

<<Insert Table 6>>

In order to enhance the comparability of our results with previous research, in Table 7 we split the sample according to the median of the CAPST variable and run differentiated regressions for each sub-sample. The coefficient of previous dividends is positive for both subsamples, thus supporting total dividend smoothing by banks, irrespective of capital adequacy regulation. Interestingly, the sign of the SR variable switches between columns: being positive for countries with the highest capital stringency ratio and negative for those with the lowest capital constraints. This result reconciles our previous findings in the sense that dividends may be due both to the outcome model (in countries with higher capital stringency) and to the substitute model (in countries with lower capital restrictions).

<<Insert Table 7>>

As a robustness check, we use an alternative definition of the dependent variables, DIV and TDIV, defined as the ratio of cash dividends and total dividends (cash plus scrip) to equity market value. Results are reported in Tables 8 and 9 and confirm those of Tables 5 and 6.

<<Insert Tables 8 and 9>>

5. Discussion and conclusions

The fall in profitability, the narrowing of financial margins, and financial turmoil have posed a challenge for bank dividend policies in recent years. It is well known that the banking sector aims to preserve traditionally high dividend payments since dividend cuts send out negative signals which may spread problems to the financial system as a whole (Acharya et al., 2011; Floyd et al., 2015). Thus, the aftermath of the recent 2007-2008 financial crisis has become a critical scenario, since European banks have sought to maintain a pre-crisis dividend policy. Moreover, the stricter capital requirements, such as the Basel Agreements and the national regulation of a number of European countries, have made it even more difficult to maintain dividend payout.

In order to address and offset such adverse conditions, banks have sought new ways of compensating shareholders. Scrip dividends, which allow shareholders to choose between cash dividends or new shares, are one such mechanism and play an additional role, since banks issue new shares (increasing equity) in order to compensate shareholders. This is relevant in the current situation in which banks must meet capital adequacy requirements. Moreover, scrip dividends are particularly suited to dividend smoothing. As repeatedly shown by the literature, both banks and nonfinancial firms alike define their payout policy conditional on previous years in order to avoid major fluctuations.

We analyse a sample of 79 banks from 20 European countries between 2014 and 2018. Our results confirm that, during said period of major financial instability, banks often used scrip dividends as a compensation mechanism and, at the same time, to smooth dividend payout. We also find that the new legal framework has enhanced the use of scrip dividends. Whereas the stricter requirements on banks' capital adequacy have a negative relationship with cash dividends, scrip dividends are positively related to these requirements.

We are aware of the controversy surrounding scrip dividends and the doubts expressed concerning their consideration as dividends. Through our research, we seek to explain why this payout policy has been so widely used by European banks. Future studies might analyse in depth the particular nature of scrip dividends, as well as the legal and fiscal consequences of using such a way to remunerate shareholders. Particularly interesting are studies into the financial implications of scrip dividends, such as the consequences in terms of risk taking or investment profitability. Indeed, even the influence of CEO power, depending on a bank's governance context, may play a key role in banks' overall payout policy (Chintrakarn et al. 2018).

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Table 1. Sample of European banks by country and level of institutional factors

Country	Obs.	# Banks	Shareholders' Rights Index	Capital Stringency Index
Austria	20	4	2.5	5
Belgium	10	2	3	5.5
Czech Republic	25	5	2.5	5
Denmark	25	5	4	7
Finland	5	1	3.5	8
France	15	3	3.5	9
Germany	15	3	3.5	8
Greece	10	2	2	7
Hungary	5	1	2.5	5
Ireland	10	2	5	5
Italy	25	5	2	7
Netherlands	10	2	2.5	9
Norway	10	2	3.5	8
Poland	20	4	2	9
Portugal	5	1	2.5	8
Spain	20	4	5	9
Sweden	35	7	3.5	4
Switzerland	45	9	3	8
Turkey	25	5	3	11
United Kingdom	60	12	5	8
Total	395	79		

Table 2. Descriptive statistics

	Mean	Std. Dev.	Median	Min.	Max.
DIV	0.045	0.007	0.002	0.000	0.103
TDIV	0.048	0.148	0.006	0.000	1.000
ROA	0.016	0.034	0.014	-0.580	0.236
TIER1	0.156	0.136	0.142	0.058	0.310
CAPST	7.757	1.744	8.000	4.000	11.000
SR	3.280	1.055	3.000	2.000	5.000
MB	1.269	1.240	0.971	0.037	6.697
SIZE	10.699	0.818	10.681	8.340	12.353

Mean, median, standard deviation and quartiles of the variables. DIV is cash dividends divided by total assets. TDIV is the total (cash plus scrip) dividend divided by total assets. ROA is return on total assets. TIER1 is the ratio of Tier1 capital as a percentage of total risk-weighted assets. MB is the market value (market capitalization of the bank) divided by the book value of assets. SIZE is the log of total assets. CAPST is the Capital Stringency Index, which ranges from 0 to 11. SR is the index of shareholders' rights.

Table 3. Correlations Matrix of variables of model 2 for cash dividends

	DIV	ROA	TIER1	CAPST	SR	MB
ROA	0.335					
TIER1	0.224	0.337				
CAPST	-0.189	-0.101	-0.392			
SR	-0.125	-0.194	-0.117	0.046		
MB	0.465	0.428	0.282	-0.195	-0.022	
SIZE	-0.392	-0.386	-0.132	0.015	0.219	-0.380

DIV is cash dividends divided by total assets. ROA is return on total assets. TIER1 is the ratio of Tier1 capital as a percentage of total risk-weighted assets. MB is the market value (market capitalization of the bank) divided by the book value of assets. SIZE is the log of total assets. CAPST is the Capital Stringency Index, which ranges from 0 to 11. SR is the index of shareholders' rights.

Table 4. Estimation of the Lintner model

	Observations	Intercept	$DPS_{i,t-1}$	$TDPS_{i,t-1}$	$EPS_{i,t}$	Adj.-R^2
Lintner (1956)	28 (US firms) Period 1918-41	352.3*** (2.85)	0.70*** (3.40)		0.15*** (2.16)	85
Aivaziain et al. (2003)	127,516 (US firms) Period 1981-98	131.07*** (6.13)	0.62*** (204.08)		0.124*** (104.19)	82.4
Our study (2019)	395(European Banks) Period 2014-18	0.004*** (3.76)	-0.209*** (-2.75)		0.058 (1.12)	15.60
Our study (2019)	395(European Banks) Period 2014-18	0.009 (0.53)		0.453*** (9.67)	0.173 (0.20)	73.85

Estimated coefficients (t-statistic) of the Lintner model (equation 1). Cash dividends per share (DPS) at time 't' is regressed against the lagged dividend ($DPS_{i,t-1}$) and earnings per share ($EPS_{i,t-1}$). We report the coefficients and adjusted R-squared obtained by Lintner (1956) for a sample of 28 US firms, and by Aivazian et. al (2003) for a sample of 127,516 US firm-year observations for the period 1981 to 1999. TDPS is total dividend *(i.e.* cash dividends and scrip dividends) per share. ***, **, and * indicate significance at the 99%, 95%, and 90% confidence level, respectively.

Table 5: Dynamic panel data estimation for cash dividends

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DIV_{t-1}	-0.045***	-0.034***	-0.013***	-0.038***	-0.018***	-0.039***	-0.140***
	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)
ROA_{t-1}	0.034***	0.045***	0.008**	0.063***	0.070***	0.060*	0.016***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
MB_{t-1}	0.001***	0.001**	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$SIZE_{t-1}$	-0.002***	-0.002***	-0.001***	-0.001***	-0.001***	-0.011***	-0.001***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$TIER1_{t-1}$	-0.008***			-0.008**	-0.010*		-0.002*
	(0.001)			(0.001)	(0.000)		(0.001)
CAPST		-0.001**		0.001		-0.001*	-0.001*
		(0.000)		(0.001)		(0.000)	(0.000)
SR			-0.001***		-0.001***	-0.001***	-0.001***
			(0.000)		(0.000)	(0.000)	(0.000)
Intercept	0.022**	0.028***	0.025***	0.022***	0.003***	0.024***	0.023***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Observations	225	237	237	222	222	237	222
Wald Test (d.f.)	39755.2(9)***	29468.26(9)***	22686.46(9)***	48664.45(10)***	147396.7(9)***	18996.1(9)***	130394.4(9)***
m_1	0.80	0.85	0.85	0.78	0.69	0.84	0.84
m_2	0.30	0.32	0.37	0.30	0.04	0.41	0.34
Hansen test (d.f.)	50.71(15)	5.38(15)	4.08(10)	6.14(15)	10.75(15)	3.57(15)	-1.86(15)

Estimated coefficients (standard errors) of the estimation of equation (2) through the GMM. The dependent variable is DIV, which is the cash dividend paid to shareholders divided by total assets. ROA is return on assets. TIER1 represents the ratio of Tier1 capital as a percentage of total risk-weighted assets. CAPST is the Capital Stringency Index with a range from 0 to 11, where 11 represents the highest level of capital stringency. SR is the index of shareholders' rights in each economy proposed by La Porta et al. (1998) and updated by Djankov et al. (2007). MB is the ratio of market capitalization and total assets. SIZE is the log of total assets. All the estimates include year dummy variables. The Wald test reflects the validity of instruments (degrees of freedom in brackets). The m_2 is a test to check the absence of second order correlation, and the Hansen test is the test for the over-identification of restrictions. ***, **, and * indicate significance at the 99, 95%, and 90% confidence level, respectively.

Table 6: Dynamic panel data estimation for total dividends

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$TDIV_{t-1}$	0.287***	0.2999***	0.293***	0.230***	0.298***	0.268***	0.244***
	(0.014)	(0.014)	(0.007)	(0.013)	(0.013)	(0.009)	(0.013)
ROA_{t-1}	0.019	0.252***	0.294***	0.010	0.049**	0.132***	0.003
	(0.026)	(0.025)	(0.033)	(0.020)	(0.019)	(0.024)	(0.022)
MB_{t-1}	0.001**	0.001**	0.001***	0.001	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$SIZE_{t-1}$	0.001***	0.006***	0.005***	-0.002**	0.001	0.001**	-0.002**
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
$TIER1_{t-1}$	0.060***			0.157***	0.058***		0.165***
	(0.006)			(0.020)	(0.007)		(0.019)
CAPST		0.001***		0.003***		0.001	0.033***
		(0.000)		(0.000)		(0.000)	(0.001)
SR			-0.001		0.001	0.001	0.001**
			(0.001)		(0.000)	(0.000)	(0.000)
Intercept	-0.016**	-0.072***	-0.057***	-0.018	-0.004***	-0.019**	-0.014
	(0.010)	(0.006)	(0.001)	(0.013)	(0.001)	(0.001)	(0.132)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	201	216	216	198	198	216	198
Wald test (d.f.)	7291.79(9)***	1800.72(9)***	9543.54(9)***	94231.26(10)***	10989.7(10)***	4720.15(10)***	23173.2(10)***
m_1	-2.74	-2.97	-2.93	-2.81	-2.75	-2.91	-2.90
m_2	1.39	1.02	0.99	1.36	1.74	1.17	1.42
Hansen test (d.f.)	48.87 (15)	54.16 (15)	50.79 (15)	48.24 (15)	47.87 (15)	52.83 (15)	51.47 (15)

Estimated coefficients (standard errors) of the estimation of equation (2) through the GMM. The dependent variable is TDIV, which is the total (cash plus scrip) dividend divided by total assets. ROA is return on assets. TIER1 represents the ratio of Tier1 capital as a percentage of total risk-weighted assets. CAPST is the Capital Stringency Index, with a range from 0 to 11, where 11 represents the highest level of capital stringency. SR is the index of shareholders' rights in each economy proposed by La Porta et al. (1998) and updated by Djankov et al. (2007). MB is the ratio of market capitalization and total assets. SIZE is the log of total assets. All the estimates include year dummy variables. The Wald test reflects the validity of instruments (degrees of freedom in brackets). The m_2 is a test to check the absence of second order correlation, and the Hansen test is the test for the over-identification of restrictions. ***, **, and * indicate significance at the 99, 95%, and 90% confidence level, respectively.

Table 7: Dynamic panel data estimation for total dividends

	(1) Higher CAPST	(2) Lower CAPST
$TDIV_{t-1}$	0.252***	0.428***
	(0.123)	(0.025)
ROA_{t-1}	1.091***	0.091*
	(0.546)	(0.041)
$TIER1_{t-1}$	-0.189	0.103**
	(0.112)	(0.023)
SR	0.009**	-0.001**
	(0.003)	(0.000)
MB_{t-1}	-0.006*	-0.001
	(0.009)	(0.000)
$SIZE_{t-1}$	-0.007*	-0.002
	(0.006)	(0.002)
Intercept	0.091	0.001
	(0.097)	(0.020)
Year dummies	Yes	Yes
Observations	59	143
Wald test (d.f.)	844.16(9)***	10048.3(10)***
m_1	-2.27**	-2.47**
m_2	1.61	0.74
Hansen test (d.f.)	2.88(12)	4.77(15)

Estimated coefficients (standard errors) of the estimation of equation (2) through the GMM. The dependent variable is TDIV, which is the total (cash plus scrip) dividend divided by total assets. ROA is return on assets. TIER1 represents the ratio of Tier1 capital as a percentage of total risk-weighted assets. SR is the index of shareholders' rights in each economy proposed by La Porta et al. (1998) and updated by Djankov et al. (2007). MB is the ratio of market capitalization and total assets. SIZE is the log of total assets. All the estimates include year dummy variables. The m_2 is a test to check the absence of second order correlation, and the Hansen test is the test for the over-identification of restrictions ***, **, and * indicate significance at the 99, 95%, and 90% confidence level, respectively.

Table 8: Robustness table, Dynamic panel data estimation for cash dividends by total shares

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
DIV_{t-1}	-0.142***	-0.113***	-0.114***	-0.135***	-0.127***	-0.109***	-0.175***
	(0.003)	(0.002)	(0.002)	(0.009)	(0.008)	(0.007)	(0.004)
ROA_{t-1}	0.026***	0.044***	0.043***	0.025***	0.024***	0.048***	0.037***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.005)	(0.004)	(0.004)
MB_{t-1}	-0.003***	-0.001**	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$SIZE_{t-1}$	-0.001***	-0.001***	-0.001***	-0.001***	-0.001*	-0.011***	-0.001*
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$TIER1_{t-1}$	-0.013***			-0.016***	-0.015***		-0.013*
	(0.001)			(0.002)	(0.002)		(0.001)
CAPST		5.3e-06**		0.001		0.001**	0.001
		(0.000)		(0.001)		(0.000)	(0.000)
SR			-1.8e-06***		0.001***	0.001*	0.001
			(0.000)		(0.000)	(0.000)	(0.000)
Intercept	0.010**	0.009***	0.025***	0.012***	0.009***		0.008**
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)		(0.002)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Observations	225	237	237	222	222	237	216
Wald Test (d.f.)	18918.1(9)***	20618.59(9)***	22686.46(9)***	40978(10)***	58960.36(9)***	8.2e+09(10)***	807202.6(9)***
m_1	-0.71	-0.77	-0.77	-0.72	-0.72	-0.77	-0.70
m_2	1.02	1.43	1.43	0.90	0.87	1.43	1.02
Hansen test (d.f.)	9.15(15)	6.11(15)	8.44(10)	5.98(15)	6.69(15)	68.85(15)	9.25(15)

Estimated coefficients (standard errors) of the estimation of equation (2) through the GMM. The dependent variable is DIV, which is the cash dividend paid to shareholders divided by equity. ROA is return on assets. TIER1 represents the ratio of Tier1 capital as a percentage of total risk-weighted assets. CAPST is the Capital Stringency Index with a range from 0 to 11, where 11 represents the highest level of capital stringency. SR is the index of shareholders' rights in each economy proposed by La Porta et al. (1998) and updated by Djankov et al. (2007). MB is the ratio of market capitalization and total assets. SIZE is the log of total assets. All the estimates include year dummy variables. The Wald test reflects the validity of instruments (degrees of freedom in brackets). The m_2 is a test to check the absence of second order correlation, and the Hansen test is the test for the over-identification of restrictions. ***, **, and * indicate significance at the 99, 95%, and 90% confidence level, respectively.

Table 9: Dynamic panel data estimation for total dividends by total shares

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$TDIV_{t-1}$	0.606***	0.510***	0.587***	0.390***	0.604***	0.513***	0.474***
	(0.011)	(0.014)	(0.007)	(0.045)	(0.027)	(0.004)	(0.021)
ROA_{t-1}	0.576***	0.492***	0.914***	0.698***	1.080***	0.176***	0.413
	(0.015)	(0.008)	(0.008)	(0.097)	(0.019)	(0.089)	(0.042)
MB_{t-1}	-0.002***	0.003**	-0.004**	-0.001	-0.001***	0.003***	-0.001
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
$SIZE_{t-1}$	0.018***	0.007***	0.001**	-0.003*	-0.001	0.002**	-0.002**
	(0.002)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)
$TIER1_{t-1}$	0.062***			0.503***	0.601***		0.455***
	(0.027)			(0.045)	(0.028)		(0.045)
CAPST		0.009***		0.013***		0.009***	0.011***
		(0.000)		(0.001)		(0.001)	(0.001)
SR			0.004***		0.003**	0.009***	-0.004**
			(0.001)		(0.001)	(0.001)	(0.002)
Intercept	-0.295**	-0.134**	-0.035***	-0.077***	-0.025	-0.105**	
	(0.090)	(0.0013)	(0.012)	(0.003)	(0.024)	(0.002)	
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	225	216	216	215	215	236	215
Wald test (d.f.)	413319.1(9)***	1.6e+06(9)***	47049.22(9)***	94231.26(10)***	1.34e+06(10)***	207367.8(10)***	1.8e+08(10)***
m_1	-1.48	-1.83	-1.84	-2.81	-1.63	-1.83	-1.54
m_2	1.64	1.11	0.87	1.36	1.64	1.09	1.64
Hansen test (d.f.)	48.87 (10)	30.18 (10)	46.55 (10)	4.43 (10)	5.66 (10)	9.40 (10)	7.79 (12)

Estimated coefficients (standard errors) of the estimation of equation (2) through the GMM. The dependent variable is TDIV, which is the total (cash plus scrip) dividend divided by equity. ROA is return on assets. TIER1 represents the ratio of Tier1 capital as a percentage of total risk-weighted assets. CAPST is the Capital Stringency Index, with a range from 0 to 11, where 11 represents the highest level of capital stringency. SR is the index of shareholders' rights in each economy proposed by La Porta et al. (1998) and updated by Djankov et al. (2007). MB is the ratio of market capitalization and total assets. SIZE is the log of total assets. All the estimates include year dummy variables. The Wald test reflects the validity of instruments (degrees of freedom in brackets). The m_2 is a test to check the absence of second order correlation, and the Hansen test is the test for the over-identification of restrictions. ***, **, and * indicate significance at the 99, 95%, and 90% confidence level, respectively.

APPENDIX

Definition of variables

Variable	Definition
DPS	Cash dividend per share. Source: *Eikon*
TDPS	Total (cash and scrip) dividends per share. Source: *Eikon*
EPS	Net earnings per share. Source: *Eikon*
DIV	Cash dividend to total assets. Source: *Eikon*
TDIV	Total (cash and scrip) dividends to total assets. Source: *Eikon*
ROA	Return on assets (Gross profit to total assets). Source: *Eikon*
TIER1	Tier 1 capital to total risk-weighted assets. The ratio represents high-quality sources of capital which banks and other financial institutions are required to keep in order to be protected against bankruptcy. It is also referred to as the core capital ratio, or as the going-concern capital ratio. Source: *Eikon*.
SIZE	Log of a firm's total assets. Source: *Eikon*.
MB	The market capitalization of the bank divided by the book value of total assets. Source: *Eikon*.
CAPST	Capital Stringency Index. It determines the nature of capital requirements and how capital is assessed and verified by banks and regulators. It ranges from 0 to 11, where 11 represents the highest level of capital stringency. Source: *Barth et al.(2004)*
SR	Index of shareholders' rights in each country. Source: *La Porta et al. (1998) and Djankov et al. (2007)*