

IMPACT OF PAYOUT RESTRICTIONS IN THE WAKE OF THE COVID-19 PANDEMIC ON EUROPEAN AND US BANKS' STOCK MARKET VALUATION

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Abstract

Banking prudential authorities in a large number of jurisdictions restricted payouts after the onset of the COVID-19 pandemic, with the aim of bolstering organic capital generation and strengthening banks' solvency. This paper analyses whether market reactions around the dates of the announcements of restrictions in 2020 by the main authorities in Europe and the United States were significant, using the event study methodology on bank excess returns. The results show evidence of negative excess returns only after some of the announcements by the European authorities in 2020, and uneven reactions to the different announcements are observed at individual bank level. In particular, the negative impact is confined to certain sub-samples of European banks around the first announcement of the European Central Bank (ECB) recommendations limiting dividend distributions and share buybacks. The cumulative excess returns that correlated more closely with bank characteristics were those in response to this announcement, with larger banks and banks with a lower CET1 ratio being those most affected. Results for the subsequent announcements do not show significant negative excess returns, and the analysis shows that other available information gradually prevailed over the informative content of the communications of payout restrictions themselves.

Keywords: Restrictions on payouts, excess returns, event study.

1 Introduction

One of the measures taken by banking prudential authorities in the wake of the COVID-19 pandemic was the announcement of several recommendations to limit payouts by the institutions under their supervision.¹ These measures urged institutions, in particular, to limit dividend distribution, and aimed to bolster organic capital generation and strengthen their solvency. They also sought to ensure that banks retained their capacity to extend credit amid the uncertainty generated by the pandemic.²

Limiting payouts increases *ceteris paribus* the regulatory capital available to absorb unexpected losses, but may also have an impact on stock prices and, consequently,

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- 1 In the case of the European authorities, the requests took the form of recommendations, while the US Federal Reserve restricted payouts through reviews of institutions' capital plans.
 - 2 Martínez-Miera and Vegas (2021) show that, in the six months following the first ECB recommendation limiting payouts (Recommendation ECB/2020/19), the Spanish banks that were able to limit their dividend distributions extended significantly more credit to non-financial corporations than those that were not able to do so. The difference in the implementation of the ECB recommendation was due to the fact that some institutions had already approved payouts in 2020 prior to its publication.

on banks' lending capacity. Payout restrictions may be perceived by investors as a negative signal, as they reduce *ceteris paribus* the discounted present value of bank shares.³ Thus, bank shares could be less attractive for investors compared with other financial instruments or other shares of companies not subject to this restriction. This would make it more costly for banks to issue capital and would probably increase the financial return demanded by shareholders to provide funds.⁴ It could also ultimately result in lower lending capacity, as it would be difficult to raise the required capital via the market. In other words, there would be a trade-off between higher organic capital generation through increased retention of earnings and the ability to generate capital through the financial market.

In the same vein, some studies also show that limiting dividend distribution and share buybacks would avoid agency problems between shareholders and bank debt holders stemming from the former's incentives to obtain revenue at the expense of not retaining profits or investing in riskier activities.⁵ Lastly, it is worth noting that, while the literature usually finds negative stock price effects following payout reduction announcements, the signalling mechanism studied in this document is different, as the measure is driven by the authorities. In this setting, it is important to empirically determine the effect of payout restrictions on banks' market value in order to assess the appropriateness of such measures.

The aim of this paper is to explore the impact that payout restrictions during the COVID-19 crisis had on European and US banks' excess returns. To this end, an event study is used,⁶ focused around the announcements of payout recommendations and restrictions made by the main banking and financial system prudential authorities in both jurisdictions during 2020. The sample of banks analysed includes 49 European banks and 49 US banks and includes both jurisdictions' largest listed banks in terms of capitalisation. In the second part of the study, the focus is on analysing which characteristics of the banks correlate, on the dates of the events, with differences in excess returns across institutions, by using cross-sectional regressions.

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- 3 The relationship between firms' payout policies and their stock market valuation has been extensively studied in the economic and financial literature since the early work of Modigliani and Miller (1961) and Gordon (1963). Notable among the empirical literature analysing this relationship is the work of Pettit (1972) and Charest (1978), which studies the correlation between changes in firms' dividend policies and subsequent excess returns, while other papers, such as Aharony and Swary (1980), analyse the information content of corporate dividend policies through event studies. These empirical papers generally find that dividend announcements or changes in dividend policies contain information about the future performance of the firm and signal it to the market. See Baker et al. (2010) for a more recent review of the literature.
 - 4 See Altavilla et al. (2021) and Fernández Lafuerza and Mencía (2021) for recent estimates of the cost of bank capital and its determinants. When the payout ratio is restricted, banks need to improve their financial performance to maintain the same level of dividend yields.
 - 5 See Jensen and Meckling (1976), one of the first theoretical papers to formally characterise these agency problems between a firm's equity holders and bondholders.
 - 6 A review of the reference literature using the event study methodology in the areas of economics and finance can be found in MacKinlay (1997).

The results show evidence of negative excess returns only after some of the announcements by the European authorities in 2020, and uneven reactions to the different announcements are observed at the individual bank level. Thus, a closer examination on an event-by-event basis shows that the negative impact is confined to around the time of the ECB's first announcement on payout restrictions (indicating that this was the announcement that provided the most information to the market) and, within this event, to the sample of European institutions in particular, excluding Greek banks. Other subsequent announcements generally do not reveal significant and robust excess returns in different windows of days around the event dates. This seems to indicate that the information in subsequent announcements was largely expected and may have already been included in institutions' capital plans. Moreover, cross-sectional regressions indicate that the cumulative excess returns that correlated most closely with bank characteristics were those following the first ECB announcement, with larger banks and banks with a lower CET1 ratio being those most affected. Therefore, taking into account the heterogeneity of the impacts, the results suggest that the set of payout restrictions had a modest aggregate effect on stock prices, noticeable only over a limited time horizon and with notable differences across institutions. The paper also highlights that other developments, such as the announcement of strong economic policy support measures around the time of the restriction announcements, may have offset their impact on the market. It should be borne in mind that this study documents the impact of these on stock prices during an extraordinary period, in terms of the scale of the crisis and the degree of government intervention, and that such restrictions could have different effects when used under normalised conditions or recurrently.

This paper contributes to the literature that analyses the effect of payout recommendations and restrictions during the COVID-19 crisis on stock prices. Hardy (2021) describes the impact of the announcements on European and US banks, finding that they had a negative effect in the short term on larger banks, consistent with the results obtained in this study for European banks. Kroen (2022) shows that, minutes after the first announcement by the Federal Reserve, the stock price of the US banks subject to the restriction fell relative to the stock price of other firms not subject to the measure.⁷ In the case of European banks, Andreeva et al. (2021) examine market reactions to the announcements of the first ECB restriction and the two subsequent extensions through difference-in-differences regressions. Using intraday frequency data, they find that the first announcement had a negative impact on stock prices in a narrow window around the time of the announcement. The effect was strongest for euro area banks that paid dividends and, within this group, for those that failed to generate returns commensurate with shareholder

7 Using daily data for the ten days around the announcement, this study also shows that yields and CDS premia on the unsecured bonds of these banks fell relative to those of other financial firms not subject to the restriction. This could indicate that limiting payouts reduced the market's perception of the riskiness of these banks' bonds, as it increased their capital buffer. The study finds that after the restriction is eased the effects are reversed.

expectations.⁸ Unlike those papers, this document analyses a longer period, which allows it to examine the continuing importance of the announcements, and uses cross-sectional regressions to analyse a different set of determinants of excess returns, including the CET1 capital ratio, return on assets (ROA) and size.

The remainder of this article is structured as follows. Section 2 sets out the payout recommendations and restrictions announced during 2020 that will be studied in the paper. Section 3 concisely explains the database used in the analysis and the methodology for obtaining the excess returns for each bank and event. Section 4 analyses the significance of excess returns for each event and the correlation of banks' characteristics with excess returns in the events where market reactions have been most important. Section 5 sets out the main conclusions of the paper.

2 Recommendations and restrictions on payouts

This paper analyses the three recommendations issued by the ECB in 2020 seeking to limit distributions out of 2019 and 2020 earnings and share buybacks aimed at remunerating shareholders. The first recommendation,⁹ published on 27 March 2020, is considered event *ECB 1* in this paper. The recommendation limited dividend distributions and share buybacks until at least 1 October 2020. The second ECB recommendation,¹⁰ of 28 July 2020, announced an extension of the restriction until 1 January 2021 and is considered event *ECB 2* in the analysis. As for the third ECB recommendation,¹¹ published on 15 December 2020, it called on institutions to refrain from or limit payouts until 30 September 2021. Specifically, this third ECB recommendation, referred to as *ECB 3*, indicates that dividends and share buybacks must remain below 15% of accumulated 2019-2020 profits and not be higher than 20 basis points (bp) of the CET1 ratio. These limits entailed a certain easing of the more general limitation of previous announcements, but, at the same time, the period during which the recommendation applied was extended.

Three Federal Reserve restrictions on payouts are likewise analysed. First, the Federal Reserve announcement in the afternoon of 25 June 2020 limiting payouts by large banks for the first time (*FED 1* event) is analysed, along with the publication of its bank stress test report.¹² This first restriction prohibited share buybacks and limited dividend payouts in 2020 Q3 to the 33 institutions participating in the Dodd-

8 The banks that failed to generate returns commensurate with shareholder expectations are those whose estimated cost of equity (COE) is higher than their return on equity (ROE).

9 See [ECB press release](#) and [ECB Recommendation of 27 March 2020 on dividend distributions during the COVID-19 pandemic \(ECB/2020/19\)](#).

10 See [ECB press release](#) and [ECB Recommendation of 27 July 2020 on dividend distributions during the COVID-19 pandemic \(ECB/2020/35\)](#).

11 See [ECB press release](#) and [ECB Recommendation of 15 December 2020 on dividend distributions during the COVID-19 pandemic \(ECB/2020/62\)](#).

12 See Federal Reserve [press release](#) dated 25 June 2020.

Frank Act Stress Test (DFAST) 2020, based on their recent income, capping them to the amount paid in Q2 that year. Subsequently, on 30 September and on 18 December the Federal Reserve announced two extensions of the restrictions, until 2020 Q4 and 2021 Q1, respectively, the latter of which allowed share buybacks but limited to an amount based on the previous year's income.¹³ These two announcements are dubbed here *FED 2* and *FED 3*, respectively.

An additional contrasting event is analysed (event *D. FED*), which refers to the statements by the Chair of the Board of Governors of the Federal Reserve System, Jerome Powell, on 9 April 2020 (at the start of the pandemic), stating that at the time there was no need for US banks to suspend dividend payouts to preserve capital, citing high solvency levels.¹⁴ However, the signals subsequently sent to the market by the Federal Reserve were contradictory, as in a press article published on 16 April 2020¹⁵ the President of the Federal Reserve Bank of Minneapolis encouraged banks not to pay dividends and to increase their capital to ensure their resilience in the face of the COVID-19 crisis.

Lastly, the recommendations issued by the European Systemic Risk Board (ESRB) on EU system-wide restraints on dividend payments, share buybacks and other payouts are considered. First, an analysis is conducted of the impact of the recommendation published on 8 June 2020 (event *ESRB 1*)¹⁶ together with the second set of ESRB measures in response to the coronavirus emergency.¹⁷ The recommendation aims to achieve a uniform approach in relation to capital distribution restrictions in the EU and in the different sectors of the financial system. The dates surrounding this event coincide with relevant updates to the macroeconomic scenarios of various economies and with an extension of the purchase programme to alleviate the effects of the coronavirus crisis (PEPP).¹⁸ It should also be highlighted that this announcement by the ESRB preceded the extension of the ECB recommendations considered under event *ECB 2*. Secondly, the extension on 18 December of the application period of the recommendation

13 See Federal Reserve [press release](#) of 30 September 2020 and [press release](#) of 18 December 2020 on the extension of the restrictions on payouts.

14 See Westbrook (2020).

15 See Kashkari (2020).

16 See [ESRB Recommendation of 27 May 2020 on restriction of distributions during the COVID-19 pandemic \(ESRB/2020/7\)](#).

17 See [ESRB press release](#) dated 8 June 2020. The second set of measures in response to the coronavirus emergency, approved on 27 May 2020, is aimed at strengthening the oversight, analysis and coordination among the competent authorities across five priority areas: (i) implications for the financial system of guarantee schemes and other fiscal measures to protect the real economy; (ii) market illiquidity and implications for asset managers and insurers; (iii) procyclical impact of debt downgrades on markets and financial institutions; (iv) system-wide restraints on dividend payments, share buybacks and other payouts; and (v) liquidity risks arising from margin calls.

18 The [ECB's macroeconomic scenarios](#) were published on 4 June 2020, the same day that the institution announced the [extension of the pandemic emergency purchase programme](#). The [Banco de España published its revised macroeconomic scenarios](#) on 8 June and the [US Federal Reserve published its macroeconomic projections](#) on 10 June.

until 30 September 2021 (event *ESRB 2*),¹⁹ which coincided with event *FED 3*, is considered.

In support of its first recommendation, the ESRB published a report²⁰ analysing several arguments that should be borne in mind when limiting payouts by financial institutions, and included an event study on the market reaction to the first ECB announcement (of 27 March 2020) on the restriction of dividend distributions, using intraday data. Among the arguments in favour of payout restrictions on banks, the ESRB highlights their critical function in the economy and the need to mitigate procyclicality in lending during recessions. As for the arguments against restrictions, the ESRB cites the possible disruptions to resource reallocation and the negative signals to investors. However, the results of its event study show that the market response to the first ECB announcement on the restriction of payouts was relatively limited in general, although it was more significant for larger banks and banks operating in jurisdictions without applicable bans on short selling.

3 Stock valuation of the main European and US banks and excess returns

This first stage of the analysis uses a database with daily stock prices for 49 European banks (eight of which are Spanish) and 49 US banks. The sample of banks analysed includes both jurisdictions' largest listed banks in terms of capitalisation.

Chart 1 shows the stock price indices weighted by the market value of each European, Spanish and US bank. It can be seen that the stock prices of the main European banks fell around the dates of the ECB announcements (which are marked with continuous vertical lines). Chart 1.3 also indicates that there were slight declines in the stock prices of the main US banks in the days following the first payout restriction announcement by the Federal Reserve. Table A.1 in the Annex shows how the indices changed around the reference dates. The chart also reveals that the performance of the markets analysed differed, since at end-2020 the weighted stock price index for the US banks in the sample had returned to its pre-pandemic level, while the index for European banks stood at around 75% of its level at the start of the period under study.

However, stock market indices fluctuate continuously, reacting to the flow of information and to market players' shifting financial goals. In order to analyse whether there were significant market reactions on the dates of the event (i.e. higher or lower than average normal fluctuations) the excess returns for each trading day and for each bank in the sample are obtained as the residual of a one-factor model. The

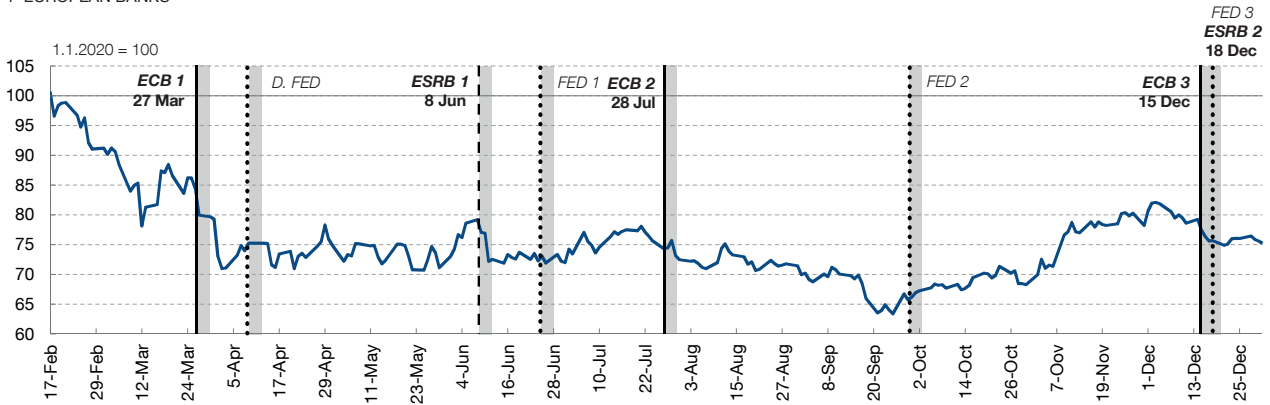
19 See ESRB press release of 18 December and ESRB recommendation of 15 December 2020 amending Recommendation ESRB/2020/7 on restriction of distributions during the COVID-19 pandemic (ESRB/2020/15).

20 See ESRB (2020).

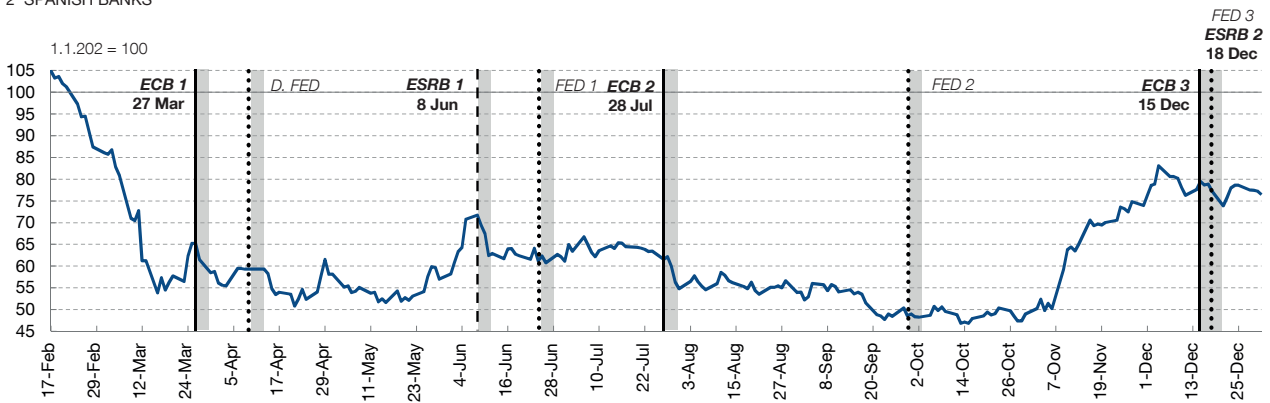
Chart 1

INDEX OF MAJOR BANKS' STOCK PRICES

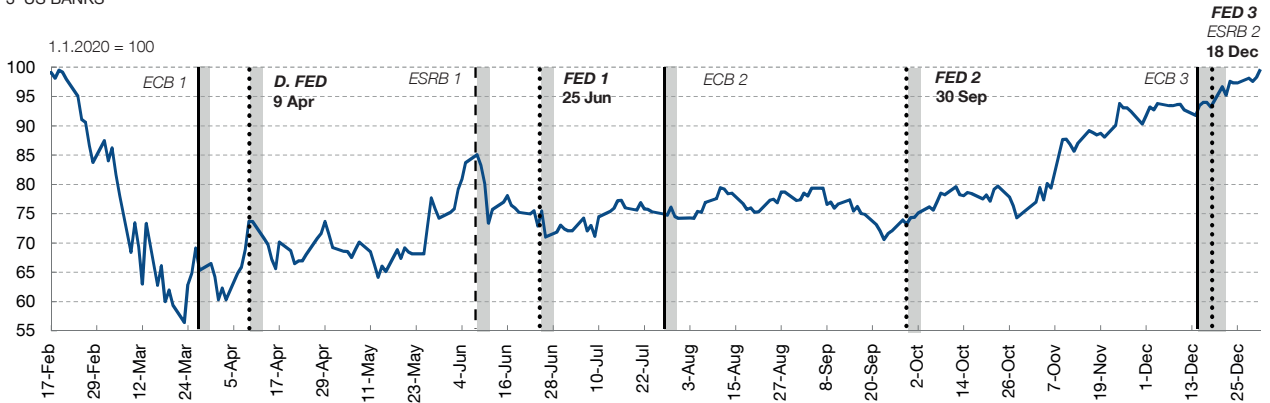
1 EUROPEAN BANKS



2 SPANISH BANKS



3 US BANKS



SOURCE: Banco de España.

NOTE: Stock price indices weighted by each bank's market value. The continuous vertical lines indicate the dates of the ECB announcements, the dotted vertical lines indicate the Federal Reserve's announcements and signals to the market and the dashed lines indicate the ESRB announcements. Events FED 3 and ESRB 2 occurred at the same time. The shaded areas cover the period of the day of the event and the two subsequent days.

model regresses the time series of the returns (changes in the stock prices) on the return of the market index, and is estimated for each bank (i) and each day (t) separately. For each of the estimations on date t, the sample period is the 200 days spanning from t-210 to t-11.

$$AR_{it} = R_{it} - (\alpha_{it} + \beta_{it}R_{mt}) \quad [1]$$

AR_{it} is the excess return of bank i on day t and R_{it} is the return of bank i on day t. The market index (R_{mt}) considered for European banks (and for the sub-sample of Spanish banks) is the EURO STOXX 600, while the S&P 500 is used in the case of US banks. The parameters of the estimated relationship between R_{it} and R_{mt} are dubbed α_{it} and β_{it} . The part of each bank's performance not explained by the performance of the relevant market in its jurisdiction is obtained from equation [1].

Chart 2 shows the time series of the resulting cumulative excess returns for three-day windows (t, t+1, t+2).

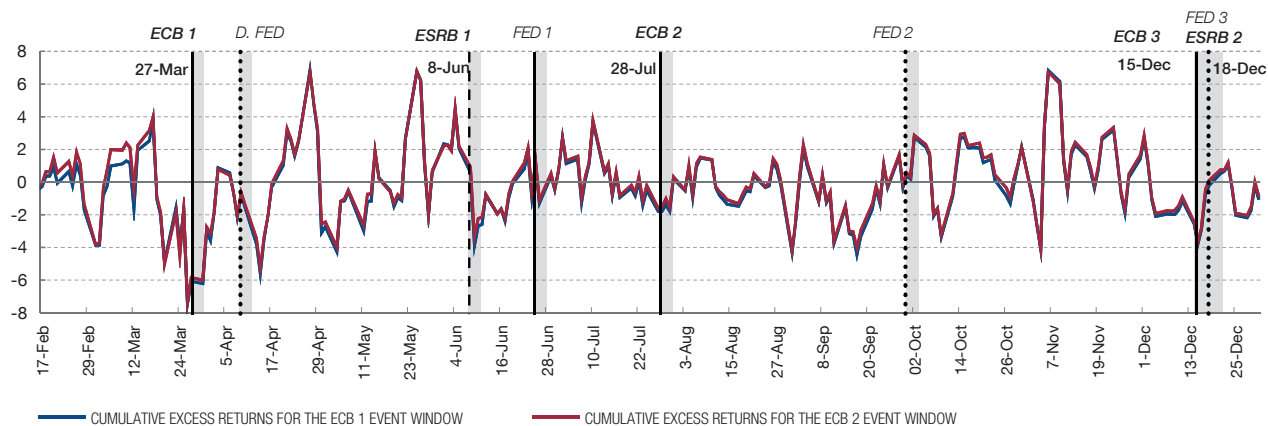
A first study is then conducted to verify whether the joint impact of the announcements on the market was relevant, through a dummy variable analysis on the panel of daily excess returns in 2020 estimated for each bank (see Table 1). In the analysis, variables d_event_eur and d_event_US take the value 1 on the days of the payout restriction announcements and on the following two days (t^* , t^*+1 , t^*+2). If these variables are statistically significant, they would indicate that the set of events analysed in the jurisdiction had a differential effect in days (t^* , t^*+1 , t^*+2), compared with the rest of the trading days in 2020. The possibility that some of the individual events do not have a significant impact is not studied here. Variable d_jurisd takes the value 1 if the institution is in the United States and shows the existence of differential effects between jurisdictions. The Driscoll-Kraay (1998) estimator is used, which makes it possible to correct for the cross-sectional correlation bias that often occurs in daily series of market variables.

Specification (1a) shows evidence that the European authorities' announcements had a negative joint impact on the excess returns of the banks in this jurisdiction, as there is a significant negative differential effect on variable d_event_eur . Specification (2a) extends the sample to include the US banks and finds that their excess returns were also negative on the dates of the European policy announcements. Although the excess returns of the banks in the US jurisdiction were larger than those of the European banks, the difference is not significant. The remaining specifications, which take into account the Fed's announcements of restrictions, do not yield significant results or differential effects between both jurisdictions. However, this methodology is agnostic as to the causes of the deviations detected and there may be heterogeneity across events and institutions. Thus, the following sections compare the impact for each event and for different sub-samples of banks.

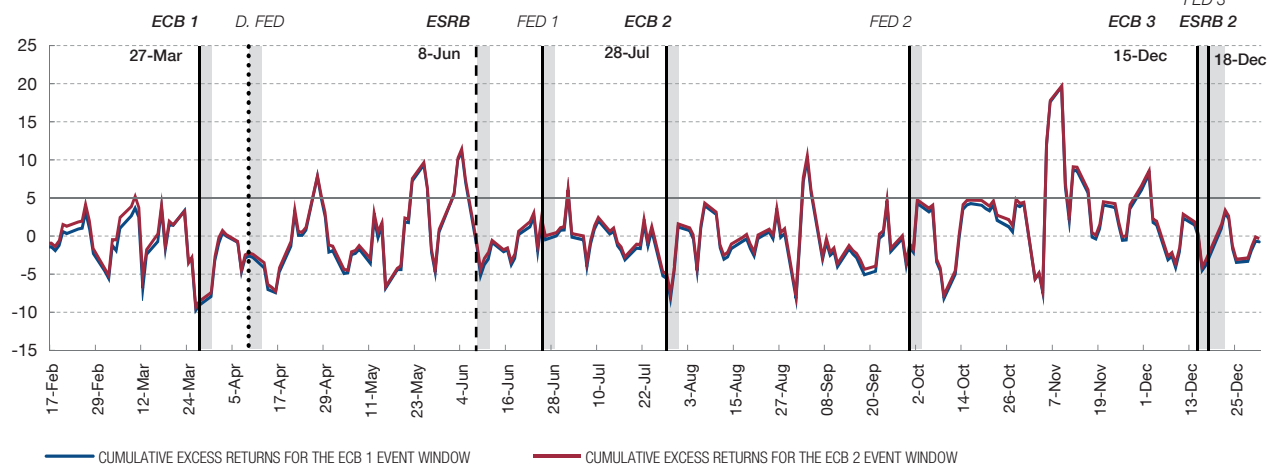
Chart 2

CUMULATIVE EXCESS RETURNS IN THREE-DAY WINDOWS

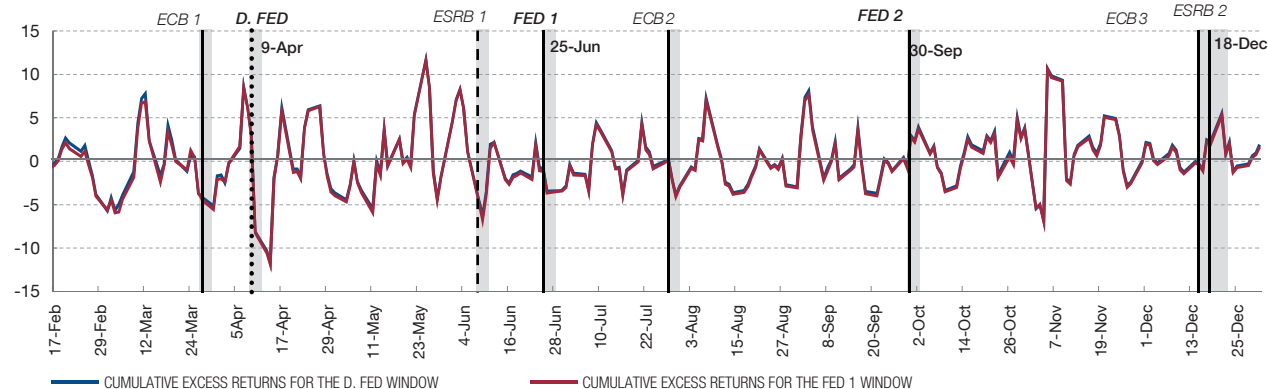
1 EUROPEAN BANKS



2 SPANISH BANKS



3 US BANKS



SOURCE: Datastream and Banco de España.

NOTES: Excess returns weighted by each bank's market value. In particular, the estimated cumulative excess returns for various 200-day windows are shown (the windows spanning from t^*-210 to t^*-11 for events ECB 1 and ECB 2 in the charts for European and Spanish banks and the windows spanning from t^*-210 to t^*-11 for events D. FED and FED 1 in the chart for US banks). The continuous vertical lines indicate the dates of the ECB announcements, the dotted vertical lines indicate the Federal Reserve's announcements and signals to the market and the dashed lines indicate the ESRB announcements. Events FED 3 and ESRB 2 occurred at the same time. The shaded areas cover the period of the day of the event and the two subsequent days.

Table 1

JOINT IMPACT OF THE ANNOUNCEMENTS

	Announcements by the European authorities		Announcements by the US authorities	
	Sample of European banks	Entire sample	Sample of US banks	Entire sample
	(1a)	(2a)	(1b)	(2b)
d_event_eur	-0.770** (0.365)	-0.770** (0.365)		
d_event_EEUU			0.473 (0.445)	0.006 (0.226)
d_jurisd.		0.013 (0.102)		0.003 (0.099)
d_event_eur · d_jurisd.		0.113 (0.465)		
d_event_EEUU · d_jurisd.				0.468 (0.416)
Constant	0.057 (0.092)	0.057 (0.092)	0.015 (0.134)	0.012 (0.098)
No. of banks	49	98	49	98
No. of observations	12.838	25.546	12.708	25.546

SOURCE: Banco de España.

NOTE: The estimations in (1a) and (1b) correspond to models $AR_t = \theta_t + p \cdot d_event_eur_t + \varepsilon_t$ and $AR_t = \theta_t + p \cdot d_event_EEUU_t + \varepsilon_t$, respectively. The variables are the excess returns (AR_t), a dummy for European events ($d_event_eur_t$), a dummy for US events ($d_event_EEUU_t$) and the residual of the model (ε_t). For (2a) and (2b) the estimates correspond to specifications $AR_t = \theta_t + p \cdot d_event_eur_t + \delta \cdot d_jurisd_t + \rho \cdot d_event_eur_t \cdot d_jurisd_t + \varepsilon_t$ and $AR_t = \theta_t + p \cdot d_event_EEUU_t + \delta \cdot d_jurisd_t + \rho \cdot d_event_EEUU_t \cdot d_jurisd_t$. Variable d_jurisd_t takes the value 1 for US banks. The estimation period is 2020. Robust standard errors in brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

4 Significance of excess returns in different bank sub-samples and explanatory factors

In order to analyse whether market reactions around the dates of each of the events were significant, the Kolari-Pynnönen (2010) test is used for different sub-samples of European and US banks (see Section 4.1). Lastly, the factors explaining the excess returns surrounding each significant event identified are analysed (see Section 4.2).

4.1 Kolari-Pynnönen test for excess returns

The Kolari-Pynnönen (2010) test shown below compares the null hypothesis of a zero value²¹ for cumulative and standardised returns surrounding each event, corrected by the average cross-correlation of banks' excess returns:²²

21 Note that the significance of the dummy variables in Table 1 indicate the existence of differential effects on days (t^* , t^*+1 , t^*+2) for all the events as a whole relative to other trading days, or differential effects between jurisdictions, in the panel of excess returns in 2020. Conversely, the Kolari-Pynnönen (2010) test is used to determine whether the excess returns were significantly different from zero for each group of banks around each event.

22 This correction is applied to prevent bias in the test results due to the common movements of banks' excess returns.

Table 2

**EVENT STUDY - [T*, T*+2] WINDOW: KOLARI-PYNNÖNEN (2010) TEST.
FIRST ANNOUNCEMENTS AND STATEMENTS**

		<i>ECB 1</i>	<i>ESRB 1</i>	<i>FED 1</i>	<i>D. FED</i>
		ECB announcement 27 March 2020	ESRB announcement 8 June 2020	FED announcement 25 June 2020	J. Powell speech 9 April 2020
Euro area banks	Full sample (37 banks)	-1.613 <i>±2.028</i>	0.304 <i>±2.028</i>	0.324 <i>±2.028</i>	-0.283 <i>±2.028</i>
	P/B > median P/B	-2.338 <i>±2.11</i>	-0.115 <i>±2.11</i>	0.930 <i>±2.11</i>	0.085 <i>±2.11</i>
	P/B < median P/B	-0.979 <i>±2.101</i>	0.709 <i>±2.101</i>	0.066 <i>±2.101</i>	-0.858 <i>±2.101</i>
	Excluding Greek banks	-2.336 <i>±2.037</i>	0.160 <i>±2.037</i>	1.255 <i>±2.037</i>	-0.090 <i>±2.037</i>
	Spanish banks	-1.808 <i>±2.365</i>	0.149 <i>±2.365</i>	1.031 <i>±2.365</i>	-0.214 <i>±2.365</i>
European banks	Full sample (49 banks)	-1.776 <i>±2.011</i>	0.417 <i>±2.011</i>	0.387 <i>±2.011</i>	0.022 <i>±2.011</i>
	Excluding Greek banks	-2.352 <i>±2.015</i>	0.309 <i>±2.015</i>	1.222 <i>±2.015</i>	0.180 <i>±2.015</i>
US banks	Full sample (49 banks)	-1.219 <i>±2.011</i>	-3.446 <i>±2.011</i>	0.165 <i>±2.011</i>	1.164 <i>±2.011</i>
	Subject to the restriction	-1.129 <i>±2.093</i>	-3.952 <i>±2.093</i>	-0.620 <i>±2.093</i>	1.887 <i>±2.093</i>
	Not subject to the restriction	-1.207 <i>±2.048</i>	-2.997 <i>±2.048</i>	0.969 <i>±2.048</i>	0.836 <i>±2.048</i>

SOURCE: Banco de España.

NOTES: For each event and bank group, the statistic (above) and its critical level (below and in italics) are shown for a significance of $\alpha = 5\%$ (since this is a two-tailed test, the critical values correspond to $\alpha/2 = 2.5\%$). Significant results are shown in bold.

$$t_{KP} = \frac{\overline{era}}{\sigma_{era} \sqrt{\frac{1+(n-1)\bar{r}}{n}}} \quad [2]$$

where \overline{era} is the average (in the cross-section) of the cumulative excess returns in the event window, considering the day of the event and the two subsequent trading days [t*, t*+2]. As proof of robustness in view of the fact that markets may have anticipated the announcements, the Annex (see Tables A.2 and A.3) shows the results including the two previous days, giving rise to five-day windows [t*-2, t*+2]. The statistic also takes the following into account: n, number of banks in the sample; σ_{era} , standard deviation of the cumulative excess returns; and \bar{r} , average cross-correlation of banks' excess returns in the period [t*-210, t*-11].

The results of Table 2 show that excess returns are negative in the *ECB 1* event for all bank groups, but they are only statistically significant for the euro area in the group of

banks with a high price-to-book (P/B) ratio or after excluding the Greek banks. This result for banks in the euro area based on their P/B ratio is unexpected a priori, since banks with a lower P/B ratio tend to pay out more dividends²³ (Gambacorta et al. (2020)) and, therefore, it could be expected that their stock market price would be more affected.

However, the banks with the highest P/B ratio in the European sample are generally the largest ones, which, in turn, suffered a greater stock market price correction.²⁴ The sample of European banks with the lowest P/B ratio includes the Greek banks, whose valuation in these event dates was affected by favourable news for them. In particular, the dates surrounding the *ECB 1* event coincide with the ECB's announcement on 18 March 2020²⁵ of the launch of the purchase programme to alleviate the effects of the COVID-19 crisis, which grants a waiver of the eligibility requirements for Greek sovereign bonds under this programme. Chart A.1 shows Greek banks' stock prices, which started to perform favourably in the second half of March. Other events that could have positively affected Greek banks' market valuation were the news about the first transfers of securitised NPLs within the Hercules Asset Protection Scheme (HAPS).

The first announcements of the ESRB (event *ESRB 1*) and of the Federal Reserve (event *FED 1*) were not significant in their respective jurisdictions,²⁶ nor is a significant positive reaction observed in the US markets with regard to the optimistic statements of the contrasting event (event *D. FED*). The significantly negative excess returns of US banks in the *ESRB 1* event could be reflecting a negative market sentiment following the publication of the Federal Reserve's less favourable macroeconomic outlook (10 June 2020). Also, as seen in Table A.2, which considers five-day windows around the events, the impact of other information can be substantial, as in the case of the announcement of the extension of the PEPP for the euro area and of the Paycheck Protection Program²⁷ for the United States.

23 When the stock market valuation is substantially lower than book value, shareholders may have incentives to increase their dividends to extract value from the bank; therefore, it is to be expected that banks with low P/B values would be more affected by the dividend payout restriction. The literature also notes the signalling mechanism whereby the distribution of dividends at banks with a lower P/B ratio is an indication of financial health or future growth opportunities (see Forti and Schiozer (2015)).

24 This result is consistent with the European Systemic Risk Board (2020) study, which reveals a negative differential impact for banks with a greater asset volume.

25 See [ECB press release](#) of 18 March 2020, on the announcement of a pandemic emergency purchase programme (PEPP).

26 In the *FED 1* event, the value of the statistic is negative for the US banks of the sample that are subject to the restriction, but positive for the other US banks. However, the impact is not statistically significant in either case. The impact has also been analysed by differentiating US banks with a P/B value above and below the median, with no significant effects having been found (the results are not shown but are available from the authors upon request). This test does not directly analyse whether the excess return differences between different groups of banks are statistically significant; it analyses whether the excess returns in each bank group are statistically different from zero. When no bank group differs from zero, this provides some evidence that there are no differences between them. Using a dif-in-dif methodology between banks subject to the restriction and other firms, Kroen (2022) estimates a negative differential effect for banks. In our study, excess returns use, by construction, the differences between each group of banks analysed and the set of firms in the market index, which are the control group.

27 See US Small Business Administration (SBA) [press release](#) of 3 April 2020, on the announcement of the launch of the SBA's Paycheck Protection Program for Small Businesses Affected by the Coronavirus Pandemic.

Table 3

**EVENT STUDY - [T*, T*+2] WINDOW: KOLARI-PYNNÖNEN (2010) TEST.
EXTENSION OF THE RESTRICTIONS**

		<i>ECB 2</i>	<i>FED 2</i>	<i>ECB 3</i>	<i>FED 3 and ESRB 2</i>
		ECB announcement 28 de July 2020	FED announcement 30 September 2020	ECB announcement 15 December 2020	FED and ESRB announcements 18 December 2020
Euro area banks	Full sample (37 banks)	-0.940 <i>±2.028</i>	0.030 <i>±2.028</i>	-0.971 <i>±2.028</i>	-1.588 <i>±2.028</i>
	P/B > median P/B	-1.795 <i>±2.11</i>	-0.098 <i>±2.11</i>	-1.145 <i>±2.11</i>	-1.459 <i>±2.11</i>
	P/B < median P/B	-0.457 <i>±2.101</i>	0.094 <i>±2.101</i>	-0.795 <i>±2.101</i>	-1.740 <i>±2.101</i>
	Excluding Greek banks	-0.836 <i>±2.037</i>	0.154 <i>±2.037</i>	-0.987 <i>±2.037</i>	-1.530 <i>±2.037</i>
	Spanish banks				
	Full sample (8 banks)	-0.121 <i>±2.365</i>	-0.214 <i>±2.365</i>	-0.165 <i>±2.365</i>	-2.306 <i>±2.365</i>
European banks	Full sample (49 banks)	-1.115 <i>±2.011</i>	0.293 <i>±2.011</i>	-1.165 <i>±2.011</i>	-0.909 <i>±2.011</i>
	Excluding Greek banks	-1.025 <i>±2.015</i>	0.412 <i>±2.015</i>	-1.175 <i>±2.015</i>	-0.812 <i>±2.015</i>
US banks	Full sample (49 banks)	0.599 <i>±2.011</i>	2.256 <i>±2.011</i>	-0.639 <i>±2.011</i>	-0.154 <i>±2.011</i>
	Subject to the restriction	0.337 <i>±2.093</i>	1.943 <i>±2.093</i>	-0.777 <i>±2.093</i>	0.503 <i>±2.093</i>
	Not subject to the restriction	0.727 <i>±2.093</i>	2.516 <i>±2.093</i>	-0.562 <i>±2.093</i>	-0.571 <i>±2.093</i>

SOURCE: Banco de España.

NOTES: For each event and bank group, the statistic (above) and its critical level (below and in italics) are shown for a significance of $\alpha = 5\%$ (since this is a two-tailed test, the critical values correspond to $\alpha/2 = 2.5\%$). Significant results are shown in bold.

As regards the subsequent announcements on the extension of restrictions, no significant results are observed overall (see Table 3). Of note is the market volatility in the last week of December 2020, since day t^*+2 of the *ESRB 2* and *FED 3* events (22 December) was the first trading day following the approval of the Pfizer vaccine in the European Union, and European bank excess returns generally became positive. The significantly positive excess returns in the *FED 2* event were probably due to the Federal Reserve's announcement on 1 October of the extension of temporary measures aimed at increasing the availability of intraday credit/liquidity for banks under its jurisdiction.²⁸

The announcements of payout restrictions in March, April and June 2020 (first announcements, see Table 2), which appear as significant, coincided with the arrival

²⁸ See Federal Reserve [press release](#) of 1 October 2020, on the extension of temporary actions aimed at increasing the availability of intraday credit extended by Federal Reserve banks.

of fresh information on the unfolding of the crisis, which may have prevailed over the informative content of the announcements themselves. Although subsequent events (see Table 3) might have had less interference from other important information for the market, they may also have been more easily anticipated by the markets, and no significant reaction is observed.

4.2 Determinants of excess returns

The results of the Kolari-Pynnönen (2010) test suggest that there is heterogeneity in the excess returns of the different sub-samples, particularly in the case of European banks. These differences are explored in this second phase of the analysis, examining the correlation with possible determinants of the three-day window cumulative excess returns surrounding each event for individual banks. In particular, excess returns are used as the dependent variable of cross-sectional regressions, using the variability of reactions between banks to analyse their correlation with bank characteristics. The explanatory factors included in the regressions to reflect the characteristics of each bank are: ROE, CET1 capital ratio, dividend yield (dividend per share over 12 months/share price) and total assets.²⁹

Explanatory factors generally relate to the quarter prior to that of the event to be analysed. This is because such variables are constructed using data from the income statements published at the end of each quarter, which are not known by the market during the event quarter. For instance, for the *ECB 1* event of 27 March 2020, the explanatory variables used refer to 2019 Q4, for the *FED1* and the *ESRB 1* events of 25 June 2020 and 8 June 2020, respectively, they refer to 2020 Q1 and for the event of 9 April 2020, they refer to 2019 Q4, since the 2020 Q1 data had not yet been published at that date. Table 4 shows the most significant results, which are obtained for the *ECB 1* event's three-day window cumulative excess returns $[t^*, t^* + 2]$.³⁰

The results reveal that European banks' excess returns have a negative (and generally significant) correlation with bank size, which is in line with the findings of previous papers (see Andreeva (2021) and Hardy (2021)). The results also indicate that the markets valued bank solvency in the *ECB 1* event positively (the coefficient of the CET1 capital ratio is positive and significant). Table 4 also shows the differential effect for Spanish banks (specification 2) and takes into account whether the decision to make distributions out of 2019 earnings had already been approved in their respective General Meetings³¹ (specification 3). However, this separation of Spanish

29 The P/B ratio has been analysed but has not been included in the regression shown because there is substantial collinearity with ROE. This is because the price in the P/B ratio reflects the market perception of future profitability.

30 The explanatory variables are more correlated with excess returns and more statistically significant when the returns are accumulated for the three-day window ($t, t + 2$ days). The Annex shows the results using the five-day window around the *ECB 1* event.

31 Significant institutions eliminated the interim dividend out of 2020 earnings.

Table 4

EXPLANATORY FACTORS FOR THE CUMULATIVE EXCESS RETURNS IN THE THREE-DAY WINDOW FOLLOWING EVENT ECB 1 [T*, T*+2]

Variables	European banks, excluding Greek banks			US banks
	(1)	(2) + ES dummy	(3) +ES dummy payout restrictions	(4)
ROE	-0.265 (0.160)	-0.276* (0.159)	-0.286* (0.165)	-1.324 (1.264)
CET1 ratio	0.707* (0.406)	0.860* (0.460)	0.869* (0.469)	0.541* (0.271)
Dividend yield	0.022 (0.347)	-0.012 (0.366)	-0.021 (0.369)	-0.191 (0.518)
Log. Total assets	-1.894*** (0.645)	-1.701** (0.649)	-1.754** (0.647)	-0.278 (0.400)
ES dummy		1.873 (2.067)		
Interaction ES* dummy no payout restrictions			1.428 (2.356)	
Interaction ES* dummy payout restrictions			3.213 (2.086)	
Constant	19.320 (16.450)	13.160 (17.190)	14.100 (17.180)	-1.117 (7.170)
Observations	45	45	45	49
R ²	0.360	0.373	0.376	0.056

SOURCE: Banco de España.

NOTES: Event *ECB 1* corresponds to the first ECB announcement on payout restrictions (March 2020). Robust standard errors within brackets. *** p<0.01. ** p<0.05. * p<0.10.

banks does not show significant differential effects. Nor are significant effects observed with regard to other events.

5 Conclusions

The impact on the market of the bank payout recommendations and restrictions was significantly negative only in specific sub-samples of European banks, in response to the ECB's first announcement of restrictions in March 2020. Following that first event, European banks' excess returns showed no significant reactions around the dates of the subsequent announcements extending those measures. The impacts of the Federal Reserve's announcements of restrictions were not significant for US banks' excess returns either. The results obtained from the cross-sectional analysis confirm that there is heterogeneity across banks, particularly in response to the

ECB's first announcement of restrictions, whose effect was most significant for the excess returns of larger banks and banks with lower capital levels.

The results of the analysis suggest that the impact of these events, compared with others, was not large enough to dominate the changes in banks' stock market value during the most acute phase of the COVID-19 crisis in 2020. As detailed throughout this paper, other equally or more important information available around the time of the events could have had a greater impact on the market than the events themselves. In this connection, the negative impact of the ECB's first announcement is only identified after excluding Greek banks, which were affected by the optimistic sentiment following the ECB's announcement of the launch of the pandemic emergency purchase programme or the news on the start of the HAPS.

It is important to note that the limited impact of the payout restrictions on banks' stock market prices in 2020 is reasonably associated with this being a temporary measure, with the announcement of this limited temporary extension being plausible for the markets and with it being part of a broad set of economic policy support measures. These results are thus useful to measure the costs of these types of measures in terms of banks' stock market value in an extraordinary crisis situation. However, announcements of related more recurrent measures, disconnected from other economic policy actions, could have a different impact and would require a specific analysis to estimate their differential effects with respect to the experience during the COVID-19 crisis.

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Table A.1

INDEX OF MAJOR BANKS' STOCK PRICES

1.1.2020 = 100

		European banks	Spanish banks	US banks
ECB 1 ECB announcement of 27 March 2020	25-Mar	86.2	65.2	64.9
	26-Mar	84.3	65.2	69.1
	27-Mar	80.0	61.5	65.4
	30-Mar	79.7	58.5	66.5
	31-Mar	79.2	58.8	64.2
ECB 2 ECB announcement of 28 July 2020	24-Jul	75.6	63.4	75.3
	27-Jul	74.3	61.5	74.9
	28-Jul	74.5	62.2	74.7
	29-Jul	75.7	59.9	76.1
	30-Jul	73.2	56.3	74.5
ECB 3 ECB announcement of 15 December 2020	11-Dec	78.6	76.3	92.7
	14-Dec	79.2	77.6	91.8
	15-Dec	77.4	79.5	93.5
	16-Dec	76.4	78.7	94.0
	17-Dec	75.6	78.9	94.0
ESRB 1 ESRB announcement of 8 June 2020	4-Jun	76.2	64.3	80.9
	5-Jun	78.6	70.8	83.7
	8-Jun	79.2	71.7	85.1
	9-Jun	77.1	69.4	83.3
	10-Jun	76.9	67.4	80.1
FED 1 FED announcement of 25 June 2020	23-Jun	73.5	64.1	75.5
	24-Jun	72.2	61.2	72.9
	25-Jun	73.1	62.3	75.4
	26-Jun	71.9	60.7	71.0
	29-Jun	73.3	62.6	71.8
FED 2 FED announcement of 30 September 2020	28-Sep	66.7	50.4	73.9
	29-Sep	65.7	48.6	73.2
	30-Sep	66.2	49.0	74.3
	1-Oct	66.9	48.3	74.4
	2-Oct	67.2	48.2	75.1
FED 3 - ESRB 2 FED and ESRB announcements of 18 December 2020	16-Dec	76.4	78.7	94.0
	17-Dec	75.6	78.9	94.0
	18-Dec	75.6	77.3	93.2
	21-Dec	74.9	73.8	96.6
	22-Dec	75.1	75.8	95.2
D. FED J. Powell's statement of 9 April 2020	7-Apr	74.8	59.4	65.9
	8-Apr	74.0	59.3	68.9
	9-Apr	75.2	59.3	73.6
	10-Apr	75.2	59.3	73.6
	13-Apr	75.2	59.3	70.7

SOURCE: Banco de España.

NOTE: Stock price index weighted by each bank's market value.

Table A.2

**EVENT STUDY - [T*-2, T*+2] WINDOW: KOLARI-PYNNÖNEN (2010) TEST.
FIRST ANNOUNCEMENTS AND STATEMENTS**

		Event 1	Event 5	Event 3	Event 4
		<i>ECB 1</i>	<i>ESRB 1</i>	<i>FED 1</i>	<i>D. FED</i>
		ECB announcement 27 March 2020	ESRB announcement 8 June 2020	FED announcement 25 June 2020	J. Powell speech 9 April 2020
Euro area banks	Full sample (37 banks)	-1.379	2.700	0.747	0.588
		<i>±2.028</i>	<i>±2.028</i>	<i>±2.028</i>	<i>±2.028</i>
	P/B > median P/B	-2.078	2.327	1.045	0.539
		<i>±2.11</i>	<i>±2.11</i>	<i>±2.11</i>	<i>±2.11</i>
	P/B < median P/B	-0.838	2.844	0.530	0.541
		<i>±2.101</i>	<i>±2.101</i>	<i>±2.101</i>	<i>±2.101</i>
Excluding Greek banks		-2.365	2.481	1.327	0.389
		<i>±2.037</i>	<i>±2.037</i>	<i>±2.037</i>	<i>±2.037</i>
Spanish banks	Full sample (8 banks)	-1.540	2.472	1.154	0.225
		<i>±2.365</i>	<i>±2.365</i>	<i>±2.365</i>	<i>±2.365</i>
European banks	Full sample (49 banks)	-1.469	2.614	0.927	0.670
		<i>±2.011</i>	<i>±2.011</i>	<i>±2.011</i>	<i>±2.011</i>
	Excluding Greek banks	-2.226	2.442	1.512	0.505
		<i>±2.015</i>	<i>±2.015</i>	<i>±2.015</i>	<i>±2.015</i>
US banks	Full sample (49 banks)	-0.787	0.553	-0.912	2.504
		<i>±2.011</i>	<i>±2.011</i>	<i>±2.011</i>	<i>±2.011</i>
	Subject to the restriction	-1.144	0.234	-0.853	2.163
		<i>±2.093</i>	<i>±2.093</i>	<i>±2.093</i>	<i>±2.093</i>
	Not subject to the restriction	-0.615	0.704	-0.933	2.513
		<i>±2.048</i>	<i>±2.048</i>	<i>±2.048</i>	

SOURCE: Banco de España.

NOTES: For each event and bank group, the statistic (above) and its critical level (below and in italics) are shown for a significance of $\alpha = 5\%$ (since this is a two-tailed test, the critical values correspond to $\alpha/2 = 2.5\%$). Significant results are shown in bold.

The results are consistent with those obtained for the three-day window. However, the results of the test for the *ESRB 1* event in the five-day window shown in this annex are likely due to other relevant information for the institutions published in the days leading up to the event. In particular, these results could be reflecting the ECB's announcement on 4 June 2020 of the extension of the PEPP and the relative underperformance of other sectors in the stock market following the macroeconomic scenario review. The significant reactions to event *D. FED* are probably due to the announcement of the launch of the Paycheck Protection Program on 3 April, several days prior to J. Powell's statement.

Table A.3

**EVENT STUDY – [T*-2, T*+2] WINDOW: KOLARI-PYNNÖNEN (2010) TEST.
EXTENSION OF THE RESTRICTIONS**

		<i>ECB 2</i>	<i>FED 2</i>	<i>BCE 3</i>	<i>FED 3 and ESRB 2</i>
		ECB announcement 28 de July 2020	FED announcement 30 September 2020	ECB announcement 15 December 2020	FED and ESRB announcements 18 December 2020
Euro area banks	Full sample (37 banks)	-1.229 <i>±2.028</i>	-0.346 <i>±2.028</i>	-0.604 <i>±2.028</i>	-2.681 <i>±2.028</i>
	P/B > median P/B	-2.022 <i>±2.11</i>	-0.347 <i>±2.11</i>	-1.101 <i>±2.11</i>	-3.119 <i>±2.11</i>
	P/B < median P/B	-0.881 <i>±2.101</i>	-0.324 <i>±2.101</i>	-0.308 <i>±2.101</i>	-2.462 <i>±2.101</i>
	Excluding Greek banks	-1.221 <i>±2.037</i>	-0.219 <i>±2.037</i>	-1.486 <i>±2.037</i>	-2.950 <i>±2.037</i>
Spanish banks	Full sample (8 banks)	-0.190 <i>±2.365</i>	-0.890 <i>±2.365</i>	-0.432 <i>±2.365</i>	-3.447 <i>±2.365</i>
	Excluding Greek banks	-1.361 <i>±2.015</i>	0.289 <i>±2.015</i>	-1.575 <i>±2.015</i>	-2.435 <i>±2.015</i>
European banks	Full sample (49 banks)	-1.365 <i>±2.011</i>	0.176 <i>±2.011</i>	-0.865 <i>±2.011</i>	-2.313 <i>±2.011</i>
	Excluding Greek banks	-1.361 <i>±2.015</i>	0.289 <i>±2.015</i>	-1.575 <i>±2.015</i>	-2.435 <i>±2.015</i>
US banks	Full sample (49 banks)	-0.259 <i>±2.011</i>	1.892 <i>±2.011</i>	-1.057 <i>±2.011</i>	-0.693 <i>±2.011</i>
	Subject to the restriction	-0.615 <i>±2.093</i>	1.721 <i>±2.093</i>	-2.320 <i>±2.093</i>	-0.182 <i>±2.093</i>
	Not subject to the restriction	-0.127 <i>±2.048</i>	2.190 <i>±2.048</i>	-0.615 <i>±2.048</i>	-1.067 <i>±2.048</i>

SOURCE: Banco de España.

NOTES: For each event and bank group, the statistic (above) and its critical level (below and in italics) are shown for a significance of $\alpha = 5\%$ (since this is a two-tailed test, the critical values correspond to $\alpha/2 = 2.5\%$). Significant results are shown in bold.

European banks' excess returns were significantly negative in the days around the extension of the restrictions recommended by the ESRB (event *ESRB 2*). However, the effect of this event is difficult to isolate, as the two previous days overlap with the ECB announcement of 15 December. Moreover, the result is blurred if only the day of the ESRB announcement and the two subsequent days, when the impact of the approval was strongest, are taken into account, as explained in Section 4.

Chart A.1

STOCK MARKET PRICE OF THE GREEK BANKS IN THE SAMPLE

SOURCE: Banco de España.

NOTE: Stock price indices weighted by each banks' market value.

Table A.4

EXPLANATORY FACTORS FOR THE CUMULATIVE EXCESS RETURNS IN THE FIVE-DAY WINDOW CENTRED AROUND EVENT ECB 1 [T*-2, T*+2]

	European banks, excluding Greek banks		US banks
	(1)	(2) + ES* dummy payout restrictions	(3)
ROE	0.056 (0.372)	0.054 (0.400)	-0.607 (1.413)
CET1_ratio	0.156 (0.552)	0.351 (0.667)	-0.239 (0.478)
Dividend yield	0.378 (0.518)	0.345 (0.532)	0.381 (0.635)
Log. total assets	-1.577** (0.705)	-1.243 (0.774)	-0.761* (0.424)
Interaction ES* dummy no payout restrictions		3.153 (2.690)	
Interaction ES* dummy payout restrictions		0.718 (2.847)	
Constant	18.140 (18.530)	8.477 (21.810)	14.480* (8.286)
Observations	45	45	49
R ²	0.098	0.118	0.093

SOURCE: Banco de España.

NOTES: Event *ECB 1* corresponds to the first ECB announcement on payout restrictions (March 2020). Robust standard errors in brackets. *** p<0.01. ** p<0.05. * p<0.10.