BANCA D'ITALIA

EUROSISTEMA

Temi di discussione

(Working Papers)

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Number 1403

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ISSN 2281-3950 (online)

Designed by the Printing and Publishing Division of the Bank of Italy

EU BANKS' DIVIDEND POLICIES: MAIN DETERMINANTS AND THE ROLE OF CAPITAL RATIOS

by Salvatore Cardillo* and Jacopo Raponi**

Abstract

The aim of this work is to gauge the main determinants of EU banks' dividend policies, by testing four theoretical assumptions, i.e. signaling, agency conflict (between shareholders and managers and between shareholders and creditors), life-cycle and regulatory pressure, on a sample of 79 banks established in the European Union (including UK) over a 15-year period. Special attention is given to the regulatory pressure theory, as our model investigates the role of both the actual capital level and the surplus above minimum requirements. Results show that the signaling, the regulatory pressure and the shareholders vs. creditors agency conflict theories hold for banks. The life-cycle theory only partially holds. With regard to the regulatory variables, capital surplus appears to have a remarkably higher explanatory power than actual capital level.

JEL Classification: G21, G28, G35, K22.
Keywords: bank, dividend policy, capital requirements, bank regulation.
DOI: 10.32057/0.TD.2022.1403

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1 Introduction[1]

"The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just don't fit together". In just one sentence, Fisher Black (1976) summarized the complexity of the apparently simple issue concerning firms' decisions on if and what dividends to pay to shareholders. Once left aside the assumption of perfectly efficient markets grounding the famous proposition of dividend irrelevance postulated by Miller and Modigliani (1961)[2], economic literature proposed several theories and models attempting to explain why firms pay dividends. The signalling theory, the theory of agency conflicts, the life-cycle theory and, for banks, the regulatory pressure hypothesis are among the most relevant ones[3].

The signalling theory focuses on the capability of dividends to convey information to market participants on firms' future performance (Bhattacharya (1979), Kalay (1980), and Miller and Rock (1985), among others). Managers' decisions to increase (decrease) dividends are therefore used to communicate their expectations of increasing (decreasing) earnings[4].

The agency conflict explanation is twofold. On the one hand, it postulates that outside shareholders - i.e. shareholders without any managerial roles - demand higher dividends to reduce resources under managers' control, thereby making them more prone to the monitoring of capital markets occurring when the firm must obtain new external capital for financing investments. Such assumption has been explored by a large strand of literature, including Easterbrook (1984), Jensen (1986), and Lepetit et al. (2018). On the other hand, it relates to the wealth transfer from debtholders to shareholders, as higher payouts subtract resources to the firm that could be used to pay back debt, thus implying a risk-shifting from the latter to the former. Managers therefore face a trade-off between retaining earnings for reimbursing creditors and satisfying shareholders' demand

[1]We thank Pierluigi Bologna, Emilia Bonaccorsi Di Patti, Daniele Ciani, Antonio Di Cesare, Alessio De Vincenzo, Arianna Miglietta and two anonymous referees for the useful comments received, Luca Bonato and Giuseppe Zito for the technical support.
The views expressed in the article are those of the authors and do not necessarily reflect those of the Bank of Italy or the European Central Bank. Any errors remain ours.
Salvatore dedicates this paper to Siro Pietro, one of the most brilliant persons ever known. He is sorely missed.

[2]According to the MM irrelevance theorem, the dividends a corporation pays do not affect the value of the firm and the overall return of its shareholders.

[3]Other major theories are the tax and clientele effects and the catering theory (Ashraf, Arshad, et al. 2015; Michaely and Allen 2002).

[4]Abreu and Gulamhussen (2013) define the signalling theory as a natural corollary of the Lintner (1956)'s seminal conclusions on dividend stickiness and permanent-earnings based adjustments: if managers actually increase dividends only if new payouts are sustainable over time, then an (unanticipated) change in dividend policy is a reliable signal on managers' expectations.

for cash. Literature contributions in this field include those of Jensen and Meckling (1976), Kalay (1982), and Myers (1977).

The life-cycle theory has been introduced by the seminal paper of Fama and French (2001) and further elaborated by H. DeAngelo, L. DeAngelo, and Stulz (2006). It postulates a changing path of the dividend payout consistent with firms' life-cycle, whose different stages are assessed according to size, asset growth rate and profitability. Younger, under-capitalized firms with less current profits but high growth potential tend to pay lower dividends, whereas bigger and more mature firms increase payouts to shareholders.

Finally, the fact that banks are regulated and monitored by supervisors raises questions about the extent to which regulatory oversight influences dividend payouts. According to the regulatory pressure hypothesis, capital-based rules may induce under-capitalized banks (i.e. banks closer to the regulatory floor) to plow-back earnings rather than pay dividends (Abreu and Gulamhussen 2013; Ashraf, Bibi, and Zheng 2016; Dickens, Casey, and Newman 2002; Theis and A. S. Dutta 2009). Dividends lower the capital ratio of a bank, increase its leverage and shift risk to debtholders and (potentially) to taxpayers. To mitigate such effects, regulators can therefore restrict dividend payments of under-capitalized banks (Ashraf, Bibi, and Zheng 2016).

The first three theories have been elaborated and tested mainly on non-financial corporates. The peculiarity of financial firms, consisting in the pervasive regulatory constraints they are subject to, led scholars to typically exclude such firms from analyses on dividend policies. Financial regulation was indeed deemed a distorting factor in "normal" dividend decisions. The attention to banks is relatively recent, as Dickens, Casey, and Newman (2002) are among the first elaborating an economic model for bank dividend policies, and it gained increasing momentum at the onset of the great financial crisis, when several US banks were found to pay dividends also in presence of injection of public funds (Acharya, Gujiral, et al. 2011; Acharya, Le, and Shin 2017). Such events led therefore scholars to more deeply investigate banks' dividend policies and the role of regulation in payout decisions (Ashraf, Arshad, et al. 2015) on the one hand, and regulators to increase oversight of dividend payouts on the other hand, as shown by the reform packages of the Federal Reserve Board (Donnell, Guide, and Boyce 2010) and of the Basel III Accord of the Basel Committee on Banking Supervision.

Our work provides additional evidence on this topic, by applying to a sample of European banks an explanatory model for banks' payouts capturing the rationale underlying the four theories described above. In this context, our main contribution to the debate is the use of both actual capital level and capital surplus above the minimum regulatory requirements individually set by the supervision authorities for each bank

to test the regulatory pressure hypothesis and compare the explanatory power of both variables. To the best of our knowledge, literature investigating such hypothesis only adopted measures of actual capital level as explanatory variable. Our paper is therefore the first to use capital surplus. As better explained in Section 4, our results show a higher explanatory power of capital surplus than capital level in banks' payout decisions, thus revealing the strong attention paid from banks to supervisory action and the build-up of a safety margin over the minimum regulatory threshold. Indeed, the risk of breaching the minimum requirements and being subject to both regulatory (see Section 4.2) and reputational sanctions appears to act as a strong incentive for banks to calibrate payouts to the excess capital.

The remainder of the paper is organized as follows. Section 2 reviews the main literature contributions on the application to banks of the four mentioned dividend theories. Section 3 describes the dataset and provides some stylised evidence on European banks' dividend policies. Section 4 presents two specifications of our analytical model. The baseline version adopts, in line with the majority of literature, the actual capital level as regulatory variable. The alternative version uses instead the capital surplus. The two approaches are then compared. Section 5 presents a set of robustness controls. Section 6 concludes.

2 Literature review

This section reviews the main literature contributions on the application to banks[5] of the theories of payout policies that inform our model.

The signalling theory - largely verified for non-financial companies - appears to hold also (and even stronger) for banks. Baker, S. Dutta, and Saadi (2008) surveyed managers of a sample of Canadian listed firms and found that those of financial firms put more preference on dividends as a signalling device than non-financial firms' ones. According to Boldin and Leggett (1995) and Gambacorta, Oliviero, and Shin (2021), banks' assets (e.g. loans) are more opaque to external investors than other firms' assets. Managers, especially those of better-run banks, have therefore more incentives to signal the higher quality of their "products". Forti and Schiozer (2015), Kauko (2012), Huang and Ratnovski (2011) and de F. Oliveira, Schiozer, and Lucas (2015) find that dividends are an important source of information for depositors, both in normal times and in periods of stress, when assets opaqueness increases. Moreover, institutional depositors are even

[5]An overall survey of the literature on dividend policies focusing also on the applications to non-financial firms would go beyond the scope of this paper. Excellent review articles are those of Michaely and Allen (2002) and Bhattacharyya (2007).

more reactive to information conveyed by dividend changes. Filbeck and Mullineaux (1993) find evidence of abnormal reactions of banks' share prices even in presence of small dividend changes[6]. In their view, this is a consequence of banking regulation[7]: because bank regulators have access to confidential information and have the ability to restrict or curtail payouts, shareholders may perceive a dividend increase as having been "validated" by the regulators and being therefore a reliable indicator. Finally, Bessler and Nohel (1996) demonstrate that the announcement of dividend cuts trigger substantially larger (negative) reactions of banks' than other firms' stock prices. Such reactions are also greater in magnitude than those stemming from other unfavourable information about banks, e.g. rating downgrades. This happens because dividend cuts not only signal expectations of future bad performances, but also hamper customers' trust, thus generating an adverse feedback loop. Basse et al. (2014) are the only standing out of the crowd, as their empirical study on European banks' dividend policy does not find any statistical evidence that dividend signalling is a relevant economic phenomenon.

With regard to the agency conflict between shareholders and managers, Filbeck and Mullineaux (1999) find support to the conclusion that dividends are not an effective tool in addressing the conflict, as banking supervision acts as a monitoring incentive alternative to (and more effective than) the dividend-induced mechanism. Similar conclusions are reached by Collins, Blackwell, and Sinkey (1994), whose study on 104 large bank holding companies over a 8-y period finds that the higher investment opportunities (proxied by the market-to-book ratio[8]), the higher the market monitoring, the lower the payout. Opposite results are instead shown by Dickens, Casey, and Newman (2002) and Abreu and Gulamhussen (2013), whose studies show a significant role of dividends in addressing the agency conflict.

With regard to the agency conflict between shareholders and creditors, Acharya, Gujiral, et al. (2011) and Acharya, Le, and Shin (2017) find evidence of US banks increasing dividend payments throughout the financial crisis, thus shifting substantial risk to debtholders. This can be attributed to the short-term nature of the majority of their funding and the (implicit or explicit) guarantees provided by the government[9].

[6]Literature on non-financial firms typically takes into account only "exceptional events", i.e. large changes (20 per cent or more) in payouts and/or dividend originations/interruptions.

[7]The authors' focus is on the US regulatory framework.

[8]The market-to-book - or price-to-book - ratio may be associated to several considerations. On the one hand, larger ratios mean that investors value the firm higher than its book values, therefore expecting high growth opportunities. This is one of the main postulates of Fama and French (2001)'s life-cycle theory (see *infra*), also reported by Theis and A. S. Dutta (2009) and Dickens, Casey, and Newman (2002). On the other hand, market participants motivated by short-term consideration value at a higher price shares paying higher dividends (ECB 2020; Gambacorta, Oliviero, and Shin 2021).

[9]The authors show that banks who received TARP funds did cut dividends only with a significant

Literature testing the life-cycle theory on banks is limited and not univocal. Abreu and Gulamhussen (2013) and Dickens, Casey, and Newman (2002) find supporting evidence to the theory. Theis and A. S. Dutta (2009), conversely, do not confirm the Fama and French (2001) framework. More recently, Gambacorta, Oliviero, and Shin (2021) find size and profitability, but not asset growth, to be significant explanatory variables for dividends.

Finally, literature is concordant in supporting the regulatory hypothesis, as it finds a positive relationship between capital levels and dividend payouts. Results are aligned despite high heterogeneity across analytical approaches with regard to the definition of the sample and the choice of the explanatory variables. For instance, for US banks Bessler and Nohel (1996), Casey and Dickens (2000), and Dickens, Casey, and Newman (2002) use equity to total assets ratio, whereas Theis and A. S. Dutta (2009) and Abreu and Gulamhussen (2013) adopt the regulatory definition of capital. With regard to European banks, Ashraf, Arshad, et al. (2015), Ashraf, Bibi, and Zheng (2016), Belloni, Grodzick, and Jarmuzek (2021), and Onali (2014) also use regulatory capital measures.

3 Data and stylised facts

The analysis considers a sample of 79 listed banks established in 18 countries of the EU 28 (i.e. including United Kingdom[10]). More in detail, 45 banks belong to the euro area (hence being included in the Single Supervisory Mechanism, or SSM). Of those, 29 are classified as Significant Institutions (SI)[11], being therefore supervised directly by the European Central Bank (ECB)[12]. As more extensively explained in the next Section, our baseline model refers to the whole sample and covers a 15-year period, from 2005 to 2019, whereas its alternative version is based on the sub-sample of significant institutions and covers a 5-year period, from 2014 to 2019.

Our model takes into account both accounting and market variables, the sample includes therefore only banks that have been listed along the entire time span considered.

With regard to mergers or other significant structural changes occurred in the reference period, we kept in the sample only resulting entities for which it has been possible

delay or, in some cases, increased payouts.

[10]The reference time span covers a period in which the UK was still part of the European Union, we therefore consider also banks established therein.

[11]The SI/LSI qualification refers to information available as of end-2019. All significant institutions included in our sample have been such along the whole period the alternative model is referred to (i.e. 2014-2019, see *infra*, section 4.2).

[12]Euro area banks not classified as significant and banks established in non-euro area countries are supervised by the respective national competent authorities.

to reconstruct a reliable data history. Finally, it shall be noted that the data-set presents missing observations on certain variables, our regressions are therefore based on an unbalanced panel.

Accounting and market data have been retrieved by the SNL Financial database, regulatory variables by Supervisory Reporting Data (FINREP/COREP), macroeconomic variables by the World Bank public database. All data have been observed on an annual basis. Where needed, bank-level data have been winsorized at 5 and 95 percent level in order to control for potential outliers.

The data of main interest - which is also the dependent variable of our model - is the payout ratio, which represents the share of yearly profits distributed to shareholders and is calculated as ordinary dividends over the net income in a given year. More precisely, the payout ratio of year (t) is calculated as the dividend per common share approved at (t) based on earnings as of year-end (t-1)[13], over basic earning per share (referred to the total amount of net income a company generates for each common share outstanding) as of year-end (t-1). The last dividend considered has been paid in 2019, being based on the 2018 net profit. Our analysis considers ordinary dividends only. Special dividends and share buybacks, due to their feature of non-recurring events, are excluded. Moreover, share buybacks are a marginal phenomenon, limited in frequency and amount, both in absolute terms and in comparison with other jurisdictions[14]. Finally, we do not consider dividends distributed in case of negative profitability. Indeed, dividends paid in such circumstances are clearly not a share of yearly profits. As such, those cannot be considered as an ordinary payout and are therefore out of the scope of our analysis[15].

The following tables and figures show some evidence on EU banks' dividend policies over the reference period. Table 3 below summarizes the distribution of sampled banks across countries, the number of significant institutions per country and the average payout ratio calculated at country level along the reference period. Column (4) shows that the top-three countries in terms of payouts are Sweden, Spain and United Kingdom. Among euro area countries, top-three payers are Spain, Finland and Malta. Moving to a bank-level perspective, table 2 shows the top 15 banks in terms of average payout over the reference time span. From a geographical point of view, three are established in United Kingdom and Sweden, two in Spain, Italy and Poland. Top-three payers

[13]Dividend payments are typically deliberated by the shareholders' meeting in the context of the approval of the annual report. Therefore, the actual payment takes place in the year following the reference period.

[14]Goldman Sachs (2020) reports that in 2017 and 2018, in the US, buybacks accounted for 70% and 73% of total capital return to shareholders respectively. For Europe, the comparable figure is 5-6%.

[15]For the sake of completeness, we observed few dividend payments in case of negative profits, around 1.6% of our gross sample.

Table 1 - Distribution of sampled banks across EU countries

Country	N. banks	N. SI	Average payout
SE	3	na	53.94
ES	4	4	52.06
UK	7	na	49.78
FI	2	1	46.59
MT	3	1	44.15
FR	3	3	43.28
PL	5	na	40.01
IT	12	8	37.05
DE	5	3	31.12
HU	1	na	22.75
BE	2	1	18.18
AT	5	5	15.37
HR	2	na	14.16
DK	16	na	13.96
IE	2	1	12.45
GR	5	3	11.37
PT	1	1	9.77
CY	1	1	6.28
Total	79	29	

Euro area countries are in bold. N. of significant institutions is reported for euro area countries only.

are established in Poland, UK and Italy respectively. Seven significant institutions are among the top payers.

Finally, with regard to the general dynamics of payout policies, figures 1 and 2 show fluctuating trends of both the number of dividend payers and the average payout per year. The observed pattern is coherent with the general economic trend along the reference period, as both indicators dramatically dropped in the wake of the Great Financial Crisis in 2008 and the euro area sovereign crisis in 2011. From 2012 onwards, both variables registered an increasing trend. It is finally worth noting that the trend line of average dividend payout is decreasing, probably influenced by the two mentioned negative peaks.

Table 2 - Top 15 highest average payouts over the reference period

Rank	Average Payout	Country	Euro area bank	SI
1	78.81	PL	N	na
2	73.34	UK	N	na
3	72.69	IT	Y	N
4	72.43	PL	N	na
5	63.86	UK	N	na
6	62.99	UK	N	na
7	59.92	ES	Y	Y
8	59.61	MT	Y	Y
9	59.24	ES	Y	Y
10	56.04	SE	N	na
11	54.08	IT	Y	N
12	53.60	FI	Y	Y
13	53.03	SE	N	na
14	52.74	SE	N	na
15	51.84	DE	Y	N

Figure 1 - Share of dividend payers per year.

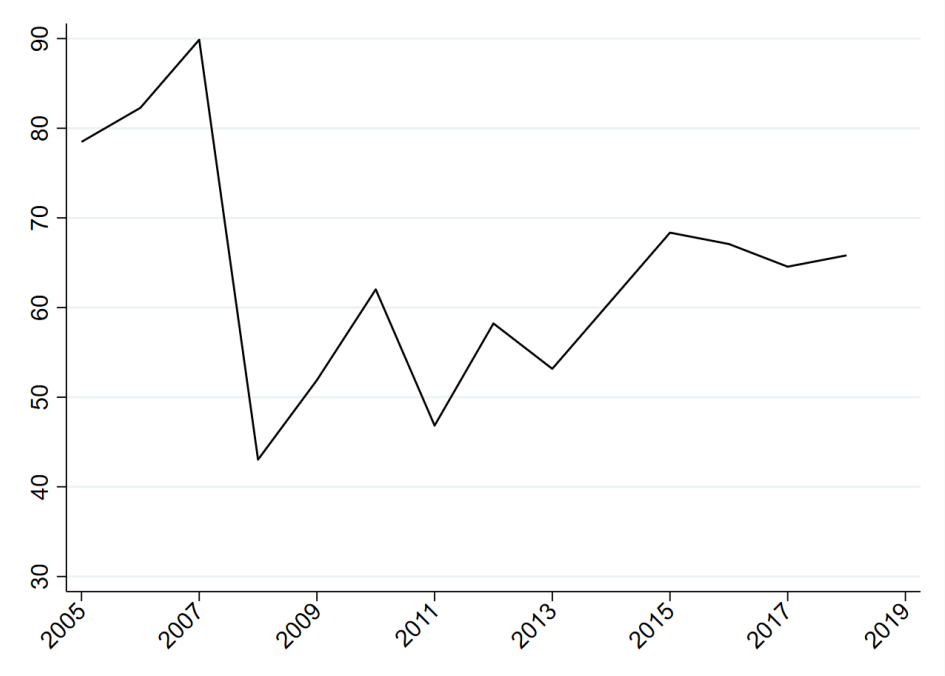
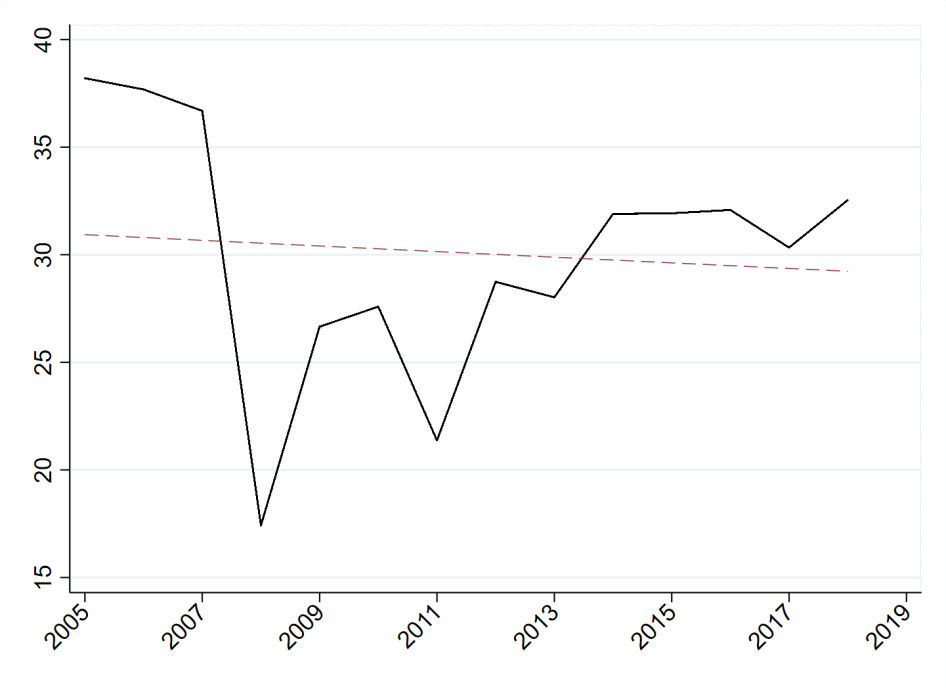


Figure 2 - Average dividend payout per year.



4 Model

4.1 Baseline

In order to investigate the determinants and the rationale underlying banks' decisions concerning whether to pay dividends or not, we construct a regression model relying on the relevant traditional dividend theories exposed in Sections 1 and 2 (i.e. signalling, agency-conflict, life-cycle and regulatory pressure). Specifically, our baseline model (equation 1) includes a set of variables identified on the basis of the existing literature. The estimations take into consideration the whole sample of 79 banks, over the 15-year reference period from 2005 to 2019. We carry out a panel regression controlling for country and time fixed effects. We do not control for bank fixed effects since explanatory variables other than the regulatory one - which is the main variable of interest for us - already control for bank-level characteristics (Abreu and Gulamhussen 2013; Ashraf, Arshad, et al. 2015; Ashraf, Bibi, and Zheng 2016). Moreover, such methodology allows us to take into account a specification for both "within" and "between" variability of the dataset, while the individual (i.e. bank-level) fixed effects model only takes into account the within variability of a certain individual across time. Such choice is supported by the characteristics of our dataset, where the "between" component is

an important part of the overall standard deviation. Under these conditions, the use of fixed effects models would remove the theoretical variation of interest and would not capture a meaningful relationship between the causal variable and the outcome variable, even if this relationship truly exists (Ashraf, Bibi, and Zheng 2016; Reeb, Sakakibara, and Mahmood 2012). Finally, use of random effects models is an established methodology in cross-country empirical studies on bank dividends (Ashraf, Bibi, and Zheng 2016; Ashraf and Zheng 2015; Zheng and Ashraf 2014). To provide stronger evidence on this point, we performed robustness controls by controlling the regression for banks' business model (see *infra*, Section 5).

$$\begin{aligned} payout_{it} = \alpha + \beta_1 payout_{it-1} + \beta_2 cet1r_{it-1} + \beta_3 size_{it-1} + \\ + \beta_4 roe_{it-1} + \beta_5 pbr_{it-1} + \beta_6 debt_{it-1} + \beta_7 insown_{it-1} + \\ + \beta_8 cr_{it-1} + \gamma gdpg_{jt-1} + country + time + \epsilon_{it-1} \end{aligned} \tag{1}$$

Where:

- $payout_t$: it is the dependent variable, representing the payout ratio of bank i at year t;

- $payout_{t-1}$: this variable accounts for dividend history, based on Lintner (1956) and Fama and Babiak (1968); a positive correlation is expected, revealing a certain stickiness of the dividend trend;

- $cet1r$: represents the regulatory Common Equity Tier 1 capital ratio, capturing the regulatory pressure assumption. Banks with higher capital are expected to face less regulatory pressure and therefore to pay higher dividends. Positive correlation expected;

- $size$: proxy of banks' size, defined as the natural logarithm of market capitalization. According to the life-cycle theory, larger banks are expected to pay higher dividends (Fama and French 2001), since they would be more prone to raise capital in markets. Moreover, larger institutions tend to be subject to higher market monitoring, therefore the agency explanation - and the related incentive to retain earnings - holds less. Finally, larger banks are typically in a more mature phase of their life-cycle, characterized by less investment opportunities and, consequently, lower incentives to retain earnings. Positive correlation expected;

- roe: ratio between net income and total equity, accounting for banks' performance. According to the life-cycle theory, more profitable banks are expected to pay higher dividends (H. DeAngelo, L. DeAngelo, and Stulz 2006; Fama and French 2001). Positive

correlation expected;

- *pbr*: Price-to-book ratio is a proxy of the expected growth *à la* Fama and French (2001) and holds multiple potential meanings. According to the life-cycle theory, higher *pbr* are associated to firms with high growth potential, which retain earnings to finance new investments. This implies an expected negative sign of the coefficient. Conversely, signalling theory states that higher dividends are suitable to signal expected growing prospects, thus a positive relationship between expected growth and dividend payout is expected. Therefore, the relationship between *pbr* and dividend payout can be either positive or negative;

- *debt*: natural logarithm of total debt exposure, which is suitable to proxy the agency conflict between shareholders and creditors. In this regard, high debt levels are typically linked to a stronger pressure of creditors on firm's managers. Therefore, the higher the debt the higher the monitoring of creditors, which may translate into lower dividends.

- *insown*: Insider ownership, measured as the percentage of shares owned by managers/directors. Such variable is a proxy of the agency conflict *à la* Easterbrook (1984). The higher the insider ownership, the lower the demand for monitoring by shareholders, the lower the dividends;

- *cr*: it is a proxy for credit risk and it is estimated through the ratio between loans loss provisions and operating income in a given year. Banks more oriented to risk should be less encouraged to pay dividends. The inclusion of a risk factor derives from the approach of Dickens, Casey, and Newman (2002). In their view, although the regulatory variable may capture some risk, the inclusion of a specific risk factor may improve the model's capability to identify the impact of risk on banks' payouts. Given the prevalence of the credit risk in European banks' balance-sheets (among others, Turk-Ariss (2017)), we adopt a credit risk measure to capture such effect;

Finally, we control for annual GDP growth (*gdpg*) for each country j at time t and include country- and time-fixed effects. Table 3 reports the descriptive statistics for the variables just described and Table 4 summarizes the results of the equation 1.

Table 3 - Descriptive statistics

	Obs.	Mean	St. Dev.	Min	Max
payout	1,074	29.94	29.59	0.00	94.08
cet1r	1,113	12.37	3.98	6.00	20.32
cet1s	174	5.73	2.68	0.90	10.83
size	1,163	7.45	2.54	1.34	12.64
roe	1,185	6.17	8.55	-15.75	20.35
pbr	1,125	123.15	98.79	0.49	741.52
debt	1,165	16.98	2.73	11.03	21.60
insown	1,155	28.61	27.62	0.00	100.00
cr	1,153	19.46	40.83	-35.33	547.33
gdpg	1,185	1.43	2.85	-10.15	25.18

Table 4 - Output results of equation 1

VARIABLES	(1)
$payout_{t-1}$	0.469***
	(0.0432)
cet1r	0.800***
	(0.289)
size	3.753***
	(1.103)
roe	0.449***
	(0.139)
pbr	0.0172*
	(0.001)
debt	-3.205***
	(1.077)
insown	-0.0163
	(0.0375)
cr	-0.00147
	(0.0147)
gdpg	-0.334
	(0.314)
constant	19.50
	(13.94)
Observations	893
R-square	0.59

Robust standard errors are in parentheses. ***, ** and * show significance at 0.01, 0.05 and 0.1, respectively.

The findings confirm almost all the characteristics of dividend payers described by the above-mentioned theories. Signalling theory appears to hold, as shown by the significant positive correlations of $payout_{t-1}$ and *pbr*. As for the first explanatory variable, our results are coherent with the vast majority of literature on dividends confirming the existence of a marked stickiness of dividend payments also for banks (Baker, S. Dutta, and Saadi (2008), Dickens, Casey, and Newman (2002), and Theis and A. S. Dutta (2009) among others). With regard to the second variable, our findings suggest a slight prevalence of the signalling argument over the life-cycle one, as shown by the sign and the small magnitude of the coefficient. This could be explained by the preferences of the investors, who tend to consider the European banking market as a mature one, with low growth opportunities. Bank stocks are therefore considered as income stocks, thus rewarding higher dividends with higher stock prices. The low coefficient may be a consequence of the declining trend of both number of dividend payers and average payout over the reference period (ECB (2020). See Figure 1 and 2).

The variables *debt* and *insown* account for the agency conflict theory between shareholders and creditors and between managers and shareholders, respectively. According to our results, only the first type of conflict is statistically related to dividends. Evidence supports the assumption of a stronger monitoring pressure of creditors in presence of higher indebtedness, in order to limit the distribution of resources and the consequent shift of insolvency risk. Conversely, there is no statistical relationship between insider ownership and dividends, thus suggesting a non-significant role of payouts in addressing the agency conflict between shareholders and managers, and between credit risk and dividends. Our results are consistent with Theis and A. S. Dutta (2009) and Filbeck and Mullineaux (1999), but at odds with Dickens, Casey, and Newman (2002) and Abreu and Gulamhussen (2013)'s findings.

With regard to the life-cycle theory, size and profitability, but not *pbr* (see *supra*), are consistent with the Fama and French (2001)'s characteristics of dividend payers. In line with Gambacorta, Oliviero, and Shin (2021) and Theis and A. S. Dutta (2009), larger and more profitable banks are therefore expected to pay higher dividends, whereas no evidence is found on the relevance of future growth opportunities.

Finally, our findings concerning the regulatory pressure - proxied by $cet1r$ - also confirm our initial expectations. Our evidence - in line with all the analyzed literature investigating the role of banking regulation in banks' payout decisions (see Section 2) - supports the idea of better-capitalized banks facing lower regulatory pressure and therefore paying higher dividends.

4.2 Alternative

In the second stage of our analysis, we are going to replace in equation 1 the $cet1r$, which represents the overall capital offer of the bank, with the $cet1s$ variable, representing the capital surplus. Specifically, such variable measures the excess $cet1$ capital the bank holds against the overall capital requirement (OCR) set individually for each bank by its supervisory authority at the end of the annual Supervisory Review and Evaluation Process (SREP)[16], which includes the 8 per cent Pillar 1 requirement, the bank-specific Pillar 2 requirement, plus the Combined Buffer Requirement (CBR). The latter is composed of the Capital Conservation Buffer, the Countercyclical Capital buffer, the Systemic Risk Buffer and the capital requirements for systemic institutions, where applicable (i.e. G-SII and O-SII buffers)[17]. We do not consider Pillar 2 guidance (which is added on top of the OCR) since, different from OCR, it is not a binding requirement. Moreover, the breach of the OCR threshold triggers the maximum distributable amount (MDA) restriction, as defined in Article 141 of the CRD.

The alternative model is described by the equation 2 below. Unlike equation 1, such specification does not include the cr variable, in order to avoid collinearity with the $cet1s$. Indeed, the capital surplus depends on the SREP capital requirement set by the supervisory authority which, in turn, can be broadly seen as a synthetic measure of the overall risk profile of a bank and therefore be correlated with other measures of riskiness.

As anticipated above, this part of the analysis refers to a restricted sample, both in terms of timeline and number of banks included. With regard to the first, we chose to analyze only SREP cycles carried out according to the current legal framework (i.e. CRD and CRR), which entered into force in 2013. The reference period goes therefore from 2014 to 2019.

Moreover, we only consider significant institutions, as we had access only to the SREP of the 29 significant institutions included in our sample. SREP cycles for non-significant institutions are carried out at national level by the local supervisory authorities, and we were not able to retrieve the necessary information.

[16] As reported by the European Banking Authority (EBA), the key purpose of the SREP - whose legal framework is set out by EU Directive 2013/36 (CRD) and the EU Regulation 2013/575 (CRR) - is to ensure that institutions have adequate arrangements, strategies, processes and mechanisms as well as capital and liquidity to ensure a sound management and coverage of their risks, to which they are or might be exposed, including those revealed by stress testing and risks institution may pose to the financial system.

[17] The capital surplus over the OCR is commonly known as *management buffer* in the supervisory practice.

$$payout_{it} = \alpha + \beta_1 payout_{it-1} + \beta_2 cet1s_{it-1} + \beta_3 size_{it-1} + \\ + \beta_4 roe_{it-1} + \beta_5 pbr_{it-1} + \beta_6 debt_{it-1} + \beta_7 insown_{it-1} + \\ \gamma gdpg_{jt-1} + country + time + \epsilon_{it-1} \tag{2}$$

As anticipated, the main difference with the baseline model concerns the regulatory pressure variable, now represented by the surplus of $cet1$ capital over the OCR. It is measured as the difference between the actual $cet1$ capital and the OCR, both expressed in percentage points over the risk-weighted assets. Results of the alternative model regression will be then compared to the baseline model ones. In this regard, in order to control for size differences between the actual $cet1$ ratio and the surplus, and allow comparison between the two models, regulatory variables $cet1r$ and $cet1s$ are standardized. Moreover, since the baseline and the alternative model refers to different samples, we also run the baseline model on the same sample of the alternative one, which includes only significant institutions between 2014 and 2019 (we define such specification as "baseline restricted model"). Table 5 below summarizes results of the new round of regressions on standardized regulatory variables. Columns (1) and (2) report results of the baseline model with the standardized $cet1$ capital ratio on the full and restricted sample respectively, column (3) reports results of the alternative model with standardized capital surpluses.

The coefficient of the new variable $zcet1s$ is significant at 0.1 level and positively correlated with the dependent variable, thus confirming the regulatory pressure hypothesis, and the coefficient is almost 1.6 times higher than the $zcet1r$ one in the baseline version. Moreover, the standardized $cet1r$ is not statistically significant in the baseline restricted model, as shown in Column (2). Banks' reaction appears therefore stronger to changes in the capital surplus than in *per se* capital level. This may suggest that banks' decision on payouts prominently depend on the regulatory requirement and on how big is the safety margin over the MDA threshold and it holds in particular after the entry into force of the SSM. The relevance of capital surplus also means that, even keeping the capital level unchanged, a variation in surplus due to variations in the capital requirement is likely to impact on banks' payout decisions. Similar results hold also for the sub-sample of Less Significant Institutions established in the euro area: whereas the coefficient of the $cet1$ ratio is statistically significant along the full reference period, it is not significant anymore starting from 2014[18].

[18]Results for LSIs have not been included in the text for editing reasons.

Table 5 - Output results of baseline and alternative model with standardized capital ratios and surpluses

VARIABLES	(1)	(2)	(3)
$payout_{t-1}$	0.47***	0.258***	0.210**
	(0.0434)	(0.0982)	(0.0973)
zcet1r	3.183***	7.743	
	(1.157)	(12.15)	
zcet1s			5.078*
			(2.620)
size	3.822***	10.08***	10.41***
	(1.075)	(2.972)	(3.841)
roe	0.414***	0.667*	0.592***
	(0.133)	(0.384)	(0.227)
pbr	0.0174**	-0.0694***	-0.0816***
	(0.0098)	(0.0166)	(0.0219)
debt	-3.277***	-10.22***	-10.37***
	(1.076)	(3.377)	(3.790)
insown	-0.0165	-0.0900	-0.120*
	(0.0377)	(0.0641)	(0.0643)
cr	-0.0146	0.0344	
	(0.0145)	(0.0731)	
gdpg	-0.336	-0.370	-0.404
	(0.314)	(0.520)	(0.447)
Constant	30.38**	113.4*	121.6**
	(12.55)	(49.86)	(51.17)
Observations	893	142	142
R-square	0.58	0.67	0.68

Column (1) shows results of the baseline model run on the full sample and period. Column (2) shows results of the baseline restricted model, run on the sub-sample of significant institutions on data from 2014 to 2019. Column (3) shows results of the alternative model. Values of both capital ratios and surpluses have been standardized. Robust standard errors are in parentheses. ***, ** and * show significance at 0.01, 0.05 and 0.1, respectively.

With regard to other variables, results obtained for the baseline model are generally confirmed, with the only exception of *pbr*. The sign of the coefficient is negative for both the restricted samples, thus suggesting a less important role of the signalling argument for the subgroup of significant institutions. This is somehow expected, since this sample is "biased" in terms of size by including "bigger" banks only, as significant institutions are typically identified as those with total assets of at least EUR 30 billion[19]. In this regard, Miller and Rock (1985) and Eddy and Seifert (1988) find an inverse relationship between firms' size and signalling effect. Larger institutions have more information available in the market and subject to closer monitoring by market participants due to their prominent role. Therefore, their dividend announcements generate lower surprise and smoother reactions.

5 Robustness

In order to ensure the robustness of the results presented in the previous section, a series of tests has been conducted. First of all, we perform a Wald tests for linear hypotheses about the parameters of the two main specifications of our model, i.e. the baseline and the alternative with standardized $cet1s$ (all variables tested). Table 6 reports the results of such tests, confirming the association previously reported.

Table 6 - Wald tests for all the variables in the baseline and alternative model

Specification	χ^2	P-value
baseline	441.07	0
alternative	78.47	0

In a second stage, we conducted the following analyses for robustness. The first set of controls - whose results are shown in Table 7 - includes the following:

- a tobit regression on both the baseline and alternative model to account for the fact that the dependent variable varies by construction in a range between 0 and 1;

- a logit regression between the independent variables in equation 1 and a dividend dummy as dependent variable, i.e. a variable equal to 1 if the bank paid a dividend in a

[19]More precisely, the criteria for determining whether banks are considered significant - and therefore under the ECB's direct supervision - are set out in the SSM Regulation and the SSM Framework Regulation. To qualify as significant, banks must fulfil at least one of the following criteria: size, economic importance, cross-border activities and direct public financial assistance. The ECB can decide at any time to classify a bank as significant to ensure that high supervisory standards are applied consistently.

given year, 0 otherwise[20]. Such variable proxies the banks' decision to whether distribute profits or not;

- a panel regression on both the baseline and alternative model after replacing the dependent variable with the dividend yield, i.e. the ratio between dividend per share and the stock value;

The second set of controls - whose results are shown in Table 8 for the baseline model and in Table 9 for the alternative model - includes four further tests, where: i) the size is defined as the natural logarithm of total assets instead of market capitalization[21]; ii) return on assets (*roa*) replaces *roe*; iii) a variable capturing the degree of protection of minority shareholders in a given jurisdiction (*minority*) replaces insider ownership. Such variable is defined as the World Bank's minority protection index; iv) a variable controlling for the bank's business model, proxied by the ratio between credit risk RWA and total RWA, is included.

As shown in table 7, both the tests with dividend dummy and dividend yield as dependent variables broadly confirm our results, showing a positive impact of performance and market capitalization, together with a negative association with risk measures (debt and credit risk). Moreover, it shall be noticed that the positive relationship with the bank's regulatory capital is confirmed only concerning the decision to pay a dividend, while it is not significant with regard to the dividend yield. This element could be explained by the fact that bank's decisions are suitable to influence the payout path according to their capital status, while the dividend yield is also influenced by market factors, which are less subject to managers' control.

Tables 8 and 9 report the result of tests which repeat equations 1 and 2 respectively, by using the abovementioned variables. Results overall confirm the positive relationship between banks' regulatory capital and the payout. With regard to the first three tests, only *roa* has a significant association with the distribution of dividends, confirming the role of performance in such decisions. Significance of capital measures is also confirmed. Finally, our model holds also when controlling for banks' business model.

[20]The logit regression has been run on the baseline model only as the iterative process which it is based on does not allow to deliver reliable results on the restricted sub-sample of the alternative model.

[21]The variable *debt* is excluded to avoid collinearity with total assets.

Table 7 - Results of the baseline model with dividend dummy and dividend yield as dependent variables

VARIABLES	(1)	(2)	(3)	(4)	(5)
L.payout	0.469***	0.232**			
	(0.0387)	(0.0967)			
zcet1r	3.211***		0.594**	0.0526	
	(0.927)		(0.236)	(0.0747)	
zcet1s		5.423**			0.132
		(2.663)			(0.165)
L.divdummy			2.249***		
			(0.308)		
L.yield				0.524***	0.457***
				(0.0377)	(0.141)
size	3.753***	9.894***	1.293***	0.229***	0.636**
	(1.134)	(2.923)	(0.386)	(0.0856)	(0.255)
roe	0.448***	0.693***	0.244***	0.0858***	0.0742***
	(0.128)	(0.197)	(0.0274)	(0.0128)	(0.0244)
pbr	0.0173	-0.0762***	-0.00754***	-0.00237***	-0.00543***
	(0.0115)	(0.0219)	(0.00291)	(0.000656)	(0.00175)
debt	-3.205***	-9.652***	-1.235***	-0.186**	-0.696**
	(1.107)	(2.931)	(0.347)	(0.0811)	(0.288)
insown	-0.0163	-0.113*	-0.00622	-0.000101	-0.00385
	(0.0331)	(0.0666)	(0.00678)	(0.00237)	(0.00479)
cr	-0.0147		-0.0326***	0.00295***	
	(0.0130)		(0.0117)	(0.000973)	
gdpg	-0.334	-0.422	0.0648	0.00118	-0.0749**
	(0.349)	(0.492)	(0.171)	(0.0242)	(0.0354)
constant	29.49**	111.1***	12.94***	1.252	8.115**
	(12.74)	(38.86)	(3.538)	(0.945)	(3.994)
Observations	894	142	894	893	142
R-square	0.09	0.012	0.63	0.65	0.76

Columns (1) and (2) show results of the baseline and alternative model respectively, run using a tobit regression to account for the censoring of the dependent variable. Column (3) shows results of a logit regression applied to the baseline model where the dependent variable is a dummy equal to 1 if a bank has paid ordinary dividends in a given year and 0 otherwise. Columns (4) and (5) show results of the baseline and alternative model respectively, using the dividend yield - instead of payout ratio - as dependent variable. For tobit and logit models - columns (1) to (3) - R-squared statistics refer to the McFadden Pseudo-R^2. Robust standard errors are in parentheses. ***, ** and * show significance at 0.01, 0.05 and 0.1, respectively.

Table 8 - Baseline model - Tests with alternative variables for size (total assets), profitability (roa) and agency conflict (minority protection), and with controls for banks' business model

VARIABLES	(1)	(2)	(3)	(4)
L.payout	0.478***	0.477***	0.481***	0.439***
	(0.0428)	(0.0439)	(0.0441)	(0.0439)
zcet1r	4.335***	2.878**	3.230***	3.770**
	(1.132)	(1.204)	(1.180)	(1.594)
size		3.817***	3.858***	4.262***
		(1.071)	(1.118)	(1.301)
lta	0.162			
	(0.494)			
roe	0.517***		0.396***	0.451***
	(0.136)		(0.142)	(0.146)
roa		3.414**		
		(1.629)		
pbr	0.0348***	0.0200**	0.0131	0.0170*
	(0.00926)	(0.0101)	(0.0108)	(0.00998)
debt		-3.109***	-3.236***	-3.600***
		(1.074)	(1.066)	(1.338)
insown	-0.0226	-0.0168		-0.0227
	(0.0374)	(0.0390)		(0.0382)
minority			-0.0725	
			(0.146)	
cr	-0.0126	-0.0285*	-0.0125	-0.0162
	(0.0139)	(0.0160)	(0.0137)	(0.0159)
bmod				-5.908
				(18.52)
gdpg	-0.167	-0.317	-0.293	-0.734**
	(0.306)	(0.313)	(0.339)	(0.346)
constant	-1.249	29.08**	33.81**	43.43*
	(9.689)	(12.99)	(14.17)	(26.26)
Observations	895	894	913	760
R-Square	0.58	0.58	0.58	0.60

The table shows robustness checks on the baseline model. In Column (1), total assets replace market capitalization to account for banks'size. In Column (2), profitability is measured by return on asets (roa) instead of return on equity. In Column (3), agency conflict between shareholders and management is captured by the World Bank's minority protection index. In Column (4), the model includes a control variable for banks' business model. Robust standard errors are in parentheses. ***, ** and * show significance at 0.01, 0.05 and 0.1, respectively.

Table 9 - Alternative model - Tests with alternative variables for size (total assets), profitability (roa) and agency conflict (minority protection), and with controls for banks' business model

VARIABLES	(1)	(2)	(3)	(4)
L.payout	0.238**	0.201**	0.254***	0.233**
	(0.0968)	(0.0984)	(0.0867)	(0.0983)
zcet1s	6.042**	4.912*	5.001*	5.599**
	(2.748)	(2.687)	(2.658)	(2.782)
size		10.54***	12.25***	9.635***
		(4.036)	(4.493)	(3.542)
lta	-0.323			
	(2.726)			
roe	0.872***		0.525**	0.653**
	(0.247)		(0.248)	(0.264)
roa		7.468**		
		(3.302)		
pbr	-0.0203	-0.0791***	-0.120***	-0.0799***
	(0.0292)	(0.0232)	(0.0368)	(0.0240)
debt		-10.73***	-11.77***	-8.239**
		(3.895)	(4.403)	(4.154)
insown	-0.130**	-0.123*		-0.106*
	(0.0642)	(0.0650)		(0.0568)
minority			1.660**	
			(0.673)	
bmod				43.12
				(53.56)
gdpg	-0.573	-0.317	-0.124	-0.430
	(0.420)	(0.460)	(0.427)	(0.450)
constant	20.18	127.2**	30.66	51.27
	(51.40)	(52.38)	(66.70)	(101.7)
Observations	142	142	142	140
R-square	0.67	0.68	0.69	0.68

The table shows robustness checks on the alternative model. In Column (1), total assets replace market capitalization to account for banks'size. In Column (2), profitability is measured by return on asets (roa) instead of return on equity. In Column (3), agency conflict between shareholders and management is captured by the World Bank's minority protection index. In Column (4), the model includes a control variable for banks' business model. Robust standard errors are in parentheses. ***, ** and * show significance at 0.01, 0.05 and 0.1, respectively.

6 Conclusions

The purpose of our work is to assess the main determinants of the EU banks' dividend policies, by referring to some of the most popular economic theories, i.e. signalling, agency conflict (defined in two ways: shareholders vs. managers and shareholders vs. creditors), life-cycle and regulatory pressure. Our model defines a set of variables capturing the rationale underlying the mentioned theories. Special attention is given to the regulatory pressure. In this respect, we define a baseline version of our model adopting the common equity capital ratio as the variable capturing the regulatory pressure effect, and an alternative version adopting the surplus *cet1* capital held by banks over the minimum regulatory requirement set in the context of SREP cycle. Results show that almost all the mentioned theories hold for banks, with the only exceptions of the agency conflict between shareholders and managers and of the effect of expected growth opportunities postulated by the life-cycle theory. The regulatory pressure variable appears to be among the most relevant factors driving banks' decision to remunerate shareholders. In this respect, better capitalized banks result prone to pay higher dividends, likely due to lower regulatory pressure. Statistical evidence is even stronger when considering the capital surplus over the minimum regulatory requirement instead of the actual capital level. This may suggest that banks' decision on payouts prominently depend on the regulatory requirement and on how big is the safety margin over the MDA threshold. The relevance of capital surplus also means that, even keeping capital level unchanged, a variation in surplus due to variations in capital requirement is likely to impact on banks' payout decisions.

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